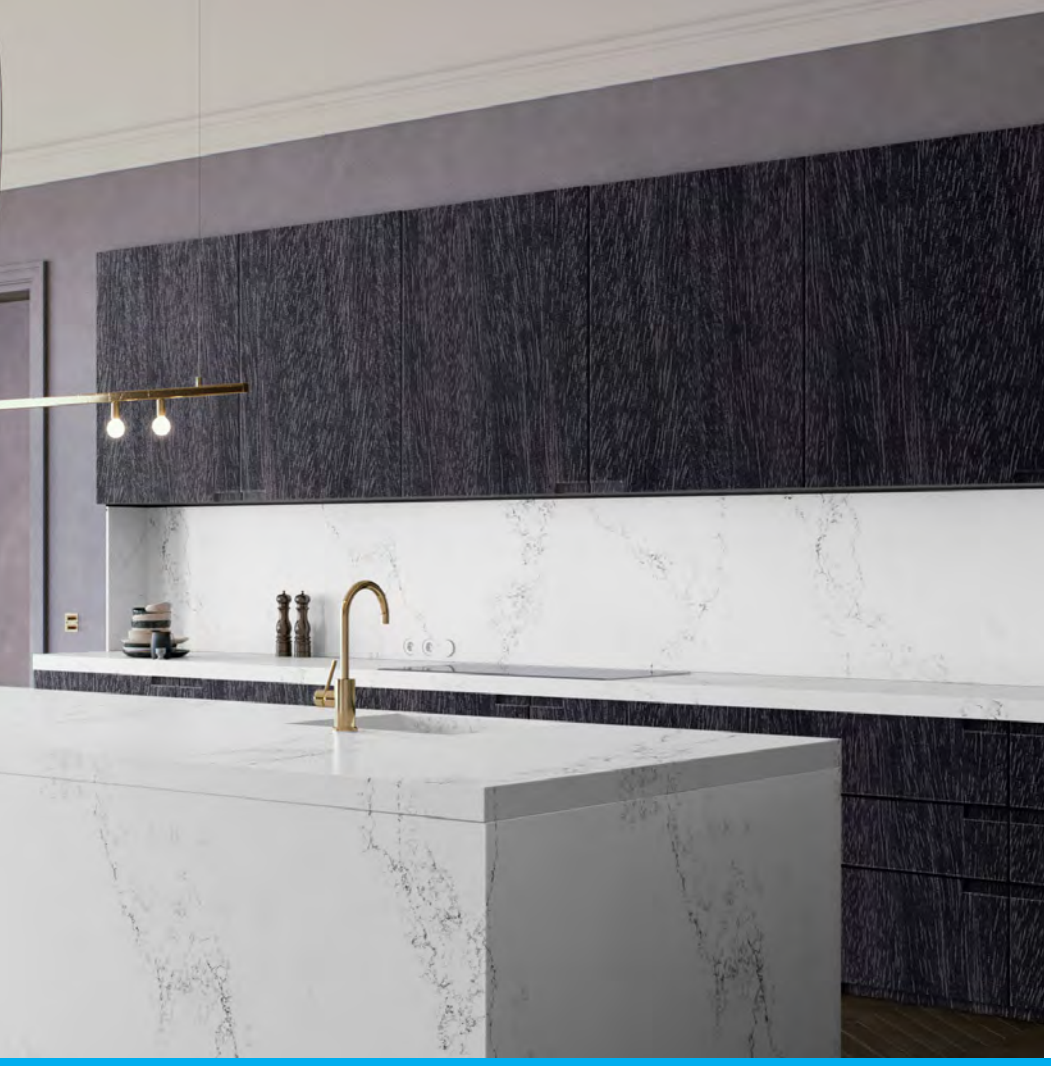


GOOD PRACTICE GUIDE

For the Control of Respirable Crystalline Silica in the Fabrication of Engineered Stone

NZ ESAG NZ ENGINEERED STONE ADVISORY GROUP

CONTENTS

INTRODUCTION

ACKNOWLEDGEMENT AND THANKS

The **New Zealand Engineered Stone Advisory Group (NZESAG)** would like to acknowledge and thank the following organisations:

- The **Australian Engineered Stone Advisory Group** for providing the base information on which this Good Practice Guide and the associated Respirable Crystalline Silica Accreditation Programme has been based.
- The **ACC** for providing funding to support the development and piloting of this Good Practice Guide and the associated Respirable Crystalline Silica Accreditation Programme.

Guide Limitations and Disclaimer

1. DEFINITIONS

Engineered Stone Fabricators Health and Safety Management System Template	Range of tools to be provided to all Fabricators participating in the RCS Accreditation Programme.
ES	Engineered Stone.
Fabricator	The Engineered Stone Fabricator (as an organisation).
Guide	This "Good Practice Guide for the Control of Respirable Crystalline Silica in the Fabrication of Engineered Stone".
Hazard	In the context of this Guide Respirable Crystalline Silica is the hazard.
HSW Act and GRWMR	Health and Safety at Work (General Risk and Workplace Management) Regulations 2016. Sets out specific requirements a PCBU must follow and these include the general health and safety duties and management of risk.
PCBU	Person Conducting a Business or Undertaking. For this Guide this typically is referring to the Fabricator.
RCS	Respirable Crystalline Silica.
RCS Accreditation Programme	The Accreditation Programme outlined in this Guide.
RCS Risk	In the context of this Guide refers to the areas or activities where there is a possibility of exposing a worker (or another person) to RCS that might be harmful to health. 50% of the Workplace exposure standard for a contaminant is frequently used as an 'action level' by occupational hygienists, and triggers investigation of the sources of exposure and implementation of suitable control strategies.
So Far as is Reasonably Practicable	In relation to a duty of a PCBU, means that what is at a particular time, reasonably able to be done in relation to ensuring health and safety, taking into account and weighing up all relevant matters.
WES and WES - TWA	A workplace exposure standard (WES) is a value that refers to the airborne concentration of a substance at which it is believed that nearly all workers can be repeatedly exposed, day after day, without coming to harm. The values are normally calculated on work schedules of 5 shifts of 8 hours duration over a 40-hour week. The WES – TWA is the average concentration of a substance, calculated over an 8-hour working day. The current NZ WES - TWA for RCS is 0.05 mg/m^3.

2. ABOUT THIS GOOD PRACTICE GUIDE

Development of this Guide has been coordinated by **IMPAC Services Ltd (IMPAC)** who are work health and safety experts, on behalf of the **New Zealand Engineered Stone Advisory Group (NZESAG)**. As has been acknowledged the foundation of this document has been sourced from the **Australian Engineered Stone Advisory Group (AESAG) RCS Health Hygiene Guidelines.** IMPAC has reviewed this and customised content to the New Zealand context.

The result is the provision of guidance to Fabricators on the minimum steps required to manage the health risks associated with RCS from working with engineered stone products. It sets out a risk management process of:

IDENTIFICATION

The process of identifying those activities that pose a risk of exposure to RCS.

EVALUATION

The process of evaluating the extent of the risk from activities giving rise to RCS exposure.

CONTROL

The process of addressing the risk by eliminating or minimising the extent of the risk.

REVIEW

The process of checking the control measures are working and effective.

KEY POINT

This guide helps you to manage Respirable Crystalline Silica (RCS) dust in the workplace. It also shows you what you need to do to become an Accredited RCS Fabricator. Accreditation demonstrates your commitment to the health and safety of your workers and sets minimum industry requirements.

2.1 RESPIRABLE CRYSTALLINE SILICA

Respirable Crystalline Silica (RCS) is the very fine dust (respirable fraction – less than 10µm in diameter) which is generated by fabricating, processing, cutting, shaping, and reworking of silica containing products such as Engineered Stone benchtops. Crystalline silica commonly occurs in nature as the mineral quartz, and is found in granite, sandstone, quartzite, various other rocks, and sand.

Silicosis is a serious and irreversible lung disease that causes permanent disability and early death. Silica dust particles become trapped in lung tissue, causing inflammation and scarring, and reducing the lungs' ability to take in oxygen. Symptoms of silicosis can include shortness of breath, cough and fatigue. Silicosis can result from exposure to RCS over many years, but very high short-term exposures can cause it to develop rapidly.

One form of silicosis is called 'accelerated silicosis'. This has been associated with exposures to high concentrations of RCS over periods, usually, of 3 to 10 years, although there are reports of cases amongst workers with only 1 year of exposure.

Workers exposed to RCS can develop conditions such as:

Kidney Disease, Tuberculosis, Heart Disease, Auto-immune diseases, Chronic-Obstructive Pulmonary (Lung) Disease (COPD) – (e.g. Emphysema), all potentially progressing to **death.**

KEY POINT

RCS is the **fine dust** caused by **cutting, grinding, polishing**, and shaping silica containing products such as engineered and naturally occurring stone. Workers who breathe in RCS can develop **silicosis** – a serious lung disease, and other health conditions that can lead to death. **Even short term exposure can be harmful.**

2.2 DUTIES OF A FABRICATOR (AS A PCBU)

All Engineered Stone Fabricators are subject to New Zealand's Health and Safety at Work Act 2015 (HSW Act). As **Persons Conducting a Business or Undertaking** (**PCBUs**), Fabricators have a primary duty of care to ensure, so far as is reasonably practicable, the health and safety of workers, and that other people are not put at risk by its work. With regard to managing risks associated with RCS the HSW Act and General Risk and Workplace Management Regulations (GRWMR) require Fabricators to:

a **monitor worker exposures to RCS** (e.g. monitor the health of workers and workplace conditions).

b **eliminate or minimise the risk of exposure to RCS** following the recommended hierarchy of control. This includes providing information and training on RCS risk, as well as supervision.

c **maintain and review control measures.**

2.3. DUTIES OF A WORKER

Workers have a duty to take responsibility for their own health and safety, and to not undertake any activity that adversely affects the health and safety of other persons.

Workers must comply with all reasonable instructions provided to them, and must adhere to all reasonable health and safety policies or procedures that they have been notified of and appropriately trained in.

If respiratory protective equipment or personal protective equipment is provided by the Fabricator, the Worker must use or wear such equipment in accordance with the information, instruction and training provided.

2.4. THE NZESAG RCS ACCREDITATION PROGRAMME

This Guide sets out how to obtain accreditation under the NZESAG "RCS Accreditation Programme".

To obtain accreditation, Fabricators must comply with the requirements set out in Sections 3 - 9 of this Guide. This is checked by an audit of the Fabricator's manufacturing facility, and their processes to identify and manage RCS exposure risk.

On the completion of the audit one of three levels of accreditation are able to be issued to a Fabricator under the programme as follows:

Level 1– Participant

Has engaged in the Accreditation Programme **but does not meet significant elements of the Good Practice Guide**. Has committed to implementing recommended improvements which will be checked at next audit.

Level 2 – Interim Accreditation

Has engaged in the Accreditation Programme and **has met significant elements of the Good Practice Guide** in practice and/or intent. Has committed to implementing recommended improvements which will be checked at next audit.

Level 3 – Accredited Fabricator

Meets all core requirements of this Good Practice Guide as set out in the Accreditation Audit.

If a Fabricator does not meet the following **two critical elements** of the Good Practice Guide and Accreditation Audit they will not be admitted to the programme at any level until they have done so:

1. The primary cutter is water suppressed.
2. Fit testing of Respirable Protective Equipment (RPE) (that requires a seal to be maintained between the RPE and the face) for all workers has been carried out by a competent person in the last 12 months.

Once the level of conformance with programme requirements is confirmed by IMPAC a Certificate detailing the level of accreditation will be issued.

Accreditation will be valid for 12 months from the date of issue of the Certificate and must be renewed annually.

For those Fabricators issued Level 1 or Level 2 accreditation, improvement in line with audit recommendations must be made to remain within the Accreditation Programme.

A Health and Safety Management System Template has been developed by IMPAC and will be provided to all Fabricators participating in the RCS Accreditation Programme. This will provide templates and guidance for meeting some of the key elements of this Good Practice Guide. This will be provided to a Fabricator on registration in the programme.

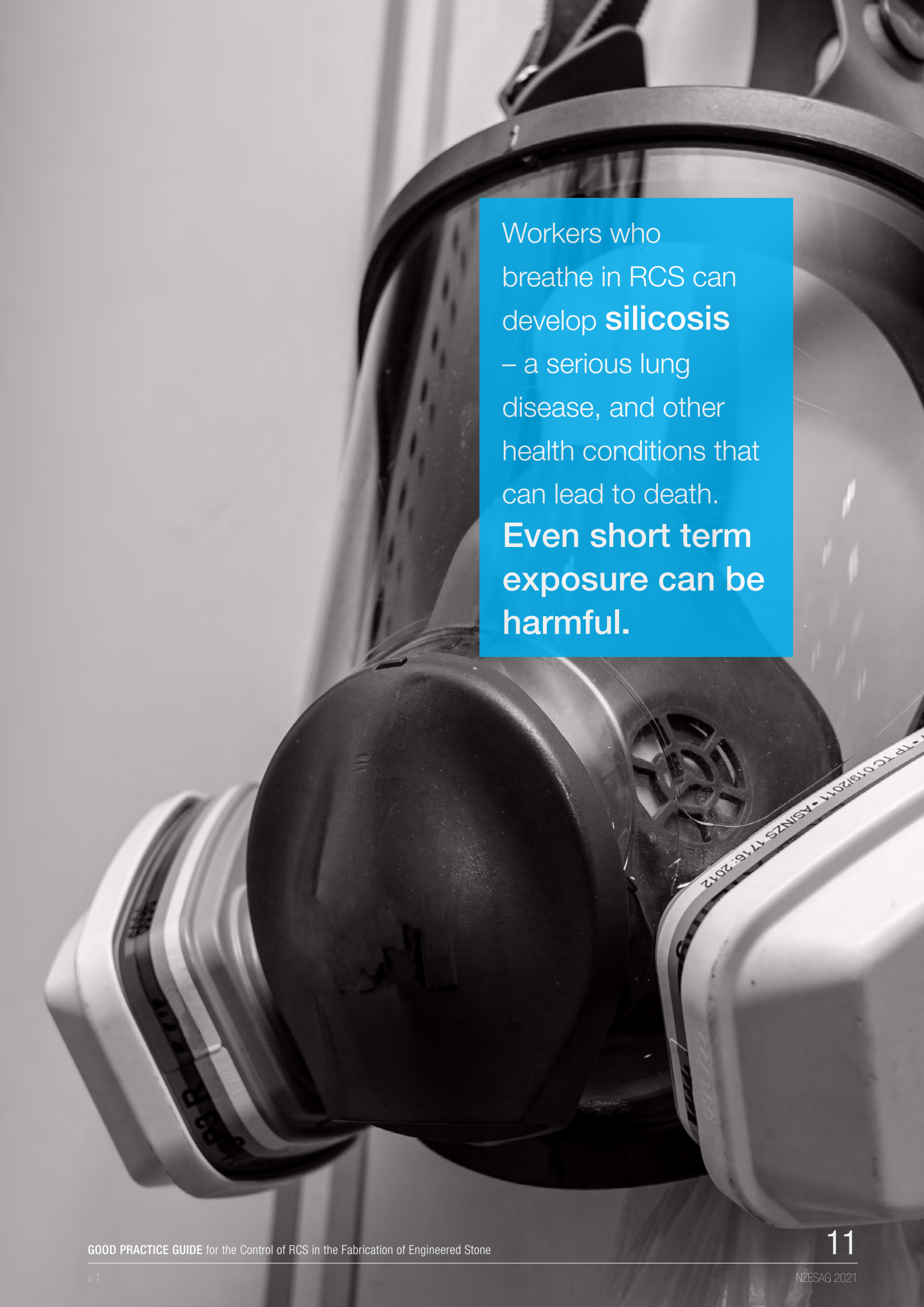
It should be noted that this Guide, and the Health and Safety Management System Template, is focused on the control of RCS risk and is not intended to be a complete description of all health and safety legislative requirements for a Fabricator. Meeting the requirements of the RCS Accreditation Programme does not confirm the Fabricator is complying with all of their wider health and safety obligations. It is highly recommended that all Engineered Stone Fabricators obtain professional advice in relation to their wider obligations.

KEY POINT

To be able to enter the RCS **Accreditation Programme** Fabricators must at a minimum:

- use a **water suppressed primary cutter**.
- have carried out **fit testing of Respirable Protective Equipment (RPE**) within last 12 months.

Once assessed and awarded an accreditation level, Fabricators are issued with an Accreditation Certificate which must be renewed each year.



Workers who breathe in RCS can develop **silicosis** – a serious lung disease, and other health conditions that can lead to death. **Even short term exposure can be harmful.**

RCS ACCREDITATION PROGRAMME ELEMENTS

3. HEALTH AND SAFETY POLICY

a The Fabricator must have a Health and Safety Policy in place that has been developed in consultation with workers. Effective consultation includes:

- **i** Talking about health and safety matters with workers
- **ii** Listening to and acting on concerns workers raise
- **iii** Sharing views and information with workers
- **iv** Considering what workers say before making decisions.

b The Health and Safety Policy must be displayed in relevant areas of the workplace and should include an acknowledgement of RCS risks and a commitment to control workers' exposure to RCS.

A **draft health and safety policy** is provided in the Engineered Stone Fabricators Health and Safety Management System Template.

KEY POINT

Do you have a Health and Safety Policy?

- As a Fabricator of Engineered Stone products you must have a Health and Safety Policy.
- This must be developed through discussions with your workers so they can contribute to and understand the Policy.

The Health and Safety Policy must be displayed clearly in the workplace.

4. PLANNING TO MEET THIS GUIDE

a To enter the RCS Accreditation Programme, the Fabricator must develop an RCS Accreditation Programme Plan (Plan) that sets out how it will achieve the requirements set out in Sections 3 through 9 of this Guide (if it does not already meet them).

b Fabricators must develop the Plan in consultation with the appropriate workers and be able to show how they have done this.

c The Fabricator must identify who within the organisation has responsibility for implementing and maintaining the overall Plan, as well as those who are responsible for various parts of the Plan.

d It is a responsibility of the Fabricator to provide training and competent supervision to workers involved in implementing and/or supporting various aspects of the Plan.

+ An **RCS Accreditation Plan Template** is provided in the Engineered Stone Fabricators Health and Safety Management System Template.

KEY POINT

- To gain RCS Accreditation you must show conformance with the requirements of this Good Practice Guide.
- If you do not conform to this Guide's requirements you must have an RCS Accreditation Programme Plan which outlines how you are going to meet them.

5. RCS EXPOSURE RISK IDENTIFICATION

a RCS is a hazard within Engineered Stone Fabrication operations.

b The Fabricator must demonstrate that they have identified areas and activities of their operations where there is a risk of worker (or others) exposure to RCS (RCS Exposure Risks).

c Good practice requires consultation with workers to identify these RCS exposure risks.

d The identified RCS exposure risks should be recorded in a hazard/risk register.

e Existing RCS exposure risks must be reviewed on an ongoing basis, but a new RCS exposure risk identification/assessment and recording processes must be undertaken when new plant and equipment is introduced or removed, or new processes are implemented or removed.

+ Section 10.1 (Appendix A) provides information on how a Fabricator can identify areas of the workplace that have potential RCS exposure risks.

+ Section 10.2 gives examples of RCS exposure risks by activity/role.

+ Section 10.3 gives an example of a hazard/risk register in which to record the identified RCS exposure risks.

KEY POINT

- Create a Hazard/Risk Register for your workplace.
- Discuss with your workers and identify areas and activities where RCS exposure can occur.
- Workers are at risk of breathing in RCS dust when working directly with engineered stone (saw operators) and in areas where the dust may move to (offices or lunchrooms).
- Record these at risk activities and locations in the Hazard/Risk Register.
- Regularly review the identified RCS risks whenever new equipment or processes are introduced.

6. ASSESSING RCS EXPOSURE RISKS

a The Fabricator must demonstrate that they have assessed the risk of exposure (usually described as high, medium, or low) to RCS for workers (or others) for all identified RCS risks. Examples of this assessment are given in the hazard/risk register example provided in Section 10.3.

b Workers should be consulted in the RCS risk assessment process.

c RCS exposure risk assessments should be documented in writing (this is best done as part of the hazard/risk register).

d Exposure monitoring will normally be required as a critical element for the ongoing assessment of risk (Refer Section 8).

KEY POINT

- Discuss with your workers and assess the RCS risks as Low, Medium or High.
- Include this information in the Hazard/Risk Register.
- You will normally be required to monitor RCS exposure within the workplace.

7. CONTROL OF RCS EXPOSURE RISK

7.1. CONTROLLING RCS EXPOSURE RISKS

Once a Fabricator has identified its RCS exposure risks:

a The Fabricator must implement controls to eliminate or minimise those RCS exposure risks.

b The Fabricator should document the controls that are used to eliminate or minimise the RCS exposure risks - typically in the hazard/risk register.

c When deciding on RCS exposure risk controls, there is a recommended hierarchy of control measures. If an exposure cannot be eliminated, then it must be minimised. Priority should be given to methods that prevent dust generation or remove dust from the air.

d Specifically:

i Elimination. Where practicable, the Fabricator should look to see if it can practicably eliminate the use of engineered stone product. If this is not possible then the Fabricator must look to see if it can eliminate processes or equipment that generates RCS dust. At a minimum, all uncontrolled dry cutting operations must be prohibited.

If it is not practicable to eliminate as described above then one or more of Substitution, Isolation, or Engineering controls must be applied where practicable.

ii Substitution. Substitute existing engineered stone product with one with lower concentrations of crystalline silica in it; and/or substitute existing work processes or equipment with ones that generate less RCS dust – see section 7.2.

iii Isolation. Separate workers from work areas where RCS is generated e.g. barriers, enclosures etc.

iv Engineering Controls. Where elimination or substitution are not practicable, the Fabricator must implement Engineering controls where practicable – see section 7.3.

v If a risk remains, it must be minimised by implementing Administrative Controls such as training and procedures – see section 7.4.

vi Providing workers with and training them in the use of Respiratory Protective Equipment (RPE) and Personal Protective Equipment (PPE) – see section 7.4.1 and 7.4.2.

KEY POINT

The Fabricator must look to eliminate or minimise the RCS risks that have been identified in the following order:

ELIMINATE

Can the use of an engineered stone product be avoided altogether?

SUBSTITUTE

Can a less hazardous product be substituted e.g. natural stone?

ISOLATE

Separate workers from areas where RCS dust is generated.

CONTROL

Use Engineering Controls e.g. wet cutting, fogging systems, ventilation.

MINIMISE

You must minimise any remaining RCS risk with Administrative Controls e.g RPE, training , processes, and other PPE.

7.2. RCS EXPOSURE RISK SUBSTITUTION CONTROLS

a If the use of engineered stone product containing RCS cannot be eliminated the next consideration should be to substitute that product with one that contains lower levels of RCS.

b If processes or equipment that generate RCS dust cannot be eliminated the next consideration must be to substitute those processes or equipment with ones that generate lower levels of RCS dust.

KEY POINT

- The best method of protecting your workers is to not use products containing high levels of silica.
- If this is not possible, replace engineered stone with a product with lower levels of RCS e.g. natural granite.

7.3. RCS EXPOSURE RISK ENGINEERING CONTROLS

a An Industry minimum standard as part of this Guide is that the primary cutter (e.g. bridge saw) must be water suppressed.

b Examples of engineering controls are:

- **i** Use of wet cutting processes and equipment.
- **ii** Use of fogging systems which produce a very dry fog (ultra-fine water droplets) which attach to dust particles which are then removed from the air by their added weight.
- **iii** Use of local exhaust ventilation systems to remove generated dust at source e.g. on-tool extraction.
- **iv** Physically isolating the work areas where RCS dust is generated e.g. enclosures around CNC machines.
- **v** Safely removing and storing RCS containing waste product.
- **vi** Isolating ventilation systems from other work areas (e.g. air-conditioning air handlers for clean areas should be separated from contaminated areas).

c Further examples of engineering controls can be found in Section 10.4.

d Engineering controls utilised should be documented in the hazard/risk register against specific activities.

e In some cases, a combination of control measures may be required e.g. water suppression on hand tools in an area with a water fogging system in place.

KEY POINT

Engineering Controls are physical changes to equipment or a process that reduces the risk from RCS.

- The primary stone cutting tool must be water suppressed at a minimum.
- Water suppression should be used in all other areas wherever possible.
- In addition use a fogging or local exhaust ventilation system to remove/suppress RCS dust.
- Use physical barriers to stop RCS dust moving to other areas of the workplace.
- Safely remove and store RCS dust.
- Ensure areas where RCS dust is present have separate air-conditioning to clean areas.

7.3.1. MANAGEMENT OF WATER USED IN WET CUTTING

Systems/processes must be put in place, relative to the amount of water used to supply wet cutting activities, that ensures the following:

a Allows for the collection of water runoff used in wet cutting and its management to ensure RCS material is contained and isolated.

b RCS containing water is treated (filtered or flocced) to remove RCS before being reused in the production process or otherwise disposed of.

c RCS material removed from water is held and ultimately disposed of in a way that ensures it is not inadvertently released into the work or wider environment.

Controls must be used on fixed plant and equipment as well as hand tools (e.g. guards, plastic flaps) to contain the water spray as workers can breathe in the contaminated water spray/mist or breathe in the dust once the water droplets settle and dry out.

Photo Courtesy of Water Treatment Solutions

KEY POINT

- Water runoff and RCS waste from wet cutting must be contained separately from other waste.
- Dispose of the RCS waste so that it does not become airborne when it dries out.

7.4. RCS ADMINISTRATIVE CONTROLS

Where higher level controls (e.g. elimination, isolation, engineering) do not adequately control RCS exposure risks, then administrative controls must be implemented to further minimise RCS exposure risk. Administrative controls include the use of safe operating procedures, training, supervision, and job design:

a Safe Operating Procedures (SOPs) or an equivalent (e.g. Job Safety Analysis) must be available in the work area. They should describe what the RCS exposure risk is and how the activity should be carried out to reduce exposures. Examples and guidance for administrative controls that can be included in SOPs are provided in Section 10.5.

b The Fabricator must ensure workers are inducted and appropriately trained in the identification and controls required to manage RCS exposure risk. This would include things such as the use, maintenance, and storage of RPE and PPE, and how to work on engineered stone safely at all stages of the fabrication process.

c Hand washing and cleaning down facilities must be provided and their use in decontamination processes applied. The quantity of hand washing and cleaning down facilities must be representative of the size of the Fabricators workforce and must ensure timely access to them by all workers. This facility should not be a break/lunchroom.

d Implement daily and through housekeeping and cleaning procedures for settled dust.

e Use low pressure water, wet sweeping or a H class rated vacuum cleaner to clean floors, walls and other surfaces.

f Prohibit the use of dry sweeping, compressed air, or high pressure water to clean surfaces or clothing.

g Rotating workers between high exposure and low exposure tasks.

Photo Courtesy of Queensland Government

+ A simple **Standard Operating Procedure Template** is provided in the Engineered Stone Fabricators Health and Safety Management System Template.

+ A **Worker Induction Checklist Template** is provided in the Engineered Stone Fabricators Health and Safety Management System Template.

+ A **Training Register Template** is provided in the Engineered Stone Fabricators Health and Safety Management System Template.

+ All Fabricators participating in the RCS Accreditation Programme are able to put their workers through a short online training course that covers all the key information they need to know about RCS.

7.4.1. RESPIRATORY PROTECTIVE EQUIPMENT

If exposure to RCS cannot be adequately controlled by higher level controls, then respiratory protective equipment (RPE) must be worn and a RPE program must be implemented. The program should include the following elements:

Selection	› RPE must be fit for the person › Filters must filter out particulate matter (P Class for RCS) › Compatibility with other PPE
Medical Evaluation	Non-powered air purifying RPE can impose an extra burden on heart and lungs therefore some workers may need to be assessed to ensure they are medically fit to wear RPE for long periods.
Fit Testing	For RPE with a close fitting facepiece, it is essential that an adequate face seal is achieved, i.e. it be properly fitted to the wearer. All workers required to wear RPE that need a tight seal are required to undergo fit testing annually. Facial hair and stubble make it almost impossible to get a good seal. If your workers are not clean shaven you will need to consider providing other forms of RPE that do not rely on a tight face fit. Jewellery, glasses, long hair can also compromise face fit. Depending on the RPE, a trim moustache or goatee may be acceptable provided that all the hair can be enclosed entirely within the respirator, and does not encroach into the area where the facepiece makes a seal against the face.
Training	Before using RPE it must be ensured that workers receive adequate training on use and looking after their RPE properly (see 7.4.1.1).
Use	Workers should visually check their RPE for signs of damage before each use and conduct a self seal check each day.

Maintenance & Care	Should include: › Cleaning and disinfection of equipment › Inspection › Repair and replacement of components (including filters) › Storage and disposal There is no overall rule about when filters on respirators or disposable masks should be changed – each situation will be different. You should ask the supplier about when and how filters should be changed. Generally with particulate respirators, they will require changing when (1) it becomes difficult to breath comfortably or (2) the filter becomes dirty or physically damaged.
Record Keeping	Issue of non-disposable RPE User records (training, fit test, medical screening) Maintenance records

Further:

a Fit testing is to be conducted by a competent person and records maintained:

- **i** Annually on an ongoing basis.
- **ii** Each time a new make or model of respirator is issued.
- **iii** Whenever there is a change in the wearer's facial characteristics or features which may affect the facial seal, for example large weight loss or gain.

b If negative pressure (reusable) RPE is required, it requires fit testing and workers must be clean shaven.

c Loose-fitting powered air-purifying respirators (PAPRs), in which the hood or helmet is designed to form only a partial seal with the wearer's face, or hoods which seal loosely around the wearer's neck or shoulders, do not require fit testing.

d Disposable dust masks are not suitable for workers regularly working with engineered stone.

Note: there are obligations around the physiological and psychological aspects of wearing RPE including the potential need for a medical assessment prior to doing so. Refer to section 8.2 for more information on Health Surveillance requirements.

Further guidance can be found in:

i **WorkSafe: Respiratory Protective Equipment (RPE)** (https://worksafe.govt.nz/topic-and-industry/personal-protective-equipment-ppe/respiratory-protective-equipment/)

ii **iAS/NZS 1715: 2009**. Selection use and maintenance of respiratory protective equipment.

Re-usable half face respirator (cartridge)

Full face respirator (cartridge)

Full face powered respirator (cartridge)

Picture Courtesy of WorkSafe

+ An **RPE Register Template** is provided in the Engineered Stone Fabricators Health and Safety Management System Template.

7.4.1.1. RESPIRATORY PROTECTIVE EQUIPMENT TRAINING

Training by a competent person is required for all new workers and for all workers on an ongoing basis. AS/NZS 1715: Selection Use and Maintenance of Respiratory Protective Equipment, states that the training frequency will depend on the complexity of the program and degree of the hazard, but as a minimum should be considered at least annually. This is probably best done as part of annual fit testing.

RPE Training must cover the following aspects:

a Why RPE is required.

b When RPE is required to be worn.

c How RPE works.

d Limitations of RPE.

e How to correctly put on and take off RPE.

f How to conduct a negative and positive pressure fit check.

g How to clean and maintain RPE.

h When and how to replace filters.

A **Training Register Template** is provided in the Engineered Stone Fabricators Health and Safety Management System Template.

KEY POINT

- Respiratory Protective Equipment (RPE) must be provided for workers if there is a risk of RCS exposure.
- Disposable dust masks are not suitable.
- RPE must be fitted to the individual and fit tested by a competent person annually.
- You must train your workers how to use and care for their RPE properly, and make sure they are using it.

7.4.2. PERSONAL PROTECTIVE EQUIPMENT

Any remaining RCS exposure risks must be minimised with suitable PPE as per the following guidance:

i WorkSafe: PPE – A Guide For Business (https://worksafe.govt.nz/topic-and-industry/personal-protective-equipment-ppe/personal-protective-equipment-a-guide-for-businesses/)

ii WorkSafe: PPE – A Guide For Workers (https://worksafe.govt.nz/topic-and-industry/personal-protective-equipment-ppe/personal-protective-equipment-a-guide-for-workers/)

PPE helps limit exposure to the harmful effects of RCS but only if workers are trained in its use and then wear and use the PPE correctly.

PPE used at the workplace to help control RCS exposure includes items such as RPE (discussed above in Section 7.4.1), rubber boots, disposable clothing (suits) and/or aprons to prevent contamination of clothing.

When PPE is used the Fabricator must:

a Select PPE to that is of suitable size and fit, and reasonably comfortable for the worker who is to use or wear it.

b Require workers to change RCS contaminated clothing prior to leaving designated work areas and then manage the contaminated clothing i.e. to ensure it is not taken home by workers.

c Ensure PPE is maintained, repaired and replaced so that it continues to minimise risk to the worker who uses it, including by ensuring that any PPE is clean and hygienic, and in good condition.

d Provide the worker with information, training, and instruction in the proper use/wearing, storage and maintenance of PPE.

e Ensure that workers use or wear the PPE in accordance with any information, training or reasonable instruction, and that they do not intentionally misuse or damage the equipment.

KEY POINT

- Reduce any remaining risk from RCS dust by giving workers Personal Protective Equipment (PPE).
- This includes rubber boots, disposable clothing, or aprons.
- As a Fabricator, you must maintain, repair or replace PPE for your workers.

8. EVALUATION AND VERIFICATION

8.1. EXPOSURE MONITORING REQUIREMENTS

An essential part of controlling RCS exposure risks is the on-going monitoring of worker exposures and evaluation of the measures in place to control those risks.

1 The Fabricator has a primary duty of care under HSWA S36(3)(g) to monitor conditions at the workplace for the purpose of preventing injury or illness. This means carrying out exposure monitoring. This can take two forms:

   i monitoring of the conditions at the workplace.

   ii biological monitoring of people at the workplace – there is currently no biological monitoring appropriate for assessing exposure to RCS.

8.2. WORKPLACE EXPOSURE MONITORING

1 Exposure monitoring is used to find out if workers are potentially being exposed to RCS at harmful levels or if the measures in place to control exposure to RCS are working.

2 Workplace exposure monitoring is done by having workers wear personal monitoring equipment to measure how much RCS they are being exposed to as they do their job.

Picture Courtesy of Qld Dept of Resources Mining & Energy

3 It should be carried out periodically and after any significant change at the workplace that may affect exposure.

4 Under some circumstances, static (fixed) samples can be collected to test the effectiveness of controls however the results from static samples cannot be compared against the Workplace Exposure Standards.

5 The monitoring program should be approved by a Competent Person, for example a member of the New Zealand Occupational Hygiene Society or international equivalent qualification, or a person deemed competent through appropriate training and experience; and:

   a All monitoring activities must be conducted by a Competent Person.

   b Personal exposure monitoring results should be analysed by a Competent Person, and results compared to the current WES – TWA to determine risk to health.

   c Records of monitoring must be kept for 30 years and be accessible.

   d Workers should be provided with their personal monitoring results.

6 The Competent person must take sufficient samples to minimise uncertainty associated with the assessment of risk to health.

KEY POINT

- You must regularly check the level of dust exposure in your workplace to ensure it meets workplace exposure standards.
- Workplace Exposure Monitoring must be carried out by an Occupational Hygienist.
- Monitoring checks that your work practices are reducing RCS risk to your workers.

8.3. HEALTH MONITORING AND ASSESSMENT

1 Health monitoring is a way to check if the health of workers is being harmed from exposures to substances that can harm their health while carrying out work and aims to detect early signs of ill-health or disease e.g. spirometry testing to detect early changes in lung function.

2 Health monitoring should be undertaken by a registered Occupational Health Professional where possible and should take the following forms:

   i Pre-employment health assessment.

   ii Ongoing health surveillance.

3 The Fabricator should pay for the cost of health monitoring.

8.3.1. WORKER NEW TO ENGINEERED STONE

Where a worker is working with engineered stone for the first time then a standard pre-employment health check should be carried out. This should include a lung function assessment to identify any pre-existing conditions and confirm suitability for using RPE.

8.3.2. WORKER > SIX MONTHS WORKING WITH ENGINEERED STONE

1. Where a worker has been working with engineered stone for six months or more (within the last 10 years) the Fabricator should strongly encourage them to participate in the Accelerated Silicosis Assessment Pathway. This is a programme developed by WorkSafe, ACC, and Ministry of Health to ensure workers who have had potentially high exposure to RCS due to working with engineered stone obtain a health check for possible diagnosis of accelerated silicosis.
2. The first step is to send the worker to a GP or Occupational Health Physician. They must inform the GP or Occupational Health Physician they have been working with engineered stone for six months or more in the last 10 years (with at least some of that in New Zealand). Once this eligibility criteria is met the worker must ensure that the GP or Occupational Health Physician lodges a claim with ACC for potential accelerated silicosis. The GP or Occupational Health Physician can contact the ACC Provider Helpline if they require more information. Key information for the GP or Occupational Health Physician lodging the claim is as follows:

ACC claim (ACC 45)

   a. Read code: silica pneumoconiosis NOS (H42z.)
   b. SNOMED code: 805002 | Pneumoconiosis caused by silica (disorder)
   c. Type of Claim: Work related
   d. Description: include details of how the exposure threshold is met: Working with engineered stone (cutting, polishing, grinding, shaping) for 6 months or more within the last 10 years (with some of that exposure occurring in NZ).

3. ACC will then make an initial assessment and then cover the cost of tests and specialist referrals from this point regardless of if accelerated silicosis is identified and the claim is accepted or declined.

+ A **Health Monitoring Letter to Doctor Template** (outlining the required health monitoring) is provided in the Engineered Stone Fabricators Health and Safety Management System Template.

8.4. VERIFICATION OF CONTROLS

a The Fabricator must ensure that it has a program to ensure that RCS Engineering, Administrative and PPE controls (identified in Sections 7.3 and 7.4) are verified as being effective. In addition to the use of Workplace and Health Monitoring to do this, other examples of verification could include:

- **i** Regular checks/inspections in the workplace during operations to ensure that SOPs or other procedures/processes are being followed.
- **ii** Regular visual inspections / walkthroughs to visually ensure that equipment and controls are operating satisfactorily.
- **iii** Performance checks on local exhaust ventilation, against the design specifications, by a competent person such as a ventilation engineer.
- **iv** Review of documentation and records.
- **v** Regular planned preventative equipment maintenance programmes.
- **vi** Discussions with workers to identify ongoing RCS exposure risks and ensure controls are working effectively.

b The Fabricator must have some form of action plan that documents scheduled future activities (one off or ongoing) for minimising exposure to RCS.

A **Workplace Inspection Checklist Template** is provided in the Engineered Stone Fabricators Health and Safety Management System Template.

8.5. INCIDENTS AND INVESTIGATIONS

Good incident investigation is key to a Fabricator making improvements in managing RCS exposure risks. Encouraging workers to report all incidents and near misses relating to potential RCS exposure is a primary way of ensuring that potentially future adverse health outcomes are minimised.

a The Fabricator must have a process for reporting and investigating incidents.

b Where individuals have been potentially exposed to higher levels of RCS (>50% of the WES – TWA), the Fabricator should ensure that controls are reviewed and improved, in consultation with workers to prevent reoccurrence of incidents.

c If a worker's medical assessment (refer section 8.3) indicates the worker may have contracted an illness as a result of exposure to RCS, the Fabricator must conduct a complete review of their RCS control program.

d The affected worker must cease working with RCS products immediately.

A **simple incident reporting and investigation template** is provided in the Engineered Stone Fabricators Health and Safety Management System Template.

9. RECORDS

a Fabricators must keep the following records:

- **i** Training of workers and supervisors in RCS.
- **ii** Workplace monitoring data (30 years).
- **iii** Health monitoring assessments (30 years).
- **iv** Training and Fit testing records for respiratory protection.

b The method of keeping records must:

- **i** Be secure and private.
- **ii** Ensure the confidential storage of health records.

c If a Fabricator ceases operation, records should be held in storage if possible.

d Other records that should be maintained include:

- **i** Equipment inspection and maintenance records.
- **ii** Records of workplace inspections / observations.
- **iii** Incident reports and investigation records including actions.

KEY POINT

You must keep records of all of your RCS health and safety processes including:

- The **types of control**s you have in place to manage RCS risk
- **Monitoring of controls** including inspections and maintenance
- RCS related **training**
- **Health checks** of workers
- Training and fitting of **respirators**
- When, how and who checks health and safety **equipment**
- Dates and details of RCS related **incidents**

Encouraging workers to **report all incidents** and near misses relating to potential RCS exposure is a primary way of ensuring that potentially **future adverse health outcomes are minimised**.

APPENDICES

10.1. IDENTIFYING RCS EXPOSURE RISK

Exposure to RCS can be viewed as either a Primary Exposure or a Secondary Exposure.

1. Primary Exposure: This occurs due to working directly with engineered stone (ES) e.g. cutting, cleaning equipment, and housekeeping activities.
2. Secondary Exposure: This occurs due to movement of RCS from areas where ES is being worked on directly to areas where it is not. This can be due to uncontrolled air flow, air movement, or things such as carriage on contaminated plant/equipment, material or clothing.

RCS exposure risks can be identified in various ways. Typically, these would include:

- **a** Undertaking training to build an understanding of the nature of RCS and related exposure risks.
- **b** Considering activities/roles (see 10.2 below) where RCS exposure is reasonably expected to occur, even if they have not yet.
- **c** Walking through and observing activities within the workplace.
- **d** Reviewing available information on RCS exposure and equipment/tools used in the work area.
- **e** Reviewing changes to plant, equipment, materials, processes and activities to understand if new or variants of existing RCS hazards or risks are being introduced.
- **f** Undertaking workplace exposure monitoring to understand the nature of the RCS risk.
- **g** Examining records of historical incidents, or online literature and health concerns that have occurred previously.
- **h** Discussing worker health and safety concerns with them.

10.2. POTENTIAL RCS EXPOSURE BY ACTIVITY/ROLE

CNC ROUTER / WATER JET WORKERS

Workers who operate CNC routers or Water Jet cutting machines utilise an automated cutting method to modify the ES into the appropriate dimensions and cut outs as required onsite. This work is generally conducted from a control point adjacent to the machine in the fabricator's factory and does not require the worker to conduct the actual cutting process with the stone using hand tools for example. Controls for these kinds of processes may include things such as enclosure of machines, isolation from the activity and engineering solutions such as water suppression and localised exhaust ventilation to prevent exposures.

SAW OPERATORS

Saw operators will cut the ES material to the correct size. This work is generally conducted from a control point adjacent to the machine in the fabricator's factory and/or does require the worker to conduct the actual cutting process with the stone. It may include controls such as isolation from the activity and engineering solutions such as water suppression and local exhaust ventilation (LEV) including on tool extraction to prevent exposures.

LABOURERS

Labourers may be required to conduct activities and tasks which bring them into contact with RCS. This may be from exposures including conducting housekeeping activities, movement and cleaning of ES products and equipment, as well as exposures by assisting with those conducting cutting of stone for example.

SHAPERS

Shapers conduct their activities by using power tools to shape the ES in the final required design for installation. This requires softer modifications of the ES to gradually change the shape as required which requires grinding and sanding modifications to the surfaces/edges. These activities may be conducted at the fabrication workshop or onsite as required. These individuals have high potential for exposure.

FINISHING WORKERS

Finishing of the ES may require sawing, cutting and shaping prior to installation of the stone onsite. This may require the use of power and/or hand tools, installation and housekeeping. This group is likely to be exposed to primary and secondary sources of RCS.

POLISHERS

Polishers smooth the surfaces of the ES to provide the appropriate surface finish to the stone. The polishers are likely to use power tools with various exposure profiles depending on the equipment and method used. Polishing may be conducted at the fabricator and onsite as required. This group may have primary and secondary exposures.

SUPERVISORS

Supervisors will have diverse roles which may have them enter the areas and oversee activities with the potential to be exposed to RCS. They may be exposed to primary and secondary exposure methods dependent on the activities being conducted.

OFFICE WORKERS

Office workers are considered personnel to be working within an office space and not normally tool or equipment-based so are not expected to be exposed to primary sources of RCS due to their activities. There is a high possibility of secondary exposures due to air movement from fabrication areas, staff movements in between spaces and inappropriate atmospheric systems.

10.3 EXAMPLE RCS EXPOSURE RISK REGISTER (GENERIC – BY ACTIVITY/ROLE)

Location/Workplace:

Date:

Hazard: Respirable Crystalline Silica

ACTIVITY/ ROLE (CAN BE LINKED TO AREA)	WHAT HARM CAN THE HAZARD CAUSE	LIKELIHOOD OF THE RCS EXPOSURE RISK RESULTING IN HARM	LEVEL OF RISK (HIGH/MED/ LOW)	CURRENT CONTROLS	ARE OTHER CONTROLS REQUIRED?	RESPONSIBLE PERSON	DUE DATE	COMPLETION DATE	REVIEW DATE AND NOTE
Polishing & grinding	Silicosis COPD Lung Cancer	Worker does this for a full shift (8 hrs). There is an exposure risk to RCS. There is still a potential risk of exposure even with water suppression.	High	Water suppression on polishing and grinding tool	Yes – Half face respirator Disposable overalls	Team Leader	30/11/2018	28/11/2018	30/11/2019 Team Leader reviewed. New controls being used. No further action required.
Cleaning the work area / Labouring	Silicosis COPD Lung Cancer	Likely – occurs every day for 1 -hour	High	Water is used	No sweeping allowed H-Class Vacuum cleaner to be used Half face respirator to be worn when cleaning Disposable overalls to be worn and removed in decontamination area.	Team Leader	Insert Date	Insert Date	
CNC Router / Water Jet workers	Silicosis COPD Lung Cancer	Worker does this for a full shift (8 hrs). Data indicates that there is an exposure risk to RCS. Guidance states that there is still a potential risk of exposure even with water suppression.	High	Water suppression CNC enclosed with local exhaust.	Yes – half face respirator. Disposable overalls	Team Leader	Insert Date	Insert Date	
Saw Operators	Silicosis COPD Lung Cancer	Worker does this for a full shift (8 hrs). Data indicates that there is an exposure risk to RCS. Guidance states that there is still a potential risk of exposure even with water suppression.	High	Water suppression	Yes – half face respirator. Disposable overalls	Team Leader	Insert Date	Insert Date	
Shapers	Silicosis COPD Lung Cancer	Worker does this for a full shift (8 hrs). Data indicates that there is an exposure risk to RCS. Guidance states that there is still a potential risk of exposure even with water suppression.	High	Water suppression	Yes – half face respirator. Disposable overalls	Team Leader	Insert Date	Insert Date	
Supervisor	Silicosis COPD Lung Cancer	Worker does this for a full shift (8 hrs). Data indicates that there is a medium to low exposure risk to RCS.	Medium to Low	Isolation	Yes – half face respirator	Team Leader	Insert Date	Insert Date	
Office Workers	Silicosis COPD Lung Cancer	Worker does this for a full shift (8 hrs). Data indicates that there is a low exposure risk to RCS	Low	Isolation	None	Team Leader	Insert Date	Insert Date	

10.4 EXAMPLES OF ENGINEERING CONTROLS

Examples of engineering controls that should be employed where there is a possibility of potential exposure to RCS while working with ES include:

- A combination of **water suppression** and **local exhaust ventilation** (LEV) is more effective at reducing RCS than either on their own, although not all LEV systems are designed to handle wet 'dust'.
- Only use tools and machinery that have been **specifically designed for use with water attachments** (e.g. tools used for cutting, grinding or polishing ES should provide water to the blade and/or be fitted with an on-tool extraction system).
- Use an **adequate number of water feeds** directed at the material and/or tool to prevent visible dust during the process, noting too, that RCS particles are too small to be seen, individually, with the naked eye.
- Maintain **adequate water pressure** to make sure water is reaching the material and/or tool.
- **Control water spray** from water suppressed tools and machinery using guards, plastic flaps or brush guards.
- **Prevent workers from being able to turn water suppression systems down** or off during operation.
- Use **bridge saws fitted with water attachments** to suppress dust when cutting.
- Use **water suppressed** routers, water jet cutters or bridge saws to complete sink and stovetop cut-outs.
- Use hand-held angle grinders **fitted with multiple water feeds** to deliver water to the cutting disc and point of contact with the stone.
- Use **water suppressed** wet-edge milling machines or polishing machines.
- Use polishers with a **centre water feed** to polish or grind the stone.
- **Local Exhaust Ventilation (LEV)**. (Where LEV is utilised, it should be designed by a "competent person" for example a Ventilation Engineer.)
- **Isolating areas of the workplace** where dust is generated by other workers.
- **Exhausting and filtering air** from the isolated area into clean areas poses a hazard.
- **Capture ALL excess water** generated from water suppressed processes through curbing and channelling.
- Use **physical barriers or computer numerical control (CNC) machines** to isolate work areas or tasks that generate dust.

10.5. EXAMPLES OF ADMINISTRATIVE CONTROLS FOR INCLUSION IN SOPS

Safe Operating Procedures (SoPs) are best developed in consultation with workers and supervisors who should have appropriate and relevant experience and training in RCS related matters.

There must be clear document control processes associated with procedure development to ensure that unauthorised or out of date copies are removed from the work area and workers are trained in the most up to date versions.

Safe Operating Procedures do not need to be long winded and complicated, providing they address the necessary requirements to complete work with ES to control RCS exposure risks appropriately. Workers require training in these procedures.

Examples of work practices that should be employed and may be documented in SOPs when working with engineered stone include:

- **Wetting slabs before cutting**, grinding or polishing to aid with dust suppression.
- **Preventing water pooling and drying** on surfaces leaving dry dust deposits.
- **Washing hands and face thoroughly** and removing PPE before eating, drinking or leaving the workplace.
- Ensuring appropriate measures are in place to **manage contaminated clothing** e.g. not wearing outside of contaminated work areas.
- **Not allowing contaminated clothing or equipment to be taken home**. Clothing should be laundered at work or by professional laundering companies that deal specifically with contaminated work clothing.
- Implementing **daily and thorough housekeeping** and cleaning procedures for water slurry and settled dust.
- Using **low pressure water, wet sweeping or an H class rated vacuum cleane**r with a HEPA filter to clean floors, walls and other surfaces.
- **Regularly cleaning vehicle tracks** in work areas where dust is transferred on wheels or high use areas and keeping them wet during the day.
- **Prohibiting the use of dry sweeping, compressed air, or high pressure water** to clean surfaces or clothing. Providing hoses for cleaning between tasks.

- Wet slurries collected during cleaning or cutting etc. being placed **inside a sealed container/bin awaiting disposal**.
- **Frequently cleaning Workers' clothes and uniforms** to prevent the transfer of RCS dust from work areas to break rooms, other parts of the facility, and importantly, into the home.
- Positioning **portable industrial vacuum units**, fitted with a HEPA filter, at the exits of RCS work areas, so workers can decontaminate their clothes before leaving (using industrial vacuum cleaners (Class H) are an easy way to remove excess silica debris from clothes and uniforms). Use an H-class vacuum cleaner in accordance with Standard AS/NZS 60335.2.69, fitted with a filter that can achieve an efficiency of 99.995% (e.g. H14 HEPA filter complying with Standard AS 4260). This includes working in someone's home (e.g. to fit a bench). Workers must not use a household vacuum cleaner to remove this dust.
- Following the vacuum manufacturer's operator manuals/instructions for changing dust bags and filters. **Seal dust waste bags** and place them in the **correct waste container**.
- When purchasing equipment and machinery, **look for dust control features** and dust collection systems.

NOTES

For additional information or to register for the RCS Accreditation Programme contact **RCSAccreditation@impac.co.nz** or **0800 246 722**.

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