

SAFETY IN WELDING

A) ARC RADIATION:

Arc radiation is a result of **ULTRA-VIOLET (UV)** and **INFRA-RED (IR)** RAYS and exposure can cause the following:-

- ▲ Skin Cancer
- ▲ Thermal Skin Burns (severe sun burn)
- ▲ ARC FLASH (Welders Flash) or EYE BURN which can result in inflammation of the cornea, cataracts or blindness.

(i) PROTECTION REQUIRED INCLUDES:

- ▲ An approved welding helmet with the correct filter and shade number.
- ▲ Safety glasses which will help to refract (bend away) the UV and IR rays away reducing the chances of Arc Flash.
- ▲ Always wear protective full covering clothing to shield your body from potential burns eg.
 - Overalls/flame resistant wool or cotton.
 - Leather apron and jackets.
 - Always wear leather gloves.
 - Skull cap (for overhead welding).
 - Screen the welding zone when welding in open spaces.

N.B. A welding flash can occur by indirectly viewing the arc even for a relatively short time eg.

- Unconsciously looking out the corner of the eye
- Looking away from the arc (close eyes then turn away).
- Reflections of the arc from shiny surfaces.

B) ELECTRIC SHOCK - "PREVENTION":

- ▲ Never touch live metal parts with bare skin or wet clothing.
Repair any damaged or loose connections, especially bare cables, before welding.
- ▲ Keep gloves and protective clothing dry and free of oil and grease.
- ▲ Never coil or loop welding cables around your body.
- ▲ Don't weld while standing on a wet surface or while standing in water.

SAFETY IN WELDING cont.

C) FUMES & GASES:

Caused by the melting, vapourisation and other reactions of the consumables, base metals and gases (where applicable) involved in the welding arc.

Some common contaminants:

Contaminant	Source
Iron fume	Vaporisation of iron from base metal and electrode coatings.
Chromium	Stainless steel, electrode coatings, platings.
Nickel	Stainless steel, nickel-clad steel.
Zinc fume	Vaporisation of zinc alloys, electrode coatings galvanised steel, zinc-primed steel.
Copper fume	Vaporisation of coatings on electrode wires, sheaths on air carbon arc gouging electrodes, copper alloys.
Vanadium, Manganese, Molybdenum	Welding rods, alloying elements in steels.
Tin	Tin-coated steel, some nonferrous alloys.
Cadmium	Plating
Lead	Fluxes, coatings on electrodes, flux in wires
Carbon Monoxide	Combustion products of gas metal arc welding, air carbon arc gouging, oxyfuel flames; exhaust from car engines.
Ozone	Gas metal arc welding, air carbon arc gouging; titanium and aluminium welding in inert gas atmospheres
Nitrogen dioxide	Gas metal arc welding; oxyfuel flame processes.
Phosgene	Welding of metal covered with chlorinated hydrocarbon solvents.

Exposure to fumes and gases can damage the lungs and respiratory system or cause asphyxiation.

SAFETY IN WELDING cont.

Fumes and Gases:

(i) PROTECTION REQUIRED FROM FUMES AND GASES:-

- ▲ Adequate ventilation.
- ▲ Keep your head out and away from the fumes.
- ▲ Use a welding fume respirator, or an air supplied respirator (especially in confined space).
- ▲ Use a fume extraction unit/or gun.

N.B. Welding fume fever caused by breathing fumes formed by the welding of various metals can occur a few hours after exposure and can last several days.

SYMPTOMS INCLUDE:-

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|------------|---------------------------|
| ▲ Nausea | ▲ Fatigue |
| ▲ Fever | ▲ Dry nose and throat |
| ▲ Chills | ▲ Metallic taste in mouth |
| ▲ Weakness | ▲ Joint and muscle pain |

Note: If any of these symptoms are observed please seek professional medical attention.

D) HEAT, FIRE & SPARKS:

- ▲ Are caused by welding and related processes, operators are at continual risk of burns by hot and molten metal, sparks and heat radiated from the arc.
- ▲ Welding sparks can travel long distances and have been known to reach up to 15 metres away from the source of welding on the ground and even further when working in elevated positions.
- ▲ These sparks can reach combustible materials and start fires, as well as burning unprotected skin.
- ▲ Burns can result from hot just welded work (the most common of welding burns) and molten weld metal (spatter) falling or spitting onto exposed skin.

(i) PROTECTION REQUIRED FROM HEAT, FIRE AND SPARKS:

- ▲ Always wear protective clothing.
- ▲ Keep safety glasses on your head where they belong.
- ▲ Always mark just welded work with the word "HOT".
- ▲ Know where the nearest fire extinguisher or fire hose is and how to use them.
- ▲ Remove combustible materials away from the welding area. (at least 15 metres or 50 feet away).
- ▲ If in an elevated position, post a person on the ground as a fire-watcher.
- ▲ Never connect the earth lead to electrical circuits of pipes containing gases or flammable liquids.

SAFETY IN WELDING cont.

Repair or replace defective cables immediately.



Keep fire extinguishing equipment at a handy location near the job.



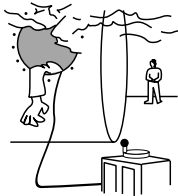
Never watch the arc except through filters of the correct shade.



Conduct engine exhaust to outside atmosphere.



In confined spaces, adequate ventilation and constant observation are essential.



Keep primary terminals and live parts effectively covered.



Leads and cables should be kept clear of passageways.



Never strike an electrode on any gas cylinder.



Never use oxygen for venting containers.

