

# Working with crystalline silica substances

Guidance for PCBUs

**JULY 2024**



**safe work** australia

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**National guidance material**

Working with crystalline silica substances

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# 1. Introduction

## 1.1 Who should use this guide?

A [person conducting a business or undertaking](#) (PCBU) who has workers (including the PCBU) intending to carry out work that involves **processing** of a crystalline silica substance (CSS), including any permitted work with legacy engineered stone.

This guide will help a PCBU understand the additional work health and safety (WHS) requirements in relation to **processing** a CSS, from 1 September 2024, to protect workers and others at the workplace from exposure to respirable crystalline silica (RCS).

From 1 September 2024, there are additional requirements in relation to the **processing** of crystalline silica substances (CSS), which are materials that contain at least 1% crystalline silica. **Processing** in relation to a CSS means:

- a. the use of power tools or mechanical plant to carry out an activity involving the crushing, cutting, grinding, trimming, sanding, abrasive polishing or drilling of a CSS; or
- b. the use of roadheaders to excavate material that is a CSS; or
- c. the quarrying of a material that is a CSS; or
- d. mechanical screening involving a material that is a CSS; or
- e. tunnelling through a material that is a CSS; or
- f. a process that exposes, or is reasonably likely to expose, a person to respirable crystalline silica during the manufacture or handling of a CSS.

## 1.2 What is respirable crystalline silica?

Crystalline silica is the crystalline form of silicon dioxide and is a naturally occurring mineral that forms a major component of most rocks, soil, sand and clay. It is found in natural stones like granite and sandstone and is used to create manufactured products like bricks, pavers, concrete and tiles.

Crystalline silica is defined in the model WHS Regulations as crystalline polymorphs of silica, and it includes quartz, cristobalite, tridymite and Tripoli<sup>1</sup>.

Dust is often generated or present when undertaking activities with products or materials that contain crystalline silica, such as:

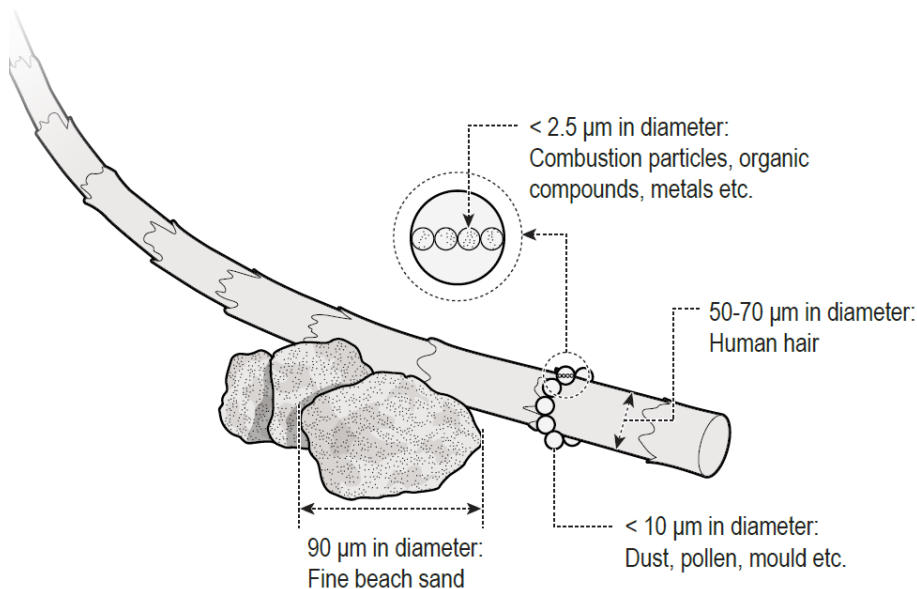
- during manufacturing and construction
- when mining, quarrying or tunnelling
- in waste from processing products containing silica, and
- in sand-based products.

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<sup>1</sup>Tripoli is a natural material that contains a high percentage of quartz

This dust contains crystalline silica in a range of particle sizes, from very small (less than 10 micrometres [ $\mu\text{m}$ ] in diameter) to larger particles that can be seen with the naked eye. Crystalline silica particles that are less than 10  $\mu\text{m}$  in diameter (Figure 1) are known as respirable crystalline silica (RCS). RCS is invisible under normal lighting or with the naked eye and stays airborne for long periods of time. When breathed in, RCS can travel deep into the lungs and cause damage.

**Figure 1 Dust particle sizes (Source: Mining and Quarrying Occupational Health and Safety Committee).**



Workers:

- fabricating, **processing**, installing, maintaining, demolishing, or removing CSS, or
- quarrying or tunnelling

without appropriate control measures in place may be exposed to high levels of RCS (for example through dust or mist clouds).

Workers can also be exposed to RCS from poor housekeeping methods that disturb accumulated dust on workplace surfaces, such as dry sweeping, using compressed air or high-pressure water cleaners and general-purpose vacuum cleaners not designed for use with hazardous dusts.

### 1.3 Health effects of RCS

In situ CSS (such as soil, rocks, natural and engineered stone, installed bricks, pavers, concrete and tiles) do not present a risk to health when left undisturbed. It is the RCS generated from **processing** these materials that has the potential to cause harm when it is breathed in. The higher the crystalline silica content of the material being processed, the greater the risk of exposure to RCS if the process is not controlled.

RCS is a significant health hazard for workers. A person is exposed to RCS whenever the RCS is airborne and the person can breathe it in. When airborne, workers can breathe RCS particles deep into their lungs where they can lead to a range of respiratory diseases, including:

- silicosis
- progressive massive fibrosis
- chronic obstructive pulmonary disease
- chronic bronchitis, and
- lung cancer.

RCS also increases the risk of developing chronic kidney disease, autoimmune disorders (such as scleroderma and systemic lupus erythematosus) and other adverse health effects, including an increased risk of activating latent tuberculosis, eye irritation and eye damage.

**Note:** Dust can be a problem in almost any industry. Whilst the hazards of RCS are well recognised, there are many more substances that when present in dusts are hazardous to health. Exposure to all dusts needs to be eliminated, and if it is not reasonably practicable to eliminate exposure, it must be minimised so far as is reasonably practicable.

## Silicosis

Silicosis is a serious, irreversible lung disease that causes permanent disability and can be fatal. When RCS comes into prolonged contact with lung tissue, it causes inflammation and scarring and reduces the lungs' ability to take in oxygen. Silicosis may continue to progress even after a worker stops being exposed to RCS. As the disease progresses, a worker may experience shortness of breath, a severe cough and general weakness. There are three types of silicosis based on the type of exposure and the effects on the lungs (Table 1).

**Table 1 Types of silicosis**

Silicosis type	Exposure type	Respiratory effects of exposure
Acute	Can develop after short-term and very high levels of RCS (less than one year, and after a few weeks).	Causes severe inflammation and protein accumulation in the lung.
Accelerated	Results from short term exposure to large amounts of RCS (1 to 10 years of exposure).	Causes inflammation, and protein accumulation and scarring in the lung (fibrotic nodules).
Chronic	Results from long term exposure (over 10 years of exposure) to low levels of RCS.	Causes scarring of the lung and shortness of breath.

Lung damage from RCS and symptoms of disease (such as shortness of breath, severe cough, and general weakness) may not appear for many years. Workers may not show any symptoms, even at the point of initial diagnosis. There is no cure for silicosis.

However, all silicosis and other silica-related diseases are preventable by using effective controls that eliminate or minimise the generation of, and exposure to, RCS at work.

## 1.4 How to use this guide

This guide is intended to supplement other information produced by Safe Work Australia to assist a PCBU to meet their duties and obligations under WHS laws.

It outlines the obligations of a PCBU as they are established in the model WHS laws. It addresses specific control measures required for the management of RCS, including how to identify whether the **processing** of a CSS is **high risk** and the additional obligations that are placed on a PCBU in those circumstances.

This guidance is relevant to all jurisdictions with harmonised WHS laws. Refer to your [WHS regulator](#) for information about how the regulations apply in your jurisdiction, including any Codes of Practice that may be in place.

This guide includes references to legal requirements in the WHS Act and WHS Regulations. These are included for convenience only and should not be relied on in place of the full text of the WHS Act or WHS Regulations. It is important that you fully understand your obligations related to crystalline silica substances by reading the regulations or seeking expert advice.

You should also read the following:

- [model Code of Practice: How to manage work health and safety risks](#)
- [model Code of Practice: Construction work](#)
- [model Code of Practice: Managing risks of hazardous chemicals in the workplace, and](#)
- [Engineered stone prohibition – Guidance for PCBUs](#)

In this guide, the word 'must' indicates a legal requirement that a PCBU is required to comply with. The word 'should' indicates a recommended course of action.

**Note:** A prohibition on the manufacture, supply, **processing** and installation of engineered stone benchtops, panels and slabs came into effect on 1 July 2024.

Under the WHS Regulations, there are limited exceptions to the prohibition that allow for work involving the **processing** of legacy engineered stone benchtops, panels and slabs. This includes:

- work involving the **processing** of installed engineered stone benchtops, panels and slabs for removal, repair and minor modification, and
- work involving the **processing** of engineered stone benchtops, panels or slabs (whether installed or not) for disposal (e.g., crushing a stockpile of engineered stone slab off-cuts for disposal at a waste management site).

Any **processing** of engineered stone benchtops, panels or slabs permitted as an exception to the engineered stone prohibition must be controlled and the PCBU must notify the relevant WHS regulator before carrying out the work.

From 1 September 2024, such permitted work with legacy engineered stone is also subject to the additional CSS requirements outlined in this guide. For further information on permitted work with legacy engineered stone, please see the [Engineered stone prohibition: Guidance for PCBUs](#).



## 2. Definitions

A full glossary of terms used throughout this guidance is available in Appendix A.

### 2.1 Crystalline silica substance (CSS)

The WHS Regulations define a CSS as a material containing at least 1% crystalline silica (by weight).

Examples of a CSS include, but are not limited to:

- natural stone products such as marble or granite benchtops
- engineered stone
- sintered stone
- porcelain and ceramic products
- sandstone
- asphalt
- cement products containing fly ash, mortar and grout
- bricks, blocks, pavers, tiles and mortar
- concrete and cement-based products, such as fibre-cement sheeting and autoclaved-aerated concrete
- most rocks, sands, and clays, and
- composite dental fillings.

PCBUs may confirm crystalline silica content in a product or substance by referring to the relevant safety data sheet. Where safety data sheets are not available, other information sources including product information or technical data sheets may be consulted.

### 2.2 Processing in relation to a CSS

The WHS Regulations define **processing** in relation to a CSS as:

- the use of power tools or mechanical plant to carry out an activity involving the crushing, cutting, grinding, trimming, sanding, abrasive polishing or drilling of a CSS
- the use of roadheaders involving material that is a CSS
- quarrying involving material that is a CSS
- mechanical screening involving material that is a CSS
- tunnelling involving material that is a CSS, or
- a process that exposes, or is reasonably likely to expose, a person to RCS during manufacture or handling of a CSS (for example cleaning and maintenance processes such as sweeping that may disturb settled RCS)

This definition is designed to capture all activity with a CSS that has the potential to generate and expose workers or others at the workplace to RCS.

## 2.3 High risk in relation to the processing of a CSS

The WHS Regulations define **high risk**, in relation to the **processing** of a CSS, as the **processing** of a CSS that is reasonably likely to result in a risk to the health of a person at the workplace.

**Note:** Additionally, *high risk* in this context is different to 'high' risk in the context of a general risk assessment or that may be referred to in other Codes or Guides.

See Part 4 of this guide for more information on how to identify **processing** of a CSS that is **high risk**.

## 2.4 Respiratory protective equipment

For the purposes of the regulations regarding **processing** of a CSS, respiratory protective equipment means personal protective equipment that is designed to prevent a person wearing the equipment from inhaling airborne contaminants. Further, the respiratory protective equipment must comply with:

- AS/NZS 1716:2012 (Respiratory protective devices), and
- AS/NZS 1715:2009 (Selection, use and maintenance of respiratory protective equipment).

AS/NZS 1716:2012 provides information to manufacturers, suppliers, PCBUs and users by setting out performance requirements for different types of respiratory protective equipment. To ensure compliance with this standard, employers should buy their respiratory protective equipment from a reputable supplier and ensure that it is certified to this standard.

Under AS/NZS 1715:2009:

- The respiratory protective equipment must incorporate a particulate filter (P1, P2 or P3 - dependent on the type of respiratory protective equipment selected and the level of airborne contamination present).
- Where tight fitting respiratory protective equipment is used:
  - the respiratory protective equipment must be successfully fit-tested to the wearer by a competent person before use,
  - a further fit test should be performed at least annually or whenever there is a change in the wearer's facial characteristics or other features which may affect the facial seal of the respiratory protective equipment, and
  - there can be no facial hair where the mask seals to the face (during fit testing or when wearing respiratory protective equipment).

Fit testing assesses the amount of leakage between the respirator facepiece and the wearer's face. If there isn't a good seal, contaminated air will leak into the respirator and the worker may not get the level of protection that is needed to protect their health. It must be undertaken by people who have been appropriately trained. Further information about respiratory protective equipment is provided in Appendix F.

You should refer to your [WHS regulator](#) for further information about the correct use of personal protective equipment, including respiratory protective equipment.

**Note:** Regulations 44,45 and 46 relating to the duties of PCBUs, workers and persons other than a worker in relation to personal protective equipment also apply.

## 3. Who has health and safety duties?

Duty holders with a role in managing risks in the workplace include:

- PCBUs
- officers
- designers, manufacturers, importers, suppliers
- workers, and
- other persons in the workplace.

A person can have more than one duty and more than one person can have the same duty at the same time.

### 3.1 Persons conducting a business or undertaking (PCBU)

#### Primary duty of care

**WHS Act section 19**  
Primary duty of care

PCBUs have the primary duty of care for the health and safety of their workers and others at the workplace.

A PCBU can be a:

- company,
- unincorporated body or association, or
- self-employed person.

If a business or undertaking is being conducted by a partnership, each of the partners is individually a PCBU.

A PCBU must ensure, so far as is reasonably practicable, the health and safety of workers at work and ensure that the health and safety of other people is not put at risk from the work carried out by the business or undertaking.

This duty requires the PCBU to manage risks by eliminating health and safety risks so far as reasonably practicable, and if it is not reasonably practicable to eliminate the risks, by minimising those risks so far as is reasonably practicable.

A PCBU also has a range of more specific obligations to manage various health and safety risks, which are set out in the WHS Regulations.

## Management of risks

### **WHS Act section 17**

#### Management of risks

A PCBU must ensure that any risks to the health and safety of workers are eliminated, so far as is reasonably practicable. If elimination is not reasonably practicable, the risks must be minimised so far as is reasonably practicable.

This includes, but is not limited to, eliminating or minimising the risks of exposure to RCS when working with a CSS.

There may be other hazards associated with working with a CSS. For example, exposure to other hazardous chemicals, cuts or lacerations from tools, or noise exposure from cutting equipment. As a PCBU, you must manage all risks in the workplace, not just those associated with exposure to RCS. You must also make sure that when you are managing the risks of exposure to RCS that you are not introducing other hazards to the workplace or not fulfilling your WHS duties to manage risks from other hazards.

Risk management is a proactive, systematic process that helps a PCBU plan and respond to potential hazards and their associated risks in the workplace.

Further information on the risk management process is in the [Code of Practice: How to manage work health and safety risks](#).

## 3.2 Officers

### **WHS Act section 27**

#### Duties of officers

An officer (for example, a company director) must exercise due diligence to ensure the PCBU complies with the WHS Act and WHS Regulations. This includes taking reasonable steps to ensure the PCBU has and uses appropriate resources and processes to eliminate or minimise risks of working with a CSS.

## 3.3 Principal contractors

### **WHS Regulations 308-315**

#### Additional duties of principal contractors

Under the WHS Regulations, each construction project (being a project involving construction where the cost is \$250,000 or more) has a principal contractor. There can only be one principal contractor for a construction project at any one time.

The PCBU who commissions a construction project is the principal contractor for that project, unless they engage another PCBU to be the principal contractor for the project. The PCBU who commissions the construction project must authorise the nominated principal contractor to have management or control of the workplace and discharge the duties of the principal contractor.

A person with management or control of a workplace has additional duties in section 20 of the WHS Act.

In addition to the primary duties that a principal contractor has as a PCBU, the principal contractor has further duties relating to the construction work including preparing WHS management plans, ensuring general WHS compliance, and managing specific risks.

## 3.4 Designers, manufacturers, importers, suppliers

### Upstream duties

**WHS Act section 22**

Duties of PCBUs that design plant, substances or structures

**WHS Act section 23**

Duties of PCBUs that manufacture plant, substances or structures

**WHS Act section 24**

Duties of PCBUs that import plant, substances or structures

**WHS Act section 25**

Duties of PCBUs that supply plant, substances or structures

**WHS Act section 26**

Duty of PCBUs that install, construct or commission plant or structures

A designer, manufacturer, importer or supplier of a CSS must ensure, so far as is reasonably practicable, that the CSS they design, manufacture, import or supply is without risk to health and safety. These duties are often referred to as 'upstream duties' because they apply to PCBUs that, as designers, manufacturers, importers and suppliers, are higher up in the supply chain and can therefore potentially impact those who use the products they deal with 'downstream' in the supply chain or later in the lifecycle of the products.

Discharging upstream duties may require the designers, manufacturers, importers or suppliers of the CSS to carry out, or arrange for, calculations, analysis, testing or examination of the CSS to demonstrate it can be worked with without risks to health and safety.

Further, designers, manufacturers, importers or suppliers of a CSS must, so far as is reasonably practicable, give current relevant information to downstream users of the CSS about:

- the purpose for which the CSS was designed or manufactured
- the results of any calculations, analysis, testing or examination in relation to the CSS, including any hazardous properties identified by testing, and
- any conditions necessary to ensure that the CSS is without risks to health and safety when used for a purpose for which it was designed or manufactured.

A designer, manufacturer, importer or supplier may provide the above information using a label, product information sheet or safety data sheet. In relation to CSS, information that upstream duty holders would generally be required to provide includes information about:

- the level of crystalline silica in the product
- the hazardous properties of, and risks to health from, RCS, and

- the health and safety measures that must be taken when **processing**, installing, maintaining or removing CSS.

### 3.5 PCBUs that install, construct or commission plant or structures

#### WHS Act section 26

Duty of PCBUs that install, construct or commission plant or structures

A PCBU who installs, constructs or commissions a structure must also ensure, so far as is reasonably practicable, all workplace activity relating to the structure (including its decommissioning or dismantling) is without risks to health or safety.

A 'structure' is defined in the WHS Regulations as anything that is constructed, whether fixed or moveable, temporary or permanent, and includes buildings, masts, towers, framework, pipelines, transport infrastructure and underground works (shafts or tunnels).

### 3.6 Workers

#### WHS Act section 28

Duties of workers

Workers have a duty to take reasonable care for their own health and safety, and to take reasonable care to not adversely affect the health and safety of other persons.

Workers must also:

- comply as far as they are reasonably able with any reasonable WHS instructions given by the PCBU, such as participating in health monitoring and wearing relevant personal protective equipment, and
- co-operate with any reasonable policy or procedure relating to WHS at the workplace that has been notified to them.

If a worker refuses to participate in health monitoring or refuses to use personal protective equipment as they have been trained and instructed, a PCBU will need to take appropriate action to meet its duties under the WHS laws. This could include removing the worker from the source of exposure to respirable crystalline silica.

### 3.7 Other persons in the workplace

#### WHS Act section 29

Duties of other persons at the workplace

'Other persons' at the workplace include visitors or customers who attend a workplace. For example, if bricks are being cut by a PCBU during renovation at a customer's home, that home becomes a workplace. The homeowner and other people who may enter the home while the work is being carried out are other persons for the purposes of the WHS Act.

Under the WHS Act, other persons must take reasonable care for their own health and safety and must take care not to adversely affect other people's health and safety. They must also comply, so far as they are reasonably able, with reasonable instructions given by the PCBU to allow the PCBU to comply with the WHS Act.

## 3.8 Other relevant duties

### Consultation

#### **WHS Act section 47**

Duty to consult workers

#### **WHS Act section 48**

Nature of consultation

PCBUs must consult, so far as is reasonably practicable, with relevant workers and their elected health and safety representatives (if any) about health and safety matters.

These health and safety matters include (but are not limited to):

- identifying hazards and risks associated with working with CSS.
- introducing or changing processes or procedures that generate RCS
- changes or additional control measures put in place to protect workers from the risks of silica-related diseases
- resolving health and safety issues
- health monitoring
- monitoring the conditions at the workplace, including air monitoring, and
- information-sharing and training of workers.

It is important that workers can participate in discussions about health and safety, as they are most likely to know about the risks of their work. You must allow workers a reasonable opportunity to express views before decisions that may affect their health and safety are made. Joint involvement in identifying hazards and assessing and controlling workplace risks will help build a mutual commitment to this process and any changes that may result.

Further information on consultation requirements is in the [model Code of Practice: Work health and safety consultation, co-operation and co-ordination](#).

### Consulting, cooperating and coordinating activities with other duty holders

#### **WHS Act section 46**

Duty to consult with other duty holders

PCBUs must consult, cooperate and coordinate activities with all other persons who have a work health or safety duty in relation to the same matter, so far as is reasonably practicable.

PCBUs might share a duty in relation to the same work health and safety matter when they:

- provide you with a product or request a particular service (e.g. part of a supply chain)

- have a duty of care for the same worker or workers (e.g. labour hire agency, host employer and building owner), or
- share the same workplace (e.g. construction site with multiple subcontractors; or a building foyer in a multi-tenanted building)

In the above situations, each duty holder must consult and exchange information to find out who is doing what task and to work together in a cooperative and coordinated way to manage the risks to health and safety.

### Example – Construction at a residential building site

The Utopia home building company is a principal contractor engaging and coordinating multiple subcontractors at a residential building site where **processing** of a CSS is due to be performed in the same work area as other work.

Tony's Concrete Flooring is required to grind a concrete floor while Andy's Electrical is undertaking electrical fit out at the same time. Tony's Concrete Flooring has assessed the process as being **high risk** and is using a combination of local exhaust ventilation on the grinder and respiratory protective equipment for all workers in the room to control exposure. As the PCBU undertaking **processing** of a CSS that is **high risk**, they have provided a copy of the risk assessment to the Utopia home building company as the principal contractor, who has shared it with the electrical PCBU. As the electrical workers would also be likely to be exposed to airborne RCS if they were working in the room during grinding, the principal contractor should reschedule the electrical fit out to occur at a time after the floor polishing has been completed, eliminating the electrical workers' risk of exposure to RCS from the grinding process.

WHS duties cannot be transferred and, if you are a duty holder in relation to the same health and safety matter as another PCBU, you cannot simply assume that another PCBU will take responsibility for the matter – even if you consider that the other PCBU is well placed to do so.

See the model [Code of Practice: Work health and safety consultation, cooperation and coordination for guidance on consultation](#).

## Providing information, training, instruction and supervision

### WHS Act section 19(3)(f) and WHS Regulations regulation 39

Duty to provide information, training, instruction or supervision

You must, so far as is reasonably practicable, provide any information, instruction, training or supervision necessary to protect all persons from health and safety risks that arise from the work carried out as part of your business or undertaking.

You must ensure that information, training or instruction provided to a worker is suitable and adequate for:

- the nature of the work carried out by the worker
- the nature of the risks associated with the work, and
- the control measures implemented.



You must also ensure, so far as is reasonably practicable, that the information, training, and instruction are provided in a way that is readily understandable by the person to whom it is provided. A PCBU should consider any special requirements of the workers, for example, information, training and instruction may need to be provided in a language other than English. Other considerations include the specific skills or experience, disability, literacy or age of the worker.

In the context of a PCBU that carries out **processing** of a CSS, training must be provided:

- as part of induction and refresher training
- to a worker who will be carrying out a particular task or activity where RCS is present or could be generated, and
- when significant changes are made at the workplace that change how workers might be exposed to RCS.

Training should provide workers with a good understanding of:

- what RCS is and its health effects,
- what controls are in place to protect them,
- when they might be at risk of exposure to RCS, including
  - work practices that breach the PCBU's instructions or policies,
  - how to determine when controls might not be working effectively, and
- what to do if they observe unsafe practices at the workplace.

You should encourage workers to report hazards and health and safety problems immediately. This is important because it allows the risks to be managed before an incident or illness occurs.

**Note:** Regulation 529CD places additional duties on a PCBUs in relation to training of workers undertaking **processing** of a CSS that is **high risk** or at risk of exposure to RCS because of **processing** of a CSS that is **high risk** – see Part 5.4 for more information.

### 3.9 WHS laws in your state or territory

The Commonwealth, state and territory WHS regulators are responsible for enforcing their WHS laws. They make decisions about compliance with the requirements.

If you need help understanding your WHS requirements, please contact your WHS regulator.

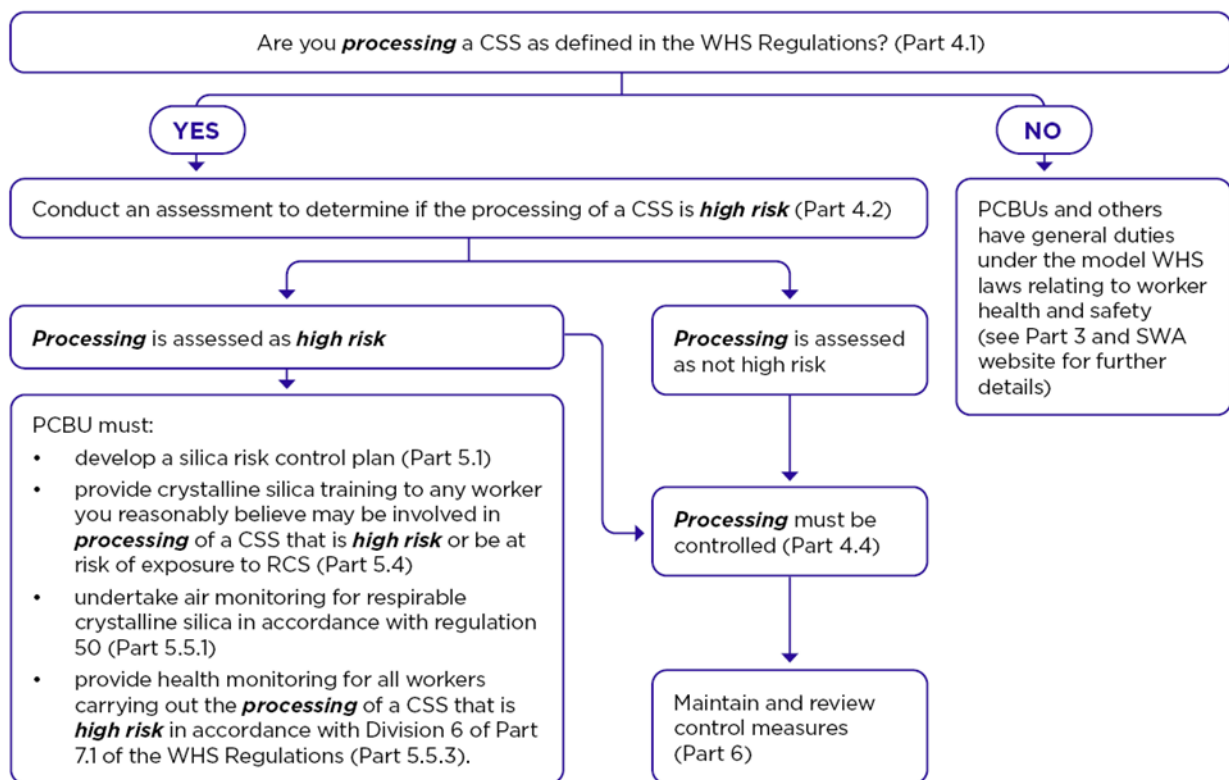
Further information on work health and safety duties is in the [model Code of Practice: How to manage work health and safety risks](#).

## 4. Identifying and managing risks from RCS

**Note:** From 1 September 2024, PCBUs have specific duties in relation to the management of risks associated with the generation of RCS from **processing** a CSS. Parts 4 and 5 of this guide relate to these specific duties, which are in addition to the general WHS duties for PCBUs outlined in Part 3.

A PCBU must ensure they are complying with all of their WHS duties, not just those that relate to the generation of RCS in the workplace.

The flow chart below outlines the process a PCBU must follow to identify processing of a CSS and determine whether the processing is high risk. Each part of this process is outlined in more detail in Parts 4 and 5 of this guide.



### 4.1 Identify processing of a CSS

To manage risks of exposure to RCS at work, you must first identify whether any **processing** of a CSS is being carried out at the workplace. See [Part 2](#) for definitions of CSS and **processing** in relation to a CSS.

Carrying out **processing** of a CSS can generate and release RCS into the air, which can expose workers and others at the workplace to RCS, if not controlled effectively. This can occur across a broad range of workplaces and industries including manufacturing, stonemasonry, construction, tunnelling, demolition, mining and quarrying.

Examples of types of work that involve **processing** of a CSS include, but are not limited to:

- excavation, earth moving and drilling plant operations.
- clay, sand and stone **processing** machine operations
- cutting and laying pavers and surfacing
- mining, quarrying and mineral ore treating processes
- road construction and tunnelling
- construction, building and demolition involving a CSS
- brick, concrete or stone cutting
- abrasive blasting (blasting agent must not contain greater than 1 per cent of crystalline silica)<sup>2</sup>
- foundry casting
- angle grinding, jack hammering and chiselling of concrete or masonry
- hydraulic fracturing of gas and oil wells
- pottery
- crushing, loading, hauling and dumping of rock, or muck from tunnelling, and
- clean-up activities such as sweeping or pressurised air blowing of dust containing crystalline silica.

## Examples of work that can result in potentially harmful exposure to RCS

### **Example 1 – fabricating, installing, maintaining and removing a CSS (manufacturing, construction and demolition industries)**

Airborne RCS can be generated from processes including cutting, grinding, trimming, polishing, drilling, scabbling, chipping, breaking, removing or blasting CSS, or from storing or disposing of dusty waste from these processes.

### **Example 2 – Mining, quarrying, tunnelling and extractive minerals activities**

Exposure to airborne RCS is a known issue, with high risks of worker exposure during rock crushing and tunnelling activities involving naturally occurring CSS.

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<sup>2</sup>As per Regulation 382 and table 10.3 of Schedule 10 to the WHS Regulations, crystalline silica must not be used for abrasive blasting at a concentration of greater than 1%.

## 4.2 Assessing the risk of *processing* CSS

### WHS Regulations 529CA

Identifying processing of a CSS that is high risk

If you have identified that *processing* of a CSS is carried out at your workplace, you must assess whether the *processing* is **high risk** and document this in writing. If you are unable to determine if the *processing* is **high risk**, you must assume it is **high risk** until you are able to determine otherwise, through a subsequent assessment.

There are additional requirements for PCBU's who are carrying out *processing* of a CSS that is **high risk**— that is, carrying out *processing* of a CSS that is reasonably likely to result in a risk to the health of a person at the workplace. These are outlined in Part 5.

If you have more than one task involving *processing* of a CSS at your workplace occurring simultaneously, this may increase the likelihood that there will be a risk to the health of persons at the workplace. In this instance, the assessment may cover all CSS *processing* tasks, and you should consider in your assessment whether multiple CSS *processing* tasks will increase the risk to the health of persons at the workplace.

The flowchart at Appendix B outlines the overall process for determining if *processing* of a CSS is **high risk** and the additional requirements that apply to *processing* of a CSS that is **high risk**.

When determining whether the *processing* of a CSS is **high risk**, and therefore reasonably likely to result in a risk to the health of a person at the workplace, a PCBU must have regard to the following:

- a. the specific *processing* that will be undertaken,
- b. the form or forms of crystalline silica present in the CSS
- c. the proportion of crystalline silica contained in the CSS, determined as a weight/weight (w/w) concentration,
- d. the hazards associated with the work, including the likely frequency and duration that a person will be exposed to RCS,
- e. whether the airborne concentration of RCS that is present at the workplace is reasonably likely to exceed half the workplace exposure standard (WES<sup>3</sup>),
- f. any relevant air and health monitoring previously undertaken at the workplace, and
- g. any previous incidents, illnesses or diseases associated with exposure to respirable crystalline silica at the workplace.

**Note:** There is no one factor that can determine the outcome of your assessment. When assessing whether the *processing* of a CSS is **high risk** you must consider all of these factors. This is because there are instances where two identical CSS processes may produce different assessment outcomes. For example, *processing* of a CSS may be determined to be **high risk** if it is performed for longer durations on a frequent basis. Whereas, the same *processing*, using the same CSS, may be determined not **high risk** if it is performed for short durations and infrequently.

<sup>3</sup>The [workplace exposure standard](#) for RCS in Australia is 0.05 mg/m<sup>3</sup> (8 hour time weighted average).

The template in Appendix C can be used to assist PCBU's to assess whether **processing** of a CSS is **high risk**. However, its use is not mandatory and other forms of documenting the assessment will be acceptable, provided it demonstrates consideration of the matters (a) to (g) listed above.

## Assessing risk and control measures

When assessing the risk of any **processing** of a CSS carried out at the workplace, PCBU's:

- cannot solely rely on having implemented control measures in accordance with the requirements for controlled **processing** of a CSS (regulation 529B of the WHS Regulations) to determine the **processing** is not **high risk**. However, PCBU's may take into account any isolation or engineering controls used to control the **processing** (see Part 4.3 of this guide), as part of their consideration of the matters set out in Part 4.2.
  - This means that, for example, even if you are using on-tool dust extraction or wet cutting methods to control exposure to RCS, this does not automatically mean the **processing** is not **high risk**. You must still consider all the matters set out in Part 4.2 of this guide when determining if your **processing** of a CSS is **high risk**.
- must not take into consideration the effect of any personal protective equipment (including respiratory protective equipment) and administrative controls (see Part 4.3 of this guide) used to control the risks of exposure to RCS. These types of control measures are excluded from the assessment because they do not control the RCS hazard at the source. These controls rely on human behaviour and are the least effective and reliable in minimising the risks of exposure to RCS.

When taking into account isolation or engineering controls, you should consider the relative effectiveness of implementing any of these types of controls and weigh this against how often and for how long the **processing** of a CSS is expected to be carried out at the workplace. Even with appropriate controls in place, your **processing** of a CSS may still be **high risk** if:

- it is carried out for long durations, multiple times a day or week
- multiple tasks involving **processing** of a CSS are being undertaken concurrently in the same work area, or
- the proportion of crystalline silica content of the CSS is high and **processing** results in the generation of significant amounts of RCS.

When considering the risk of exposure to RCS in the workplace, you should think about primary and secondary exposure:

- **Primary exposure** to RCS may occur to workers who are carrying out the task that is generating dust containing RCS or making it airborne.
- **Secondary exposure** to RCS may occur to workers doing other tasks in or near work areas where these processes are being undertaken or have recently been undertaken. This may include site supervisors, maintenance personnel, cleaners, housekeeping after **processing** of a CSS has been undertaken, general labouring, and associated trades such as electrical work.

**Note:** Regardless of whether you determine the **processing** of a CSS to be **high risk** or not, you must still ensure that the **processing** is controlled. See Part 4.3 of this guide for more information on your duty to ensure that **processing** of a CSS is controlled.

To assist you in assessing whether the **processing** of a CSS is **high risk**, matters that must be considered are outlined in more detail below.

## Details of the CSS

In undertaking an assessment to determine whether any **processing** of a CSS at your workplace is **high risk**, you must have regard to the form or forms of crystalline silica, as well as the proportion of crystalline silica (determined as a weight/weight concentration) present in the CSS that will be processed.

The most common form of crystalline silica is quartz (CAS 14808-60-7), but other less common forms include cristobalite (CAS 14464-46-1), tridymite (CAS 15468-32-3), and Tripoli (CAS 1317-95-9).

If you are **processing** a manufactured product (such as natural and artificial stone slabs, tiles, bricks, pavers or concrete) you may be able to determine how much and what forms of crystalline silica are in the CSS by referring to the label, safety data sheet or product information from the manufacturer or supplier. If a label, safety data sheet or product information is not available or does not contain the information required, you should contact the manufacturer, importer or supplier to find out whether the product contains crystalline silica and, if so, what forms and levels of crystalline silica it contains.

Different types of materials can contain different amounts of crystalline silica. The table below lists some common CSS and their typical crystalline silica content (Table 2). Whilst this table may assist you to assess the risk of your **processing** of a CSS, it is only a guide. You should always refer to the safety data sheet or product information relating to the CSS, if available, to obtain a more accurate crystalline silica content.

**Table 2 Common CSS and their typical crystalline silica content.**

Type	Amount of crystalline silica (%)
Engineered stone <sup>4</sup>	Up to 97%
Sandstone	70% to 90%
Granite	25% to 60%
Ceramic tiles	5% to 45%
Autoclaved aerated concrete	20% to 40%
Slate	20% to 40%
Concrete	Less than 30%
Porcelain	14% to 18%
Brick	5% to 15%
Marble	Less than 5%

**Note:** PCBUs that design, manufacture, import or supply a CSS must, so far as reasonably practicable, give current information to downstream users of the CSS about the product. Generally, this would include giving information in relation to the intended use, any hazardous properties and any conditions for safe use of a CSS. Please see Part 3.4 of this guide for more information on upstream duties.

<sup>4</sup>See definition of engineered stone in Appendix A

If your **processing** involves a naturally occurring material (for example in mining, quarrying or tunnelling operations, and most civil construction sites), the best way to determine how much and what forms of crystalline silica are present is to undertake scientific testing of the material using an accredited laboratory. Relying on previously reported data or analysis (instead of undertaking testing) can give you an idea about whether a naturally occurring material is a CSS and the approximate amount of crystalline silica it may contain. However, it should be used with caution due to the variability of crystalline silica within natural substances.

If you have not performed scientific testing or are otherwise unable to determine the amount and form of crystalline silica in the CSS being processed at your workplace, you will need to take this into account when assessing the risk. In this instance, you should use the precautionary principle and assume the CSS contains a high amount of crystalline silica.

## Frequency and duration of **processing** of a CSS

In undertaking the assessment of any **processing** of a CSS carried out at your workplace, you must also consider the frequency and duration of the **processing** when determining if any **processing** of a CSS is **high risk**.

The more often **processing** of a CSS is carried out, the higher the risk of exposure to RCS is for workers and others at the workplace. The same applies to increasing the duration of the **processing** of a CSS carried out at the workplace.

## Previous air monitoring results

In undertaking the assessment of any **processing** of a CSS, you must have regard to the results of any previous air monitoring that has been conducted at the workplace that are relevant to the specific **processing** of a CSS that are the subject of the assessment. That is, you should ensure the data is relevant to the task, controls and conditions in your workplace. If it is not, then the data may not give an accurate indication of your workers' likely exposure to RCS.

Examples of when previous air monitoring results may not be relevant include:

- the CSS has changed (new formulation of the substance)
- the **processing** of a CSS has changed
- the workplace has changed (e.g. a new location that is enclosed or has different dimensions)
- additional tasks involving **processing** of a CSS are now undertaken in close proximity, or
- additional controls have been implemented.

In considering previous air monitoring results, you should determine if they indicate a risk to the health of workers as a result of the **processing** of a CSS at your workplace.

Considering this information can also assist you in determining whether the airborne concentration of RCS is likely to exceed half the WES<sup>5</sup>, as explained in Part 4.2.5. If you have previous monitoring for the specific **processing** of a CSS being assessed, that indicates the airborne concentration of RCS was above half the WES, then the **processing** of a CSS are likely to be **high risk**.

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<sup>5</sup>The [workplace exposure standard](#) for RCS in Australia is 0.05 mg/m<sup>3</sup> (8 hour time weighted average).

If you do not have any previous air monitoring results, this does not prevent you from determining whether the **processing** of a CSS is **high risk**, rather you must undertake your assessment considering all the other matters set out in Part 4.2.

## Airborne concentration of RCS

In undertaking the assessment of any **processing** of a CSS at your workplace, PCBUs must consider if it is reasonably likely that the airborne concentration of RCS at the workplace will exceed half the WES for RCS. The full list of WES is published on the SWA [website](#).

PCBUs must not take into account any protection provided by administrative controls or respiratory protective equipment when considering the airborne concentration of RCS in the workplace.

**Note:** Reasonably likely, in this context means the airborne concentration of RCS is more likely than not to exceed half the WES, when considered objectively and taking into account all relevant factors.

To assess whether any **processing** of a CSS carried out at your workplace is likely to result in an airborne concentration of RCS that exceeds half the WES, you can use previous air monitoring results. If previous air monitoring results are not available, personal exposure data obtained from other sources can be used to assess the likely airborne concentration of RCS. This may include exposure data obtained from:

- the manufacturer of the control or tool used
- an industry association, or
- a certified occupational hygienist<sup>6</sup>.

### Personal exposure data

Personal exposure data is generated by conducting air monitoring and is a measure of how much RCS is in the breathing zone of the worker. This is the most reliable form of data that can be used when conducting an assessment and it can be used to work out how effective control measures are.

See [Part 5.5.1](#) for further information on how air monitoring is conducted.

If you are using exposure data from air monitoring that was not conducted in your workplace, you should ensure the data is relevant to the task, controls and conditions in your workplace. If it is not, then the data may not give an accurate indication of the airborne concentration of, and your workers' likely exposure to, RCS.

If you do not have previous air monitoring results, and you do not have any alternative exposure data to inform your assessment, you may need to undertake air monitoring at your workplace when the **processing** of a CSS is being carried out.

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<sup>6</sup> Where data from a certified occupational hygienist is not available, data from a non-certified occupational hygienist may be an appropriate alternative.



Air monitoring data that shows the airborne concentration of RCS exceeds half the WES may not automatically result in a determination that the **processing** of a CSS is **high risk**. Other factors must be considered, in particular the frequency and duration of the **processing** of a CSS, and may influence the assessment.

For example, **processing** of a CSS that generates RCS at concentrations above half the WES and is performed once per year is not likely to be **high risk**, whereas **processing** of a CSS that generates RCS at concentrations above half the WES, but below the WES and is performed every working day of the year is likely to be **high risk**.

While you must consider whether it is reasonably likely that the airborne concentration of RCS exceeds half the WES, there may be circumstances where exposure data is not required to reach an outcome. For example, where all other factors have been considered and provide sufficient information to determine whether the **processing** of a CSS is **high risk** or not.

## Previous health monitoring results

When conducting your assessment to determine if the **processing** of a CSS is **high risk**, you must consider the results of any relevant health monitoring that has been previously conducted at the workplace. That is, you should ensure any health monitoring results are relevant to the task, controls and conditions in your workplace. If previous health monitoring relates to different tasks or controls, it should not be included for consideration.

Examples of when previous health monitoring results may not be relevant include:

- the CSS has changed
- the **processing** of a CSS has changed
- the workplace has changed (e.g. a new location that is enclosed or has different dimensions)
- additional tasks involving **processing** of a CSS are now undertaken in close proximity, or
- additional controls have been implemented.

Adverse health monitoring findings for workers who undertake specific **processing** of a CSS at your workplace may indicate a risk to health and should be considered when making an overall determination of whether the **processing** of a CSS is **high risk**.

Actual health monitoring records do not need to be included in the assessment. Please also refer to the confidentiality requirements related to health monitoring records provided in regulation 378 of the WHS Regulations.

If you do not have any previous health monitoring results, it does not prevent you from determining whether the **processing** of a CSS is **high risk** or not, rather you must undertake your assessment considering all the other matters set out in Part 4.2.

## Previous incidents, illnesses or diseases associated with exposure to RCS

In addition to considering the outcomes of health monitoring, you must also consider any reports of previous incidents, illnesses or diseases associated with RCS exposure at the workplace.

As part of your assessment, you should consider whether there is a likelihood of these incidents, illnesses or diseases occurring in relation to the processing of a CSS being undertaken at your workplace.

## Providing an outcome and justification

At the end of your assessment, you must record in writing:

- how the relevant factors have been taken into account, and
- whether or not the **processing** of a CSS is **high risk**.

In determining the outcome of the assessment, you must have regard to all of the required matters listed above in Part 4.2 of this guide. If you determine that **processing** of a CSS is not **high risk**, you must be able to explain why.

Each assessment is unique and must consider the specific factors as they relate to the CSS, **processing** of a CSS, and your workplace. This is important because, the **processing** of a CSS performed at one workplace may be determined to be **high risk**, whereas the same **processing** of a CSS performed at another workplace may not, depending on the frequency and duration of the **processing** of a CSS and other matters including the implementation of isolation and engineering control measures, as well as the nature of the CSS being processed.

You may seek professional advice to assist you in undertaking the assessment and determining whether the **processing** of a CSS is **high risk** or not. Advice should be sought from a person who has acquired the knowledge and skills to carry out the task, from training, qualification or experience, for example, a certified occupational hygienist<sup>7</sup> or health and safety professional.

Your assessment will result in one of the three outcomes outlined below:

### Unable to determine if the processing of a CSS is **high risk**

If, after completing the assessment, you are unable to determine if your **processing** of a CSS is **high risk**, then you must assume that it is **high risk**. All requirements for **processing** of a CSS that is **high risk** apply, until you can determine the **processing** is not **high risk** (for example by implementing additional engineering controls, undertaking further testing or additional air monitoring and performing a new assessment).

### **Processing** of a CSS determined as high risk

If you determine the **processing** of a CSS is **high risk**, then you must:

- ensure that **processing** is controlled as outlined in Part 4.3 of this guide
- meet the additional requirements for **processing** of a CSS that is **high risk** outlined in Part 5 of this guide, and
- meet all other duties and requirements under the WHS laws, including the general duties outlined in Part 3 of this guide.

### **Processing** of a CSS determined as not **high risk**

If you determine the **processing** of a CSS is not **high risk**, then you must:

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<sup>7</sup> Best practice is to use a certified occupational hygienist. However, there may be circumstances where a certified occupational hygienist is not available. Where a certified occupational hygienist is not available, a person with knowledge and experience in occupational hygiene can be used instead.

- ensure all **processing** is controlled as outlined in Part 4.3 of this guide, and
- meet all other duties and requirements under the WHS laws, including the general duties outlined in Part 3 of this guide.

### Example 1 – Julia’s Electrical

Julia is a PCBU who undertakes **processing** of a CSS when installing power points in kitchens and bathrooms that contain tile backsplashes. The task requires Julia to drill holes into the tiles to facilitate the installation. In conducting an assessment, Julia considers the likely crystalline silica content of the tiles to be 30% w/w.

Due to the variety of electrical work performed Julia estimates the **processing** of a CSS is undertaken infrequently (up to 10 times per week) and that each **processing** of a CSS is for short duration (less than 5 minutes per installation). She uses an on-tool dust extraction on the drill as an engineering control to control the release of dust.

When taking into account all of the considerations outlined in regulation 529CA, Julia determines that the **processing** is not **high risk**. Julia then documents the risk assessment in accordance with regulation 529CA and ensures that the cutting is controlled in accordance with regulation 529B (Part 4.3 of this guide).

### Example 2 – Tony’s denture clinic

Tony is a dental prosthetist who owns and runs a denture clinic. Whilst some of Tony’s dentures are made from acrylic resins, he primarily makes porcelain dentures as they last longer.

The denture manufacturing process requires Tony to carry out casting, sandblasting, and grinding of the porcelain dentures, sometimes for a full 8-hour workday.

Tony conducts an assessment to determine if the **processing** is **high risk** or not. When considering all matters outlined in regulation 529CA, Tony reaches the view that the **processing** is **high risk**. Tony then:

- documents the assessment in accordance with regulation 529CA
- completes a silica risk control plan in accordance with regulation 529CB
- implements control measures outlined in Part 4.3 of this guide in accordance with regulation 529B
- undertakes training in accordance with regulation 529CD, and
- establishes an air monitoring program to ensure the control measures are working in accordance with regulation 50 and undertakes health monitoring in accordance with regulation 368.

### Example 3 – Demolition of a structure

A contractor wins a job to demolish a structure consisting of bricks and cement-based products. The work will involve using a hammer attachment on an excavator to demolish the structure. There is an overhead electrical power line within 4 metres of a perimeter wall to be demolished – due to this an electrical spotter is required to spot for the excavator operator while the excavator is within 3 – 6.4 metres of the powerline.

For the purposes of regulation 529CA, the contractor identifies the demolition task involves **processing** of a CSS because of the use of mechanical plant to crush materials that contain crystalline silica.

The contractor conducts an assessment to determine whether the **processing** of a CSS is **high risk**, using the template provided at Appendix C. They document the following:

The specific <b>processing</b> that will be undertaken	demolition of a large structure consisting of bricks and cement-based products with an excavator fitted with a hammer attachment
The form of crystalline silica present	quartz
The proportion of crystalline silica contained in the CSS, determined as a weight/weight (w/w) concentration	bricks and cement may contain between 25 to 40% crystalline silica
The hazards associated with the work, including the likely frequency and duration that a person will be exposed to respirable crystalline silica	the demolition will take between 2-5 days to complete, with workers undertaking the <b>processing</b> of a CSS, and therefore potentially exposed to RCS, for approximately 5 hours each day.
Whether the airborne concentration of respirable crystalline silica that is present at the workplace is reasonably likely to exceed half the WES <sup>8</sup>	there are previously conducted air monitoring results for workers involved in similar demolition projects, which show half the WES for RCS was exceeded. The results are directly related to the task, controls and conditions at the new worksite and therefor indicate it is likely that the airborne concentration of RCS will exceed the half the WES.
Relevant air and health monitoring results previously undertaken at the workplace	air monitoring results as indicated above, and no relevant health monitoring results.
Previous incidents, illnesses or diseases associated with exposure to respirable crystalline silica at the workplace	there have been no previous incidents, illnesses or diseases.

The contractor makes a written record describing how the matters above were taken into account and identifies the work as **high risk**.

The contractor develops a silica risk control plan, using the template provided in Appendix G. To ensure that the **processing** is controlled as per regulation 529B, the contractor documents, and will implement following isolation and engineering controls:

- A water-spraying system will be attached to the hammer to produce a fine mist to suppress dust at the working area.
- A water-mist fan will be used to provide further fine water spray to the working area.

<sup>8</sup>The [workplace exposure standard](#) for RCS in Australia is 0.05 mg/m<sup>3</sup> (8 hour time weighted average).

- The excavator cabin:
  - is retrofitted with a positive-pressure, HEPA filtered system to reduce the risk of respirable crystalline silica being drawn into the cabin, and
  - will be enclosed and the doors and windows kept shut, air flow will be put on recirculation and the cabin will be cleaned every day using wet wiping/cleaning methods or a H or M-class industrial vacuum.

In addition to this:

- Air monitoring is conducted in accordance with regulation 50 of the WHS Regulations.
- Health monitoring will be conducted in accordance with Division 6 of Part 7.1 of the WHS Regulations.
- An exclusion zone will be set up around the working area to prevent other people being exposed to the airborne dust.

The electrical spotter will wear a fit tested P2 reusable respirator, be clean shaven and trained in how to use, store and maintain the respirator.

### 4.3 Ensuring processing of a CSS is controlled

#### WHS Regulation 529B

When processing of a CSS is controlled

#### WHS Regulation 529C

Duty for processing of a CSS to be controlled

A PCBU must not carry out, or direct or allow a worker to carry out, **processing** of a CSS (regardless of whether it is **high risk** or not) unless the **processing** is controlled.

Under regulation 529B(1) of the WHS Regulations, the **processing** of a CSS is controlled if:

- control measures to eliminate or minimise risks arising from the processing are implemented so far as is reasonably practicable; and
- at least 1 of the following measures are used during the processing:
  - the isolation of a person from dust exposure;
  - a fully enclosed operator cabin fitted with a high efficiency air filtration system;
  - an effective wet dust suppression method;
  - an effective on-tool extraction system;
  - an effective local exhaust ventilation system; and
- a person still at risk of being exposed to respirable crystalline silica after 1 or more of the measures in paragraph (b) are used:
  - is provided with respiratory protective equipment (respiratory protective equipment); and
  - wears the respiratory protective equipment while the work is carried out.

If it is not reasonably practicable to implement at least one of the isolation or engineering controls outlined in paragraph (b) above, the **processing** of a CSS will only be considered controlled if a person who is at risk of being exposed to RCS during **processing** of a CSS is:

- provided with appropriate respiratory protective equipment; and
- wears the respiratory protective equipment correctly while the work is carried out.

**Note:** The use of respiratory protective equipment as the only control measure for **processing** of a CSS will only satisfy the requirements for controlled **processing** of a CSS in circumstances where none of the isolation or engineering controls prescribed in regulation 529B(1)(b) above are reasonably practicable. To rely on respiratory protective equipment only, you should be able to demonstrate you have considered isolation and engineering controls and be able to explain why the implementation of such higher order controls is not reasonably practicable in the circumstances.

See Part 2.4 for definition of respiratory protective equipment in this context, and Appendix F for further information about personal protective equipment, including respiratory protective equipment, more generally.

## 4.4 Applying the hierarchy of control measures to manage RCS risks

In addition to controls being specifically addressed in regulation 529B (see Part 4.3), crystalline silica is a hazardous chemical under the WHS Regulations. This means that PCBUs must also ensure that they are managing risks to health and safety from exposure to RCS at the workplace in accordance with Part 3.1 of the WHS Regulations. This requires PCBUs to, among other things, manage risks in accordance with the hierarchy of control measures.

The hierarchy of control measures ranks control measures from the highest level of protection and reliability to the lowest level. The different types of control measures are set out below in order from highest order (i.e., elimination) to lowest (i.e., administrative controls and personal protective equipment).

### Elimination

Elimination is the most effective control and must always be considered before all other control measures. A PCBU must first consider whether a risk can be completely removed from the workplace.

If it is reasonably practicable, eliminate the CSS from the workplace. This will effectively remove the risk of workers being exposed to RCS when **processing** these products or materials.

In many cases, eliminating CSS may not be reasonably practicable. For example, if:

- a CSS is naturally occurring at your workplace
- you cannot make the required end product without using a CSS, or
- you cannot deliver a required service without **processing** a CSS.

If it is not reasonably practicable to eliminate the risk, then risks must be minimised, so far as is reasonably practicable, using the hierarchy of controls.

### Substitution

Substitution is where you replace a product with something that is less hazardous and therefore has a lower risk.



Substitution can be an effective way of reducing the risk of exposure to RCS. For example, you can:

- use products that have less crystalline silica in them, or
- use a CSS that does not need to be processed in any way.

Effective substitution of a CSS will depend on your workplace and the work tasks your workers carry out. Again, substitution might not be practical where a CSS is naturally occurring or if it means you cannot make the required end product or deliver a required service.

In addition to considering substitution (and its implementation if this is reasonably practicable), if you continue to process a CSS, regulation 529B requires at least 1 of the following measures to be used during **processing** of a CSS, unless it is not reasonably practicable to do so:

- i. the isolation of a person from dust exposure;
- ii. a fully enclosed operator cabin fitted with a high efficiency air filtration system;
- iii. an effective wet dust suppression method;
- iv. an effective on-tool extraction system;
- v. an effective local exhaust ventilation system.

Further information on isolation and engineering controls is outlined below.

## Isolation

Isolation involves physically separating the source of harm from people.

This may involve placing solid barriers or distance between a hazard and your workers, ensuring that **processing** takes place within a fully contained system, using fully enclosed operator cabins fitted with a high efficiency air filtration system or positive pressure for enclosed cabins/rooms.

A fully enclosed operator cabin fitted with a high efficiency air filtration system is one that:

- is operated with the cab door and windows closed, and
- is maintained to ensure the cab, door, windows and rubber seals are free from damage which could allow ingress of dust, and
- maintains a positive internal cab pressure between 50 Pa and 200 Pa (as per ISO 10263-4:2009) when the machine is in use, and
- is fitted with a real-time monitor which displays the internal cabin pressure and alarms when the pressure drops below a pre-determined level, and
- uses HEPA (H13 or H14) filtration on the cabin air intake, and
- incorporates a HEPA (H13 or H14) filter in the internal air-recirculation system (where possible)

For further guidance on enclosed operator cabins and air filtration systems, please refer to:

- AS/NZS ISO 23875 Mining — Air quality control systems for operator enclosures — Performance requirements and test methods
- ISO 10263 Operator enclosure environment (parts 1 – 5)



Isolation is an effective way of protecting your workers from exposure to RCS. Due to the airborne nature of RCS, it is difficult to effectively isolate the **processing** of a CSS and your workers using distance. Physical barriers that remove the worker or others from contact with RCS are the most effective form of isolation controls.

Isolation controls include:

- isolating high dust generation work processes within an enclosed room with restricted access
- providing solid physical barriers and exclusion zones between different workers and workstations to prevent dust or water mist from moving into other work areas or towards other workers
- distancing where processing of a CSS is carried out from other workers, and
- designating a room or area for other tasks such as changing or eating, away from the work area.

You can also use solid barriers around automated tasks to shield workers from RCS.

When **processing** of a CSS needs to be done at the installation site, this work should be done outdoors (if possible) and in a designated area away from other people, using engineering controls, including wet cutting methods and dust collection systems, and wearing appropriate personal protective equipment.

## Engineering controls

Engineering controls use physical methods to change the characteristics of a task, including mechanical devices or processes that eliminate or minimise exposure of workers to RCS.

Engineering controls to control exposure to RCS can include:

- enclosed or isolated automation when cutting, grinding or drilling
- using wet **processing** methods
- local exhaust ventilation
- drills, routers, saws and other equipment designed to be fitted with local exhaust ventilation and/or a water attachment to suppress dust
- fitting large machinery such as excavators and bulldozers with positive pressure enclosed cabs, and
- cleaning up dust with an M or H-class industrial vacuum cleaner.

The selection of reasonably practicable engineering controls for your workplace will depend on the tasks your workers carry out. When considering and using engineering controls, be aware of other hazards that may be introduced. As many engineering controls are motorised, you should be aware of noise and vibration levels at your workplace and issue personal hearing protection as needed. You need to also be aware of electrical hazards that may arise combining electrical equipment with wet methods.

**Note:** Where reasonably practicable, a PCBU must implement one or more of the following isolation or engineering controls measures to comply with the requirement in paragraph 529B(1)(b) of the WHS Regulations for controlled *processing* of a CSS (Part 4.3 of this guide):

- isolation of a person from dust exposure
- a fully enclosed operator cabin fitted with a high efficiency air filtration system during a *processing* of a CSS
- an effective wet dust suppression method,
- an effective on-tool extraction system, or
- an effective local exhaust ventilation system during *processing* of a CSS.

General dust, including dust containing RCS is abrasive and can cause damage and wear to tools and equipment that are part of your engineering controls. It is important to have a maintenance and cleaning schedule in place to keep your equipment in good working order. You should regularly inspect your equipment for:

- wear and tear, corrosion or damaged parts
- air leaks in pneumatic tools
- kinks, holes or leaks in water suppression or dust extraction equipment, or
- damage to guards and flaps that contain water spray.

Maintenance and cleaning activities should be separately assessed to determine whether they involve processing of a CSS that is **high risk**, as they may pose a higher or lower risk than other **processing** of a CSS undertaken in the workplace.

See Appendix D for detailed information on ventilation and wet cutting methods.

## Administrative controls

If risks remain after implementing higher order control measures, including those specified in regulation 529B for controlled **processing** of a CSS, PCBUs must consider additional administrative controls to minimise risks.

Administrative controls must only be considered after consideration of substitution and the implementation of isolation and engineering controls. They may be used to support other control measures (by implementing a preventative maintenance program) or used to provide additional protection (such as job rotation).

Administrative controls rely on worker behaviour to be effective, and it is very important to have the necessary administrative policies and worker training in place when crystalline silica is identified at your workplace. You also need to supervise your workers to make sure they understand and follow your administrative policies that are in place to help manage risks of exposure.

See Appendix E for further information on administrative controls for **processing** of a CSS.

## Personal protective equipment

Personal protective equipment is the least effective method for controlling risks. However, it can be effective at minimising residual risk when used in conjunction with higher order controls, or if it is not reasonably practicable to implement higher order control measures.

Before **processing** a CSS at the workplace, the PCBU should assess the conditions likely to affect the health and safety of workers and arrange for the provision and use of appropriate personal protective equipment, including any appropriate respiratory protective equipment.

You must ensure that personal protective equipment is provided by a PCBU at no cost to the worker and ensure workers are trained in its correct use.

Where a person is still at risk of exposure to RCS after the implementation of higher order control measures, including one or more of the isolation or engineering controls specified in regulation 529B, then the person must be provided with respiratory protective equipment and must wear the respiratory protective equipment while the work is carried out. The respiratory protective equipment used for this purpose must meet the requirements set out in Part 2.4 of this guide.

There may be some cases where implementing higher order isolation and engineering control measures is not reasonably practicable. Provided PCBUs are fulfilling their primary duty to minimise risks so far as is reasonably practicable, the use of respiratory protective equipment only, in the absence of higher order control measures, may be appropriate.

More information about personal protective equipment can be found in Appendix F.

### Example - Silversmith (short duration processing of a CSS)

Jen is a silversmith who operates a small business as a sole trader from a small workshop. In Jen's job she is often cutting, filing, hammering, or polishing metals and materials. Jen works with CSS that produce RCS during metal finishing procedures such as polishing and buffering with Tripoli. It is reasonably likely that Jen, and other workers who share the workshop, will be exposed to RCS during these tasks. Jen determines that she is undertaking *processing* of a CSS and proceeds to undertake an assessment to determine if the *processing* is **high risk**. After completing an assessment and weighing up all the required matters, Jen determines that her *processing* of a CSS is **not high risk**.

Jen must then ensure that all her *processing* of a CSS is controlled, in accordance with regulation 529B. Jen considers whether it is reasonably practicable to implement any of the following control measures:

- the isolation of a person from dust exposure;
- a fully enclosed operator cabin fitted with a high efficiency air filtration system;
- an effective wet dust suppression method;
- an effective on-tool extraction system; or
- an effective local exhaust ventilation system.

Jen determines that it is not reasonably practicable to implement any of the above controls, based on the following:

- Jen is undertaking *processing* of a CSS for a short duration (5-10 minutes at a time) and frequency (5 times a week)
- Jen uses a CSS that contains a relatively low amount of crystalline silica (10%), and
- Jen conducts the work outdoors in an area with good ventilation

As a result, to ensure the *processing* of a CSS is controlled, Jen and any other person who is at risk of being exposed to RCS at the workplace must:

- be provided with respiratory protective equipment; and
- wear the respiratory protective equipment while the work is carried out.

Considering the requirements of AS/NZS 1715:2009, Jen decides that a P1 filtered mask that complies with the requirements of AS/NZS 1716:2012 is commensurate with the risk posed by the CSS hazard.

## 5. Additional requirements for processing of a CSS that is high risk

### 5.1 Silica risk control plan

#### WHS Regulation 529CB

Silica risk control plan required for processing of a CSS that is high risk

A silica risk control plan is a practical tool to document the specific tasks and control measures related to each **processing** of a CSS that is **high risk** carried out by the PCBU. It will be informed by the assessment of the **processing** of a CSS undertaken in accordance with regulation 529CA, that determined the **processing** is **high risk**.

If you have assessed the **processing** of a CSS, or a combination of **processing** of a CSS, as being **high risk**, you must develop a silica risk control plan covering those **processing** tasks. You must also make it available to all workers generally and provide it to all workers before they commence the processing of a CSS. Further, once a silica risk control plan is in place, you must ensure any **processing** of a CSS that is **high risk** are carried out in accordance with the plan.

You must ensure that the silica risk control plan is reviewed and revised to maintain, so far as reasonably practicable, a safe work environment. This includes reviewing and revising the control measures specified in the plan to minimise exposure to RCS whenever:

- they may no longer be effective
- they are impacted by a change at the workplace, or
- where a new hazard or risk is identified

Further information about reviewing control measures is included in Part 6 of this guide.

The silica risk control plan must be developed in consultation with workers involved in carrying out **processing** of a CSS that is **high risk** and if any, their elected health and safety representatives (HSR). It must also be set out and expressed in a way that is readily accessible and understandable by the persons who use it.

A silica risk control plan template is available in Appendix G. To assist you in completing your silica risk control plan, each Part is outlined in more detail below.

**Note:** If **processing** of a CSS that is **high risk** is being carried out is part of construction work, you may use a Safe Work Method Statement (SWMS) in place of a silica risk control plan provided the SWMS covers all the required silica risk control plan content. See Part 5.3 of this guide for more information.

### 5.2 Completing a silica risk control plan

The information in this Part is intended to assist you to complete the silica risk control plan template at Appendix G. If you are not using the template, you should ensure you document all the required information and that you do so in a way that is readily accessible and understandable to persons who use it.

## PCBU and process information

This section of the silica risk control plan template allows you to record essential details about your business, the number and type of tasks involving **processing** of a CSS that is **high risk** carried out at your workplace and the number of workers likely to carry out these **processing** tasks. This section also allows you to describe how you have met your duty to consult with workers and their HSRs (if any).

## Assessment of risk

You need to include in the silica risk control plan a copy of the assessment for each task involving processing of a CSS that is **high risk** covered by the plan.

## Control measures

A silica risk control plan must document which control measures you have chosen to implement to minimise the risks of RCS, including any administrative controls and personal protective equipment. In order to identify which controls will be the most appropriate for the processing of a CSS that is **high risk** being carried out, a PCBU must work through the hierarchy of controls (see Part 4.4 of this guide), and must also ensure that the **processing** is controlled in accordance with regulation 529B (see Part 4.3 of this guide).

You must outline the control measures chosen for each task involving **processing** of a CSS that is **high risk**. This includes details about how these control measures will be implemented and integrated into daily activities in the workplace, for example, toolbox talks, pre-start checks and daily cleaning of work areas.

You must also document how you will monitor and review the effectiveness of the control measures to be implemented, to ensure they are working effectively. This includes ensuring control measures are fit for purpose, suitable for the work, and installed, set up, and used correctly. You should also include the details of any reviews of control measures.

## Training

As outlined in Part 5.4 of this guide, you must provide crystalline silica training to any worker involved in processing of a CSS that is **high risk** or who is at risk of exposure to RCS because of the **processing** that is **high risk**. You are also required to keep a record of the training provided to workers. While not a mandatory requirement of a silica risk control plan, you may document in the plan where and how training records for crystalline silica are going to be kept.

## 5.3 Use of a Safe Work Method Statement as a silica risk control plan

### WHS Regulation Part 6.3 Division 2

High risk construction work – safe work method statements

‘Construction work’ is defined in the WHS Regulations as any work carried out in connection with the construction, alteration, conversion, fitting-out, commissioning, renovation, repair, maintenance, refurbishment, demolition, decommissioning or dismantling of a structure.

Regulation 291 of the WHS Regulations sets out a list of construction work that is high risk for the purposes of the WHS Regulations, and for which a SWMS is required. This includes work ‘carried out in an area that may have a contaminated or flammable atmosphere’.

A SWMS is required in the specified circumstances because it helps a PCBU clearly communicate to all workers at the construction site what the health and safety risks are and how they will be managed.

**Processing** of a CSS may be considered high risk construction work if RCS may contaminate the work atmosphere. If a SWMS has been prepared for high risk construction work that involves **processing** of a CSS that is **high risk**, a silica risk control plan is not needed, provided the SWMS includes all the information required for a silica risk control plan as outlined in Parts 5.1 and 5.2 of this guide.

More information about a SWMS for high risk construction work can be found in the [model Code of Practice: Construction work](#).

## 5.4 Training

### WHS Regulation 529CD

Duty to train workers about the risks of crystalline silica

You must provide crystalline silica training to any worker you reasonably believe may be involved in **processing** of a CSS that is **high risk** or be at risk of exposure to RCS because of **processing** of a CSS that is **high risk** at your workplace.

Crystalline silica training must be nationally accredited training, or another form of training approved by the WHS regulator, and must cover:

- the health risks associated with exposure to RCS, and
- the need for, and proper use of, any risk control measures required by WHS laws.

Examples of crystalline silica training may be nationally accredited training listed on [training.gov.au](http://training.gov.au) (such as training packages, qualifications, units of competency, skill sets or courses), or training approved by the WHS regulator. You should contact the relevant [WHS Regulator](#) for further information about what crystalline silica training is required or acceptable in your jurisdiction.

You must ensure a record of crystalline silica training undertaken by workers is kept while the worker is carrying out the **processing** of a CSS that is **high risk**, and for 5 years after the day the worker ceases working for your business. This record of training can be documented in the silica risk control plan, see Part 5.4 of this guide.

If the **processing** of a CSS is not **high risk**, you must still ensure you are meeting your other duties under WHS laws to provide appropriate information, instruction, training or supervision to workers who may be exposed to RCS at the workplace (see Part 3.8 of this guide).

## 5.5 Monitoring

### WHS Regulation 529CE

Monitoring in relation to processing of a CSS that is high risk

### WHS Regulation 50

Monitoring airborne contaminant levels

### WHS Regulation 368

Duty to provide health monitoring

For each **processing** of a CSS that is high risk at the workplace, a PCBU must:

- undertake air monitoring for respirable crystalline silica in accordance with regulation 50, and
- provide health monitoring for all workers carrying out the **processing** of a CSS that is **high risk** in accordance with Division 6 of Part 7.1 of the WHS Regulations.

In addition, you must provide air monitoring results to the regulator if the airborne concentration of RCS has exceeded the WES<sup>9</sup> for RCS. You must report the result to the WHS regulator as soon as reasonably practicable and no more than 14 days from the date the result was reported to you.

### Air monitoring

Regulation 50 of the WHS Regulations requires a PCBU to undertake air monitoring to determine the airborne concentration of a substance or mixture which has a WES if:

- you are uncertain on reasonable grounds whether or not the airborne concentration of RCS at the workplace exceeds the WES for RCS, or
- monitoring is necessary to determine whether there is a risk to health from RCS at the workplace.

This means that, in addition to any air monitoring necessary to identify whether the **processing** of a CSS is **high risk**, the PCBU may also need to undertake additional air monitoring to meet the obligations of regulation 50.

Air monitoring to determine a worker's exposure involves measuring the level of RCS in the breathing zone of workers using a personal sampler during their usual shift activities, including routine breaks.

Figure 2 shows an approximation of a worker's breathing zone. The results of air monitoring help you assess the risk to your workers by showing:

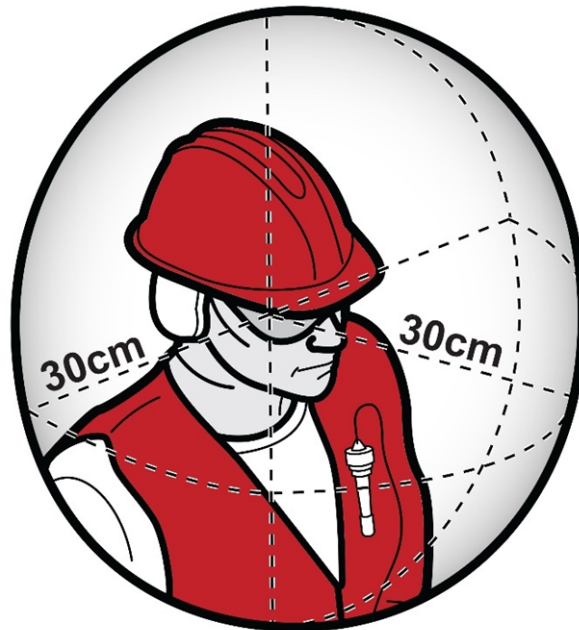
- how much RCS is in the breathing zone of your workers
- which processes or products are the source of the exposure, and
- if your current control measures are working.

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<sup>9</sup>The [workplace exposure standard](#) for RCS in Australia is 0.05 mg/m<sup>3</sup> (8 hour time weighted average).



**Figure 2 Worker's breathing zone**



### **How air monitoring is conducted**

Conducting an effective air monitoring program requires training, specialist knowledge and a high level of competency and experience. Interpretation of the results of air monitoring and decisions about whether a workplace has an airborne concentration of contaminant above the exposure standards can be complex.

You should engage the services of an expert in air monitoring, for example a certified occupational hygienist<sup>10</sup>, to design, undertake (or oversee) and interpret the results of a suitable air monitoring program, and to determine compliance with exposure standards.

A good air monitoring program should be undertaken over time, and may require multiple days of sampling, to increase the likelihood that samples are representative of actual workplace exposures and take into account variability between workers and workplace conditions. Sampling should ideally be taken over the duration of the shift and not less than 4 hours or half of the shift duration. To get the most effective information, air monitoring should be arranged on days when normal CSS processes are taking place.

Results from an air monitoring program should include statistical analysis of the data to provide a reliable estimate of the true range of RCS exposures. The length of an air monitoring program will depend on factors such as the variety of work processes that need examining, the extent of monitoring required, the nature of the processes and the type of laboratory analyses required.

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<sup>10</sup> Best practice is to use a certified occupational hygienist. However, there may be circumstances where a certified occupational hygienist is not available. Where a certified occupational hygienist is not available, a person with knowledge and experience in occupational hygiene can be used instead.

## Air monitoring records

The WHS Regulations require you to keep the results of air monitoring for 30 years. You must also make sure that the records are readily accessible to people at your workplace who may be exposed to RCS. Any previous air monitoring results in relation to **processing** of a CSS that is **high risk** must also be taken into consideration as part of your assessment to determine if the **processing** of a CSS is **high risk**, if the air monitoring was relevant and was conducted prior to undertaking the assessment.

An air monitoring report should include:

- the background and purpose of the air monitoring including the WES
- the task to be measured including work patterns and hazards involved with this task
- the control measures in place and their performance
- what sampling and measurements were taken (long and short-term) including information on the calibration of the sampling equipment
- specifics of how sampling was taken
- how and where the samples were analysed (analysis of samples taken in the workplace should be carried out by a NATA-accredited laboratory)
- an interpretation of the results:
  - exposure sources
  - adequacy of current control measures
  - assessment of risk including identification of tasks not measured that are likely to be an exposure source and any workers who could be exposed but were not measured, and
  - compliance with WHS laws
- recommendations, for example:
  - dust control action plan
  - changing control measures and work practices
  - worker training
  - further air monitoring, and
  - health monitoring.

Further information on air monitoring and complying with exposure standards is in the [Workplace exposure standards for airborne contaminants](#) and the guidance material [Interpretation of Workplace exposure standards for airborne contaminants](#).

**Note:** If you receive an air monitoring result that shows the airborne concentration of RCS is above the WES, you must report this result to your WHS Regulator. See Part 5.5.2 of this guide for more information on reporting of WES exceedances.

## Reporting airborne concentration of RCS above the WES

### WHS Regulation 529CE

Monitoring in relation to processing of a CSS that is high risk

If, as a PCBU, you have undertaken air monitoring for RCS for **processing** of a CSS that is **high risk**, and the results show the airborne concentration of RCS has exceeded the WES for RCS, you must report the results to the WHS regulator. The results must be reported even if workers are wearing appropriate and correctly fitted respiratory protective equipment, which provides protection from exposure to RCS. The results must be reported as soon as reasonably practicable and no more than 14 days from the date that the air monitoring result was provided to the PCBU.

The air monitoring results must be reported to the WHS regulator in a form approved by the WHS regulator. Please refer to your [WHS regulator](#) to identify the approved form in your jurisdiction and find out how to submit the reporting form to the regulator.

### Health monitoring

Division 6 of Part 7.1 of the WHS Regulations requires a PCBU to provide health monitoring to any worker carrying out ongoing work at a workplace using, handling, generating or storing hazardous chemicals and there is a significant risk to the worker's health because of exposure to a hazardous chemical.

This means that where there is significant risk to a worker's health arising from ongoing exposure to RCS, whilst undertaking **processing** of a CSS that is **high risk**, the worker must be provided with health monitoring.

Depending on the circumstances, health monitoring may not only be required for workers who are directly generating RCS by regularly undertaking **processing** of a CSS that is **high risk** but also for workers who may regularly be in the vicinity of RCS or in contact with RCS in other ways such as through cleaning work areas or equipment.

### Determining significant risk

As the PCBU, it is your responsibility to determine if there is a 'significant risk' to inform whether you need to monitor the health of your workers. For RCS generated from **processing** of a CSS that is **high risk**, the level of risk depends on the frequency, duration and amount of exposure (also known as dose or how much your worker might be exposed).

You should consider a health monitoring program for all workers undertaking ongoing tasks involving **processing** of a CSS that is **high risk** frequently at your workplace or where you regularly use administrative controls or personal protective equipment to control risks.

If you are not sure if there is a significant risk to your worker's health or if your workers are at a significant risk of exposure, as a result of **processing** of a CSS that is **high risk**, you can seek specialist advice from a certified occupational hygienist<sup>11</sup>, health monitoring physician, occupational physician or a WHS regulator.

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<sup>11</sup> Best practice is to use a certified occupational hygienist. However, there may be circumstances where a certified occupational hygienist is not available. Where a certified occupational hygienist is not available, a person with knowledge and experience in occupational hygiene can be used instead.

Further information on how to work out the level of risk is available in the [Health monitoring guide for persons conducting a business or undertaking](#).

## How health monitoring is conducted

Health monitoring should begin at the time a worker is first employed or when they first start work involving **processing** of a CSS that is **high risk** and are at significant risk of exposure to RCS. This is so any changes to the worker's health can be detected as early as possible. If your workers have been carrying out **processing** of a CSS that is **high risk** and you have not provided health monitoring, you must organise it as soon as possible.

Health monitoring must be carried out or supervised by a medical practitioner with experience in health monitoring. Health monitoring for RCS includes workers being screened with specialised equipment. Depending on the worker's past exposures and medical history, some doctors may recommend carrying out further tests with a specialist to detect early-stage silicosis.

Under WHS laws, the minimum requirements for health monitoring for crystalline silica through exposure to RCS are:

- collection of demographic, medical and occupational history
- records of personal exposure
- standardised respiratory questionnaire
- standardised respiratory function tests, for example, FEV1 (forced expiratory volume in one second), FVC (forced vital capacity) and FEV1/FVC, and
- chest X-ray full posterior-anterior (PA) view.

All full-size PA chest X-rays should be taken in a specialist radiology practice or hospital department. The X-rays should be read by a radiologist who meets the reporting requirements and competencies of the Royal Australian and New Zealand College of Radiologists or is qualified as a 'B reader'. A B reader is a radiologist who has undertaken specialised training to detect dust lung diseases such as silicosis, coal workers pneumoconiosis, mixed dust pneumoconiosis and progressive massive fibrosis (PMF).

High-resolution computed tomography (HRCT) is more sensitive and effective than X-rays in the early detection of silicosis. A low dose HRCT scan of the chest (non-contrast) may be used by the registered medical practitioner supervising or carrying out the health monitoring, depending on the worker's history and levels of silica exposure. Low dose HRCT may be used instead of, or as an adjunct to, X-ray. Alternative imaging methods are being developed and may also be considered. Note that in Western Australia low dose HRCT must be undertaken for health monitoring required for RCS rather than chest X-ray.

## Health monitoring records

The medical practitioner doing your workers' health monitoring will provide you with a health monitoring report relating to each worker. The report must be kept for at least 30 years and the worker must receive a copy of the report.

You must provide the health monitoring report to your WHS regulator if the medical practitioner doing your monitoring:

- informs you that a worker may have contracted a disease, injury, or illness as a result of carrying out work using, handling, generating, or storing silica, or
- recommends that you take remedial measures (such as stopping a worker from continuing to perform particular work or implementing additional exposure controls).

You must also take into account any previous relevant health monitoring provided and any previous adverse outcomes related to the particular **processing** of a CSS in your assessment. The assessment must be included as part of the silica risk control plan, as outlined in Part 5.2 of this guide. However, the information you record in the assessment (and include in the silica risk control plan) should not identify a worker or contain any personal or confidential medical information.

In some jurisdictions, the doctor may notify a worker's silicosis diagnosis to the Department of Health. The National Occupational Respiratory Disease Registry (NORDR) stores data on occupational respiratory diseases in Australia. For all states and territories, it is mandatory for physicians to report cases of silicosis to NORDR. Further information is available on the [Department of Health and Aged Care](#) website.

If you are a PCBU that provides health monitoring, please seek further information from the [Health monitoring guide for PCBUs](#) and [Health monitoring guide for crystalline silica](#).

## 6. Maintain and review control measures for processing of a CSS

### **WHS Regulations 38**

Review of control measures

### **WHS Regulations 352**

Review of control measures

Managing WHS risks is an ongoing process that needs attention over time and particularly when any changes affect the activities carried out at your workplace.

The control measures you put in place to manage risk of exposure to RCS should be reviewed regularly to make sure they are working as planned. You should review the control measures for tasks involving processing of a CSS that is high risk more frequently. Do not wait until something goes wrong. A review of your control measures is required:

- when the control measure is not effective in controlling the risk. For example if:
  - it is obvious due to general dust levels in the workplace
  - it is identified that workers are not complying with administrative or personal protective equipment requirements
  - air monitoring shows RCS is at or above half of the WES
  - a worker's health monitoring report shows an injury, illness or disease, or
  - the doctor supervising a worker's health monitoring requests a review of your control measures
- before something significant changes at the workplace. For example there is a change to:
  - the safety data sheet for the CSS (where applicable),
  - the workplace itself,
  - any aspect of the work environment, or
  - any system of work, process or procedure
- if a new hazard or risk is identified
- if raised by your workers or HSR during consultation
- if an HSR requests a review, and
- at least once every five years.

To review your control measures, you can use the same process as when you are identifying a hazard. Consult with your workers and any HSRs and consider the following questions:

- Are the control measures working effectively in both their design and operation?
- Have the control measures introduced new hazards?
- Have all hazards been identified?
- Have new work methods, new equipment or chemicals made the job safer?
- Are safety procedures being followed?
- Has the instruction and training provided to workers on how to work safely been successful?

- Are workers actively involved in identifying hazards and possible control measures?  
Are they openly raising health and safety concerns and reporting problems promptly?
- Are the frequency and severity of health and safety incidents reducing over time?
- If new information becomes available, does it show that your current controls may no longer be the most effective?

If you find that the existing control measures may not be sufficient to eliminate or minimise the risks of exposure to RCS, you should review your risk assessment and determine if additional control measures are needed.

# Appendix A - Glossary

Key terms	Meaning
<b>Duty holder</b>	Any person who owes a work health and safety duty under the WHS laws including a person conducting a business or undertaking, a designer, manufacturer, importer, supplier, installer of products or plant used at work (upstream duty holder), officer or a worker.
<b>Engineered stone</b>	Engineered stone: <ul style="list-style-type: none"><li>a) is an artificial product that:<ul style="list-style-type: none"><li>i. contains 1% or more crystalline silica determined as a weight/weight (w/w) concentration; and</li><li>ii. is created by combining natural stone materials with other chemical constituents such as water, resins or pigments; and</li><li>iii. becomes hardened; but</li></ul></li><li>b) does not include the following:<ul style="list-style-type: none"><li>i. concrete and cement products;</li><li>ii. bricks, pavers and other similar blocks;</li><li>iii. ceramic wall and floor tiles;</li><li>iv. porcelain, where it does not contain resin;</li><li>v. sintered stone, where it does not contain resin;</li><li>vi. roof tiles;</li><li>vii. grout, mortar and render;</li><li>viii. plasterboard.</li></ul></li></ul>
<b>Hazard</b>	A situation or thing that has the potential to harm a person. Hazards at work may include, noisy machinery, a moving forklift, chemicals, electricity, working at heights, a repetitive job, bullying and violence at the workplace.
<b>Health and safety representative (HSR)</b>	A worker who has been elected by their work group under the WHS Act to represent them on health and safety matters.
<b>Legacy engineered stone</b>	Any previously installed engineered stone or stock of engineered stone that was not installed prior to the commencement of the engineered stone prohibition.
<b>May</b>	'May' indicates an optional course of action.
<b>Must</b>	'Must' indicates a legal requirement exists that must be complied with.
<b>NATA-accredited laboratory</b>	A testing laboratory accredited by the National Association of Testing Authorities (NATA) or recognised by NATA either solely or with someone else. The NATA accredits laboratories and regularly carries out reaccreditation audits of the laboratories. A list of accredited laboratories is available from the NATA web site ( <a href="http://www.nata.com.au">www.nata.com.au</a> ).



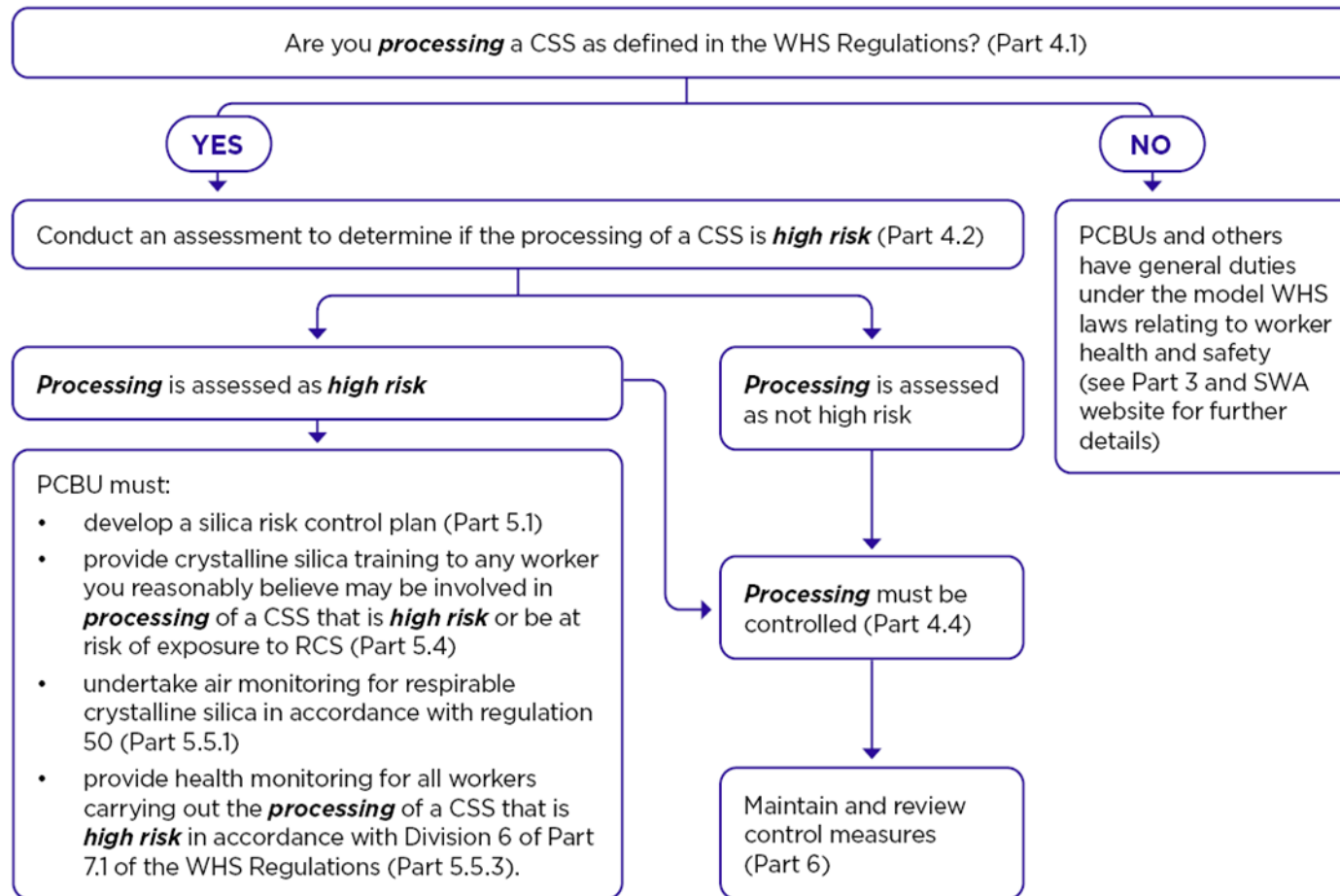
<b>Officer</b>	<p>An officer under the WHS Act includes:</p> <ul style="list-style-type: none"> <li>• an officer within the meaning of section 9 of the <i>Corporations Act 2001</i> (Commonwealth)</li> <li>• an officer of the Crown within the meaning of section 247 of the WHS Act, and</li> <li>• an officer of a public authority within the meaning of section 252 of the WHS Act.</li> </ul> <p>A partner in a partnership or an elected member of a local authority is not an officer while acting in that capacity.</p>
<b>Person Conducting a Business or Undertaking (PCBU)</b>	<p>A PCBU is an umbrella concept which intends to capture all types of working arrangements or relationships.</p> <p>A PCBU includes a:</p> <ul style="list-style-type: none"> <li>• company</li> <li>• unincorporated body or association, and</li> <li>• sole trader or self-employed person.</li> </ul> <p>Each individual who is in a partnership that is conducting a business or undertaking will individually be a PCBU.</p> <p>A volunteer association or elected members of a local authority will not be a PCBU.</p>
<b>Personal protective equipment</b>	<p>Anything used or worn by a person to minimise risk to the person's health and safety.</p>
<b>Processing</b>	<p>Processing in relation to a CSS means:</p> <ol style="list-style-type: none"> <li>a) the use of power tools or mechanical plant to carry out an activity involving the crushing, cutting, grinding, trimming, sanding, abrasive polishing or drilling of a CSS; or</li> <li>b) the use of roadheaders to excavate material that is a CSS; or</li> <li>c) the quarrying of a material that is a CSS; or</li> <li>d) mechanical screening involving a material that is a CSS; or</li> <li>e) tunnelling through a material that is a CSS; or</li> <li>f) a process that exposes, or is reasonably likely to expose, a person to respirable crystalline silica during the manufacture or handling of a CSS.</li> </ol>
<b>Risk</b>	<p>The possibility harm (death, injury or illness) might occur when exposed to a hazard.</p>
<b>Should</b>	<p>'Should' indicates a recommended course of action.</p>
<b>Weight/weight (w/w) concentration</b>	<p>In relation to crystalline silica, a weight/weight (w/w) concentration is defined as the mass of crystalline silica divided by the total mass of the crystalline silica substance and multiplied by 100%.</p>

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<b>Worker</b>	Any person who carries out work for a person conducting a business or undertaking, including work as an employee, contractor or subcontractor (or their employee), self-employed person, outworker, apprentice or trainee, work experience student, employee of a labour hire company placed with a 'host employer' or a volunteer.
<b>Workplace</b>	Any place where work is carried out for a business or undertaking and includes any place where a worker goes, or is likely to be, while at work. This may include offices, factories, shops, construction sites, vehicles, ships, aircraft or other mobile structures on land or water.
<b>Workplace exposure standard (WES)</b>	A workplace exposure standard published by Safe Work Australia in the <a href="#"><u>Workplace Exposure Standards for Airborne Contaminants</u></a> .

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# Appendix B – Processing of a CSS: Risk Management Process



# Appendix C – Assessment to determine if the processing of a CSS is high risk – optional template

This template is designed to help you to document an assessment to determine if the processing of a crystalline silica substance is high risk, as defined in Chapter 8A of the WHS Regulations.

## PCBU obligations

If you are intending to process a crystalline silica substance (CSS)<sup>12</sup>, you **must** assess the risk and document the outcome before commencing work.

If you determine that the processing of the CSS is high risk, you **must** also complete a silica risk control plan and comply with additional regulations as outlined in the Working with crystalline silica substances guide.

### Determining if the processing of a CSS is high risk

You must complete an assessment for each type of processing carried out at the workplace to determine if it is high risk. However, if you have more than one type of processing at your workplace occurring simultaneously, this may increase the likelihood that there will be a risk to the health of persons at the workplace. In this instance, the assessment may cover all types of processing of a CSS, and you should consider in your assessment whether this will increase the risk to the health of persons at the workplace. For example, different workers may be undertaking different types of processing in the same shift. When considered individually each type of processing might not be assessed as high risk with regard to the below considerations. However, the combined exposure to respirable crystalline silica (RCS) from multiple processes may be reasonably likely to result in a risk to the health of a person at the workplace, making the overall assessment as high risk.

When conducting this assessment, the WHS Regulations state you must have regard to:

- the specific processing to be undertaken
- the form or forms of crystalline silica present in the CSS
- the proportion of crystalline silica contained in the CSS, determined as a weight/weight (w/w) concentration
- the hazards associated with the work, including the likely frequency and duration that a person will be exposed to RCS,

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<sup>12</sup> A crystalline silica substance or CSS is any material that contains at least 1% crystalline silica, determined as a weight/weight (w/w) concentration.

- whether the airborne concentration of RCS that is present at the workplace is reasonably likely to exceed half the workplace exposure standard,
- any relevant air and health monitoring results previously undertaken at the workplace, and
- any previous incidents, illnesses or diseases associated with exposure to RCS at the workplace.

You must weigh up all of the above matters when conducting the assessment and cannot solely rely on control measures implemented in accordance with sub-regulation 529B(1)(b) (duty for the processing of a CSS to be controlled) to determine that the processing of a CSS is not high risk. In addition, you must not have regard to the use of any personal protective equipment and administrative controls used to control the risks associated with RCS in the assessment.

You must record the assessment in writing, including how you have considered the above factors, and the reasons why the processing is determined to be high risk or not high risk.

### **Outcome of risk assessment**

If you determine that your processing of a CSS is not high risk, you must still ensure any processing is controlled in accordance with regulation 529B.

If you determine that your processing of a CSS is high risk, you must complete a silica risk control plan and ensure you comply with the additional regulations applying to processing of a CSS that is high risk, which are outlined in the *Working with crystalline silica substances* guidance for PCBUs.

### **Related guidance material**

Additional information on the duties of PCBUs when working with crystalline silica substances is included in the *Working with crystalline silica substances* guidance for PCBUs.

## How to use this template

This template is an optional tool designed to assist you to determine if your *processing of a CSS* is **high risk**.

**High risk**, in relation to the processing of a **CSS** is defined in the regulations as the processing of a CSS that is reasonably likely to result in a risk to health of a person at the workplace.

Once documented, it is your responsibility to consider all factors in determining if your processing is high risk. When making this assessment, you must provide justification.

A WHS regulator has the power to inspect an assessment and require a PCBU to review it if they do not agree with the assessment outcome.

If you determine that processing of a CSS is high risk as a result of the assessment, you will need to complete a silica risk control plan, before commencing work.

**Whilst this template can be used to assist you in meeting your WHS duties, it is not mandatory to use this template, and other forms of documenting the assessment are acceptable, provided they demonstrate consideration of the matters outlined above.**

## Assessment

This assessment was prepared on [\_\_/\_\_/\_\_].

### PCBU Details

**Business name:** Click here to enter text.

**Business address:** Click here to enter text.

### Details of person completing the assessment

**Name:** Click here to enter text.

**Position:** Click here to enter text.

**Contact details:** Click here to enter text.

## Workplace(s) that this assessment covers

Please list the address(es) of the workplace(s) this assessment covers:

[Click here to enter text.](#)

## Consultation

Have affected workers and their health and safety representatives (HSRs; if applicable) been consulted in the preparation of this assessment:

Yes  No

Please briefly describe how workers have been consulted in the preparation of this assessment:

[Click here to enter text.](#)

## Details of crystalline silica substance (CSS)

Please list all CSS you work with (materials that contains at least 1% crystalline silica, determined as a weight/weight concentration):

[Click here to enter text.](#)

If the CSS has an available safety data sheet, outline the details below:

Product name	Product supplier	Form(s) of crystalline silica present	Silica content (sourced from safety data sheet or product information)

Is a copy of the safety data sheet or product information attached to this document  Yes  No

**If a safety data sheet is not available or the CSS is a natural material, do you have any other information available to indicate the amount and form(s) of crystalline silica present?**

*Note: this may include any scientific analysis you have conducted to determine the amount and type of crystalline silica present, publicly available information from suppliers or manufacturers, scientific literature etc.*

Yes  No

If yes, please outline below (including any references where applicable):

Click here to enter text.

**If there is no available information, and you have not conducted any scientific analysis, you should assume the CSS contains high levels of crystalline silica for the purposes of this assessment, until you can determine otherwise.**

## Identifying processing of a CSS

For the purpose of this assessment, a processing of a CSS means:

- a. the use of power tools or mechanical plant to carry out an activity involving the **crushing, cutting, grinding, trimming, sanding, abrasive polishing** or **drilling** of a CSS; or
- b. the use of **roadheaders** to excavate material that is a CSS; or
- c. the **quarrying** of a material that is a CSS; or
- d. **mechanical screening** involving a material that is a CSS; or
- e. **tunnelling** through a material that is a CSS; or
- f. a **process** that exposes, or is reasonably likely to expose, a person to respirable crystalline silica during the manufacture or handling of a CSS.



When carrying out processing of a CSS, the generation of harmful RCS is the predominant hazard. Please outline the factors associated with the processing occurring at your workplace in the table below to help you assess likely exposure to RCS. If you have more than one processing task at your workplace occurring simultaneously, please document for each task.

In considering the likely exposure to RCS, you may take into account any isolation or engineering controls in place to control RCS, but you cannot take into account any administrative controls or personal protective equipment.

Location	Task	Frequency and duration	Isolation or engineering controls	Likelihood of exposure to RCS
<b>Example only</b> Fabrication workshop – cutting bench	Cutting granite with a bridge saw	2 workers cutting granite for 2 hours per day, 3 times per week	Wet suppression system using built in blade water feed nozzle	

### Previous air monitoring results

You must consider any relevant RCS air monitoring results for your workplace. This means that you should ensure the air monitoring results are relevant to the CSS, task, controls and conditions at your workplace. You may also attach relevant air monitoring reports to this assessment as evidence.

If you have previous air monitoring results that are relevant to the processing of a CSS being assessed, please use the table below to document them.

Details	Task details	RCS airborne concentration	Recommended actions
Carried out by: [insert name of independent competent person] On: [Insert date] In response to: [insert specific trigger or routine]			

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## Airborne concentration of RCS

You must consider whether the airborne concentration of RCS is reasonably likely to exceed half the workplace exposure standard.

As you are considering the airborne concentration of RCS, not the actual exposure of workers to RCS, you must not take into account any protection provided by respiratory protective equipment.

If you have previous RCS air monitoring results from your workplace that are relevant to the processing of a CSS being assessed, you should use this data to inform your assessment. However, it is not a requirement to perform new air monitoring to assess whether you are likely to exceed half the workplace exposure standard. You can use personal exposure data obtained from other sources, including:

- the manufacturer of the control or tool used,
- an industry association, or
- a certified occupational hygienist<sup>13</sup>

If you are using exposure data from air monitoring that was not conducted in your workplace, you should ensure the data is relevant to the task, controls and conditions in your workplace.

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<sup>13</sup> Best practice is to use a certified occupational hygienist. However, there may be circumstances where a certified occupational hygienist is not available. Where a certified occupational hygienist is not available, a person with knowledge and experience in occupational hygiene can be used instead.

If you are unsure whether the airborne concentration of RCS is reasonably likely to exceed half the workplace exposure standard, you should indicate yes, until you can determine otherwise (by completing further air monitoring).

Please refer to Part 4.2.5 of the Working with crystalline silica substances guidance for PCBUs for further information on completing this section.

**Is the airborne concentration of RCS at the workplace reasonably likely to exceed half the workplace exposure standard?**  Yes  
 No

**Do you have exposure data that supports your determination of whether the airborne concentration of RCS at the workplace is reasonably likely to exceed half the workplace exposure standard?**  Yes  No

**If yes, please outline in the table below, the exposure data you have used to base your assessment.**

Type of evidence	Source	Results/data
For example – air monitoring results, exposure data	For example – scientific literature, safety data sheet, manufacturer publication, industry association, certified occupational hygienist etc.	

### Previous health monitoring

You must consider any health monitoring performed at your workplace previously and consider the findings of that monitoring, if they are relevant to your processing of a CSS. This means that you should ensure the health monitoring results are relevant to the CSS, task, controls and conditions at your workplace.

**Have you previously provided health monitoring for workers at your workplace?**

Yes  No

**Are these results relevant to the processing of a CSS being assessed?**

Yes  No

If yes, please provide details below.

**Carried out on:** [insert date]

**In response to:** [insert specific trigger or routine]

**Frequency of health monitoring:** [Click here to enter text]

**Do not record personal or confidential health information about individuals in this assessment.**

### Previous incidents, illnesses or diseases

You must record any previous incidents, illnesses or diseases associated with RCS at your workplace, this may include adverse health monitoring findings. You must have regard to this in assessing whether the processing of a CSS is high risk.

Details should be recorded in the table below.

Details of incidents, illnesses and diseases/adverse health monitoring outcomes	Has this been reported to the WHS Regulator?	Actions arising

**Do not record personal or confidential health information about individuals in this assessment.**

## Outcome and justification

You must now use all the information documented in previous sections to determine if your processing of a CSS is high risk. In making this assessment, you must weigh up all of the relevant factors. Processing of a CSS is considered high risk if it is reasonably likely to result in a risk to the health of a person at the workplace. If you determine that processing of a CSS is not high risk, you must be able to explain why it is more likely than not that the process is not high risk.

If you are unable to determine if your processing of a CSS is high risk, you must treat it as if it is high risk until you are able to determine otherwise.

Having regard for all the above matters, is the processing of a CSS **high risk**?  Yes  No

Please provide justification of the assessment outcome:

## Next steps

If you have determined your processing of a CSS is high risk, you **must**:

- complete a silica risk control plan, and
- attach a copy of this assessment.

If you have determined your processing of a CSS is not high risk, you **must**:

- ensure processing is controlled, in accordance with **regulation 529B** (as explained in more detail in the *Working with crystalline silica substances* guidance for PCBU.s.), and

- ensure you comply with all other duties under WHS laws, including in relation to other hazards that may present a risk while undertaking your processing of a CSS.

## Appendix

You may attach copies of the following documents to support this assessment:

- any safety data sheets, product information, literature or other suitable evidence used to support this plan.
- any scientific analysis of a CSS to determine its crystalline silica content.
- relevant occupational hygiene air monitoring reports.

## Appendix D – Ventilation and water suppression

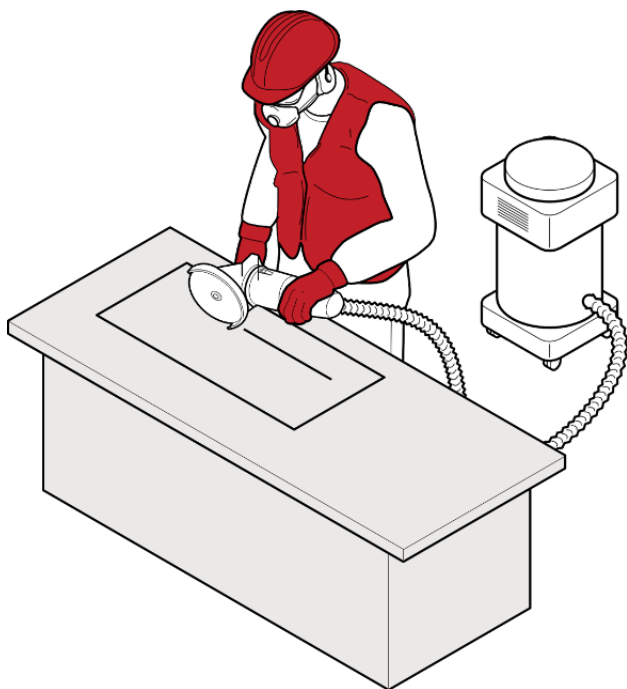
Ventilation is a very effective engineering control when designed correctly. There are a range of different ventilation systems, and you need to use the ones that suit your workplace and the tasks your workers carry out.

More information about ventilation and other engineering controls can be found in the [model Code of Practice: Managing risks of hazardous chemicals in the workplace](#).

### On-tool dust extraction

On-tool dust extraction systems can include a shroud, an on-tool hose attachment and a vacuum extraction system. The dust or mist is collected within the shroud and is then drawn into the hose attachment to the vacuum, where it is extracted, filtered and discharged. When correctly designed and used an on-tool extraction system can both capture and contain dust or mist generated from the **processing of a CSS** (Figure 3).

**Figure 3 A worker cutting/grinding with on-tool dust extraction**



RCS is very abrasive to LEV and on-tool dust extraction equipment. Regularly inspecting equipment for damage will help ensure it is effective and fit for purpose.

### Local exhaust ventilation (LEV)

LEV is designed to remove airborne contaminants from the air before they reach the breathing zone of workers. It is the most effective control for large quantities of RCS when it is applied close to the source of generation.

For drills, routers, saws and other equipment, an appropriately designed LEV should be fitted. The manufacturer of on-tool extraction and LEV equipment can provide information about how the equipment captures dust to determine its suitability for a particular workplace.

A simple LEV system most commonly comprises of:

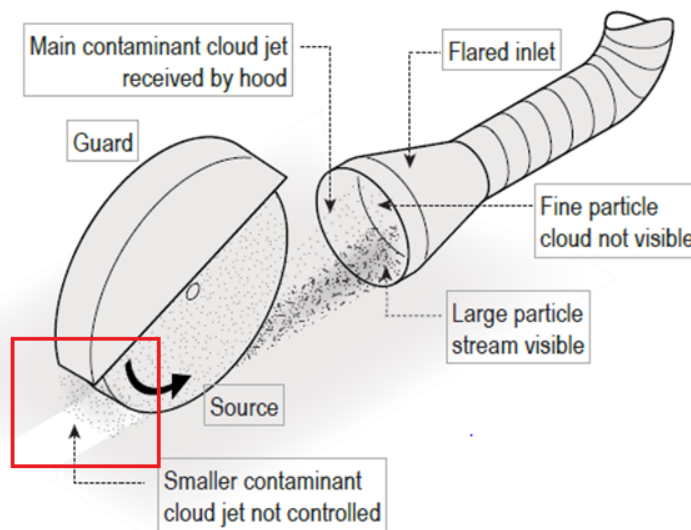
- an extraction hood to capture and remove contaminated air near the point of release
- ducting to connect to an air-cleaning system
- a fan to move the air through the system, and
- an exhaust stack outside the building to disperse the cleaned air.

While these controls may reduce background levels of RCS, they are not as effective in reducing exposure to RCS for workers performing high exposure tasks. High exposure tasks should be performed using on-tool controls that suppress or capture dust at the source, such as integrated water suppression or dust extraction.

If there is too much distance between an extraction unit and the dust generation point, the capture strength or velocity of extraction at the point of dust generation is too low to adequately capture the RCS generated.

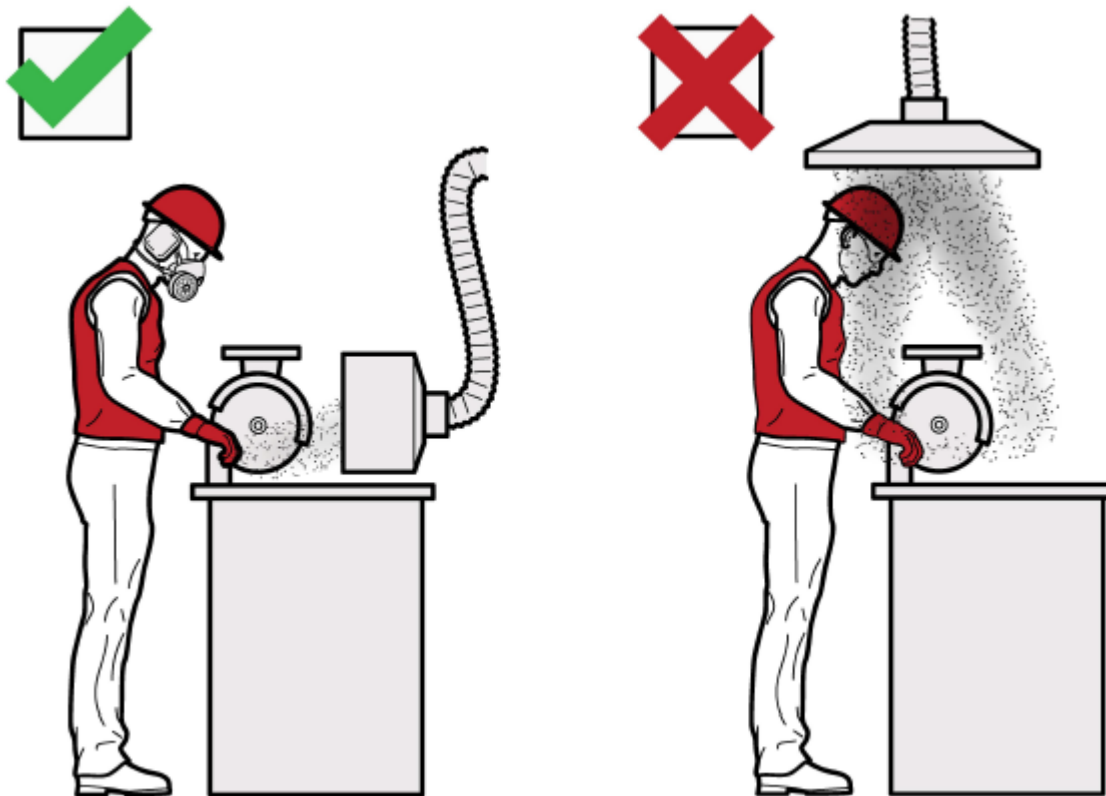
For extraction to be effective, the cutting point needs to be close to the extraction hood. The nature of the work may not allow this, or it may require the worker to constantly reposition the work piece or hood. For example, a stonemason cutting a sink hole into a stone benchtop is regularly moving and turning the tool, which generates dust in a range of directions and angles.

**Figure 4 Operational view of local exhaust ventilation**





**Figure 5 Examples of using local exhaust ventilation**



## Natural ventilation

Improving the general ventilation to a room or building may help reduce the concentration of contaminants in the air. However, ventilation should not be relied on to ensure RCS exposure is controlled. Other controls must also be used to prevent the release of RCS into the air and adequately protect workers and others in the vicinity from exposure to RCS.

The workplace should have an adequate supply of fresh air. For on-site installation, processes that generate RCS may be undertaken outside, provided the contaminated dust does not travel in the direction of other workers or premises. When working indoors, windows and doors within a room or building should be open to provide general ventilation. Fans may support the movement of air, but it is important that air streams are directed appropriately. Fans should be arranged so that streams of clean air are drawn past workers and contaminated air streams are drawn away from workers and ensure contaminated air is not directed towards others, for example, workers or adjacent businesses.

Wet slurries should be cleaned up before fans are used to prevent them from drying and creating potential dust hazards.

More information about natural ventilation at the workplace can be found in the model [Code of Practice: Managing the work environment and facilities](#).

## Water suppression

Water suppression uses water at the point of dust generation to dampen down or suppress dust before it is released into the air. Powered hand tools and equipment fitted with water feeds are available, including grinders and polishers, and large machinery including bridge saws, routers or polishing machines.

The equipment or machinery used for water suppression should:

- have an appropriate ingress protection (IP) rating for use with water suppression
- have the water feed attached and an adequate number of water feeds directed at the material and/or tool to prevent dust being released during the process
- have a consistent water flow and adequate water pressure during operation (usually at least 0.5 L/min)
- be fitted with guards, plastic flaps or brush guards designed to manage the water spray or mist containing RCS, and
- be maintained according to manufacturer's instructions.

**Note:** Only tools and machinery that have been designed for use with water attachments should be used with water suppression. Handheld spray bottles, sponges or garden hoses are inadequate at suppressing RCS. They are also dangerous if used with power tools that are not designed for use with water.

## Combining water suppression with other controls

Research has found that even when wet methods are used on products that contain high levels of crystalline silica that RCS may not be adequately controlled. Applying water to rotating tools can also generate RCS-contaminated mist that must also be controlled.

For this reason, properly designed water suppression and local exhaust ventilation may be required in combination when working with these products. It is important to:

- only use tools and machinery that have been specifically designed for use with water attachments with the appropriate ingress protection (IP), for example:
  - when cutting natural, engineered and sintered stone or porcelain slabs, use bridge saws fitted with water attachments to suppress dust
  - to complete sink and stovetop cut outs, use water suppressed routers, water jet cutters or bridge saws
  - for brick and concrete cutting, use hand-held power tools fitted with multiple water feeds that deliver water to the cutting blade and use water suppressed wet edge milling machines or polishing machines
- use an adequate number of water feeds to prevent visible dust during the process
- maintain adequate water pressure (0.5 L/min or as specified by the manufacturer) to make sure water is reaching the product or tool
- control water spray using guards, plastic flaps or brush guards
- prevent workers from being able to turn water suppression systems down or off during operation

- only use tools and machinery that have been specifically designed for local exhaust ventilation attachments such as drills, circular saws and grinders equipped with a shroud and an M- or H- class rated vacuum
- install fixed, portable or flexible capturing hoods to capture dust at the point of generation, and
- suppress dust by using water sprays to reduce airborne dust and dust clouds (for example, during earthworks, on stockpiles and roads, and when using machinery and cutting equipment).

Wet methods of fabrication can introduce other hazards to your workplace. When using wet methods consider:

- installing ventilation to control water mist that may carry dust in the mist cloud
- providing waterproof aprons, waterproof non-slip footwear and eye protection that does not fog up and obstruct worker's vision
- filtering water that is recycled
- ensuring run-off is effectively drained away from equipment and work areas
- installing non-slip flooring
- implementing housekeeping policies to make sure run-off does not dry to create a dust hazard, and
- if you are working outside with wet methods and it is very cold, check for ice hazards.

# Appendix E – Administrative controls

## Administrative controls

Examples of administrative controls for RCS include:

- planning cutting tasks to make sure the minimum number of cuts are made
- written rules and policies for working with a CSS or cleaning CSS waste
- for example, having a written clean-up procedure and log
- a maintenance schedule and log for equipment and personal protective equipment
- limiting the length of time a worker may be exposed to RCS
- restricted area policies so that only staff who are carrying out a task that generates RCS are allowed access to those areas, and
- signage at the workplace highlighting there is a dust hazard and any required use of respiratory protective equipment and other personal protective equipment (Figure 6)

## Housekeeping

When respirable crystalline silica (RCS) is made or generated in the workplace, it can settle on floors, plant, equipment and workers' clothing. From there, it can easily get into the air and get breathed in. It is important to do a regular clean up (or housekeeping) to effectively manage the risk of exposure to RCS in the workplace.

Good housekeeping can eliminate or reduce exposure to RCS, even after work has stopped. Developing written rules and policies for your workplace is a good way to implement housekeeping as an administrative control, and training people in appropriate cleaning methods.

### Housekeeping Do's and Don'ts

Do:	Don't:
<ul style="list-style-type: none"><li>• <b>wet down dusty work areas and processes</b></li><li>• <b>conduct a cleaning schedule for work areas and a maintenance schedule for engineering controls</b><ul style="list-style-type: none"><li>○ for example, regularly cleaning dusty vehicle tracks or high use areas and keeping them wet during the day</li></ul></li><li>• <b>carry out daily cleaning procedures for slurry and settled dust</b><ul style="list-style-type: none"><li>○ for example, placing wet slurry inside a sealed container for disposal</li></ul></li><li>• <b>use a low-pressure water, wet sweeping or an M or H class rated vacuum cleaner to clean dusty floors, walls, other surfaces, and equipment,</b></li></ul>	<ul style="list-style-type: none"><li>• use compressed air, dry sweeping or general-purpose vacuum cleaners to clean surfaces or clothing</li></ul>

- always follow the vacuum manufacturer’s operator manuals and instructions for changing dust bags and filters
- clean personal protective equipment and equipment in designated areas only
- if dusty personal protective equipment and equipment cannot be cleaned immediately after use it should be stored in sealed bags and cleaned prior to re-use.

If your workers are outdoors, you can cover the ground with plastic sheeting and remove remaining dust using the above methods.

Figure 6 Examples of dust hazard signs



## Management of wet slurry

Wet slurry is the resultant waste from water suppression. This slurry has the potential to build up from continuous **processing** using water suppression on equipment and machinery. The slurry is not hazardous while wet. However, if it dries, the dust can become airborne when disturbed and expose workers and others.

Wet slurry can be managed by:

- capturing or containing it through floor grading, grates, curbing and channelling
- keeping floors and surfaces wet, and
- regularly cleaning, including at the end of each day, to prevent wet slurry drying overnight.

Any wet slurry that is de-watered so that it is still wet, but of cake-like consistency, should be disposed of in a way that minimises the risk of dust being redistributed over the workplace. This may include covering the slurry, keeping it wet or bagging it before disposal.

## Recycled water

Water that is recycled on-site for use in water suppression should be effectively filtered to remove RCS and prevent contaminated water continually passing through the system. Without an appropriate filtration system there is a risk that continual recycling of water will increase the concentration of RCS in the water over time and subsequently the level of RCS in the mist arising from the water suppression activities.

Water recycling systems can filter slurry so that RCS and other dust particles are removed from the water before it is re-used. These systems can include:

- a pit that collects slurry from drains,
- a slurry collection tank and filter press that compacts silica and other particles into a solid block for disposal,
- a slurry settlement tank and waste bag, where waste forms into a solid block, and
- a filtered water tank that recirculates clean water back into the water supply.

Some products, such as commercially available flocculants, promote the clumping of particles, and will consolidate RCS in recycled water more effectively. Water that is recycled needs to be visually assessed to ensure it is clear. If the water has a cloudy or milky appearance this means it is likely to contain a high concentration of RCS and may increase the risk that airborne particles or contaminated mist will be released in the workplace.

For further information on the management of recycled water, please refer to guidelines in your state or territory.

## Decontamination

Dusty clothing and personal protective equipment can expose workers and others to RCS. Examples of how you can minimise exposure to dust carried on personal protective equipment and work clothes include:

- using an industrial M- or H- class vacuum cleaner to remove dust from clothes and uniforms:
  - by positioning these units at the exits of dusty work areas, you can encourage workers to vacuum their clothes before leaving
  - you should make sure that workers have access to an area to wash their arms, hands, faces and even their hair.
- providing a laundry service for dusty personal protective equipment and work wear supported by a policy, which includes:
  - that dusty personal protective equipment and work wear are not to be taken home
  - designated areas where dusty personal protective equipment and clothes must be changed
  - when dusty personal protective equipment and clothes must be laundered
  - if you use 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 RCS
- requiring workers to change dusty clothing after each shift, or if they have just finished a very dusty task to change at their next break, and
- providing workers with rubber boots and aprons.

Workers' clothes and uniforms must be cleaned frequently to stop RCS from contaminating break rooms, other parts of the workplace and importantly, to stop workers from taking RCS home.

More information about facilities at your workplace can be found in the [model Code of Practice: Managing the work environment and facilities](#).

# Appendix F - Personal Protective Equipment

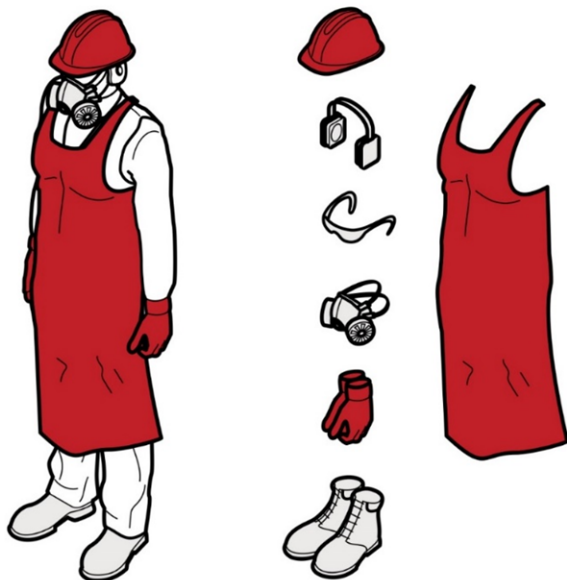
**Sole reliance on personal protective equipment as a control measure to protect workers from RCS is rarely appropriate because it does not prevent airborne dust. It is the least effective form of controlling dust exposure and relies on correct fit and use by the worker, as well as adequate supervision.**

Before using personal protective equipment, you need to do a risk assessment to see what other controls can and should be used. Personal protective equipment should only be considered after implementing substitution, isolation, engineering and administrative controls. It should only be used to supplement higher-level control measures or when no other safety measures are available. Figure 7 illustrates some examples of different types of personal protective equipment.

You must make sure personal protective equipment is clean, hygienic and in good working order. This is so that you do not introduce other hazards to the worker and that the personal protective equipment will work as intended. Information about maintaining and cleaning personal protective equipment should be sourced from the manufacturer or supplier.

You must provide ongoing training, information and instructions for your workers on how to use, clean and store the personal protective equipment you provide. Workers must also take reasonable care for their own health and safety. They are required to follow reasonable instructions and cooperate with any workplace policies you have in place to protect them. Workers must use and wear personal protective equipment as instructed by you. However, you must also supervise your workers to check they understand their training and are using the personal protective equipment correctly.

**Figure 7 Examples of personal protective equipment**



## Respiratory protective equipment



Tight-fitting respiratory protective equipment requires an effective face seal to work properly. This means that workers need to be clean-shaven or only have facial hair that does not interfere with the fitting surfaces or the respirator valve. As everyone's face is a different size and shape, there is no 'one size fits all' tight-fitting respirator. This means that you must also fit test each worker and their respiratory protective equipment before they undertake dusty work.

Tight-fitting respiratory protective equipment cannot be provided to workers who are, for valid reasons, unable to remain clean-shaven. In these circumstances, a powered air purifying respirator with a loose hood may be the only effective option.

## Choosing the right personal protective equipment

There are requirements under the WHS laws when it comes to choosing and using personal protective equipment.

You must make sure the personal protective equipment you provide is appropriate (check the safety data sheet for the CSS if one is provided) and fits the worker who will be wearing it. This will ensure that the personal protective equipment is doing its job. Wrong or ill-fitting personal protective equipment means that RCS can harm your workers because dust, including RCS, may be able to get into worker's eyes or into the worker's breathing zone and into their lungs.

When determining suitability, the protection factor assigned to the respiratory protective equipment must be sufficient to provide protection. The respiratory protective equipment filter must also be suitable for RCS.

When choosing the respiratory protective equipment, you must make sure the respiratory protective equipment is suitable.

- Respirators should comply with Australian standard AS/NZS 1716:2012. This number is usually displayed on the respirator or its packaging.
- The respirator should provide the required minimum protection factor (MPF). See the table below from AS/NZ 1715: 2009 for further information.
- You should consider respiratory protective equipment maintenance requirements, including cleaning and availability of appropriate equipment and spare parts.

**Table 3 Minimum protection factor afforded by different types of respiratory protective equipment (source: adapted from AS/NZS 1715:2009)**

Required minimum protection factor	Suitable respiratory protective equipment
Up to 10	<ul style="list-style-type: none"> <li>• P1, P2 or P3 filter half facepiece—replaceable filter</li> <li>• P1 or P2 disposable facepiece</li> <li>• PAPR—P1 filter in PAPR with any head covering or facepiece</li> </ul>
Up to 50	<ul style="list-style-type: none"> <li>• P2 filter in full facepiece</li> <li>• PAPR-P2 filter in PAPR with any head covering or full facepiece</li> <li>• PAPR-P3 filter in PAPR with any head covering</li> <li>• Half facepiece with positive pressure demand or continuous flow air-line</li> <li>• Half facepiece—air-hose respiratory protective equipment with electric blower</li> </ul>
Up to 100	<ul style="list-style-type: none"> <li>• P3 filter in full facepiece</li> <li>• Full facepiece air-hose (hose mask) natural breathing type</li> </ul>
100+	<ul style="list-style-type: none"> <li>• PAPR-P3 filter in PAPR with full facepiece or head covering and blouse</li> <li>• Head covering air-hose with electrical blower</li> <li>• Head covering air-line respiratory—continuous flow</li> <li>• Full facepiece air-line respiratory—positive pressure demand or continuous flow modes</li> <li>• Full facepiece air-hose with electric blower</li> </ul>

## Fit testing respiratory protective equipment

Fit testing measures the effectiveness of the seal between the respirator and the wearer's face. If there is not a good seal contaminated air, potentially containing RCS, could leak into the respirator and be breathed in by the worker.

Workers should pass a respirator fit test before they first start wearing a tight-fitting respirator including:

- half face disposable
- half face reusable
- full face reusable, and
- tight-fitting powered air purifying respirators (PAPR).

Types of respiratory protective equipment are shown in Figure 8.

There are two types of fit testing that can be carried out:

- Qualitative
  - a pass/fail test that relies on the wearer's ability to taste or smell a test agent
  - only used on half face respirators, and
- Quantitative
  - uses specialised equipment to measure how much air leaks into the respirator
  - used on half face respirators, full face respirators and PAPR.

Quantitative fit testing results are more objective than qualitative testing because some workers have difficulty with their ability to taste or smell. This can result in a 'false pass' and worker health not being adequately protected.

Full face respirators and PAPR must be fit tested using the quantitative method.

All fit testing must be carried out by a competent person, manufacturer, supplier or consultant before a worker wears a tight-fitting respirator for the first time.

A further fit test should be performed:

- at least annually,
- each time a new make or model of respirator is provided to a worker, and
- whenever there is a change in the wearer's facial characteristics or features that may affect the seal (e.g. large weight loss or gain).

Keep a written record of fit tests carried out for each worker and share the record with the worker after fit testing is complete. The record should include the:

- type of test performed
- make, model, style and size of respirator tested, and
- date and result of the test.

## Fit checking respiratory protective equipment

Fit checking enables workers to take reasonable care of their own health and safety while working with CSS.

A fit check is a quick check to ensure a fit tested respirator is properly positioned on the face and there is a good seal between the respirator and face. Fit checks do not replace the need for a fit test. Workers should follow the respirator manufacturer's instructions on how to carry out a fit check.

Fit checking is the responsibility of the worker. Workers must be trained on how to carry out a fit check for their tight-fitting respiratory protective equipment. They should undertake a fit check every time they use a tight-fitting respirator to ensure they are using and wearing respiratory protective equipment in a way that will protect their health and safety. As a PCBU it is also important to supervise your workers to ensure fit checking is being conducted correctly by your workers. For respiratory protective equipment to be effective, workers who are required to wear tight-fitting respirators must be clean shaven.

## Respiratory protective equipment training and maintenance

When issuing respiratory protective equipment, training must be provided to ensure that workers correctly use and maintain the respiratory protective equipment. Training can be carried out by:

- a health and safety consultant
- a trained person in-house
- a representative from a respiratory protective equipment manufacturer or supplier
- a certified occupational hygienist<sup>14</sup>, or
- the holder of recognised qualifications in WHS with expertise or experience in this area.

You must provide training for your workers who are provided with respiratory protective equipment. This is to make sure they fit, use and maintain the respiratory protective equipment they are expected to use. Training must be provided by a competent person; this could be a consultant, someone in house or a representative from a respiratory protective equipment manufacturer or supplier.

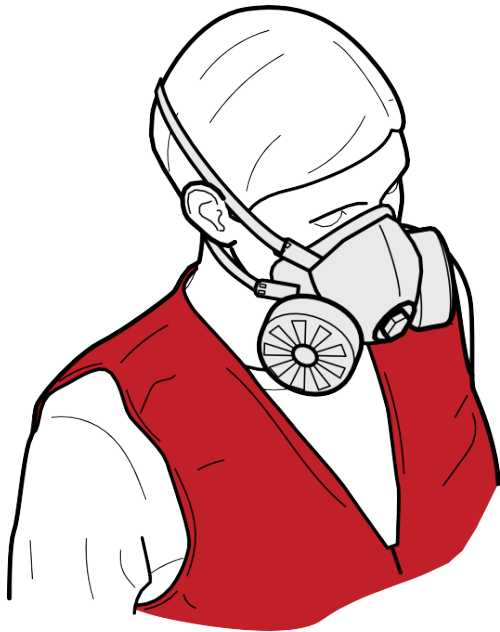
Good training for respiratory protective equipment should cover:

- why the respiratory protective equipment is required for their job
- when the worker must wear the respiratory protective equipment
- how the respiratory protective equipment works
- the limitations of the respiratory protective equipment
- how to correctly put on and take off the respiratory protective equipment
- how to fit check
- how to clean and maintain the respiratory protective equipment
- when and how to replace the filters, and
- how and where to store respiratory protective equipment when not in use.

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<sup>14</sup> Best practice is to use a certified occupational hygienist. However, there may be circumstances where a certified occupational hygienist is not available. Where a certified occupational hygienist is not available, a person with knowledge and experience in occupational hygiene can be used instead.

**Figure 8 Respiratory protective equipment**



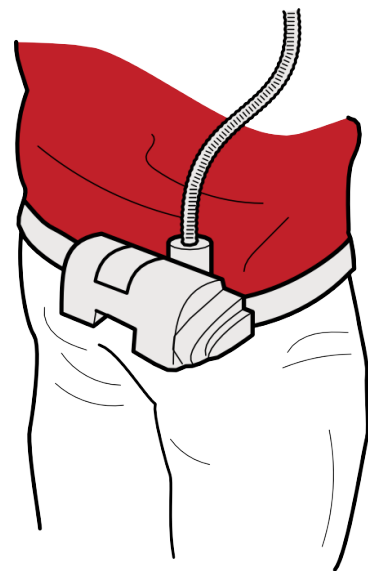
Reusable half-face respirator



Full face respirator (cartridge)



Full face Powered Air Purifying Respirator (PAPR)



# Appendix G – Silica risk control plan – optional template

This template will help you to document details of any processing of a crystalline silica substance (CSS) that is high risk and the control measures used to manage the risks of exposure to respirable crystalline silica.

You will need to complete the plan by adding details specific to your workplace. The plan should be developed in consultation with workers and relevant Health and Safety Representatives of the work group (if applicable) and be available and provided to all workers before they commence the processing. It should also be provided to any registered medical practitioner carrying out or supervising health monitoring at the workplace.

## PCBU obligations

If you are carrying out a processing of a CSS that is high risk, you **must** complete a silica risk control plan before commencing any processing.

You can use the same silica risk control plan to document multiple types of processing of a CSS, so long as you provide details for each and outline the specific control measures that will be used to manage the risk of respirable crystalline silica (RCS) for each process.

### What must a silica risk control plan contain?

A silica risk control plan must:

- a. identify all processing carried out at the workplace that is high risk
- b. contain a copy of the information used to assess the risk, including:
  - the specific processing that will be undertaken
  - the form or forms of crystalline silica present in the CSS
  - the proportion of crystalline silica contained in the CSS, determined as a weight/weight (w/w) concentration
  - the hazards associated with the work, including the likely frequency and duration that a worker will be exposed to RCS
  - results of any relevant air and health monitoring previously undertaken at the workplace
  - information regarding previous incidents, illnesses or diseases associated with exposure to RCS at the workplace

- whether the airborne concentration of RCS present at the workplace is reasonably likely to exceed half the workplace exposure standard, and
- the reasons why the processing has been assessed as being a high risk,
  - a. document what control measures will be used to control the risks and how those measures will be implemented, monitored and reviewed, and
  - b. be set out and expressed in a way that is readily accessible and understandable.

If the processing is also high risk construction work, a safe work method statement can be used instead of a silica risk control plan as long as it meets the requirements of a silica risk control plan.

A silica risk control plan must be reviewed and as necessary revised if relevant control measures are revised under regulation 38 (review of control measures).

### **What are the additional requirements if processing of a CSS has been determined to be high risk?**

Additional requirements for processing of a CSS that is high risk include:

- training to workers about the risks of crystalline silica
- air monitoring for RCS and reporting to the WHS regulator if the airborne concentration of RCS exceeds the workplace exposure standard, and
- health monitoring.

### **Related guidance material**

For more information on the duties of PCBUs when working with CSS, please see the relevant sections above.

## How to use this template

The purpose of this template is to assist you in documenting a silica risk control plan for processing of a CSS that is high risk. There are five parts to this template, as outlined below.

### **Part A – PCBU and process information**

*This section includes PCBU location and contact details, and an outline of the number and type of processes covered by the silica risk control plan.*

### **Part B – Assessment of risk**

*This section contains the information used to assess the risk of each process and can be completed by attaching a copy of the original assessment conducted to determine the process was high risk.*

### **Part C – Control measures**

*This section includes details on the control measures that will be used to control the risks for each process and how those measures will be implemented, monitored and reviewed.*

### **Part D – Training**

*It is not mandatory to include training information in the silica risk control plan and completion of this section is optional. However, it will allow you to outline where you have documented the training provided.*



## Part A – PCBU and process information

This silica risk control plan was prepared on [\_\_/\_\_/\_\_] and will be reviewed on [\_\_/\_\_/\_\_]

### PCBU details

**Business name:** Click here to enter text.

**Business address:** Click here to enter text.

**Contact details of PCBU:** Click here to enter text.

### Process details

**Number of processes this plan covers:** Click here to enter text.

**What type of processing does this plan cover (provide a list of tasks as per the assessment for each process):**

Click here to enter text.

**Number of workers likely to carry out each process that is high risk:** Click here to enter text.

### Consultation

**Have affected workers and their health and safety representatives (HSRs; if applicable) been consulted in the preparation of this silica risk control plan:**

Yes  No

**Please describe how workers have been consulted in the preparation of this plan:**

Click here to enter text.

**Please describe how feedback from workers and/or HSRs has been incorporated into the plan:**

Click here to enter text.

## Part B – Assessment of risk

I have included a copy of the assessment for any processing of a CSS that is high risk at my workplace in the Appendix of this plan

Yes  No

*[you can attach printed copies of each assessment or copy and paste the details into the electronic document]*

## Part C – Control measures

In this section, you must document what control measures will be used to control the risks associated with each processing of a CSS that is high risk, and how those measures will be implemented, monitored and reviewed.

### Controlling the risk of exposure to RCS

In the table below, detail all processing of a CSS that is high risk and the control measures that will be implemented to control the risk of exposure to RCS.

Location	Processing task	Control measures	Work practices	Respiratory protection	How will control measures be implemented/integrated into daily activities
<p><b>Example only</b> Fabrication workshop – cutting bench</p>	<p>Cutting stone with a bridge saw</p>	<p>Wet suppression system using built in blade water feed nozzle Water spray/mist guards</p>	<p>Ensure:</p> <ul style="list-style-type: none"> <li>cutting area is clearly marked on workshop floor</li> <li>water supply to the saw is turned on and operational before starting the saw</li> <li>water is flowing to the cutting area prior to blade making contact with the product</li> <li>spray guards are in place before commencing work, and regular cleaning of saw table and surrounding areas</li> </ul>	<p>Full face powered air purifying respirators (PAPR) with a P2 class filter</p>	<p>Tool box talks, pre-start checks and daily cleaning of work areas.</p> <p>For example, daily checks of:</p> <ul style="list-style-type: none"> <li>water supply &amp; flow</li> <li>safety and spray guards are in place</li> <li>equipment (including guards) have no visible damage or build-up of residue, no blockages</li> <li>work area is kept clean &amp; slurry managed to prevent drying out</li> <li>PAPR (tight fitting) fit checked each time the respirator is worn</li> <li>PAPR filter check/replace</li> </ul> <p>PAPR performance check</p>

## Monitoring and review

You must routinely review control measures that have been put in place for the processing of a CSS to ensure they remain effective and protect the health and safety of workers.

Control	Date of review		Comments/outcome of review: For example: the review was scheduled, or in response to [insert specific trigger or routine]
	Scheduled	Completed	

## Part D – Training

You must ensure any worker, who you reasonably believe may be involved in the processing of a CSS that is high risk or is at risk of exposure to RCS because of a processing of a CSS that is high risk, receives crystalline silica training that is nationally accredited or approved by the regulator.

You must also ensure a record is kept of the training while the worker is carrying out the processing and for 5 years after the day the worker ceases working for you.

**Have you conducted training for workers that may be involved in processing of a CSS that is high risk?**

Yes  No

**Where have you documented these training records?**

## Declaration

I,           [FIRST AND LAST NAME]           hereby declare that:

I have authority to complete this plan on behalf of the PCBU.

The information in this plan is true and correct to the best of my knowledge.

- The PCBU understands that, when carrying out, or directing or allowing a worker to carry out, processing of a CSS that is high risk, it has duties under WHS laws, including those described in the Identifying and managing the processing of crystalline silica substances in the workplace guidance material.

Position title      \_\_\_\_\_

Signature      \_\_\_\_\_

Date:      [ \_ / \_ / \_ ]

**WHS regulators have powers to investigate and enforce WHS laws. The WHS regulator may rely on those powers to obtain further information and may attend your workplace(s) to assess compliance with this plan and other relevant provisions of the WHS laws.**