Cancer Council | KNOW WORKPLACE CANCER

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 your 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. For example, exposure to welding fumes can increase your risk of developing lung cancer, while UV radiation can cause melanoma of the eye. Both of these agents are Group 1 carcinogens meaning they can cause cancer in humans.

Your cancer risk from welding is directly related to the amount of exposure to welding fumes or UV light from welding. This means the risk is affected by factors such as the:

- Type of welding process used
- Use of ventilation controls
- Personal protective equipment worn
- 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.

In addition to cancer, exposure to welding fume can cause other health issues, such as metal fume fever, chronic obstructive pulmonary disease, asthma, pneumonia, and neurological effects.

Table one shows some common welding fume types and the metals that can cause these fumes.

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

Table 1. Common welding fume types and their sources

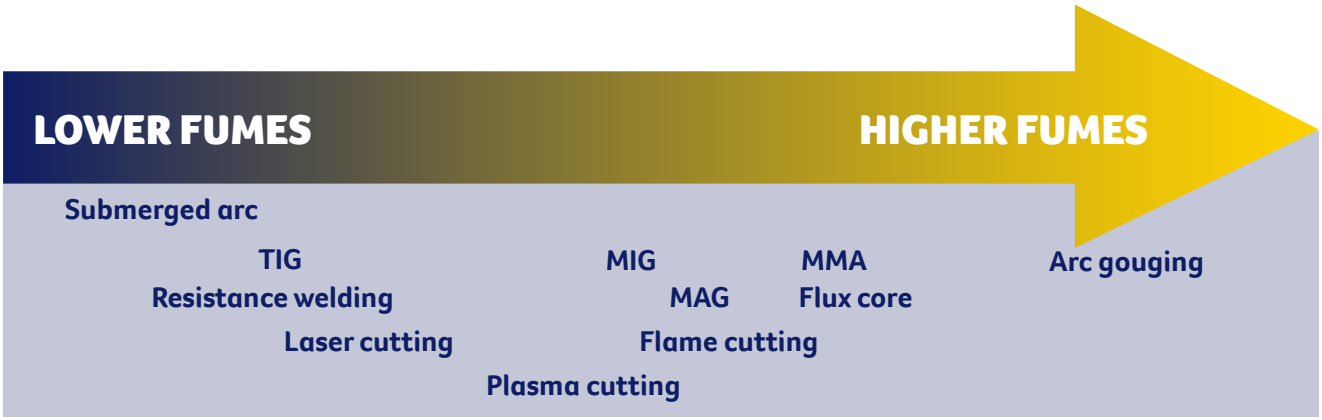

Figure 1. Can you use a welding process that makes less fume?

UV RADIATION

When welding, you can be exposed to high levels of UV radiation, a known carcinogen. The UV is produced by the arc or laser and can be reflected off hard and smooth surfaces around you. Exposure can cause melanoma of the eye, 'welder's flash' or 'arc eye' (painful inflammation of the cornea), cataracts (clouding on the lens of the eye), and burns to exposed skin.

The risk of cancer due to UV radiation from welding is affected by factors such as:

- 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
- if you are wearing appropriate eye protection and clothing

EFFECTIVE CONTROLS

All Australian workplaces must follow work health and safety laws. 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 of 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 hazards by following the risk management process and using the hierarchy of control (Figure 2). Workers should always be involved in the risk management process. 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.

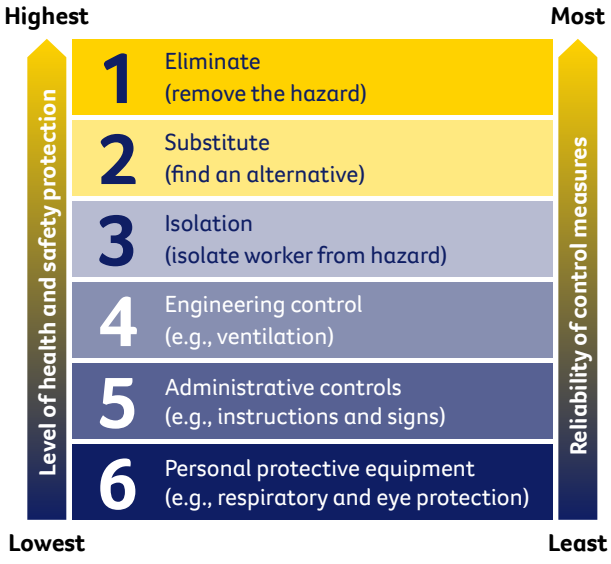

Figure 2. Hierarchy of control

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. Ambient capture air cleaning can be used to clean the ambient air over the welding area before the air is returned to the workshop. Natural ventilation should not be relied upon as the only ventilation control measure.
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 and UV radiation.
Personal protective equipment (PPE)	Wear either air supplied or air purifying respiratory protection. These 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 and made of non-flammable material, covering all exposed skin. Wear welding gloves and boots.

Table 2. Summary of controls for welding hazards

HEALTH MONITORING

Health monitoring identifies workers who have an increased risk of developing a work related disease. 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?

The best way to reduce your cancer risk is to minimise your exposure.

To find out what you can do to help reduce cancer risk, speak to an experienced health professional on 13 11 20 or visit cancer.org.au.

For more information visit the 'useful websites' listed on cancer.org.au/cancer-information/causes-and-prevention/workplace-cancer/welding