

Health and safety.

Avoiding the hazards associated with welding.

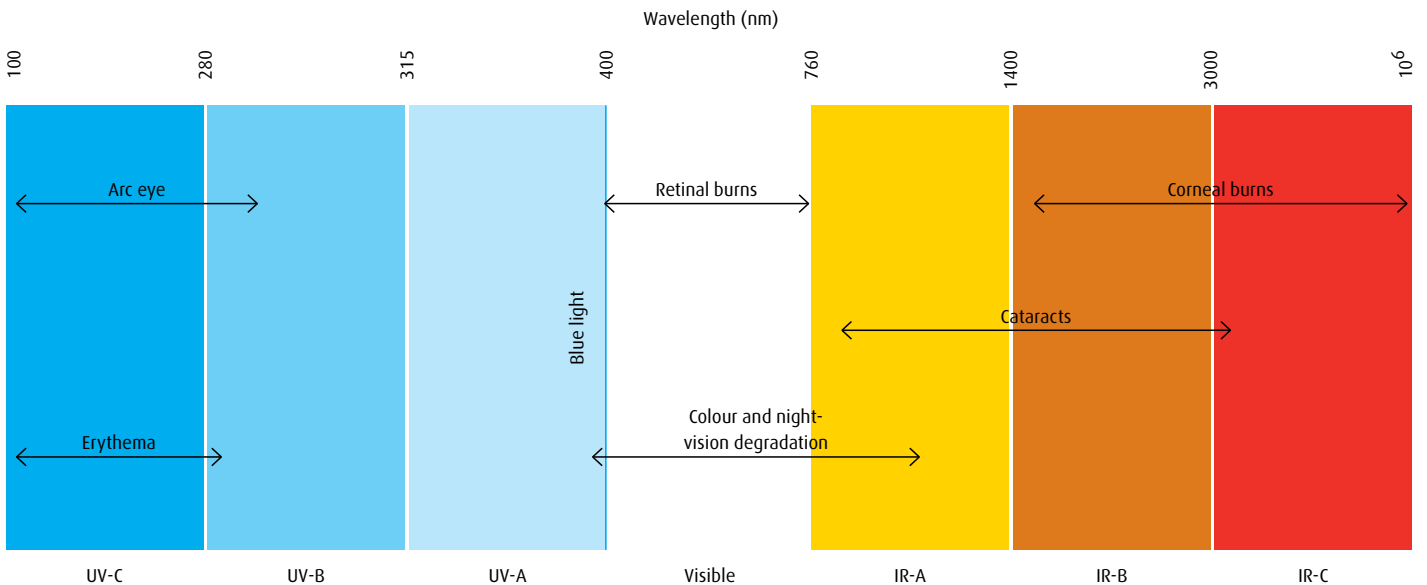




The welding environment can be a hazardous place. Welding, cutting and allied processes pose numerous occupational hazards to welders and others in the surrounding area. Everybody bears the responsibility of working safely and not to endanger themselves or others in the workplace.

Understanding the hazards in the welding workshop.

Electromagnetic radiation



An awareness of the possible hazards and how best to avoid them is paramount in reducing the risk associated with these hazards. The main hazards encountered in the welding environment include:

- electrical
- radiation
- heat, flames, fire, explosion
- confined spaces
- noise
- welding fumes
- solvents

Environmental differences such as humidity, rain or cold can also have an impact increasing or changing the hazard.

These are not the only hazards faced in the welding workshop and people working in this environment must always remain vigilant.

Electrical hazards

Touching “live” electrical equipment or components, including the electrode and the workpiece, can result in burn injuries or, more seriously, electric shock. Electric shock can kill through direct contact with the body and may also cause you to fall if working at height.

Electrical hazards are frequently not obvious, and it is important to act with caution when working with arc welding processes, equipment and machinery.

Radiation hazards

Arc welding and cutting emit electromagnetic radiation in the form of ultraviolet (UV), visible light and infrared (IR) radiation. The potential effect of radiation on the body depends on the type and intensity of the radiation, the distance from it and the duration of exposure.

Non-ionising radiation from welding/cutting processes can cause damage to the skin and eyes. UV radiation in particular can cause burns to unprotected skin and eyes (arc-eye).

Radiation from electric welding arcs is usually apparent but arc flashes can occur without warning. The effects of IR and UV radiation are not normally felt until some time after exposure.



Heat, flames, fire and explosion

A burn is a hazard that welders face every working day as welding is a process that frequently involves heat, flames, molten metal and high temperature welding arcs. Burns may occur to the skin or potentially to the eyes.

Fire and explosion are serious hazards in the welding environment. Heat and flames can result in fire or even explosion in the presence of combustible materials, dust, flammable liquids, gases, or vapours.

Working in a hot environment can also cause the body to overheat, this is known as heat stress. Heat exhaustion can result if fluids are not taken to replace those lost through sweating. In the extreme, heatstroke may occur, and this condition can be fatal.

Confined spaces

Many of the everyday hazards encountered in welding can be exacerbated if the work is being carried out in a confined space. A significant number of deaths involving people working in confined spaces occur each year, with asphyxiation being the major cause of those deaths, so extra vigilance is needed.

A confined space does not have to be small and cramped, but if it is then there is likely to be restricted ventilation, which can allow the build-up of a hazardous atmosphere.

Working in such spaces requires a greater awareness of potential hazards and safe working practices than normal. Welders working in enclosed spaces must be properly trained, equipped and supervised. Additional protective and monitoring equipment over and above that normally necessary may be required.



Noise

Noise is an every-day occurrence in an industrial workshop. All welding and cutting processes generate noise but some are much louder than others. Ancillary processes like grinding, chipping, gouging and hammering also generate varying levels of noise.

Exposure to noise over a period of time can result in impairment or loss of hearing.

Welding fumes

All welding processes generate fume but amounts vary dependent on the process and welding conditions used. Welding fume consists of particulate fume – the cloud of smoke you can see and gaseous fume, which you cannot see but can sometimes smell. In most cases, welding fume is formed close to the arc, near the welder, but some of the gaseous fume, for example ozone, can be generated well away from the arc.

The potential effects on the body of exposure to welding or cutting fume depends mainly on the amount of fume produced, its composition and the length of time the worker is exposed to the fume. While all components of welding or cutting fume may present a risk to health at the right concentration, some present a greater hazard than others. The more commonly encountered pollutants thought to carry the highest risk include ozone, chromium – particularly in its hexavalent state (Cr6+) –, nickel, cadmium and lead.

Solvents

Solvents used in the welding industry may be flammable, or contain flammable components. The most frequently encountered flammable solvents are acetone, petroleum ether and white spirits.

Some solvents break down under the action of the welding arc to form toxic or irritant by-products, the most toxic breakdown product being phosgene.

Flammable solvents present a fire or explosion hazard in the vicinity of welding arcs, flames, hot metal and hot components.

Taking precautions in the welding workshop.

Precautions

In order to work safely in a welding environment, it is necessary to identify hazards and to assess risks.

A hazard is something that has the potential to cause harm. A risk is the likelihood that the hazard will actually cause harm under the prevailing conditions. Some aspects of welding present serious hazards but the risk depends on how the hazards are dealt with or controlled.

Controls

Good general ventilation, and/or local fume extraction should be used to control the fumes and gases produced during welding. Fumes should be kept to levels below individual recognised exposure limits, when measured in the welder's and co-workers' breathing zone.

In confined spaces where ventilation is not adequate, it may be necessary to use an air-fed breathing system. Where fume levels exceed the recognised exposure limits, respiratory protection may be required.

Detection systems may also be required especially where there is risk of asphyxiation or to detect leaks of flammable gases or by-products of burning.

Personal Protection

Due to the hazards associated with welding, cutting and other manufacturing processes, welders and co-workers in the vicinity should always wear the correct protective clothing, hearing and eye protection as specified by local standards.

Personal detectors, especially at low oxygen levels, are an important safety precaution for individuals who work in confined spaces.

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Linde – ideas become solutions.

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