

Controlling Welding Fume

Welding is a necessary but dangerous manufacturing technique that creates many hazards, including fume. The fume given off by welding and hot cutting processes is a mixture of airborne gases and very fine particles, and it can cause serious ill health if inhaled. Gases commonly found in welding and cutting fume include nitrous oxide (NO_x), carbon dioxide (CO₂), carbon monoxide (CO), shielding gas (argon and helium) and ozone (O₃).

The exact level of risk from the fume depends on the following three factors:

- The toxicity of the fume
- The concentration of the fume
- The length of time breathing the fume

Although fume is a serious workplace hazard, employers can manage their risks and ensure their employees' safety with the proper precautions.

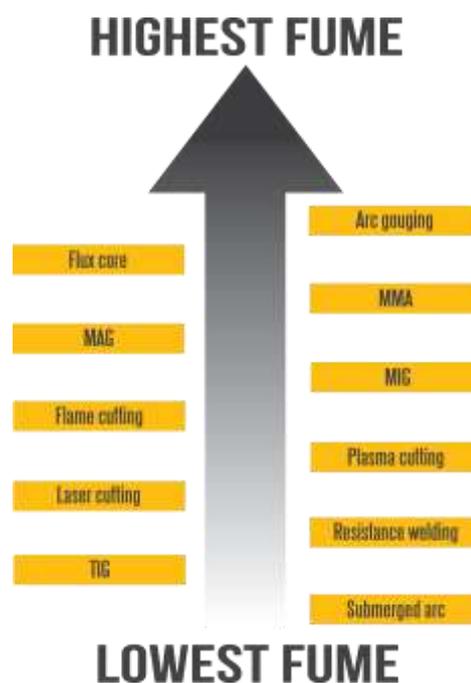
What are the risks?

Some welders acquire either short-term or permanent illnesses from breathing welding fume. Either way, as a manager or employer, you are responsible for reducing your employees' workplace risks, and that includes protecting them against welding fume. Regularly breathing in welding fume can cause a variety of conditions, including the following:

- **Pneumonia:** Welders are particularly prone to a type of lung infection that can lead to severe, and even fatal, pneumonia. While modern antibiotics usually stop the infection, a severe case can send a worker to hospital. According to a recent HSE estimate, breathing metal fume at work leads to

hospitalisation for 40 to 50 welders each year, and pneumonia kills about 2 welders each year.

- **Occupational asthma:** Recent scientific evidence was not strong enough for HSE to list welding fume as a confirmed cause of asthma. However, about 9 welders each year develop asthma so severe that they are able to claim industrial injuries and disablement benefits. This tends to occur due to stainless steel welding fume.



- **Cancer:** Welding fume is internationally classified as possibly carcinogenic to humans. Although cancer is primarily associated with stainless steel welding, this classification covers all welding fume.
- **Metal fume fever:** Many welders report flu-like symptoms after welding. The effects are often

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worse at the start of the working week and are usually linked to welding or hot work on galvanised metals. High exposures to mild steel weld fume can also cause this illness. Metal fume fever does not usually have lasting ill effects.

- **Throat and lung irritation:** Gases and fine particles in welding fume can cause dryness of the throat, tickling, coughing or a tight chest. The effects tend to be short-lived. In particular, ozone can cause these symptoms when performing tungsten inert gas (TIG) welding on stainless steels and aluminium. High exposures to nitrous oxides (generated during most arc welding operations) can also cause this health effect.
- **Temporarily reduced lung function:** Overall lung capacity and the ease of exhaling are affected by prolonged exposure to welding fume. The effects tend to get worse through the working week but gradually improve when not exposed.

Employees aren't the only ones threatened by the risks of welding fume—employers or managers like you are affected as well. Without proper risk management, you may incur the following negative effects and extra expenses:

- An increase in liability insurance claims
- Increased worker absence
- Decreased productivity
- Higher onboarding costs
- Increased return-to-work expenses

How can I control my risks?

Health risk varies depending upon the type of welding technique used, since different techniques produce different amounts of fume. If your organisation uses welding techniques that emit high amounts of fume, consider the following risk control techniques:

- Assess whether the job can be designed so there is less hot work (welding, gouging, manual flame/plasma cutting).

- Use an extraction system to remove fume from the area. For more information on which specific extraction system you should use, consult HSE guidance by clicking here: www.hse.gov.uk/welding/fume-extraction-rpe.htm.
- Optimise your shielding gas to produce less ozone. You will usually see production benefits (such as reduced arc time and better weld quality) that can be used to justify any additional costs.
- Use resistance welding, which generally produces less fume than manual arc welding processes.
- Minimise the work carried out in enclosed or confined spaces.
- Plan the welding sequence in a way that allows welders to work in positions where they are not directly breathing in the fume cloud.
- Encourage welders to avoid working in a crouching position, since they are more likely to have fume passing the nose and mouth areas than welders who stand while welding. Seated welders tend to have the least fume around their faces.
- In large-scale fabrications where you are creating internal voids or rooms, organise the welding sequence to reduce the 'internal' welds. Small, high-flow fume extractors can help remove fume when welding in tight corners, and the reduced size still allows welders to see what they are doing.

Clear the air and keep employees safe.

Welding fume can be a serious hazard to your employees. But with the right risk management and stringent health and safety controls, you can control your risk and ensure your employees' safety. Contact **Crendon Insurance Brokers Ltd** for more guidance on safety, loss prevention and insurance solutions to protect your business.