Blackwoods

CLEARING THE AIR ON WELDING FUMES

In 2017, the International Agency for Research on Cancer changed the classification of all welding fumes from Group 2B "possibly carcinogenic to humans" to Group 1 "carcinogenic to humans. These welding fumes can contain a range of carcinogens including metallic oxides, silicates and fluorides.

The reclassification came following sufficient evidence that welding fumes cause lung cancer.

This reclassification has forced many welders and workplaces to rethink their current approach to welding fumes and how to manage exposure on a day-to-day basis. Welding processes must be subject to risk assessment, and the hierarchy of controls should be applied to these risks.

Rethink your approach to welding fumes.

Follow our easy guide to ensure you are managing risks and worker exposure for your application.

blackwoods.com.au/weldingfumes

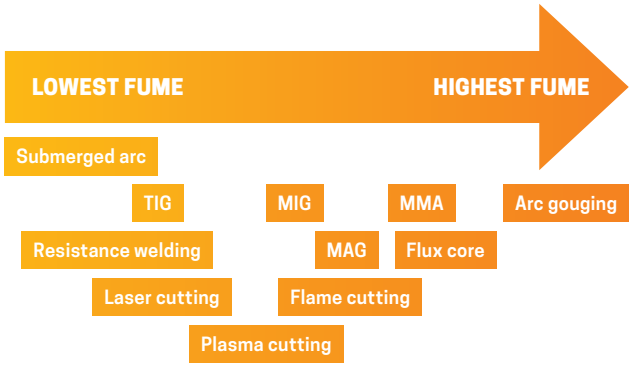
MANAGING DANGEROUS LEVELS OF EXPOSURE

There are more than 80 different types of welding and associated processes, with each type producing different levels of toxic fumes.

In addition to complying with the exposure standards for specific contaminants, the occupational exposure standard for general welding fumes in the breathing zone (which is inside a welder's helmet when worn) must not exceed 5mg/m (time-weighted average concentration when measure inside the welder's helmet) is 5mg/m3 using a time weighted average (TWA). This TWA is based on 8 hours per day over a 5 day working week.

Other fume types created by chromium, copper and other specific metals have lower exposure limits.

These standards were set under the consideration of short term illness (metal fume fever) being the primary consequence of fume exposure. With the reclassification of welding fumes as a carcinogen, there are new concerns around long-term cumulative exposures with potential for disease to occur decades after exposure.



Currently, Australian exposure standards are high compared with many parts of the world, with countries such as Germany allowing just 1.25mg/m3 and Netherlands 1mg/m3 for 8-hour workdays.

The Australian workplace exposure standard for welding fumes is currently being reviewed by Safe Work Australia to ensure it protects workers exposed to welding fumes against health effects.

Having a qualified professional conduct a systematic industrial hygiene assessment of worker exposures and site evaluation to determine the best fume control measures is critical.

Consult your relevant State-based regulator for specific requirements for industry.

HEALTH IMPLICATIONS

Welders are exposed to a range of hazards, including electric shocks, flash burn, ultraviolet radiation and fume and gas inhalation. An important part of being a welder is knowing the risks of the job and how to work safely to avoid these hazards.

Exposure to welding fumes can lead to a range of both acute (short-term) and chronic (longer-term) health issues if inhaled.

SHORT TERM EFFECTS

The short term effects of exposure to welding fumes are often referred to as Metal Fume Fever. Metal Fume Fever is an illness with flu-like symptoms that can occur when fumes from components including zinc oxide, aluminium, magnesium and copper are inhaled.

The symptoms of Metal Fume Fever are generally experienced several hours after welding, and can include fever, chills, nausea, headache, fatigue, muscle aches, joint pains, lack of appetite, shortness of breath, pneumonia, chest pain, change in blood pressure and coughing.

LONG TERM EFFECTS

There is now sufficient evidence that long term exposure to welding fumes can lead to cancer of the lung, larynx and urinary tract, bronchitis, asthma, pneumonia, emphysema, skin disease, as well as nervous system and kidney damage.

Studies of lung cancer among welders indicate that there could be a 30 to 40 percent increase in risk the disease compared to the general population.

CHOOSING THE BEST CONTROL MEASURE FOR WELDING FUME EXPOSURE

Some control measures are more effective than others, with the five measure ranked from the highest level of protection and reliability to the lowest. This ranking is known as the hierarchy of control.

According to Safe Work Australia, managing risks and worker exposures can be achieved by selecting and implementing measures using this hierarchy of control. A combination of these control measures may be required in order to adequately manage the risks of welding fumes.

FOLLOWING THE HIERARCHY OF CONTROL

1. ELIMINATION – PHYSICALLY REMOVE THE HAZARD

Elimination is designed to completely remove the hazard from the workplace. Moving welding from a confined space to outdoors would be an example. While this would be the most effective method of managing exposure, it will often not be reasonably practicable in many applications.

2. SUBSTITUTION – REPLACE THE HAZARD

Where possible, substituting for a less hazardous process or material is the next most effective method of control. Modifying the weld process, for example, using submerged arc welding instead of flux-cored wire welding would reduce the risk of exposure to fumes. Substitution will often not be practical or suitable for many welding applications.

PRODUCT SPOTLIGHT

ENGINEERING CONTROLS: FUME EXTRACTORS

When it comes to welding fume extraction, there is no one-size-fits-all solution. There are a host of variables that will impact which solution is best, including the size of materials being welded, the material type, the consumable choice, the welding process, as well as other work practices.

Having a qualified professional conduct a systematic industrial hygiene assessment of worker exposures and site evaluation to determine the best fume control measures is critical.

Lincoln Electric Mobiflex 400-MS Welding Fume Extractor

- Low vacuum system for welding fume extraction and filtration
- Small size makes it ideal for light to medium duty fume extraction in variable locations
- Front casters and rear wheel for mobility
- Ideal for facilities including maintenance departments, general fabrication and job shops and industrial welding environments
- Generour 735 CFM Airflow
- Ideal for Stick, TIG, MIG & Flux-Cored processes

Part Number: 0336 6127

Lincoln Electric Miniflex Portable Fume Extractor

- Lightweight, high vacuum, low volume portable system
- Specifically designed for the light duty extraction and filtration of welding fume
- Current sensor offers automating start stop capability by sensing welding current
- Quiet operation
- Ideal for Stick (light duty), TIG, MIG & Flux-cored (light duty) processes

Part Number: 0365 7354

3. ENGINEER CONTROLS – ISOLATE PEOPLE FROM THE HAZARD

This includes local exhaust ventilation including portable and stationary fume extractors, extraction arms with centralised collectors and fume extraction guns can help capture and remove fumes at their source before they reach a welders breathing zone.

4. ADMINISTRATIVE CONTROLS – CHANGE THE WAY PEOPLE WORK

Administrative controls can assist in limiting or preventing welder's exposure by modifying their behaviour. Ensuring best practices are followed including keep the welders head out of the weld plume, changing body position so that airflow moves from back to front and making sure air movement in the work area pushes away from the breathing zone.

PERSONAL PROTECTIVE EQUIPMENT: PAPR

Powered Air Purifying Respirators (PAPR) are a type of respiratory protection equipment suitable for applications requiring higher levels of respiratory protection and where head, eye & face protection is also required.

PAPR systems provide a continuous flow of filtered air via a motor and filter unit, creating a positive pressure inside the helmet which assist in keeping contaminants out.

PAPR systems provide a higher level of respiratory protection, which lowers the exposure to harmful contaminants (hazardous articulates, fumes and gases – AKA 'welding fume') when welding, cutting or grinding.

The use of PAPR means there is little to no breathing resistance. Unlike other air purifying respirators, PAPRs create a fanning effect that keeps the face piece / hood / mask from fogging and the wearer more comfortable, along with little to no breathing resistance to assist in reducing worker fatigue.

3M SPEEDGLAS Welding Helmet 9100Xxi Air with Adflo PAPR

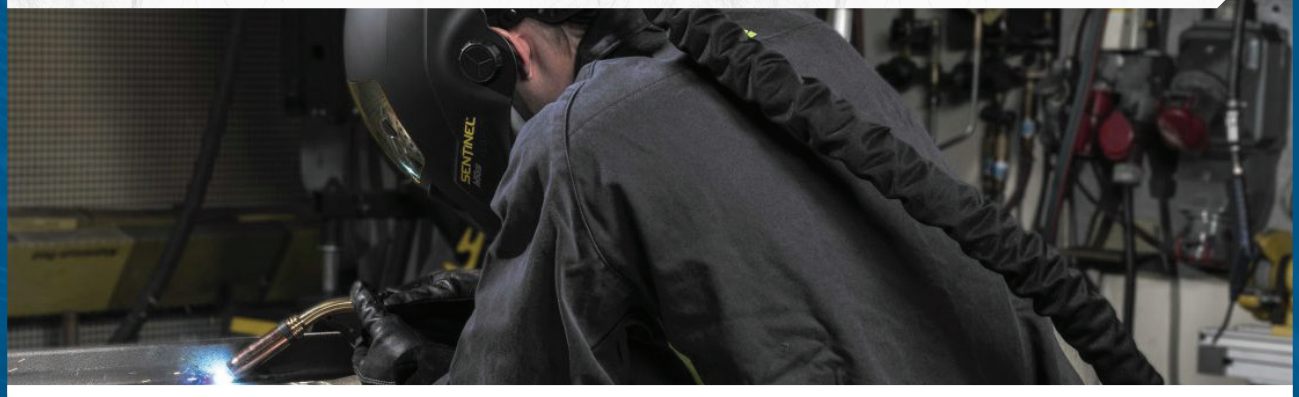
- Large 73 x 107mm viewing area plus side windows
- Advanced Tig Sensor Technology with arc detection down to 1Amp
- Variable shares 3, 5, 8, 9 -13
- Highest optical clarity and classification (1/1/1/1)
- Adflo PAPR with Standard (8 hour) or Heavy duty (12 hour) battery
- External button for grinding with powered air respiratory protection

Part Number: 0305 6455

ESAB SENTINEL A50 PAPR Welding Helmet with Aristo Air

- Unique shell design made from high-impact resistance nylon
- Externally activated grind button
- Colour touch screen control panel
- Infinitely adjustable 5 point head gear for comfort and balance
- Optical class 1/1/1/2
- User adjustable air flow 170 – 210L/min

Part Number: 0410 5202



5. PERSONAL PROTECTIVE EQUIPMENT – PROTECT THE WORKER WITH PPE

Any remaining risk must be addressed with suitable personal protective equipment. Implementing suitable respiratory protection such as disposable masks, half masks, powered air purifying respirators (PAPR), and supplied air respirators.

PRODUCT SPOTLIGHT

3M REUSABLE AND DISPOSABLE WELDING RESPIRATORS

3M disposable or reusable respirators provide options suitable of welding applications and environments where there are low levels of contaminants and exposure as per risk assessments.

A low profile means they can fit under most welding and grinding shields. For comfortable protection that is easy to use and for short durations.

8514 Cupped Welding Respirators P2

- Low profile design allows compatibility with welding shields
- Proprietary 3M Cool Flow valve helps to remove exhaled air and minimise risk of misting eyewear
- Activated carbon layer filters out ozone, welding fumes and nuisance odours e.g. welding - MIG, TIG, metal fumes

Part Number: 0099 0253

6528QL Welding Kit – GP2

- Includes: 1 x 6500 Half Face Respirator, 2 x Pairs Particulate Metal Fume Filter 2128 GP2, 2 x Cleaning Wipes 504 & 1 x Respiratory Protection Guide

Size	Part Number
S	0009 9556
M	0009 9539
L	0009 9675

7528 Welding Respirator Kit – GP2

- Includes 1 x 7500 Half Face Respirator, 1 x Pairs Particulate Metal Fume Filter 2128 GP, 22x Filters, 4 x Cleaning Wipes 504, 1 x Respiratory Protection Guide

Part Number: 0190 0761

- **Air Purifying Respirators are not to be used in immediately dangerous to life and health (IDLH) environments. If welding applications are to be conducting in IDLH environments then Air Supplied Respiratory Equipment is required to be used as per risk assessment.**

CONTACT BLACKWOODS TECHNICAL SAFETY SPECIALISTS TO DISCUSS YOUR SPECIFIC RESPIRATORY PROTECTION REQUIREMENTS.

- Cancer Council - https://www.cancer.org.au/preventing-cancer/workplace-cancer/welding.html
- Australian Mining - https://www.australianmining.com.au/news/welding-fume-now-classified-carcinogenic-humans/html
- Welding Technology Institute of Australia - http://wtia.com.au/wp-content/uploads/2015/02/FUME-MINIMISATION-GUIDELINES.pdf
- Safe Work NSW - https://www.safework.nsw.gov.au/__data/assets/pdf_file/0014/52160/Welding-processes-COP.pdf
- Department of Mines, Industry Regulation and Safety WA - https://www.dmp.wa.gov.au/Documents/Safety/MSH_SB_154.pdf
- Safe Work Australia - https://www.safeworkaustralia.gov.au/system/files/documents/1705/mcop-welding-processes-v3.pdf

Blackwoods

We are truly committed to being the chosen partner for the supply of industrial and safety products and solutions to support Australian industries.
In living this commitment, we will demonstrate our:

Proven experience and expertise

Our history of over 140 years in successfully delivering solutions for industry.

True competitive drive

With a strong heritage in Industrial supply we want to ensure this is protected by ensuring we remain genuinely competitive across products, solutions, service and innovation.

Partnership commitment

We partner with selected suppliers so you can be confident we will deliver the best solutions for both your business and your industry applications.