

Control of exposure to silica dust

A guide for employees



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This leaflet explains what your employer and you should do to prevent lung disease caused by exposure to silica at work.

What is silica?

Silica is a natural substance found in most rocks, sand and clay and in products such as bricks and concrete. Silica is also used as filler in some plastics. In the workplace these materials create dust when they are cut, sanded, carved etc. Some of this dust may be fine enough to breathe deeply into your lungs and cause harm to your health. The fine dust is called respirable crystalline silica (RCS) and is too fine to see with normal lighting.

The quantity of silica contained in stone and other materials varies considerably between different types of stone:

Approximate crystalline silica content of different materials	Crystalline silica content (%w/w)
Sandstone, gritstone, quartzite	above 70%
Artificial stone *	up to 95% (but depends on the type of stone pieces or minerals used in its production)
Mortar, concrete	25–70%
Shale	40–60%
China stone	up to 50%
Granite	20–45% (typically 30%)
Slate	20–40%
Ironstone	Up to 15%
Basalt, dolerite	Up to 5%
Limestone, chalk	Up to 5% (typically less than 2%)
Marble	Up to 5% (but can contain veins of crystalline silica so the overall content may be a lot higher)

* Artificial stone may also be known as agglomerated stone and includes engineered stone, sintered stone and terrazzo. Resin-based engineered stone often comprises up to around 95% quartz, and about 5% resin (usually polyester), whilst sintered stone, which includes ceramic and porcelain, usually contains around 5–25% crystalline silica.

Occupational exposure to RCS can occur in many industries, including:

- construction and demolition processes – when cutting or breaking concrete, stone, brick, mortar;
- quarrying;
- slate mining and slate processing;
- potteries, ceramics, ceramic glaze manufacture, brick and tile manufacture;
- foundries;
- refractory production and cutting;
- concrete product manufacture;
- monumental and architectural masonry manufacture, stone fireplace manufacture;
- kitchen and bathroom worktop manufacture and installation;
- grit and abrasive blasting, particularly on sandstone;
- industries using silica flour to manufacture goods;

Certain activities create dust containing RCS, such as:

- grinding, drilling, boring, sawing, cutting, sanding, chiselling, blasting;
- polishing, conveying;
- fettling;
- mixing and handling, shovelling dry material;
- rock drilling/breaking/crushing/scabbling, screening.

In workplaces, the following can happen:

- leaks or spillages cause a build-up of dust containing RCS;
- dust containing RCS is not cleaned up safely, eg by dry sweeping rather than wet cleaning (see below);
- clothing and surfaces are contaminated with dust containing RCS;
- accumulated dust containing RCS is 'raised' from the ground or other surfaces by moving vehicles and people;
- fine dusts remain in the air from work activities.

How can RCS harm your health?

By breathing in RCS, you could develop the following lung diseases:

Silicosis: Silicosis is a lung disease caused by inhaling respirable crystalline silica (RCS). It results in a hardening or scarring (fibrosis) of the lung tissue with loss of lung function. It usually develops after at least 10 years of RCS exposure, with there being no symptoms initially and the changes in the lungs being found on X-ray.

Chronic obstructive pulmonary disease (COPD): COPD is a group of lung diseases, including bronchitis and emphysema, resulting in severe breathlessness, prolonged coughing and chronic disability. It may be caused by breathing in any fine dusts, including RCS. It can be very disabling and is a leading cause of death. Cigarette smoking can make it worse.

Lung cancer: Heavy and prolonged exposure to RCS can cause lung cancer. When someone already has silicosis, there is an increased risk of lung cancer.

The health risks from RCS are almost entirely preventable when exposure to dust is adequately controlled – you do not need to become ill through work activities.

What should your employer do to protect you?

Employers must comply with The Control of Substances Hazardous to Health Regulations 2002 (COSHH) (as amended) and need to:

- assess the risks to your health – this is called a ‘risk assessment’;
- keep a written record of the risk assessment if they employ more than five people;
- tell you anything significant about the risk assessment;
- consider substituting material for another that does not contain silica, or for a material with a lower silica content;
- prevent or control exposures to RCS by:
 - implementing adequate control measures – more advice can be found in HSE’s COSHH essentials (see ‘Find out more’);
 - for RCS, control measures must be effective in keeping exposure below the Workplace Exposure Limit (WEL) (0.1 mg/m³ respirable dust, averaged over 8 hours);
- where necessary, provide you with personal protective equipment, including respiratory protective equipment (RPE), when the risk cannot be controlled by engineering controls alone;
- maintain all equipment used as control measures in good working order;
- instruct and train you to use equipment properly, and tell you about health risks;
- monitor to ensure that controls are effective and that the WEL for RCS is not exceeded (this may include measurement of the dust levels in your work area);
- where appropriate arrange health surveillance.

What should you do?

Your employer must tell you about the risks from RCS, and how to avoid them. Make sure you understand what you have to do and do it.

You should:

- ask if the material you are using, or dust from the work you are doing, contains silica
- ask how the job should be done safely, without creating risks to your health
- follow all safe working procedures, including cleaning procedure
- use controls such as dust extraction as you were trained to do
- wear protective clothing properly.

If you have to wear RPE, make sure that:

- you are wearing the right type of RPE for the job
- you are face-fit tested for tight-fitting RPE, to ensure it fits properly – **you need to be clean shaven for this tight fit type of RPE to work effectively**
- you have been trained to use, check and clean the RPE
- disposable respirators are changed regularly
- the filters on reusable RPE respirators are changed in accordance with manufacturer’s recommendations
- the equipment is stored in a clean, dust-free place
- you tell your supervisor or employer if you find any defects, or your RPE does not fit, is dirty or its filter is old – your employer must put it right.

Do not:

- dry sweep – use a vacuum of dust class M or H, or wet cleaning;
- use compressed air for removing dust from clothing.

If the controls to protect you from dust exposure include dust extraction (local exhaust ventilation (LEV)) or other engineering control equipment, you should ask yourself the following questions:

- Were you involved in the design and selection of control equipment? The way you work may need to change to maximise the protection you get.
- Are the proposed changes workable? If they are not you could suggest alternatives; the way you work may need to change to maximise the protection you get.
- Have you been trained in how the control equipment works? You need to know how to use it effectively, your employer, the equipment supplier or some other competent person should do this.
- Can you tell if the control equipment is not working effectively? You should be trained to recognise the signs, eg dust extraction equipment should have an airflow indicator to show that it is working properly.
- Is the control equipment easy to use properly? If it forces you to work in an awkward way or prevents you doing the task properly tell your employer and suggest improvements.

Your employer may also need to arrange for you to be placed under health surveillance. This may include:

- health and working history questionnaires
- lung function tests
- chest X-rays.

Decisions on the appropriate form of health surveillance may require the advice of an occupational health professional. The precise form of health surveillance will depend on the particular circumstances of exposure (level, frequency and duration) identified by the risk assessment.

You should co-operate with your employer or works doctor/nurse if health surveillance is required.

You are not entitled to see someone else's personal medical records and your employer is not entitled to see yours. But the staff representative or union official can be given an idea of the workforce's overall ill health effects.

If you have concerns about working with RCS after talking to your employer, ask your trade union or employee health and safety representative for help, or speak to the doctor/nurse involved in the health surveillance.

Find out more

To protect employees and others, employers should comply with the workplace health and safety requirements in the Control of Substances Hazardous to Health Regulations 2002 (COSHH). HSE has produced simple *COSHH essentials* guidance sheets on how to control RCS exposure:

Brick and tile making series

www.hse.gov.uk/pubns/guidance/bkseries.htm

Ceramics series

www.hse.gov.uk/pubns/guidance/crseries.htm

Construction series

www.hse.gov.uk/pubns/guidance/cnseries.htm

Foundries series

www.hse.gov.uk/pubns/guidance/fdseries.htm

Manufacturing series

www.hse.gov.uk/pubns/guidance/mnseries.htm

Quarries series

www.hse.gov.uk/pubns/guidance/qyseries.htm

Stonemasons series

www.hse.gov.uk/pubns/guidance/stseries.htm

Controlling exposure to stone dust HSG201

www.hse.gov.uk/pubns/priced/hsg201.pdf

G403 – Health surveillance for occupational contact dermatitis (OCD)

www.hse.gov.uk/pubns/guidance/g403.pdf

G409 – Exposure measurement: Air sampling

www.hse.gov.uk/pubns/guidance/g409.pdf

Guidance on respiratory protective equipment (RPE) fit testing

Leaflet INDG479(rev1) HSE 2019

www.hse.gov.uk/pubns/indg479.htm

Fit2fit Accreditation - Fit2Fit RPE Fit Test Providers Accreditation Scheme Direct advice sheets - COSHH e-tool (hse.gov.uk)

Health surveillance series

www.hse.gov.uk/pubns/guidance/g404.pdf

Respiratory protective equipment series

www.hse.gov.uk/pubns/guidance/rseries.htm

You can find out more about health surveillance at

www.hse.gov.uk/coshh/basics/surveillance.htm

Using cut-off saws: A guide to protecting your lungs Leaflet INDG461 HSE and The Highways Agency 2012 www.hse.gov.uk/pubns/indg461.htm

Further information

For information about health and safety, or to report inconsistencies or inaccuracies in this guidance, visit www.hse.gov.uk. You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops.

This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory, unless specifically stated, and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance.

This leaflet is available at www.hse.gov.uk/pubns/indg463.htm.

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