Making products that include silica flour

Control approach R
Respiratory protective equipment (RPE)

Hazard
✓ Some manufactured products contain powdered silica or mineral as an ingredient, and produce airborne respirable crystalline silica (RCS).
✓ All RCS is hazardous, causing silicosis. This is a serious lung disease causing permanent disability and early death.
✓ Silicosis is made worse by smoking.
✓ ‘Respirable’ means that the dust can get to the deepest parts of the lung. Such fine dust is invisible under normal lighting.
✓ Keep inhalation of RCS as low as possible.
✓ When all controls are applied properly, less than 0.1 mg/m³ RCS is usually achievable (based on an 8-hour time-weighted average).

Crystalline silica concentrations in common materials
✓ Silica flour contains 100% crystalline silica and is a common ingredient in products such as surface coatings, abrasives, plastics, grouts, mastics, ceramic glazes and investment casting media.

Access and premises
✓ Only allow access to authorised staff.
✓ Segregate this task as far as possible to reduce cross-contamination.

Equipment
✓ Respiratory protective equipment (RPE) is normally needed to reduce exposures to an acceptable level.
✓ Can you use safer systems, eg bulk delivery to a silo or in an FIBC?
✓ Enclose the operation as much as possible.
✓ Make the enclosure big enough to contain the materials and equipment.
✓ Keep the open face as small as possible, while giving room for safe working. Use plastic strips to reduce the open area.
✓ Locate the booth away from doors, windows and walkways to stop draughts interfering with the extraction.
✓ Wire in the extraction with the lighting.
✓ You need an inward air speed between 1 and 1.5 metres per second at the face of a cross-draught booth.
Manufacturing: Silica

Respiratory protective equipment (RPE)

- Fit a manometer or pressure gauge near the extraction point, to show that the system is working properly.
- Mark the acceptable range of readings.
- Discharge cleaned, extracted air to a safe place outside, away from doors, windows and air inlets.
- Have a supply of clean air coming into the workroom to replace extracted air.
- Fit an indicator or alarm to show if filters have blocked or failed.
- Consult a qualified ventilation engineer to design new control systems or to update current controls. See sheet G406.

Storage
- Make sure spills can be contained and cleaned up without raising dust.
- Sacks are often contaminated with dust on the outside, which is disturbed by handling. Use RPE for sack handling.

Procedures
- Always confirm that the dust extraction is turned on and working before starting work.
- Make sure that workers check that their RPE works properly every time they put it on.
- Workers should stand to the side of a cross-draught booth, not in the air-flow.
- Tip gently from bags. Roll up empty bags with the open end close to the extraction point, then put them in a bag collector.
- Clean air pre-filters daily, or follow the manufacturer’s advice.
- Shake down air filters regularly (eg every hour), or use automated reverse-jet cleaning.
- Make sure you can get spares easily.

Maintenance, examination and testing
- Minerals and silica-containing dusts are very abrasive. Plan regular maintenance.
- Follow instructions in maintenance manuals - keep equipment in effective and efficient working order.
- Clean down the equipment before starting maintenance - use wet or dustless methods.
- If the dust extraction or filtration plant is faulty, stop work until it is repaired.
- Daily, look for signs of damage. Noisy or vibrating fans can indicate a problem.
- At least once a week, check that the dust extraction system and gauges work properly.
- Check that filter seatings are in good condition.
- You need to keep all controls in good working order. See sheet G406 for advice on engineering controls.
- You need to know the manufacturer’s specifications to check the extraction’s performance.
- If this information isn’t available, hire a competent ventilation engineer to determine the performance needed for effective control.
- The engineer’s report must show the target extraction rates.
- Keep this information in your testing log-book.
✓ Get a competent ventilation engineer to examine the extraction thoroughly and test its performance at least once every 14 months. See the HSE publication HSG54 - see ‘Further information’.
✓ Examine and test RPE thoroughly at least once every three months.
✓ Check the air flow and air quality to air-fed RPE at least once every three months or before use. Ensure that compressors (including mobile compressors) take in only clean air.
✓ Keep airline oil and water traps empty, and filters clean.
✓ Keep records of all examinations and tests for at least five years.
✓ 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.

**Personal protective equipment (PPE)**
✓ Ask your supplier to help you select the right PPE.
✓ Provide storage for clean and contaminated PPE.

**Respiratory protective equipment (RPE)**
✓ RPE is normally needed.
✓ RPE is often needed for maintenance and some cleaning jobs.
✓ Use RPE for handling sacks.
✓ Powered or air-fed RPE is more comfortable to wear.
✓ Select RPE that suits the wearer, the job and the work environment.
✓ Decide the level of protection from air sampling data. Otherwise, use RPE with an assigned protection factor (APF) of at least 20. See sheet R3.
✓ Disposable RPE is acceptable.
✓ Make sure all RPE is properly fit-tested - get advice from your supplier.
✓ Replace RPE filters as recommended by the supplier. Throw away disposable RPE at the end of the job or the end of the shift.
✓ Keep RPE clean.

**Other protective equipment**
✓ Provide coveralls that do not retain dust. Use synthetic fabrics - not cotton or knitted.
✓ Use a contract laundry or a suitable equivalent to wash work clothing. Warn them that the dust contains silica.
✓ Skin creams help in washing contamination from the skin. After-work creams help to replace skin oils. **Caution: Never allow use of compressed air for removing dust from clothing.**

**Health surveillance**
✓ You need health surveillance unless exposure to RCS is well below the limit. See sheet G404.
✓ Consult an occupational health professional - see ‘Useful links’.
Cleaning and housekeeping

- Store empty bags outside the workroom. Dispose of wastes safely.
- Clean down the enclosure and equipment as soon as possible after use.
- Wash down the workroom at the end of each day's work.
- Damp down and shovel large amounts carefully to avoid stirring up dust. Provide RPE.
- Use a Type H vacuum cleaner fitted with a HEPA filter, or wet clean. Caution: Don't use a brush or compressed air.

Training and supervision

- Tell workers that silica dust can cause serious lung diseases.
- Working in the right way and using the controls correctly is important for exposure control. Train and supervise workers. See sheet MN0.

Further information

- For environmental guidelines see sheet MN0

Useful links

- 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.
- Contact the British Occupational Hygiene Society (BOHS) on 01332 298101 or at www.bohs.org for lists of qualified hygienists who can help you.
- Look in the Yellow Pages under ‘Health and safety consultants’ and ‘Health authorities and services’ for ‘occupational health’.
- Also see www.nhsplus.nhs.uk.

Employee checklist

☐ 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.
☐ Clear up dust spills promptly.
☐ Make suggestions to improve the effectiveness of dust control.
☐ Make sure that bags etc aren’t drawn into the extraction ducts.
☐ Co-operate with health surveillance.
☐ Use, maintain and store your protective equipment in accordance with instructions.
☐ Use skin creams provided as instructed.

This document contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do.

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