

FD12

COSHH essentials for
foundries

Spray coating a large casting (open workshop)

Control approach: Respiratory Protective
Equipment / General ventilation

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 when spray coating large castings in the open workshop. Spray coating smaller castings should be carried out under extraction. See MR2 in Essential information.

THIS SHEET APPLIES ONLY WHERE YOU CANNOT USE AN EXTRACTED OR ENCLOSED SPRAY BOOTH.

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.

Exposure to solvent vapours may cause drowsiness, loss of consciousness, and irritation of eye, skin and respiratory system.

Reactive products (eg epoxy and isocyanate-containing paints) may cause asthma if inhaled in paint mist. They can also cause dermatitis by skin contact.

Spraying chromate primers and coatings can cause cancer and skin contact may cause dermatitis.

Access to work area

- ✓ Identify an exclusion zone in which exposure to the spray/over-spray could occur.
- ✓ Display warning signs in this area, and leave in place until spraying, curing and cleaning up has finished.
- ✓ Allow access to authorised and appropriately trained people only.

Equipment and procedures

Spray coating

- ✓ Choose the least hazardous coating available for your process (discuss this with your suppliers and customers).
- ✓ Apply the spray coating either outdoors or outside normal working hours and not immediately prior to the start of a shift.
- ✓ Carry out spraying within an exclusion zone.
- ✓ Use physical barriers or shrouding in the area to prevent spray drift.

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- ✓ Use spray equipment that minimises the amount of mist generated.
 - ✓ Apply controls to limit exposure during the mixing of paint, loading the spray gun, and gun washing.
 - ✓ Vacate the area after spraying and keep RPE on until outside of the area.
 - ✓ Keep unprotected workers out of the area after spraying, until the spray mist has cleared and coatings have cured.

General ventilation

- ✓ Provide effective general ventilation to the work area to prevent the build-up of solvent vapour, by providing sufficient air movement to rapidly clear the vapour.
- ✓ Ensure the flow of air into and out of the building is not obstructed.
- ✓ Confirm that any fan extractors are switched on. Link the fan with the lighting, where practicable.
- ✓ If you have an overhead travelling crane above or close to the spray area, provide a clean air supply to the driver's cab.
- ✓ Mechanical general ventilation will be required when natural ventilation from open doors and windows is not sufficient to disperse the vapour.
- ✓ Design the mechanical general ventilation to include mobile fans and flexible ducting systems positioned to maximise dilution and removal of solvent vapour.
- ✓ Do not turn the ventilation off until all the solvent vapour has cleared.
- ✓ Discharge extracted air to a safe place outside the building, away from doors, windows and air inlets.
- ✓ Ensure that the general ventilation is operational during the task and while the solvent is evaporating.

Respiratory protective equipment (RPE)

- ✓ RPE is normally needed for spraying. Provide RPE with an assigned protection factor (APF) of at least 40 (eg powered respirator or constant flow airline breathing apparatus (CFABA) with a mask or a hood). See sheets R4 and R5 in Essential information.
- ✓ RPE is needed for cleaning and maintenance. Provide RPE with an assigned protection factor (APF) of at least 20 (eg half mask respirator). See sheet R3 in Essential information.
- ✓ Face fit testing is required for RPE with a tight fitting face seal. See INDG479 in Essential information.
If using breathing apparatus:
 - ✓ Air supplied to CFABA should meet minimum quality requirements, in line with the latest British Standard.
 - ✓ Check the quality of the air supply to the airline breathing apparatus at least every three months and more often when the quality of air cannot be assured to these levels.
 - ✓ Visually check the compressed airlines for signs of damage before each use.
 - ✓ Maintain the airline breathing apparatus at least once every month. Replace valves, face seals and worn or damaged parts on respirators. The valves need changing frequently if substances such as paint spray land on them.
- ✓ Keep a small stock of replaceable parts.

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- ✓ Keep airline oil and water traps empty and filters clean.
 - ✓ Keep breathing apparatus clean and store it in a clean place.
If using a respirator:
 - ✓ 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.
 - ✓ 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
 - they become harder to breathe through; or,
 - they have reached their break-through time for vapours or gases.
 - ✓ 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 three 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 suitable disposable hooded coveralls (Type 3 for heavy splashes, Type 4 for light spray or Type 6 for light accidental contact), chemical protective gloves and protective footwear. Single-use nitrile gloves are acceptable.
- ✓ 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.
- ✓ Have equipment thoroughly examined and tested against its performance standard at suitable intervals.
- ✓ Keep records of all examinations for at least 5 years.
- ✓ Several measures are available to check effectiveness of controls ranging from simple qualitative (eg use of dust lamp) to complex quantitative techniques (eg air sampling and/or biological monitoring) usually for higher risk scenarios. See sheet G409 in Essential information.
- ✓ Biological monitoring may be needed if workers are spraying isocyanate paints (see sheet G408 in Essential information).

Cleaning and housekeeping

- ✓ Clean work equipment and the work area daily. Clean other equipment and the workroom regularly – at least once a week.
- ✓ Deal with spills immediately. Absorb liquid spills with granules and decontaminate according to the method in the safety data sheet.
- ✓ Keep lids on containers when they are not in use.
- ✓ Dispose of wastes safely.

Health surveillance

- ✓ Provide health surveillance when workers are regularly exposed to asthmagens (eg binder systems) and there is a reasonable likelihood that asthma may develop. See sheet G402 in Essential information.
- ✓ Provide health surveillance for dermatitis where there is a reasonable likelihood that dermatitis may occur in your workplace. See sheet G403 in Essential information.
- ✓ Workers undertaking the task described in this sheet and using paint containing asthmagens or substances that can cause dermatitis 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.

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

- G402 – Health surveillance for occupational asthma. <https://www.hse.gov.uk/pubns/guidance/g402.pdf>
- G403 – Health surveillance for occupational dermatitis. <https://www.hse.gov.uk/pubns/guidance/g403.pdf>
- G408 - Urine sampling (biological monitoring) for isocyanate exposure measurement. <https://www.hse.gov.uk/pubns/guidance/g408.pdf>
- G409 – Exposure measurement: Air sampling. <https://www.hse.gov.uk/pubns/guidance/g409.pdf>
- R3 – UK Standard Assigned Protection Factor 20 (APF 20) <https://www.hse.gov.uk/pubns/guidance/rpe3.pdf>
- R4 – UK Standard Assigned Protection Factor 40 (APF 40). <https://www.hse.gov.uk/pubns/guidance/rpe4.pdf>
- R5 – UK Standard Assigned Protection Factor 40 (APF 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
- MR2 - Spraying two-pack (2K) products in a spray booth or room. <https://www.hse.gov.uk/pubns/guidance/mr2.pdf>

Further information

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

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

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>

EH40/2005 Workplace exposure limits HSE 2020 www.hse.gov.uk/pubns/books/eh40.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.
- Co-operate with health surveillance.
- Use, maintain and store your PPE in accordance with instructions.
- Check that any RPE 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.