

FD14

Furnace relining

COSHH essentials for
foundries

Control approach: Containment / Respiratory
protective equipment

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 dust during furnace relining. Similar precautions should be applied to smaller maintenance tasks that can give rise to dust and fibres (eg ladle maintenance).

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

This is achieved by following good control practice (ie follow all points described in this sheet or use equally effective measures), and by reducing exposure to below the relevant workplace exposure limits (WELs).

Hazards

Health hazards in foundries include dusts (foundry sands, fettlings and kiln linings contain silica), metal fumes, products of combustion and thermal decomposition, and substances associated with binder systems.

Refractory ceramic fibres (RCF) in kiln linings can be fine enough to be inhaled and deposited in the lungs and cause serious lung diseases including cancer. RCF can also cause irritation of the skin, eyes and upper airways.

RCF may have converted to crystalline silica when furnace linings were subject to high temperatures.

Crystalline silica dust, which is fine enough to reach deep inside the lung, is known as respirable crystalline silica (RCS). Exposure to RCS can cause silicosis, where irreversible lung damage can be present before any symptoms develop. Silicosis may continue to worsen even after exposure to RCS stops. RCS can also cause other serious diseases such as chronic obstructive pulmonary disease (COPD) and lung cancer. The workplace exposure limit for RCS is detailed in HSE publication EH40/2005 Workplace Exposure Limits (see Essential information).

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

Metals found in dust can include nickel, chromium, manganese, cobalt and lead. Some metals such as nickel and cobalt can cause dermatitis and skin allergies.

Access to work area

- ✓ Allow access to authorised and appropriately trained people only.
- ✓ Isolate and enclose the work area to avoid contaminating nearby workplaces.
- ✓ Use a permit-to-work for access.

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- ✓ The furnace may be a confined space. If it is, and a worker needs to enter it, you must comply with the Confined Spaces Regulations. See HSE publication L101 in Essential information.
 - ✓ Provide good access to enable safe waste removal.

Equipment and procedures

- ✓ Select the safest material or form of material for lining furnaces.
- ✓ Keep all material wrapped when not in use.
- ✓ Provide a good standard of general ventilation eg an air blower to get fresh air into the work area.
- ✓ Ensure the work area is cold before starting work, as far as reasonably practicable.
- ✓ If hot work is necessary, additional control measures will be required and you may need to seek expert advice.
- ✓ Enclose the process so far as is reasonably practicable using enclosures constructed of appropriate materials which do not retain the dust, eg plastic sheeting.
- ✓ Make use of any existing Local Exhaust Ventilation (LEV) on the furnace.
- ✓ Where reasonably practicable, use water for dust suppression, eg wet the RCF insulation in situ before removal.
- ✓ Carry out furnace relining outside normal working hours, if reasonably practicable.
- ✓ Use vacuum equipment that meets at least the dust Class M (medium hazard) classification.
- ✓ Never use dry brushing or compressed air.

Caution:

- **Some dry dusts, for example those containing aluminium, magnesium, titanium or zirconium, can self-ignite or ignite in the presence of contaminants like rust on steelwork.**
- **Some dusts can absorb the oxygen from the air, or can emit harmful gases if they become wet.**
- **The composition and properties of the dusts being worked with should form part of your risk assessment under the COSHH, Confined Spaces and DSEAR (Dangerous Substances and Explosive Atmospheres) Regulations.**

Respiratory protective equipment (RPE)

- ✓ RPE is normally needed for furnace relining, including related cleaning and maintenance.
- ✓ Provide respirators with an assigned protection factor (APF) of at least 40 (eg powered TH3). See sheet R4 in Essential information.
- ✓ Constant flow airline breathing apparatus (CFABA) will be needed if work is to be carried out in a confined space and/or there is a risk of exposure to toxic gases. See sheets R5 and L101 in Essential information.
- ✓ Face fit testing is required for RPE with a tight fitting face seal. See INDG 479 in Essential information.
- ✓ Workers wearing tight fitting RPE must be clean shaven.
- ✓ Ensure RPE is compatible with other PPE worn.
- ✓ Workers should be trained how to check RPE is working properly before every use, how to fit it properly and how to look after it.

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- ✓ Ensure workers 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 manufacturer's recommendations and if:
 - the shelf-life expiry date has passed
 - they are damaged or visibly contaminated; or,
 - they become harder to breathe through.
 - ✓ Keep RPE clean and store it in a clean place.
 - ✓ For reusable RPE, a thorough maintenance, examination and test should be carried out at least once a month. However, if the RPE is used only occasionally, an examination and test should be carried out before use and, in any event, the interval should not exceed 3 months.

Personal protective equipment (PPE)

- ✓ Ask your supplier to advise on suitable PPE.
- ✓ Consult workers to ensure PPE will be suitable for them.
- ✓ Make suitable arrangements for maintenance, storage and replacement of PPE. Provide separate storage for clean and contaminated PPE.
- ✓ Provide disposable hooded coveralls (type 5 for dusts), protective gloves and protective footwear.
- ✓ Workers should change and discard damaged gloves immediately.
- ✓ Keep any PPE clean and replace at recommended intervals.
- ✓ Do not allow workers to wear their own outer clothing in contaminated areas.
- ✓ Use a contract laundry or a suitable equivalent to wash work clothing. Warn them of any hazardous substances on the clothing.

Personal decontamination and skin care

- ✓ Prohibit eating, drinking and smoking in contaminated areas.
- ✓ 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.
- ✓ Barrier creams are not 'liquid gloves' and 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.

Cleaning and housekeeping

- ✓ 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 the dust Class M (medium hazard) classification.
- ✓ Avoid the use of brushes or compressed air for removing dust from clothing, surfaces and machinery.

Health surveillance

- ✓ Provide health surveillance for dermatitis where there is a reasonable likelihood that dermatitis may occur in your workplace. See sheet G403 in Essential information.
- ✓ Provide health surveillance when workers are regularly exposed to RCS dust and there is a reasonable likelihood that COPD and/or silicosis may develop. See sheet G404 in Essential information.
- ✓ Workers undertaking the task described in this sheet will normally need health surveillance.
- ✓ You will need to take advice from a competent occupational health professional (a doctor or nurse) when setting up a health surveillance programme.
- ✓ If workers are exposed to lead, you must comply with the Control of Lead at Work Regulations.

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.
- ✓ 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.
- ✓ Provide supervision – ensure that safe work procedures are followed.
- ✓ Involve managers and supervisors in health and safety training.
- ✓ Training records are helpful to demonstrate what information, instruction and training has been provided.

Essential Information

- G403 – Health surveillance for occupational dermatitis.
<https://www.hse.gov.uk/pubns/guidance/g403.pdf>
- G404 – Health surveillance for those exposed to respirable crystalline silica (RCS). <https://www.hse.gov.uk/pubns/guidance/g404.pdf>
- R4 - UK Standard Assigned Protection Factor 40 (APF 40).
<https://www.hse.gov.uk/pubns/guidance/rpe4.pdf>
- R5 – Breathing apparatus with UK Assigned Protection Factor 40.
<https://www.hse.gov.uk/pubns/guidance/rpe5.pdf>
- Guidance on respiratory protective equipment (RPE) fit testing Leaflet INDG479(rev1) HSE 2019 www.hse.gov.uk/pubns/indg479.htm
- L101 – Safe work in confined spaces. Confined space regulations 1997. Approved Code of Practice and Guidance.
<https://www.hse.gov.uk/pubns/books/l101.htm>
- L132 - Control of Lead at Work Regulations 2002 Approved Code of Practice and guidance (Third edition). HSE 2002.
<https://www.hse.gov.uk/pubns/priced/l132.pdf>
- L138 - Dangerous Substances and Explosive Atmospheres Regulations 2002 Approved Code of Practice and Guidance.
<https://www.hse.gov.uk/pubns/books/l138.htm>
- EH40/2005 Workplace exposure limits HSE 2020
www.hse.gov.uk/pubns/books/eh40.htm

Further information

You can find the full COSHH essentials series at Foundry - COSHH e-tool (hse.gov.uk)

Control of exposure to silica dust - A guide for employees indg463.pdf (hse.gov.uk)

Respiratory protective equipment at work - A practical guide, HSG53. www.hse.gov.uk/pubns/books/hsg53.htm

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>

The dust lamp: A simple tool for observing the presence of airborne particles MDHS82. <https://www.hse.gov.uk/pubns/mdhs/pdfs/mdhs82-2.pdf>

L5 - The Control of Substances Hazardous to Health Regulations 2002. Approved Code of Practice and guidance (Sixth edition) <https://www.hse.gov.uk/pubns/books/l5.htm>

BOHS Directory of Occupational Hygiene Consultants: www.bohs.org/find-expertise/

Institute of Local Exhaust Ventilation Engineers Accredited members
Institute of Local Exhaust Ventilation Engineers (ILEVE) | CIBSE

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@williamslea.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 controls?
- If you find any problems, tell your supervisor, don't just carry on working.
- Is the LEV switched on and working properly? Check the gauge.
- Co-operate with health surveillance.
- Use, maintain and store your PPE in accordance with instructions.
- Check that any RPE/ breathing apparatus works properly every time you use it. Look for signs of leaks, wear and damage.
- Wash hands before eating, drinking, smoking, using the lavatory and after work.
- Follow any skin care programme provided. Never use solvents to clean your skin.