MN1

COSHH essentials in manufacturing: Silica

Weighing mineral powders containing silica

Control approach 2 Engineering Control and Respiratory protective equipment (RPE)

The Control of Substances Hazardous to Health Regulations 2002 (COSHH) require employers to ensure that exposure is prevented or, where this is not reasonably practicable, adequately controlled. This guidance gives practical advice on how this can be achieved by applying the principles of good practice for the control of exposure to substances hazardous to health, as required by COSHH.

It is aimed at people whose responsibilities include the management of substances hazardous to health at work (eg occupational health specialists, anyone undertaking COSHH assessments and supervisors) It is also useful for trade union and employee safety representatives. It will help you carry out COSHH assessments, review existing assessments, deliver training and supervise activities involving substances hazardous to health.

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.

See Essential information near the end of the sheet.

What this sheet covers

This sheet describes good practice for the control of exposure to Respirable Crystalline Silica (RCS) during the weighing of dry mineral powders containing crystalline silica, including silica flour which contains 100% crystalline silica.

It covers the key points you need to follow to reduce exposure to an adequate level.

Follow all the points, or use equally effective measures.

Main points

- Mineral powders are very fine and can produce a lot of airborne dust containing RCS when disturbed.
- Get safety data sheets – consider using mineral powders containing less RCS.
- Contaminated work clothing may also be a source of dust exposure, even after the task has been completed.
- Air sampling may be needed to show that control of exposure to RCS is being maintained.
- Some substances in mineral powders can also be flammable or corrosive and your controls must be suitable for these hazards too.
- Provide health surveillance when workers are regularly exposed to RCS dust and there is a reasonable likelihood that silicosis may develop.

Hazards

✓ RCS is also known as alpha-quartz, cristobalite or ‘free silica’, and can be wrongly labelled as ‘amorphous silica’.

✓ RCS is hazardous by inhalation as the ‘respirable’ dust, which is very fine and invisible under normal lighting and can get deep into the lungs.

✓ The workplace exposure limit for RCS is detailed in HSE publication EH40/2005 Workplace Exposure Limits: www.hse.gov.uk/pubns/priced/eh40.pdf.

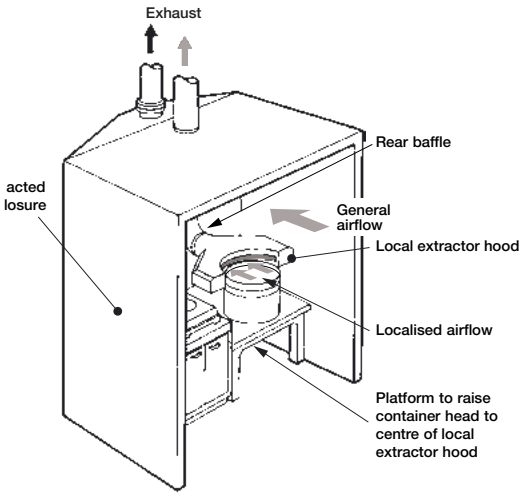
✓ Inhaling RCS can lead to:

- Silicosis which is a serious and irreversible lung disease that can cause permanent disablement and early death. There is an increased risk of lung cancer in workers who have silicosis.
- Chronic obstructive pulmonary disease (COPD) which is a group of lung diseases, including bronchitis and emphysema, that results in severe breathlessness, prolonged coughing, chronic disability and can lead to death. The risk of COPD is increased by smoking.

✓ RCS dust is also abrasive and drying when in contact with skin, and can lead to contact dermatitis.

Access to work area

- ✓ Allow access to authorised and appropriately trained people only.
- ✓ Segregate this task as far as possible to reduce spreading of airborne contamination to other workers.
- ✓ Where possible slope floors gently towards gulleys, to help dust removal by wet washing.
- ✓ Gulleys should not flow through clean areas, as there is a risk of the slurry drying out and dust becoming airborne.



Equipment and procedures

- ✓ Select the form of mineral product to minimise dust generation during handling eg use slurries or granules in preference to fine dry powders.
- ✓ Arrange bulk delivery to a silo, or in an IBC (Intermediate Bulk Container), to avoid the need to transfer powders unnecessarily.
- ✓ Enclose the transfer and weighing operations as much as possible and use extraction local exhaust ventilation (LEV), see illustration.
- ✓ Handle any sacks and bags carefully, particularly during the transfer of powder. Use extraction at the transfer point and wear RPE.
- ✓ Tip / scoop gently from bags. Roll up empty bags with the open end close to the extraction point, then put them in a closed bag collector.
- ✓ Avoid having powders in large and deep containers to prevent the need for workers to bend into the container to scoop out powder and reduce the distance that dust could fall.
- ✓ Keep containers of powder closed when not in use.
- ✓ Make the enclosure big enough to contain the materials and equipment and to allow the task to be carried out within the enclosure.
- ✓ Keep the open face as small as possible, while giving room for safe working. Use transparent panels or plastic strips to reduce the open area.
- ✓ Locate the enclosure away from doors, windows and walkways to stop draughts interfering with the extraction.
- ✓ Airflow must be sufficient to control airborne contaminants effectively. This will depend on the design, size of opening and the type of process and substance being controlled.
- ✓ Have a supply of clean air coming into the workroom to replace extracted air.
- ✓ Discharge extracted air to a safe place away from doors, windows and air inlets.
- ✓ You can re-circulate thoroughly clean filtered air into the workroom but under these circumstances incorporate monitoring and an alert system (eg alarm or indicator).

- ✓ Provide an easy way of checking the LEV is working, eg airflow indicator or equivalent.
- ✓ Fit an indicator or alarm to show if filters have blocked or failed.
- ✓ Always confirm that the extraction is turned on and working at the start of work. Check the gauge. Workers should know and follow proper positioning when using an enclosure.

Respiratory protective equipment (RPE)

- ✓ Provide RPE with an assigned protection factor (APF) of at least 40 (see sheets R4 and R5) unless air sampling data show that a lower level of protection is adequate
- ✓ Fit testing is required for RPE with a tight fitting face seal.
- ✓ Workers wearing tight fitting RPE should be clean shaven, trained how to fit it properly and how to look after it.
- ✓ Tell workers to discard disposable RPE at the end of the shift, or sooner if their RPE becomes clogged with dust.
- ✓ Change the filters on respirators in accordance with manufacturers recommendations and if:
  - the shelf-life expiry date has passed
  - they are damaged or visibly contaminated
  - they become harder to breathe through
- ✓ Examine and test non-disposable RPE thoroughly at least once every month.
- ✓ Tell workers to check RPE is working properly before every use.
- ✓ If RPE is required for extended periods, eg longer than 1 hour, use powered respirators or constant flow airline breathing apparatus.
- ✓ Air supplied to breathing apparatus should meet minimum quality requirements, in line with the latest British Standard
- ✓ Keep RPE clean and store it in a clean place.

Personal protective equipment (PPE)

- ✓ Ask your supplier to help you select the right PPE.
- ✓ Provide separate storage for clean and contaminated PPE.
- ✓ Provide coveralls that do not retain dust – synthetic rather than cotton.
- ✓ Use a contract laundry or a suitable equivalent to wash work clothing. Don't allow workers to do this at home. Warn them that the dust contains silica.
- ✓ Provide protective gloves suitable for working with RCS and any other hazardous substances in the mineral powder.

Personal decontamination

- ✓ Provide warm water, mild skin cleansers, and soft paper or fabric towels for drying. Avoid abrasive cleansers.
- ✓ Provide pre-work skin creams, which will make it easier to wash dirt from the skin.
- ✓ Provide after-work creams to replace skin oils.

Caution: 'Barrier creams' are not 'liquid gloves' and they do not provide a full barrier.

Maintenance, examination and testing

- ✓ Keep all equipment used for the task in effective working order. Maintain it as advised by the supplier or installer.
- ✓ Establish a plan for regular preventative maintenance.
- ✓ Check for signs of damage to control equipment before starting work.
- ✓ Have equipment thoroughly examined and tested against its performance standard, at suitable intervals.
- ✓ For LEV a user manual or log book is helpful in setting out the frequency of checking, maintenance or parts replacement.
- ✓ For LEV with no user manual or log book, you may need the help of a competent person. They can determine the performance needed for adequate control.
- ✓ Keep records of all examinations for at least 5 years of TExT information. eg target extraction rates which show the LEV is performing as originally intended.
- ✓ LEV systems require a statutory 'thorough examination and test' (TExT).
- ✓ Get a competent person to perform the TExT at least every 14 months.
- ✓ Carry out all actions arising from the TExT.
- ✓ HSG258 provides more detailed information on LEV systems and legal and competence requirements.
- ✓ Several measures are available to check effectiveness of controls. These range from simple qualitative (use of dust lamp) to complex quantitative techniques (eg air sampling) usually for higher risk scenarios.

Cleaning and housekeeping

- ✓ Vacuum dry dust or use wet cleaning methods.
- ✓ Use vacuum equipment that meets dust Class H (high hazard) classification to remove dust.
- ✓ Clean down the enclosure and equipment as soon as possible after use.
- ✓ Keep machinery and workroom clean.
- ✓ Dispose of wastes safely.
- ✓ Wash down the workroom at the end of each day's work.
- ✓ Make sure spills can be contained and cleaned up without making dust airborne. Ensure any wet spills are cleaned up promptly so they do not dry out.

Caution: Never allow the use of brushes or compressed air for removing dust from skin and clothing. Avoid the use of brushes or compressed air for removing dust from surfaces or from inside machinery.

Health surveillance

- ✓ Provide health surveillance when workers are regularly exposed to RCS dust and there is a reasonable likelihood that silicosis may develop. See sheet G404.
- ✓ Provide health surveillance for dermatitis where there is a reasonable likelihood that dermatitis may occur in your workplace. See sheet G403.

Training and supervision

- ✓ Tell workers about the hazards associated with their work and how to prevent and recognise early signs of lung damage and dermatitis from exposure to RCS and wet working.

- ✓ Provide workers with training on operating the equipment and using the control measures correctly, and to report any faults immediately.
- ✓ Provide supervision – ensure that safe work procedures are followed.
- ✓ Involve managers and supervisors in health and safety training.
- ✓ Training records are helpful to demonstrate training has taken place.

Essential Information

- R4 - Respiratory protective equipment (RPE)
- R5 - Respiratory protective equipment (RPE)
- G403 – Health surveillance for occupational dermatitis
- G404 - Health surveillance for those exposed to respirable crystalline silica (RCS)
- G406 – New and existing engineering control systems
- G409 – Exposure measurement: Air sampling

Further information

Occupational Safety and Health Consultants Register www.oshcr.org/

Institute of Local Exhaust Ventilation Engineers http://www.cibse.org/Institute-of-Local-Exhaust-Ventilation-Engineers-I

Controlling airborne contaminants at work: A guide to local exhaust ventilation (LEV), HSG258 http://www.hse.gov.uk/pubns/books/hsg258.htm

Local exhaust ventilation (LEV) workplace fume and dust extraction web page: www.hse.gov.uk/lev/

INDG 408 – Clear the air: A simple guide to buying and using local exhaust ventilation (LEV)

Respiratory protective equipment at work: A practical guide HSG53 (Fourth edition) HSE Books 2013 ISBN 978 0 7176 6454 2 http://www.hse.gov.uk/pubns/books/hsg53.htm

Preventing contact dermatitis and urticaria at work. HSE Books. INDG233(rev2), published 07/15. Introduction. www.hse.gov.uk/pubns/indg233.pdf

Health surveillance for those exposed to respirable crystalline silica (RCS) - Guidance for occupational health professionals. Published 2015 http://www.hse.gov.uk/pubns/priced/healthsurveillance.pdf

You can find the full COSHH essentials series at http://www.hse.gov.uk/coshh/essentials/index.htm

For information about health and safety visit https://books.hse.gov.uk or http://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.

To report inconsistencies or inaccuracies in this guidance email: commissioning@wlt.com.

Employee checklist

- ☐ Do you understand the health hazards associated with your work ?
- ☐ Are you sure about safe work procedures?
- ☐ Are you sure how to use all dust controls?
- ☐ Check your RPE works properly every time you use it.
- ☐ Is the dust extraction working? Check the gauge.
- ☐ Look for signs of leaks, wear and damage every day.
- ☐ If you find any problems, tell your supervisor, Don't just carry on working.
- ☐ Make suggestions to improve the effectiveness of dust control.
- ☐ Co-operate with health surveillance.
- ☐ Use, maintain and store your protective equipment in accordance with instructions.
- ☐ Wash hands before eating, drinking, smoking, using the lavatory and after work.
- ☐ Follow any skin care programme provided.
- ☐ Clear up dust spills promptly.