

WL2

COSHH essentials for
welding, hot work and allied
processes

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.

Welding in confined/ limited/restricted spaces

Control approach 4 Forced ventilation and Respiratory protection equipment (RPE)

What this sheet covers

This sheet describes good control practice when working in confined/limited/restricted spaces and using forced ventilation. Before carrying out work in confined spaces, refer to the specific guidance: *Safe work in confined spaces* (L101).

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

Follow all the points, or use equally effective measures.

Hazards

- ✓ A confined space can be any space of an enclosed nature, where there is a risk of death or serious injury. This could be from the rapid build-up of hazardous substances, or from lack of oxygen.
- ✓ Less obvious confined spaces include open-topped chambers, ductwork and poorly-ventilated rooms.
- ✓ Welding fume (which includes irritating gases such as oxides of nitrogen and ozone) may cause respiratory irritation and metal fume fever. It can also increase susceptibility to pneumonia. In the longer term, it can lead to serious lung diseases including chronic obstructive pulmonary disease (COPD), which used to be called chronic bronchitis, and emphysema, occupational asthma and cancer.
- ✓ Shielding gases (such as argon, helium and nitrogen, or argon-based mixtures containing carbon dioxide, oxygen or both) can cause asphyxiation (suffocation from lack of oxygen), usually resulting from accumulation of the gases in confined spaces.
- ✓ Fume and dust from allied processes, eg flame and arc cutting, blasting and post-weld dressing, can cause lung disease. Abrasive blasting produces a great deal of dust that includes metals and metal oxides.
- ✓ Each situation is different. The hazard varies and is dependent on the process, eg the welding consumable, the base metal, surface coatings or contaminants, and where the task is done.
- ✓ Welding could act as a source of ignition for flammable gases, vapours (eg from residues), dusts, plastics and many other materials which may burn, leading to a fire or explosion.
- ✓ Welding on the outside of a confined space can easily ignite materials in contact with the metal on the inside.

Access to work area

- ✓ Allow access to authorised and appropriately trained people only.
- ✓ If possible avoid entry to undertake the task.
- ✓ If entry is unavoidable, ensure there is a safe system of work.
- ✓ Ensure that there are emergency arrangements in place before work starts.

Equipment and procedures

Safe system of work

- ✓ Ensure good air movement and mixing by a suitable means of forced ventilation.
- ✓ If required, wear breathing apparatus. Workers should check that it is working properly, see the detail in *Safe work in confined spaces* (L101).
- ✓ Ensure that whoever develops the safe system of work is competent.
- ✓ Identify the precautions that will reduce the risk. A permit-to-work is needed.
- ✓ Ensure that workers selected are competent and physically able to do the task.
- ✓ Equipment must be suitable for use in a confined space.
- ✓ Isolate mechanical and electrical equipment that could cause harm if turned on.
- ✓ Ensure safe access and egress from the confined space, access routes and hatches are large enough, and rescue harnesses are suitable.

Caution: Never use fuelled engines in confined spaces or where there is poor ventilation. Carbon monoxide gas can cause asphyxia and death.

- ✓ Check the concentration of oxygen in the air before entry, and monitor the air continuously during the procedure.
- ✓ Have a competent person perform toxic and flammable gas/vapour tests.
- ✓ Provide personal gas monitors for the gases that may be encountered in the confined space.

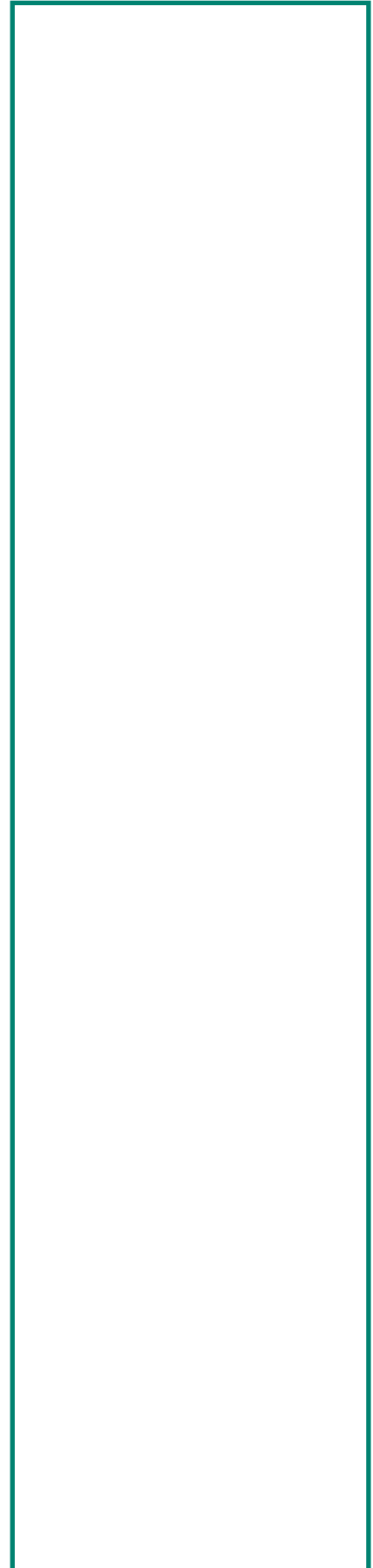
Caution: Never try to 'sweeten' the air with oxygen. This increases the fire or explosion risk.

- ✓ Ensure alarms are in place and that they were audible when last tested.
- ✓ Use non-sparking tools or flameproof lighting for the task.
- ✓ Ensure that people inside the space can communicate with those outside.
- ✓ Where multiple entry occurs, ensure workers are checked in and out.

Emergency procedures

- ✓ When things go wrong, you need effective arrangements for rapid rescue of those in danger.
- ✓ A specific plan is needed for an identified confined space, the risks, the number of people at work, and the likely nature of any emergency rescue.
- ✓ Critical requirements include defining:
 - means for communication between workers and rescuers;
 - the rescuers' capabilities and training;
 - the rescue and resuscitation equipment needs;
 - any emergency shut-down of plant or equipment.
- ✓ Train everyone involved. Hold practice sessions and modify your procedures to improve the performance.

Caution: Reducing flames can produce carbon monoxide gas, which can cause asphyxia and death.



Respiratory protective equipment (RPE)

- ✓ Provide air-fed 'CE'-marked RPE with an Assigned Protection Factor (APF) of at least 40, or cylinder breathing apparatus (BA) if oxygen levels could be depleted.
- ✓ Wearers must be medically fit to wear BA.
- ✓ Make suitable arrangements for maintenance, storage and replacement of RPE.
- ✓ Air supplied to BA should meet minimum quality requirements, in line with the latest British Standard.
- ✓ Tell workers to check RPE is working properly before every use.
- ✓ Keep RPE clean and store it in a clean place.

Personal protective equipment (PPE)

- ✓ Ask your supplier to advise on suitable PPE.
- ✓ Provide and ensure that workers use a welding visor, flame-resistant overalls and protective gloves.
- ✓ Ensure that all items of PPE are compatible.
- ✓ Use a contract laundry or a suitable equivalent to wash work clothing. Don't allow workers to do this at home.
- ✓ Make suitable arrangements for maintenance, storage and replacement of PPE.
- ✓ Keep any PPE cleaned and replace at recommended intervals.

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.

Caution: '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.
- ✓ Check for signs of damage to equipment before starting work.
- ✓ Have equipment thoroughly examined and tested against its performance standard at suitable intervals.
- ✓ Daily, look for signs of damage. Noisy or vibrating fans can indicate a problem.
- ✓ Get a competent ventilation engineer to examine the system thoroughly and test its performance regularly.
- ✓ Keep records of all examinations and tests for at least five years.
- ✓ Review records – failure patterns show where preventive maintenance is needed.

Cleaning and housekeeping

- ✓ Keep the work area clean and free of combustible materials.

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 asthma where there is a reasonable likelihood that asthma may occur in your workplace. See sheet G402.

Training and supervision

- ✓ Tell workers that shielding gas can deplete the oxygen in the air, which can cause unconsciousness and even death.
- ✓ Explain to workers about the health hazards from welding fume.
- ✓ Train and supervise workers and ensure they fully understand the safe working practices detailed in the confined space risk assessment.
- ✓ Before work begins, a competent person must assess the suitability of the workers intending to enter the confined space. The competent person may need to consider other factors, eg. concerning claustrophobia or fitness to wear breathing apparatus, and may need to seek medical advice.
- ✓ Provide training for any work in confined spaces and specifically for:
 - the task to be carried out;
 - the working environmental conditions in the confined space;
 - working materials and tools to be used;
 - arrangements for emergency rescue.
- ✓ Consider keeping training records.
- ✓ Involve managers and supervisors in health and safety training. See sheet WL0.

Essential information

WL0 – *Advice for managers*

G402 – *Health surveillance for occupational asthma*

For further information on respiratory protective equipment: HSG53 *Respiratory protective equipment at work - A practical guide*: www.hse.gov.uk/pubns/books/hsg53.htm

COSHH essentials Respiratory Protective Equipment R Series: www.hse.gov.uk/pubns/guidance/rseries.htm

Further information

Confined spaces: A brief guide to working safely, Leaflet INDG258, HSE Books 2013 www.hse.gov.uk/pubns/indg258.htm

Safe Work in Confined Spaces Regulations 1997. Approved Code of Practice, Regulations and guidance L101 HSE 2009 www.hse.gov.uk/pubns/books/l101.htm

The safe use of compressed gases in welding, flame cutting and allied processes HSG139 HSE 1997 www.hse.gov.uk/pubns/books/hsg139.htm

Hot work on small tanks and drums Leaflet INDG314 HSE 2013
www.hse.gov.uk/pubns/indg314.htm.

For further health and safety information for welding and allied processes, visit the HSE welding website: www.hse.gov.uk/welding/

For further information on local exhaust ventilation (LEV): HSG258 *Controlling airborne contaminants at work: A guide to local exhaust ventilation (LEV)*: www.hse.gov.uk/pubns/books/hsg258.htm

G series: General Guidance COSHH Essentials sheets
www.hse.gov.uk/pubns/guidance/gseries.htm

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

Occupational Safety and Health Consultants Registe: www.oshcr.org/

EIS 45 *Asphyxiation hazards in welding and allied processes*.

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

- Are you in good health today for starting work in a confined space?
- Are you sure about safe work procedures?
- Is equipment in good condition and working properly?
- Do you know how to use the control equipment properly?
- Is the air mover/blower in the right position and working?
- Is your RPE working properly? Check it every time.
- Is your portable/personal alarm fully charged and working properly?
- Use, maintain and store your PPE in accordance with instructions.
- Look for signs of leaks, wear and damage.
- If you find any problems, tell your supervisor. Don't just carry on working.
- Co-operate with health surveillance.
- Wash your hands before eating, drinking, smoking, using the lavatory and after work.
- Never clean your hands with solvents or concentrated cleaning products.
- Use skin creams provided as instructed.