

Welding

Welding fumes: protect your workers

Overview

You must protect your workers' health by controlling the risks from welding fume.

By law you must protect your workers by controlling the health risks from welding fume. This applies to specialist welders and workers who do some welding, no matter how small the amount.

All welding fume can cause lung cancer, so you must put controls in place. HSE has issued a [safety alert about the health risks of welding fume](#). Welding fume can also cause [asthma and many other health conditions](#).

You can control risks to health from welding fumes by:

- using alternative cold joining techniques
- welding in a way that produces less fume
- local exhaust ventilation (LEV)
- using respiratory protective equipment (RPE) and personal protective equipment (PPE)
- maintaining control measures and good general ventilation
- making sure welders understand the risks and how to use controls

Welding fume is subject to the Control of Substances Hazardous to Health (COSHH) Regulations. These [COSHH advice sheets](#) on welding, cutting and surface preparation help you to comply with COSHH. You can also read more general [guidance on COSHH](#).

Control the risk

Consider if you could avoid or reduce exposure by doing the job in a different way.

Consider controls in this order for all welding work:

1. Avoid or reduce exposure
2. Use local exhaust ventilation (LEV) to take the fume away at source
3. Use suitable respiratory protective equipment (RPE), for example a facemask, to protect workers from inhaling fumes

Avoid or reduce exposure

To protect your workers from the health risks of inhaling welding fume, first think about if you can use alternative joining, cutting or surface preparation methods that produce less fume or dust.

Consider if you could avoid or reduce exposure by doing the job in a different way. For example, can you:

- automate or mechanise the process, by using distance welding, turntables or enclosing the work
- reduce the amount of welding
- use materials or a process that generates less fume, for example using MIG welding (an arc welding process) instead of MMA welding (stick welding)
- use clean metals, for example pre-fabrication shaping or better machining

Use local exhaust ventilation (LEV)

If you can't avoid welding in your workplace, use [local exhaust ventilation systems](#) for indoor working to help remove fume at its source. This is also known as extraction or fume control.

This will protect your welder from exposure to welding fume. It will also help to protect others nearby.

LEV works by using an air-flow to remove contaminated air from the process for capture by the hood. Types of LEV include:

- on-torch extraction
- extracted benches
- extracted booths
- movable LEV

There is guidance on choosing the right LEV in our [COSHH essentials welding sheets](#).

Use suitable respiratory protective equipment (RPE)

If you cannot achieve adequate control from LEV alone, or if it is not reasonably practicable to provide LEV, you must provide your workers with suitable [respiratory protective equipment](#) (RPE). For example, if they're welding with LEV but not all the fume is captured you might be able to see residual uncaptured fume, or in the case of TIG welding, smell uncaptured ozone, then you're not controlling the risk and you should also provide respiratory protective equipment.

When you provide RPE for your workers:

- use an [FFP3 disposable mask or half-mask with P3 filter](#) (PDF) - Portable Document Format , for work of up to an hour
- use battery-powered air-fed protective equipment for longer duration work, with a minimum assigned protection factor of 20 (APF20)
- ensure RPE wearers are clean shaven and provide [face-fit testing](#) for them

For welding outdoors, local exhaust ventilation will not work, so workers should use suitable RPE to control exposure.

You should always provide appropriate:

- [personal protective equipment](#) for your welders
- shielding to protect other workers from eye damage

Maintain exposure controls

You must monitor any controls you have to protect your workers

You must make sure any controls you have to protect your workers from health risks from welding fume remain effective:

- Follow instructions on how to use equipment
- Keep equipment in working order
- If equipment is faulty, repair it straight away
- Each day look for signs of damage
- Get a competent ventilation engineer to [thoroughly test and examine](#) the LEV system and its performance at least every 14 months
- Keep records of all examinations and tests for at least 5 years
- Review records – failure patterns show where you need to do preventive maintenance
- Review your controls when anything changes in your workplace

Health surveillance

Consider using respiratory health surveillance

Health surveillance is a system of ongoing health checks that is used to:

- collect data to detect or evaluate health hazards
- protect employees' health by early detection of changes or disease
- evaluate control measures

If your risk assessment shows you need health surveillance for any reason, you should provide it.

Exposure to welding fume as an asthmagen

Employers should provide respiratory health surveillance when welding stainless steel, where a known asthmagen, for example chromium, is present in the fume. You should do this unless the risk assessment has shown there is not a reasonable likelihood of developing asthma.

Asthma health surveillance should include:

- a baseline questionnaire and spirometry
- a further questionnaire at 6 and 12 weeks post start of work (this period may vary)
- an annual questionnaire and spirometry

You should provide workers with adequate information, instruction and training so that they report relevant symptoms.

You should seek advice from a competent person, such as an occupational health provider.

Exposure to welding fume as a carcinogen

It may be helpful to develop and maintain an individual health record for all those exposed to welding fume, where the health effect is cancer. The record should contain:

- surname
- forename(s)
- gender
- date of birth
- permanent address and postcode
- national insurance number
- date when present employment started
- a historical record of jobs in this employment involving exposure to the known carcinogen

As the employer, if you choose to do this then it's your responsibility to maintain health records.

Keep them for at least 40 years.

Training

You must train workers, especially those new to the job

You must train workers, especially those new to the job. Tell them that fume and dust from welding and cutting can cause lung cancer and other lung conditions, if not properly controlled.

Training should include:

- health risks associated with welding fume
- advice on health effects and likely exposures

- how to do the job properly, including where to stand and how to angle the weld
- what pre-use checks you should make to check your welding equipment is working correctly
- how to use controls and check that they are working
- how local exhaust ventilation (LEV) systems work, for example:
 - how to position movable LEV to make sure it is in the right place as you work
 - how to ensure fume is not passing through your breathing zone
 - what pre-use checks you should make to ensure LEV is working correctly
 - how to ensure you are working within the 'capture zone' of the hood
- how to use and look after respiratory protective equipment and personal protective equipment
- what to do if something goes wrong
- safety risks associated with welding activities

You must consult workers and their safety representatives on your health and safety arrangements.

Further Information Available From the HSE

Welding and cutting metals Link:- <https://www.hse.gov.uk/welding/index.htm>

Extensive information, guidance and videos is available on the following:-

COSHH advice sheets

- Advice sheets to help you control risk from hazardous substances in welding:
- WL0 - Advice for managers (PDF) - Portable Document Format
- Welding
- WL2 - Welding in confined/limited/restricted spaces (PDF) - Portable Document Format
- WL3 - Welding Fume Control (PDF) - Portable Document Format
- Cutting
- WL14 - Manual gas and oxy-gas cutting (PDF) - Portable Document Format
- WL15 - Plasma arc cutting: fixed equipment (PDF) - Portable Document Format
- WL16 - Arc-air gouging (air-carbon arc gouging) (PDF) - Portable Document Format
- Surface preparation and cleaning
- WL18 - Surface preparation: Pressure blasting (small items) (PDF) - Portable Document Format
- WL19 - Surface preparation: Pressure blasting (medium-sized items) (PDF) - Portable Document Format
- WL20 - Surface preparation: Pressure blasting (Large items) (PDF) - Portable Document Format
- WL21 - Weld cleaning with pickling paste (PDF)

Controlling the risks from welding

- LEV
- RPE
- Other Workers in the Area
- Resistance Spot Welding
- Prevention of Arc-Eye Using Welding Curtains
- PPE

Safety risks from welding

- Confined Space Working
- Preventing Fire and Explosion
- Electrical Hazards
- Offshore Welding
- Slips & Trips

Cutting metals

- Plasma
- Laser
- Flame Arc-Air

Resources

- Publications
- COSHH guidance
- Information documents (Asphyxiation hazards in welding and allied processes , Post weld cleaning using pickling pastes, The safe use of oxy-propane preheating)
- Research
- Videos

- [COSHH essentials welding sheets](#)
- [Welding publications](#)
- [Welding information sheets](#)
- [Research papers](#)
- [Videos](#)

Health risks from welding

- Acute respiratory health effects
- Irritation to the throat and larger airways in the lungs
- Acute irritant-induced asthma
- Metal fume fever
- Acute pneumonia
- Chronic respiratory health effects
- Lung cancer
- Chronic obstructive pulmonary disease (COPD)
- Welder's lung
- Occupational asthma
- Asphyxiation when welding in a confined space
- Asphyxiation when welding in a confined space
- Skin effects
- Neurological effects
- Ocular melanoma
- Arc-eye
- Noise and vibration

Maintenance of control measures

- LEV
- RPE

Useful links

- [The Welding Institute](#)
- [BOHS](#) The Chartered Society for Worker Health Protection
- [Make UK](#) The Manufacturers' Organisation
- [SAFED](#) The Safety Assessment Federation
- [BCGA](#) British Compressed Gases Association