

Occupational Cancer Risk Series

Welding



There may be hazards where you work that increase your risk of developing cancer. This factsheet discusses occupational hazards related to welding.

Key messages

- Welding activities can increase the risk of developing cancer.
- During welding you may be exposed to cancer causing agents (carcinogens) through contaminants in the air and/or ultraviolet (UV) radiation
- Exposure to carcinogens during welding can be eliminated or reduced by using the recommended controls.
- Refer to the [Safe Work Australia Welding Code of Practice](#) for more information.

Welding and cancer

There are many different welding techniques; but most fall into the categories of:

1. Electric arc welding
2. Oxy-fuel welding.

Welding activities produce many hazards through the production of **contaminants in welding fumes and UV radiation in the welding arc**. Both of these are Group 1 carcinogens, meaning they can cause cancer in humans. Exposure to these fumes or UV radiation can increase your risk of developing melanoma of the eye, lung and potentially other cancers.

Your cancer risk from welding depends on the:

- type of welding process used
- material being welded (including any surface coatings or metal treatments)
- contaminants in the air (for example vapours from solvent cleaners or degreasers)
- consumables being used
- shielding flux or gas
- power settings
- where the welding is being carried out (outside or in an enclosed space)
- length of time welding.

Airborne contaminants

Welding fume is made when a metal is heated above its boiling point. The metal cools and then condenses into fume; fine particles that can be

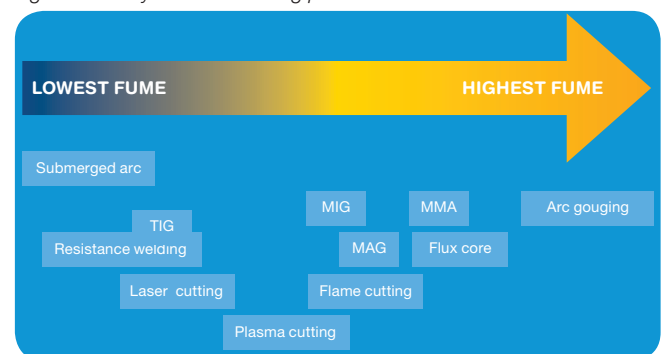
breathed in. Some welding fumes are easy to see but many are invisible. In 2017, *all* types of welding fume were classified as a Group 1 carcinogen. Table one shows some common welding fume types and the metals that can cause these fumes.

Table 1. Common welding fume types and their sources

FUME TYPE	SOURCE
Beryllium	Hardening agent found in copper, magnesium, aluminium alloys and electrical contacts.
Cadmium Oxides	Stainless steel containing cadmium or plated materials, zinc alloy.
Chromium	Most stainless-steel and high-alloy materials, welding rods. Also used as plating material.
Nickel	Stainless steel, nickel-chromium, nickel-copper and other high-alloy materials, welding rods and plated steel.

Different types of welding produce different amounts of welding fume (Figure 1).

Figure 1. Can you use a welding process that makes less fume?



UV Radiation

Electric arc and laser welding give off UV radiation, a known carcinogen. When welding, you are exposed to direct UV radiation produced by the arc and the UV radiation that is reflected off hard and smooth surfaces around you. Exposure can cause sunburn, eye damage (welder's flash), skin cancer, eye melanoma and cataracts (clouding on the lens of the eye).

The effect of the UV radiation depends on:

- the type of welding (electric arc or laser welding)
- intensity of the radiation
- how long you are exposed to the radiation
- the distance you are from the welding activity.

Effective controls

All Australian workplaces must follow work health and safety laws; however these vary slightly between states and territories, but the duty of care for employers and responsibilities of workers across Australia is similar:

- Employers are required to ensure the health and safety of their workers at their workplace.
- Employers are required to ensure the health and safety other people due to the work carried out.
- Employers have a duty to control the risks associated with work.
- Workers must take reasonable care of their own health and safety.
- Workers must not negatively affect the health and safety of other people.
- Workers must follow any reasonable instruction and workplace health and safety policies, of which they have been notified.

For specific information regarding the laws in your state or territory please use the links supplied on the landing page under 'useful resources'.

A summary of recommended controls is outlined in Table 2; for full details on how to control welding hazards see:

- [Welding Processes Code of Practice](#)
- [Airborne Contaminants Exposure Limits](#)
- [Fume Minimisation Guidelines](#)

If adequate control measures are not in place, welders and people working near welding activities are at increased risk of being exposed to carcinogens.

Eliminate or reduce exposure to identified hazards using the hierarchy of control (Figure 2) and implement a [risk management process](#), (workers should always be involved). Training workers on hazards and the procedures in place to manage them is a work health and safety requirement. Air monitoring in the breathing zone of the welder can be used to check if welding contaminants are being reduced by the controls. An occupational hygienist can help with air monitoring.

Figure 1. The hierarchy of risk control

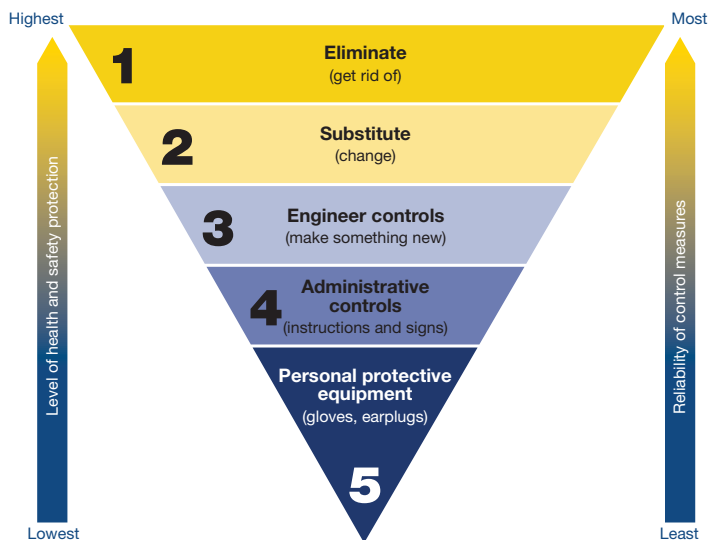


Table 2. Summary of controls for welding hazards

ACTIVITY	CONTROL
Surface preparation	Remove any paint or coatings from surfaces before welding. Do not use chlorinated solvents for cleaning.
Welding process and consumables	Choose a welding process and consumables that produce less fume and/or UV radiation. Change power settings to reduce fumes.
Ventilation	A combination of local exhaust and forced dilution ventilation is best practice. Natural ventilation should not be used as a control measure.
PPE	Wear either air supplied or air purifying respiratory protection. They should be fitted for each worker. Use a full face welding helmet, with a UV filtered lens. Wear long trousers and long sleeved shirts without cuffs in non-flammable material, covering all exposed skin. Wear welding gloves and boots.
Isolation	Separate welding activities from other work jobs. Many workers welding in one space can increase welding fume. Use welding screens to protect other workers from the welding arc. Where possible, automate welding activities.
Share activities	Rotate job tasks between workers. This will help to reduce the duration of exposure to fumes, gases and UV radiation.

Health monitoring identifies workers who have an increased risk of developing a work related disease. If control methods are not in place, health monitoring may be required by law. Further help on these requirements is available from your [state and territory work health and safety regulators](#).

For any concerns related to adequacy of control measures at your workplace, contact:

- your workplace supervisor or management (if you are an employee)
- your workplace health and safety representative or union representative
- [state and territory work health and safety regulators](#)
- [Safe Work Australia](#).

How do I detect cancer early and reduce my cancer risk?

If you think you may have been exposed to a cancer-causing agent, it is important to speak with your doctor. To find out what you can do to create a workplace that supports healthy choices to help reduce cancer risk, contact Cancer Council on **13 11 20** or visit www.cancer.org.au/preventing-cancer/workplace-cancer/welding.html