



GOOD PRACTICES A GUIDE FOR SMEs

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INTRODUCTION

ABOUT THIS MANUAL

This short guide offers information about crystalline silica and the NEPSI Good Practices that reduce occupational exposure to **respirable crystalline silica (RCS)** and the associated health risks. It is based on the NEPSI Good Practice Guide, the complete version of which is available online at **guide.nepsi.eu**.

Crystalline silica is a vital component in our modern world, used in infrastructure, transport and everyday items such as phones, cars and railways. Silica is among the most abundant resources on earth and makes up 12% of the earth's crust.

When materials containing crystalline silica are used in high-energy processes, freshly broken particles of crystalline silica can be released in the form of very fine dust. The dust particles, referred to as respirable crystalline silica (RCS), can enter the lungs. In small quantities, this dust poses no problems. However, if individuals are exposed to large amounts of RCS over long periods of time, it can cause an occupational disease called **silicosis**.

Thankfully, the health risks posed by RCS can be avoided by putting in place dust control measures. These measures have been collated into the NEPSI Good Practice Guide to help companies and workers eliminate or reduce the risks.



WHY SHOULD COMPANIES AND WORKERS CARE?

Companies have a legal and moral obligation to protect their workforce from workplace hazards. Applying the NEPSI Good Practices has been proven to drastically reduce the risk of RCS exposure in the workplace.

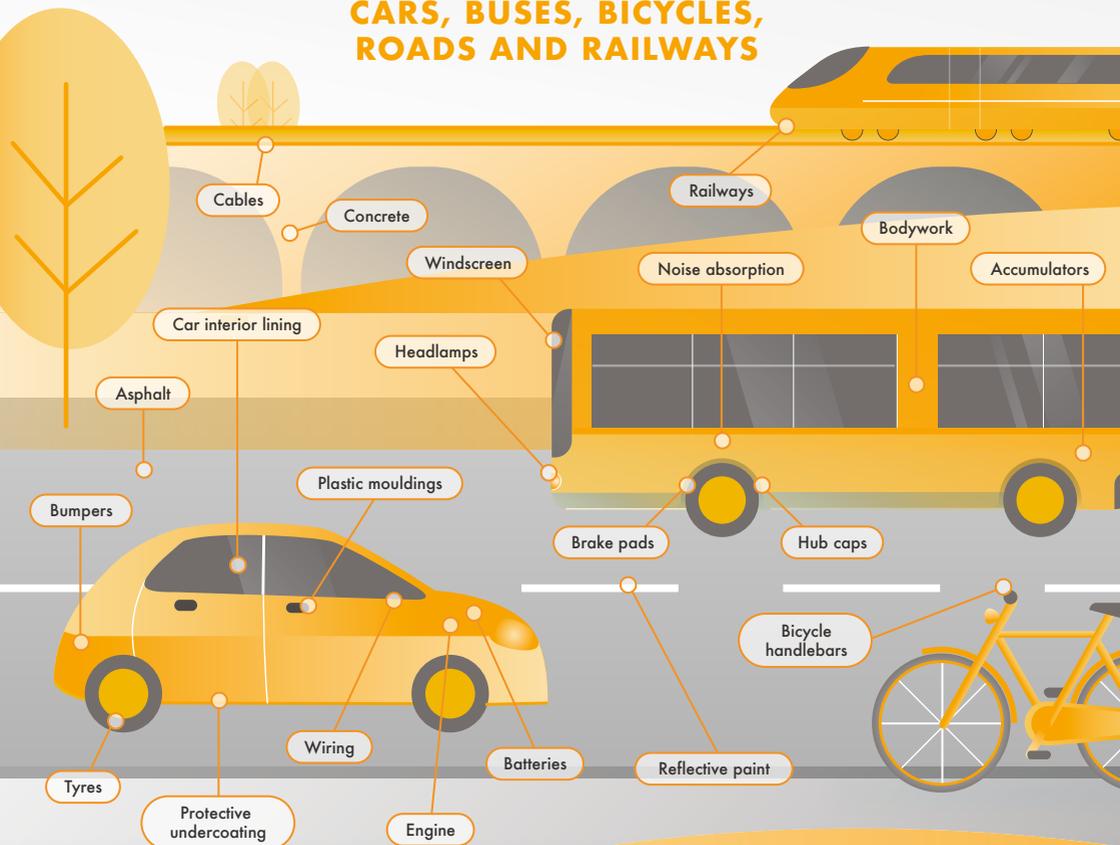
By applying the NEPSI Good Practices, companies are able to show a serious commitment to the well-being of their workforce that is proven to be successful. This improves both the working conditions of employees and makes businesses more competitive — which is in everyone's best interests.

WHAT IS CRYSTALLINE SILICA?

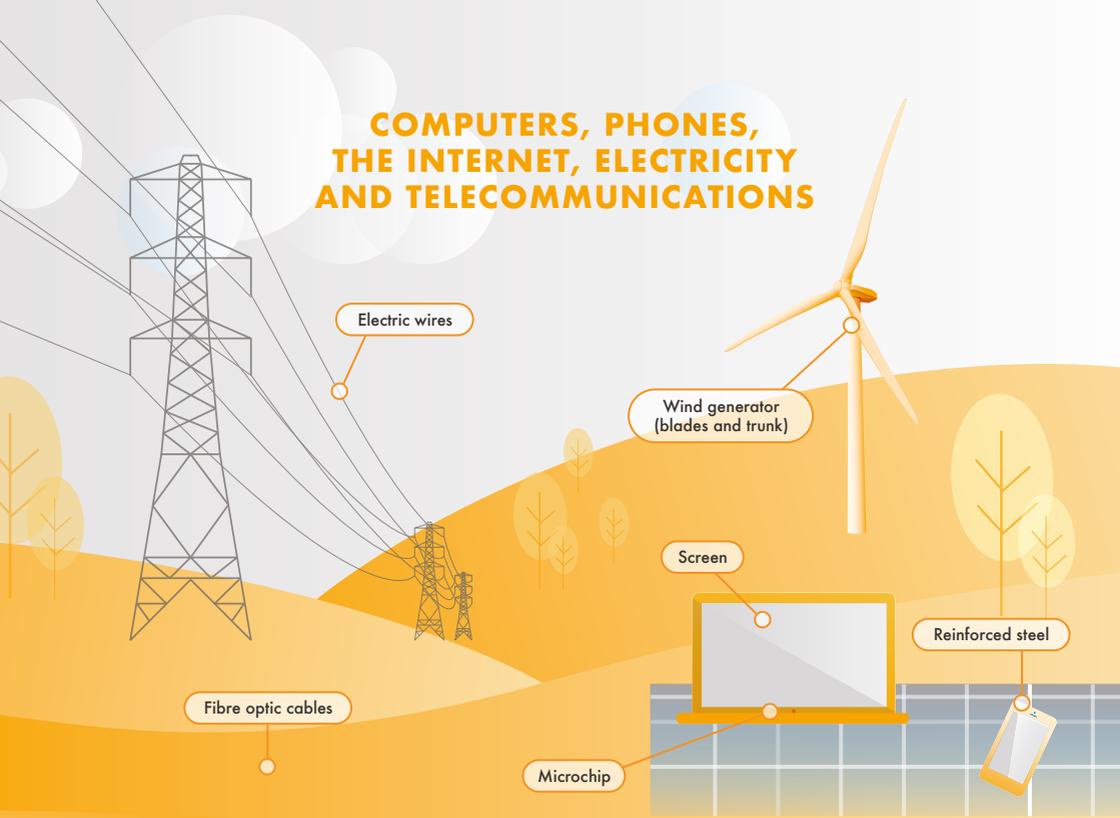
Crystalline silica occurs nearly everywhere in the natural world and is an essential component in our day-to-day lives. Also known as silicon dioxide (SiO_2), it is most commonly found in nature as quartz. It also makes up most of the sand on the planet.

Industrially, crystalline silica is valued for its hard consistency and high melting point. Its applications are endless – including in the manufacturing of pharmaceuticals and cosmetics, plastics, metals and even foods.

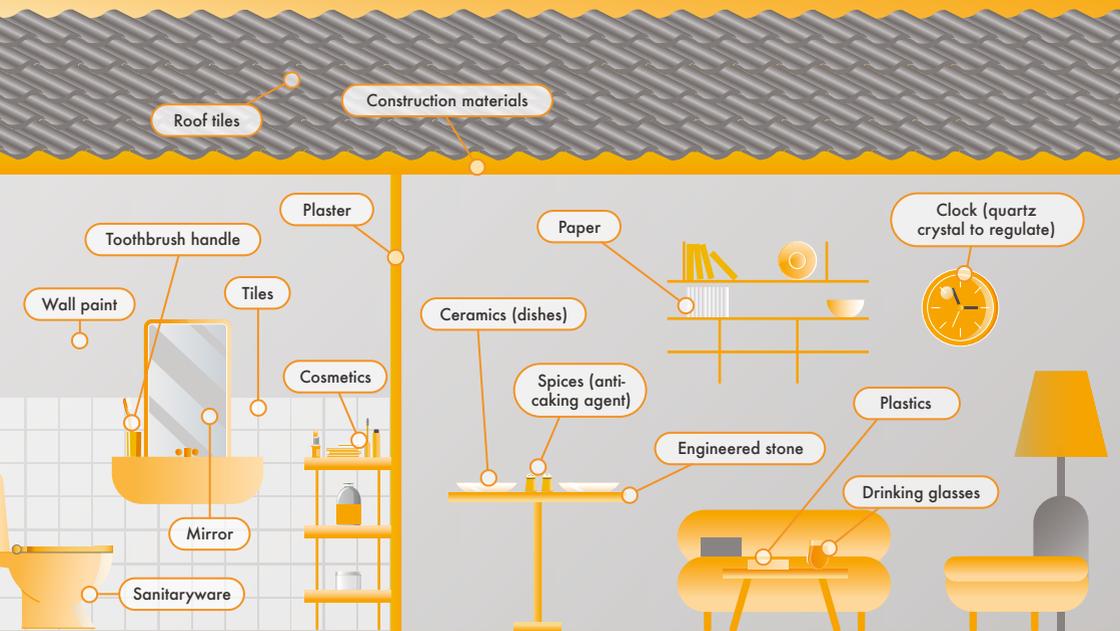
CARS, BUSES, BICYCLES, ROADS AND RAILWAYS



COMPUTERS, PHONES, THE INTERNET, ELECTRICITY AND TELECOMMUNICATIONS



YOUR HOME





CRYSTALLINE SILICA AND RCS

Crystalline silica by itself is inert and completely safe. However, when materials containing crystalline silica are used in high-energy processes (such as crushing or drilling) fine dust particles may be generated and made airborne. These dust particles are known as **respirable crystalline silica (RCS)**. These particles are so small that they cannot be seen with the naked eye, except under a bright light.

Once airborne, respirable dust takes a long time to settle. A single release of dust into the air can lead to significant workplace exposure for those working in the direct vicinity. In fact, in enclosed spaces where the air is constantly disturbed and no fresh air is introduced, respirable dust may remain airborne for days.

THE HEALTH HAZARDS OF RCS

The health risks caused by RCS dust are often underestimated by workers and employers — dust is more likely to be considered a nuisance, not a hazard.

In fact, exposure to high quantities of RCS for extended periods (e.g. over months and years) has been shown to cause **silicosis**.

Silicosis is one of the world's oldest known occupational diseases (i.e. a disease that is caused by a specific job or working conditions). The cumulative build-up of fine dust particles in the lungs results in irreparable scarring of soft tissue. This can lead to breathing difficulties and, in severe cases, death.

Only the very smallest particles, known as the **respirable fraction**, cause this lung damage. However, these tiny particles are created as a by-product of many standard high-energy industrial processes (**see section Activities that Generate or Disturb Dust**).

Larger (non-respirable) particles do not pose a risk of silicosis. They are also generated by the same high-energy processes but are captured within the respiratory system before reaching the lungs and cleared by coughing.

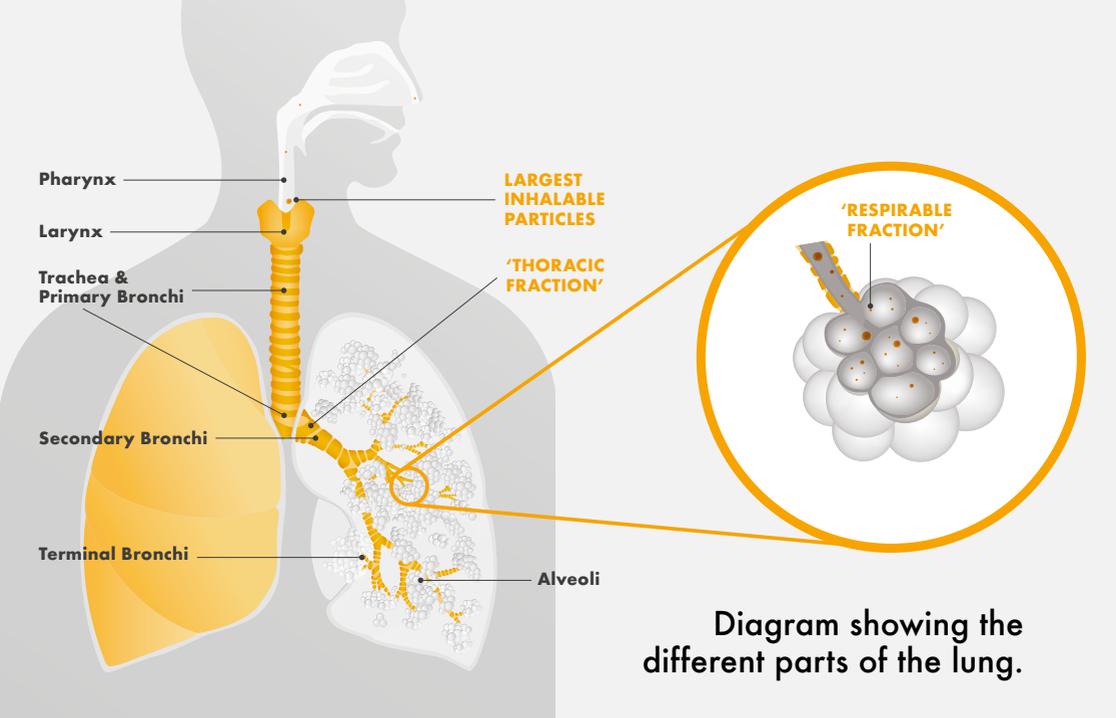


Diagram showing the different parts of the lung.

CANCER RISK

In addition to silicosis, experts have discovered a relationship between extended workplace exposure to high levels of respirable crystalline silica dust and lung cancer. This led to workplace exposure to respirable crystalline silica dust, in the form of quartz or cristobalite, being included in the EU's workplace carcinogens and mutagens directive.

Cigarette smokers are also more likely to be negatively affected by long-term exposure to silica dust.

SILICA AND THE SILICA INDUSTRY

The first step toward reducing health risks associated with exposure to respirable crystalline silica (RCS) is to be aware of the industries where it occurs, and the activities that generate RCS dust.

WHERE SILICA OCCURS

Crystalline silica, in the form of mineral quartz, is found in many different materials. The table below gives an indication of typical levels of crystalline silica in certain mineral sources.

MINERAL SOURCES	PERCENTAGE OF CRYSTALLINE SILICA
Aggregates	0 to 100%
Ball clay	5 to 50%
Basalt	Up to 5%
Natural Diatomite	5 to 30%
Dolerite	Up to 15%
Flint	Greater than 90%
Granite	Up to 30%
Gritstone	Greater than 80%
Iron Ores	7 to 15%
Limestone	Usually less than 1%
Quartzite	Greater than 95%
Sand	Greater than 90%
Sandstone	Greater than 90%
Shale	40 to 60%
Slate	Up to 40%

SILICA IN THE WORKPLACE

Exposure to RCS occurs in many industries, including industrial minerals, quarries, cement production, construction and many others.

The following are 15 industries in which workplace exposure to RCS is acknowledged and approached as a health risk:



Mines and Quarries



Aggregate Production



Calcium Silicate Masonry



Cement Production



Glass and Mineral Wool



Ceramics Industry



Expanded Clay Industry



Engineered Stones



Foundry Industry



Mortar Industry



Precast Concrete Industry



Ready Mixed Concrete



Fibre Glass Production



Insulation Production



Industrial Minerals

There are currently 18 industry associations and one trade union (19 signatories) that are committed to the implementation of the Good Practices.

The NEPSI Good Practices were developed to raise awareness among employers and workers of the dangers of RCS and educate them on techniques to protect workers' health, by reducing their occupational exposure to RCS dust.

ACTIVITIES THAT GENERATE OR DISTURB DUST

Airborne dust may be generated when materials containing crystalline silica are put through high-energy processes. In addition to the processes themselves, there are also several activities that can disturb dust that has not been properly cleaned, heightening workplace exposure to RCS.

Across the different industries, dust generating activities include (but are not limited to):



Cleaning



Transporting



Bagging



Loading



Packing



Crushing



Grinding



Drying



Shaping



Mixing

PROTECTING THE WORKFORCE FROM RCS



Silica is naturally present in our environment. It is an irreplaceable material used across industries and makes our modern world possible. Its use can't be avoided, but exposure to RCS and the related health hazard can.

THE GOOD PRACTICES

Employers can protect their employees and others by applying the NEPSI Good Practices. Contained in the NEPSI Good Practices are over 70 task sheets that provide technical recommendations for specific tasks that are applicable across industries where RCS is a risk.

The implementation of the Good Practices can be summarised in four steps:

STEP 1: ASSESSMENT

The first step is to assess whether there is a significant risk of RCS exposure in your work environment.

STEP 2: CONTROL

Decide what type of control and prevention measures should be put in place to address the identified risks (i.e. to eliminate them, or to limit them to an acceptable level).

STEP 3: MONITORING

Monitor the effectiveness of the control measures in place.

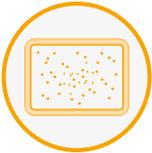
STEP 4: EDUCATION

Provide information, instruction and training to the workforce in order to inform them about the risks they face in their work environments.

This guide, and the task sheets, provide guidance on implementing all of these steps in your workplace.

Controlling RCS exposure in the workplace

As a general introduction to 'Step 2: Control', there are five main techniques for reducing exposure to RCS in the workplace:



ENCLOSURE

Conducting RCS producing processes in a sealed environment



EXTRACTION / VENTILATION

Capturing RCS at the source, before we are exposed to it, and replacing contaminated air with clean air



WATER

Keeping processes wet to prevent dust becoming airborne



PROTECTIVE EQUIPMENT

(eg. face masks) preventing dust being breathed in



GOOD HYGIENE / HOUSEKEEPING

Washing work clothes and vacuuming up dust produced by processes

*non-exhaustive list

Further information on the design and use of these control measures is included in the Task Sheets (**see section on NEPSI Task Sheets**).

TRAINING WORKERS

To support 'Step 4: Education', NEPSI has developed a set of learning tools that provide information and guidance to help protect workers by reducing their exposure to silica dust in the workplace. There are four main education resources (in addition to this guide – The NEPSI Good Practices: A Guide for SMEs):

The (original) NEPSI Good Practice Guide

An extended version of this Guide which includes practical information on progressively improving workers' health protection. This document also includes the Task Sheets as an appendix. The Task Sheets are also available separately online (see section on NEPSI Task Sheets).

The NEPSI Agreement Guide

An A5 information leaflet designed for SMEs, that explains the purpose and benefits of the *NEPSI Agreement on Workers Health Protection through the Good Handling and Use of Crystalline Silica and Products Containing It*.

PowerPoint Training Packs

A series of PowerPoint-based training packs, accessible both online and offline, that cover a range of general topics, applicable across many industries. The training supports workers' health protection by explaining the risks and defining practical good practice measures that will successfully minimise exposure to RCS. You can use this free resource to give staff training on key aspects of RCS, and how to safely manage various RCS-producing tasks.

E-Learning Platform

A web-based blended learning platform aimed directly at workers, which incorporates audio-visual content with interactive quizzes about the Good Practices and the dangers of silica dust.

Additionally, a series of workplace posters have been designed along with a guide for SMEs to explain the NEPSI social dialogue agreement.

All of these resources are available to access and download for free at nepsi.eu/good-practice-guide.

NEPSI TASK GUIDANCE SHEETS

About the task guidance sheets

The NEPSI task sheets are digital and printable work aids that provide practical guidance and control measures that help employers design safe processes, and employees to reduce exposure levels for many common work activities.

The task sheets are organised into three categories:

GENERAL TASK GUIDANCE SHEETS (brown) apply to all of the industries that are signatories (cement, ceramic, clay etc.) of the NEPSI Agreement.

SPECIFIC TASK GUIDANCE SHEETS (blue) consists of tasks concerning only a limited number of industry sectors, indicated with a tick box in the task sheet key in our interactive task sheet finder.

MANAGEMENT TASK GUIDANCE SHEETS (purple) relate to general management tasks and apply to all industries.

Using the task guidance sheets

The task sheets should be available to managers and staff at every site.

Before starting any work activity that may expose workers to RCS, employers must carry out a risk assessment to identify:

- 1 the material containing crystalline silica**
- 2 the activity that will potentially generate RCS**
- 3 the amount of dust generation and exposure**

When deciding which task sheet(s) to use, priority should be given to the activity which generates the biggest source of RCS exposure.

Following the information on the relevant task sheet, control measures should be put in place to control and limit exposure as far as possible.

Finding your way around task guidance sheets

All the task sheets are available online and can be found at guide.nepsi.eu/sheets.

The following section provides an explanation of the task sheets, the list of different task sheets and identifies the industries in which they can be applied.

Theme Colours

GENERAL

Part 2.1

SPECIFIC

Part 2.2

MANAGEMENT

Part 2.3

Section Icons



Access



Design & equipment



Maintenance



Examination & testing



Cleaning & housekeeping



Training



Supervision



Personal protective equipment



Examination & testing



Undertaking the work



Health & safety



General



Organisation



Communication



Written agreement



Half face respirator



PAPR



CNC machines



Manual tools



Manual saws

Sectors

AGG	Aggregates
AST	Agglomerated Stones
CEM	Cement
CER	Ceramics
CSMU	Calcium Silicate Masonry Units
EXCA	Expanded Clay Aggregates
FND	Foundry
GLA	Glass
IMA	Industrial Minerals
INS	Mineral Wool
MIN	Mining
MOR	Factory-Made Mortars
NST	Natural Stones
PC	Precast Concrete
RMC	Ready Mixed Concrete

ALL

GENERAL TASK GUIDANCE SHEETS

2.1.	GENERAL GUIDANCE SHEETS - ALL SECTORS
2.1.1	Cleaning of surfaces and installations
2.1.2	Design of buildings
2.1.3	Design of control rooms
2.1.4	Design of ducting
2.1.5	Design of dust extraction units
2.1.6	Planning for unforeseeable high exposure situations
2.1.7	General indoor storage
2.1.8	General outdoor storage
2.1.9	General ventilation
2.1.10	Good hygiene
2.1.11	Handling and transport systems
2.1.12	Laboratory work
2.1.13	Local exhaust ventilation
2.1.14	Maintenance, service & repair activities
2.1.14a	Dry cutting and grinding applications using hand-held angle grinders/cutters or electric wall chasers
2.1.14b	Dry grinding of concrete using electric concrete surface grinders
2.1.14c	Dry sanding activities using hand-held electric power tools
2.1.14d	Wet processing of mineral workpieces containing crystalline silica using hand-held power tools
2.1.15	Personal protective equipment
2.1.16	Removing dust or sludge from an extraction unit
2.1.18	Systems of packaging

SPECIFIC TASK GUIDANCE SHEETS

Specific task guidance sheets consist of tasks concerning only a limited number of industry sectors.

Please visit the interactive task guidance sheet finder at guide.nepsi.eu/sheets to find the task sheets relevant to your sector.

2.2.	SPECIFIC GUIDANCE SHEETS
2.2.1a	Bag emptying – small bags
2.2.1b	Bag emptying – bulk bags
2.2.2	Batch charging into the process – glass
2.2.3a	Bulk road tanker loading
2.2.3b	Bulk loading
2.2.4a	Bulk road tanker unloading (blowing off)
2.2.4b	Bulk unloading
2.2.5	Core making and moulding in foundries
2.2.6	Crushing of minerals/raw materials
2.2.7	Cutting and polishing ceramic and stone materials
2.2.8	Drying minerals/raw materials
2.2.9	Dry pressing in ceramics
2.2.10	Fettling larger castings in foundries
2.2.11	Fettling smaller castings in foundries
2.2.12	Final treatment (dry or wet) in ceramic and concrete
2.2.13	Firing (biscuit, glaze, final, decoration) in ceramics and stones
2.2.14	Glass furnace batch charging – container glass

SPECIFIC TASK GUIDANCE SHEETS

2.2.	SPECIFIC GUIDANCE SHEETS
2.2.15	Sandblasting in factories
2.2.16	Grinding of minerals/raw materials
2.2.17	Isostatic pressing (dry) in ceramics
2.2.18	Jumbo bagging
2.2.19	Knock-out and shake-out in foundries
2.2.20	Lining and break-out in foundries
2.2.21	Mixing of materials
2.2.22	Periodic and continuous drying
2.2.23	Plastic shaping in ceramics and concrete
2.2.24	Preparation in ceramics
2.2.25	Preparing sand in foundries
2.2.26a	Weighing out small quantities
2.2.26b	Weighing out of bulk materials
2.2.27	Using water/additives on the roads or open surfaces to reduce dust levels
2.2.28	Screening
2.2.29	Shot-blasting in foundries
2.2.30a	Small bag filling – coarse products
2.2.30b	Small bag filling – flours/fines
2.2.30c	Automated small bag filling
2.2.31	Spray drying in ceramics and concrete
2.2.32	Spray glazing in ceramics
2.2.33	Transport systems for fine dry silica products

SPECIFIC TASK GUIDANCE SHEETS

2.2.	SPECIFIC GUIDANCE SHEETS
2.2.34	Use of a drilling rig
2.2.35	Water assisted dust suppression
2.2.36	Installation of countertops
2.2.37	Respiratory protective equipment for the slab industry
2.2.38	Manufacturing of stone by fabricators: water-integrated machinery tools at the fabrication plant
2.2.39	Cleaning of hardening carriages of calcium silicate masonry units
2.2.40	Moulding of calcium silicate masonry units before hardening
2.2.41	Surface treatment of calcium silicate masonry units
2.2.42	Wet cutting processes of masonry units, agglomerated and natural stones
2.2.43	Quarry mobile machine and equipment – excavation and haulage
2.2.44	Quarry mobile processing plant

MANAGEMENT TASK GUIDANCE SHEETS

2.1.	MANAGEMENT GUIDANCE SHEETS
2.3.1	Dust monitoring
2.3.2	Real time dust monitoring
2.3.3	Supervision
2.3.4	Training
2.3.5	Working with contractors

CONTINUOUS REVIEW

No workplace is perfect and there is always opportunity to make improvements. New good practices emerge over time. A key part of the good practices is the process of continuous review. This means periodically reviewing risks, control measures, monitoring methods, and the knowledge of the workforce.

It is also important to review the bigger picture. That means being up to date with the latest legislation, information and developments related to RCS-exposed industries.

Ensuring the widest possible implementation of existing measures is the best way to protect workers' health in the long-term. Any industry in which RCS poses a risk is welcome to use NEPSI good practices to minimise the risk to their workers.