

Loss Prevention Standards – Cross Classes

# Welding Operations

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Advice for organisations on how to manage  
the inherent risks of welding operations.

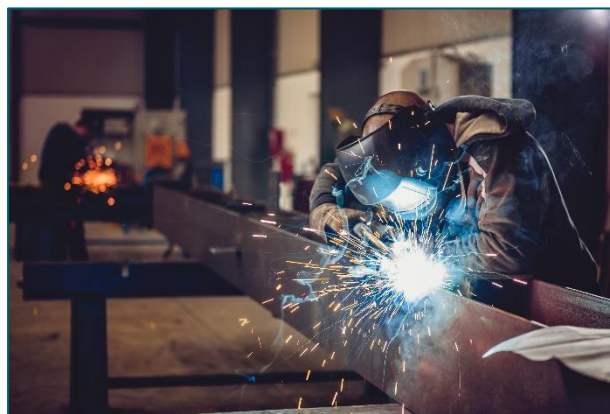


## Introduction

Welding encompasses a range of processes for joining materials/metals together using high heat and often a filler material (the weld pool).

Welding is one of several hot work activities that are a significant cause of major fires, injuries, and ill health. The hazards from welding are discussed in this guidance document and advice is given in how to minimise the risks.

In [2019](#) the Health and Safety Executive (HSE) announced raised control standards for welding fumes/operations. This follows an announcement from the International Agency for Research on Cancer (IARC) that exposure to mild steel welding fume can cause lung cancer and possibly kidney cancer in humans.



## Electric Shock

Electric shock can cause severe injury, and in some cases can be fatal. The higher the voltage, the higher the current, resulting in an increased risk of serious injury or fatality. A shock of 50 volts or less may be enough to injure or kill a welder.

Precautions that should be taken include:

- Wear dry gloves and never touch the electrode or metal parts with skin or wet clothing
- Always repair or replace any damaged insulation before use
- When not in use disconnect welding equipment from the power source
- Maintenance should only be undertaken by qualified, competent persons

## Arc Eye

“Arc Eye” or “Welders Flash” is a painful eye condition caused by exposure to the ultra-violet light from arc welding light. It causes inflammation of the cornea, with symptoms appearing up to a few hours after exposure.

Symptoms can include but are not limited to:

- Abnormal watering of the eyes
- Reddening of the eye and surrounding membranes
- Feeling as if you have sand or grit in your eye

Medical attention should be sought immediately if you suspect arc eye.

Control measure to protect from exposure to welding arc light include flame-retardant heavy canvas, or in some cases semi-transparent plastic screens are used to separate the welding area from others. Welding curtains and screens should conform to BS EN ISO 25980: *Health and safety in welding and allied processes – transparent welding curtains, strips, and screens for arc welding processes*, or be of an equivalent standard. Personal Protective Equipment (PPE) should also be worn to protect the person undertaking the welding activities including appropriate eye protection and face protection.

It is recommended that protection should be provided to all those who come within a minimum of 10-20m of the welding activity as a rule of thumb. Even though the intensity of the light diminishes with distance, it is still not wise

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to look directly at the arc light as a flash burn may still occur and no safe limits have been scientifically determined, so again your risk assessment conclusions will be important and should be regularly reviewed to help minimise risk.

## Fire Risk

Welding uses the direct application of heat and is a source of ignition with the potential to ignite, fuel and cause a fire. Ideally welding should be undertaken in designated areas that are designed to contain the risks. In these areas a hot work permit may not be required, however, any welding activities that take place outside of these areas should always be subject to a hot work permit and a high level of control. Further advice is available in the Aviva Loss Prevention Standards *Hot Work Operations* and *Permit to Work Systems*.

Key considerations:

- Remove combustible and flammable materials in the area (minimum of 10-metres). Where combustible materials within 10-metres cannot be removed, they should be protected by the use of non-combustible or purpose-made blankets, drapes, or screens
- Combustible floors within the area should be covered with overlapping sheets of non-combustible material or wetted and liberally covered with sand. Care should be taken to ensure that any holes or gaps in walls, floors and ceilings through which sparks could pass are adequately protected/covered
- Be aware of any nearby conveyors or ducts that may carry sparks some distance
- Identify any nearby partition walls that may be of a combustible construction
- If possible, conduct temporary welding outside the premises, away from buildings and combustibles if there is no permanent welding workshop
- Take appropriate fire precautions and operate a continuous fire watch during the work and for a minimum of 60-minutes once the work has been completed

## Asphyxiation

Inert gases such as argon, carbon dioxide, nitrogen and helium can displace air in enclosed spaces, with heavy gases pooling in areas such as vehicle inspection pits. Such gases may build-up when working in confined or restricted spaces. Electric arc welding (MAG, MIG and TIG) use inert gas to provide a temporary protective atmosphere around the arc and molten weld pool, to prevent air adversely reacting with the weld.

Confined spaces should always be managed as defined in the [Confined Spaces Regulations 1997](#) and associated code of practice.

Controls include:

- Gas testing to ensure adequate oxygen levels
- Respiratory Protective Equipment (RPE) – independent air supply
- Emergency arrangements – provision of rescue equipment, trained persons, harnesses, lifts, hoists as appropriate

## Recent Changes

There has been a strengthening of the HSE's enforcement expectation for all welding fume, including mild steel welding as general ventilation does not achieve the necessary control.

A new understanding of the risks means that natural ventilation will no longer be considered adequate for any welding activities undertaken indoors. Welding operations indoors will require suitable engineering controls, e.g. Local Exhaust Ventilation (LEV). This will also have the benefit of controlling exposure to manganese (present in mild steel welding fume), which can cause neurological effects similar to Parkinson's Disease.

Where LEV is not enough to control exposure adequately, it should be supplemented by suitable RPE to protect against any residual fume that may still be present.

Appropriate RPE should be provided for welding outdoors because there will still be some exposure to fume.

All welders should be suitably instructed and trained in the use of these controls and the training provided should be recorded.

Regardless of the duration of the task, the HSE will no longer accept any welding undertaken without suitable exposure control measures in place, as there is no known level of safe exposure.

Risk assessments should be reviewed to ensure that they reflect this change.

## Checklist

A generic Welding Operations Checklist is presented in Appendix 1 which can be tailored to your own organisation.

## Specialist Partner Solutions

Aviva Risk Management Solutions can offer access to a wide range of risk management products and services at preferential rates via our network of Specialist Partners.

For more information please visit:

[Aviva Risk Management Solutions – Specialist Partners](#)

## Sources and Useful Links

- [HSE - Change in Enforcement Expectations for Mild Steel Welding Fume](#)
- [International Agency for the Research on Cancer](#)
- [HSE - Asphyxiation Hazards in Welding and Allied Processes](#)
- [HSE - Health and Safety in Engineering Workshops - HSG129](#)
- [HSE - ACOP - Safe Work in Confined Spaces](#)

## Additional Information

Relevant Aviva Risk Management Guides include:

- [Hot Work - An Aviva Risk Management Solutions Guide](#)

To find out more, please visit [Aviva Risk Management Solutions](#) or speak to one of our advisors.

Email us at [riskadvice@aviva.com](mailto:riskadvice@aviva.com) or call 0345 366 6666\*

\*Calls may be recorded and/or monitored for our joint protection.

# Appendix 1 – Welding Operations Checklist



Location	
Date	
Completed by (name and signature)	

	Welding Operations Checklist	Y/N	Comments
1.	Is there a suitable and sufficient risk assessment in place for all welding activities?		
2.	Is exposure to any welding adequately controlled using engineering controls such as LEV?		
3.	Are suitable controls provided for all welding activities, irrelevant of duration, including welding outdoors?		
4.	Where engineering controls alone cannot control exposure, is adequate and suitable RPE provided to control any residual risks?		
5.	Are there arrangements in place to ensure all engineering controls are correctly used and suitably maintained?		
6.	Are all engineering controls subject to thorough examination and test where required?		
7.	Have all those who may be exposed to welding fume been trained in the use of appropriate RPE?		
8.	Is all training provided recorded?		
9.	Is a hot work permit issued for all welding operations undertaken outside of the designated controlled area?		

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	Welding Operations Checklist Contd.	Y/N	Comments
10.	Additional comments:		

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