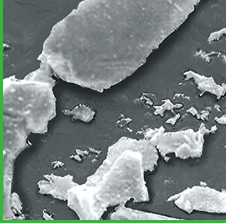


# HEALTH AND SAFETY GUIDANCE FOR USING SILICA BASED PRODUCTS



## INTRODUCTION

Crystalline silica is a natural substance found in stone, rocks, sand and clay, as well as products like bricks, tiles, concrete and some plastic composites.

The minerals Quartz, Cristobalite and Tridymite are crystalline forms of Silica that are found naturally around the world. Quartz is in most rocks, but most particularly in sandstone and granite. Some of these natural minerals can be blended to make refractory products such as investment casting powder.

Respirable silica dust particles are typically less than around 5 micrometers in size. Compare this to the full stop at the end of the sentence, which is around 200–300 micrometers in diameter, and the finest sand on that beach, which is about 50–70 micrometers. Individual silica dust particles are so small that they are invisible to the naked eye in normal light – so you can have relatively high airborne concentrations without being aware that the dust is being inhaled.

Silica dust is generally only harmful when it's inhaled deep into your lungs (Respirable dust), where oxygen is taken up into the blood. Sitting on a sandy beach won't, in theory, cause any respiratory harm because any sand particles breathed in will generally be much too big to go beyond your nose or upper airways (Inhalable dust). As a very fine airborne dust, respirable silica can be dangerous.

Investment powder contains fine silica, and those exposed to the product must be adequately protected from the harmful dust.

Long-term exposure to silica dust without adequate protection, caused by tasks such as; handling or using materials containing Respirable Crystalline Silica (RCS), or even just sweeping up after a task; can cause silicosis (an irreversible chronic respiratory illness).

## LABEL ELEMENTS ASSOCIATED WITH STOT RE 2 INVESTMENT POWDER:

The below is an example of a label used on GRS branded products. This breakdown gives an explanation on what the information means to aid in safe use of the product by the end user.

**WARNING**  
(respirable crystalline silica 1-10%)

H373: May cause damage to lungs through prolonged or repeated exposure via inhalation.  
P260: Do not breathe dust.  
P284: Wear respiratory protection.  
P501: Dispose of contents/containers in accordance with local regulations.

**STOT RE 2**

**WARNING**

Wear Respiratory Protection

1-10 % RCS = STOT RE 2  
10 % + RCS = STOT RE 1

Specific target organ toxicity- Repeat exposure (STOT – RE) means specific target organ toxicity arising from repeated exposure to a substance or mixture, in this case RCS.

Hazard pictogram relevant to specific target organ toxicity as required under the Classification and Labelling of Packaging regulations.

'WARNING' is the signal word required for STOT RE 2 classified products under the Classification and Labelling of Packaging regulations.

In accordance with Classification and Labelling of Packaging regulations, relevant Hazard and precautionary statements must be given to inform the user of associated classification and risks of using the product.

## WHAT IS EXPOSURE?

Exposure to a substance is uptake into the body. The exposure routes are:

- By breathing fume, dust, gas or mist
- By skin contact
- By injection into the skin
- By swallowing

When using investment casting powder, the relevant exposure route is by breathing dust containing RCS.

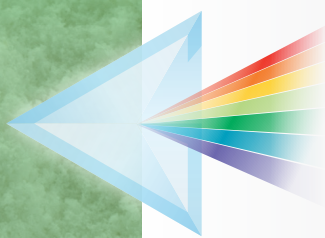
Many thousands of substances are used in the workplace but only about 500 of these substances have Workplace Exposure Limits (WELs). A WEL/ OEL (Occupational Exposure Limit) is an upper limit on the acceptable concentration of a hazardous substance in workplace air for a particular material or class of materials. It is typically set by competent national authorities and enforced by legislation to protect occupational safety and health.

In Europe, RCS exposure has a workplace exposure limit (WEL), which is  $0.1 \text{ mg/m}^3$  expressed as an 8-hour time-weighted average (TWA). However, this differs between countries, for example USA has an OEL of  $0.05 \text{ mg/m}^3$ . It is for this reason that the user should ensure they follow local regulations with regards to RCS exposure limits.

## PROTECTIVE MEASURES FOR THE HANDLING OF INVESTMENT POWDERS CONTAINING RESPIRABLE CRYSTALLINE SILICA

In a factory or workshop environment which uses investment powder containing respirable silica, the best strategy to reduce airborne dust is to use engineering controls such as: adequately designed enclosures/hoods and local exhaust ventilation system (LEV/Dust extraction) to extract the contaminated air at the point in which it is produced.

Where air monitoring indicates that the respirable crystalline silica concentration is still above the local workplace exposure limit (WEL), further controls need to be taken to reduce operator's exposure such as; adequate Respiratory Protective Equipment (RPE). However, RPE is the last line of defence against the inhalation of silica dust and the hierarchy of controls must be followed.



## HIERARCHY OF CONTROL

### ELIMINATION & SUBSTITUTION

When possible, consider using materials for industrial applications that don't contain silica. Often however, the very nature of a task means that the creation of silica dust can not be removed, so be prepared to take other measures to reduce exposure.

### ENGINEERING CONTROLS

The technical means of controlling exposure to RCS dust are well known and significantly reduce the airborne concentration of crystalline silica dust. The control options can include local exhaust ventilation (LEV) along with other options. Consider cleaning methods and HEPA filtration for vacuum cleaners.

### ADMINISTRATIVE CONTROLS

Administrative controls include adopting safe working practices and providing appropriate training, instruction and information to reduce the potential for harm and/or adverse health effects to workers from exposure to RCS. This includes appropriate supervision to ensure the correct dust control measures provided are being used correctly, ensuring practices are followed and monitoring RCS levels Vs local workplace exposure limits.

### PPE

The use of PPE is the last line of defence in the hierarchy of control. When there is still a risk present, PPE is necessary. In addition to engineering controls, RPE is an essential part to silica dust control.

## FURTHER INFORMATION SOURCES

<http://www.hse.gov.uk/pubns/indg463.pdf>

Control of exposure to silica dust

<http://www.hse.gov.uk/pubns/priced/healthsurveillance.pdf>

Health surveillance for those exposed to respirable crystalline silica

<http://www.hse.gov.uk/pubns/priced/hsg258.pdf>

Controlling airborne contaminants at work- a guide to local exhaust ventilation

EH40 Workplace exposure limits

<http://www.hse.gov.uk/pubns/indg136.pdf>

working with substances hazardous to health

Product SDS provides information on classification of specific Investment powders can be supplied on request and should be referenced for safety information.