

# Loss Prevention Standards

## 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.

The Health and Safety Executive (HSE) has also recently 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 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:

- Wearing 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 if you have sand or grit in your eye

Medical attention should be sought immediately if you suspect Arc Eye.

Control measures 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 British Standard 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 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 regularly reviewed to minimise risk.

## Fire Risk

Welding uses the direct application of heat and therefore is a source of ignition with the potential to ignite a 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](#).

Key considerations:

- Remove combustible materials in the area (minimum of 10m). If this is not possible dampen down or use non-combustible covers
- 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 fire watch 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) uses 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 and associated Code of Practice.

Controls include:

- Gas testing – 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; because 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 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 recent change.

## Checklist

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



## Additional Information

- [Change in Enforcement Expectations for Mild Steel Welding Fume](#) – Health and Safety Executive
- [International Agency for Research on Cancer](#)
- [Asphyxiation hazards in welding and allied processes](#)– Health and Safety Executive
- [Health and safety in engineering workshops](#) – Health and Safety Executive
- [Safe work in confined spaces – Approved Code of Practice and guidance](#) – Health and Safety Executive

Further risk management information can be obtained from [Aviva Risk Management Solutions](#)

### Please Note

This document contains general information and guidance and is not and should not be relied on as specific advice. The document may not cover every risk, exposure or hazard that may arise and Aviva recommend that you obtain specific advice relevant to the circumstances. AVIVA accepts no responsibility or liability towards any person who may rely upon this document.



## Appendix 1 – Welding Operations Checklist

<b>Location</b>	
<b>Date</b>	
<b>Completed by (name and signature)</b>	

	<b>Welding Operations Checklist</b>	<b>Y/N</b>	<b>Comments</b>
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 fume?		
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 the appropriate RPE?		
8.	Is all training provided recorded?		
9.	A hot work permit is issued for all welding undertaken outside of a designated controlled area?		
10.	Additional comments:		

