HSE
Health and Safety Executive

QY8

COSHH essentials in quarries: Silica

Silica flour and mineral powder: Small bag (15-50 kg) filling and transfer

Control approach 2 Engineering control and 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, supervisors and 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.

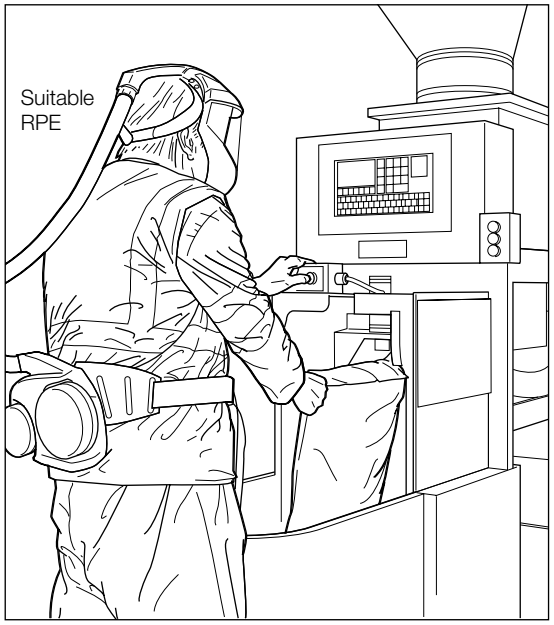
See Essential information near the end of the sheet.

What this sheet covers?

This sheet describes good control practice when small bag filling.

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

Follow all the points, or use equally effective measures.



Main points

- If possible use an automated carousel bagging system with screw feed to fill bags slowly.
- Extraction must be strong enough to collect the very dusty air that is displaced when filling, moving and palletising bags.
- Bags also get coated with dust; this is another exposure source
- Breathing in dust may cause silicosis.
- Keep the emission sources as small as possible
- Use all the controls in this sheet, make sure the controls work.
- Use air sampling. See sheet G409.
- Health surveillance is usually needed. See sheets G401 and G404.

Hazards

- Respirable crystalline silica (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, can get deep into the lungs. The workplace exposure limit (WEL) for RCS is 0.1 mg/m^3 (based on an 8-hour time-weighted average).
- Inhaling RCS can lead to:
  - Silicosis – 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) – a group of lung diseases, including bronchitis, and emphysema. 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.

Equipment and Procedures

✓ If possible use an automated carousel bagging system with screw-feed to fill bags slowly.
✓ Could you persuade customers to accept bulk delivery?
✓ Use local exhaust ventilation (LEV) to control the airborne contaminants.
✓ Use equipment which is designed to resist the abrasive effects of silica-containing materials.
✓ Enclose the filling point as much as possible with LEV to capture dust as bags fill, and on removing bags from the filling nozzle.
✓ Leave powders to settle and compact inside the silo before bagging.
✓ Use plastic curtains or other suitable dividing material to enclose the bag transfer area.
✓ Use good quality bags to reduce leakage through seams.
✓ Clamp the bag securely to the bagging head during filling.
✓ Control the filling rate so that LEV continues to be effective.
✓ 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.
✓ Where possible, site the work area away from doors, windows and walkways, to stop draughts interfering with the LEV and spreading the airborne contaminant.
✓ Fit an indicator or alarm to show if filters have blocked or failed.
✓ Have a supply of clean air coming into the workroom to replace extracted air.
✓ Define the areas for storage and put up clear signs.
✓ Make sure spills can be contained and cleaned up without raising dust.
✓ Paper sacks are often contaminated with dust on the outside, which is disturbed by handling. Use RPE for sack handling.
✓ Shake down air filters regularly (eg every hour), or use automated reverse-jet cleaning.

Respiratory protective equipment (RPE)

✓ Provide powered respirators or constant flow airline breathing apparatus with a UK Assigned Protection Factor (APF) of at least 40.
✓ 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.
✓ 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 RPE thoroughly at least once every month and record this.

- ✓ Tell workers to check RPE is working properly before every use and record this.
- ✓ Keep RPE clean and store it in a clean place.
- ✓ Air supplied to BA should meet minimum quality requirements, in line with the latest British Standard. Your RPE or air compressor supplier should be able to advise.

Personal protective equipment (PPE)

- ✓ Ask your supplier to advise on suitable PPE.
- ✓ Provide separate storage for clean and contaminated PPE.
- ✓ Warn workers that dusty PPE can be a source of secondary exposure.
- ■ Provide coveralls that do not retain dust – synthetic rather than cotton.
- ■ Provide protective gloves suitable for working with RCS.
- ■ 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.

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 replenish skin oils.

Maintenance, examination and testing

- ✓ Keep all equipment used for the task in effective working order. Maintain it as advised by the supplier or installer.
- ✓ Check for signs of damage to control equipment before starting work.
- ✓ Keep airline oil and water traps empty, and filters clean.
- ✓ Check for signs of damage daily. Make repairs.
- ✓ Check that filter seatings are in good condition.
- ✓ Review records – failure patterns show where preventive maintenance is needed.
- ✓ Carry out air sampling to check that the controls are working well. See sheet G409.
- ✓ 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.
- ✓ LEV systems require a statutory 'thorough examination and test' (TExT).
- ✓ Get a competent person to perform the TExT at least once every 14 months.
- ✓ Carry out all actions arising from the TExT.
- ✓ Several measures are available to check effectiveness of controls ranging from simple qualitative (use of dust lamp) to complex quantitative techniques (eg air sampling) usually for higher risk scenarios.
- ✓ HSG258 provides more detailed information on LEV systems and legal and competence requirements.

Cleaning and housekeeping

- ✓ Clear up accumulated waste every day.
- ✓ Provide an extracted hopper for burst or damaged bags.
- ✓ Store empty bags outside the workroom. Dispose of wastes safely.
- ✓ Clean work equipment and the work area daily. Clean other equipment and the workroom regularly – at least once a week.
- ✓ Vacuum dry dust or use wet cleaning methods.
- ✓ Use vacuum equipment that meets at least dust Class M (medium hazard) classification to remove dust.

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 for COPD where there is a reasonable likelihood that COPD may occur in your workplace. See G401.
- Provide health surveillance for dermatitis where there is a reasonable likelihood that dermatitis may occur in your workplace. See G403.
- Provide health surveillance for silicosis where there is a reasonable likelihood that silicosis may occur in your workplace. See G404.

Training and supervision

- ✓ Provide supervision – ensure that safe work procedures are followed.
- ✓ Tell workers about the hazards associated with their work and how to recognise early signs of lung damage from exposure to RCS.
- ✓ Provide workers with training on:
  - working safely with hazardous substances;
  - when and how to use controls;
  - how to check they are working;
  - what to do if something goes wrong.
- ✓ Involve managers and supervisors in health and safety training.
- ✓ Training records are helpful to demonstrate training has taken place.

Essential information

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

Health surveillance, monitoring and sampling sheets are available at www.hse.gov.uk/pubns/guidance/gseries.htm

Health surveillance for chronic obstructive pulmonary disease (COPD) COSHH Guidance Sheet G401 HSE 2016 www.hse.gov.uk/pubns/guidance/g401.pdf

Health surveillance for occupational dermatitis COSHH Guidance Sheet G403 HSE 2011 www.hse.gov.uk/pubns/guidance/g403.pdf

Health surveillance for silicosis COSHH Guidance Sheet G404 HSE Books 2016 www.hse.gov.uk/pubns/guidance/g404.pdf

New and existing engineering control systems COSHH Guidance Sheet

G406 HSE Books 2016 www.hse.gov.uk/pubns/guidance/g406.pdf
Exposure measurement: Air sampling COSHH Guidance Sheet G409 HSE Books 2016 www.hse.gov.uk/pubns/guidance/g409.pdf

General storage of solids and liquids COSHH Guidance Sheet G101 HSE 2015 www.hse.gov.uk/pubns/guidance/g101.pdf

General advice on chemicals causing harm via skin or eye contact COSHH Guidance Sheet S100 HSE 2015 www.hse.gov.uk/pubns/guidance/s100.pdf

Selecting personal protective equipment (PPE) COSHH Guidance Sheet S102 HSE 2015 www.hse.gov.uk/pubns/guidance/s102.pdf

Advice for managers COSHH Guidance Sheet QY0 HSE 2006 www.hse.gov.uk/pubns/guidance/qy0.pdf contains a table showing RCS concentrations in common materials

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RPE with a UK Standard Assigned Protection factor 40 (APF40) COSHH Guidance Sheet R4 HSE 2016 www.hse.gov.uk/pubns/guidance/rpe4.pdf

Further Information

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

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

Controlling airborne contaminants at work: A guide to local exhaust ventilation (LEV) HSG258 HSE Books 2011 www.hse.gov.uk/pubns/books/hsg258.htm

HSE's LEV web page: www.hse.gov.uk/lev/

Clearing the air: A simple guide to buying and using local exhaust ventilation (LEV) Leaflet INDG408 HSE 2008 www.hse.gov.uk/pubns/indg408.htm

This document is available at: www.hse.gov.uk/pubns/guidance/qy08.pdf

Employee checklist

- ☐ Keep the cabin interior clean.
- ☐ Check for signs of leaks, wear and damage every day including to the door and window seals.
- ☐ If you find any problems, tell your supervisor. Don't just carry on working.
- ☐ Confirm that the water suppression is turned on and working.
- ☐ Use, maintain and store your PPE in accordance with instructions.
- ☐ Clean your work boots before entering the cabin.
- ☐ Close cabin doors and windows.
- ☐ Switch on and check the cabin ventilation system before starting work.
- ☐ Wear RPE when leaving the cabin and entering dusty areas.
- ☐ Shower and change clothing before leaving the site.
- ☐ Co-operate with health surveillance.
- ☐ If you develop any ill health symptoms that may be related to work, inform your supervisor.

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