# WELDING FUME PRODUCT CONTROLS

## SCIENTIFIC STUDY KEY FACT DOCUMENT

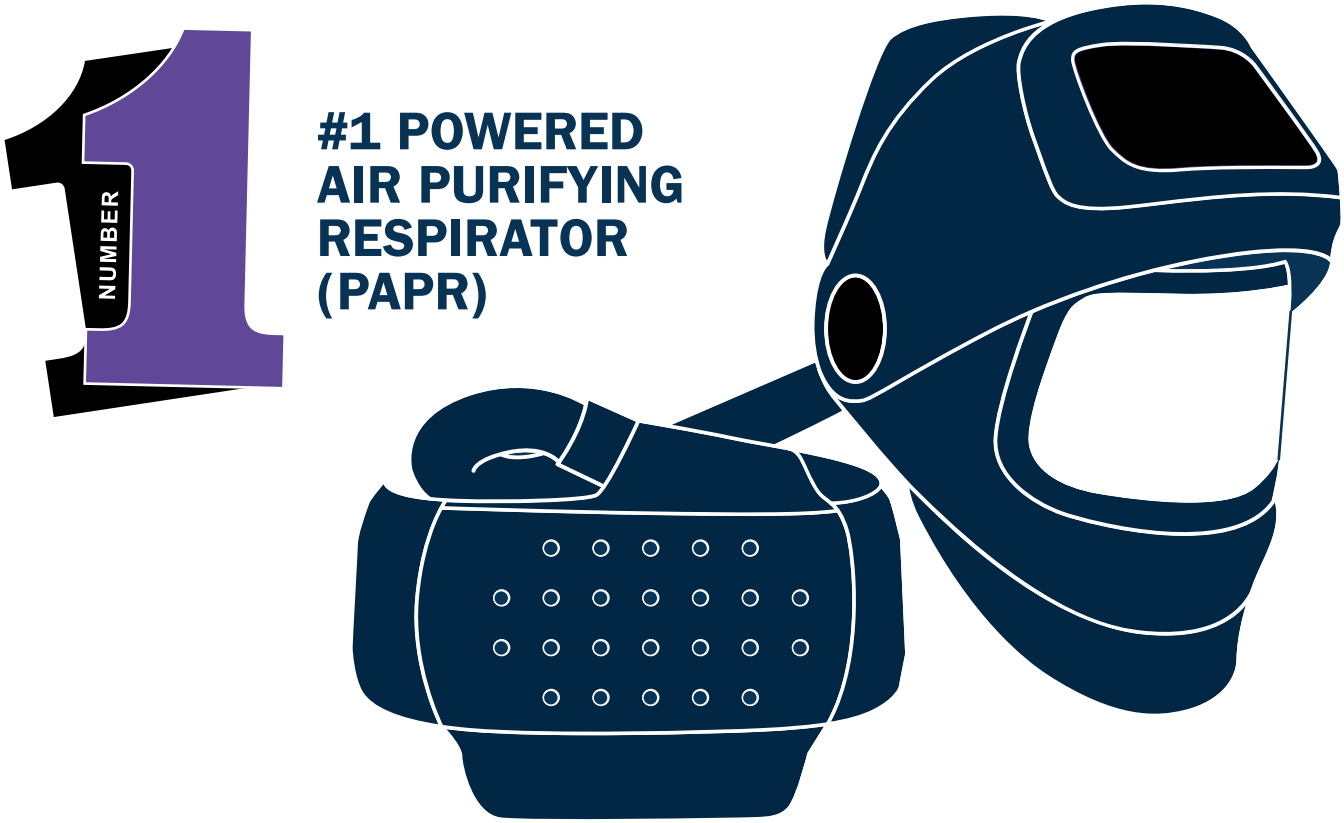
In 2022, an Australian independent scientific study was conducted to compare the effectiveness of welding fume product controls. The methods analysed were On-Gun Fume Extraction, Hooded Capture Local Exhaust Ventilation (LEV), and a Welding Helmet with a Powered Air Purifying Respirator (PAPR). The study "Welding fume; a comparison study of industry used control methods" was published in the Safety Journal in 2023[i].

[i] Please note this document only outlines the key results from the study. For more detailed information please download the Welding Fume Product Controls White Paper at www.apexweldingsafety.com.au.

MOST EFFECTIVE METHOD TO

# PROTECT ONLY THE WELDER^

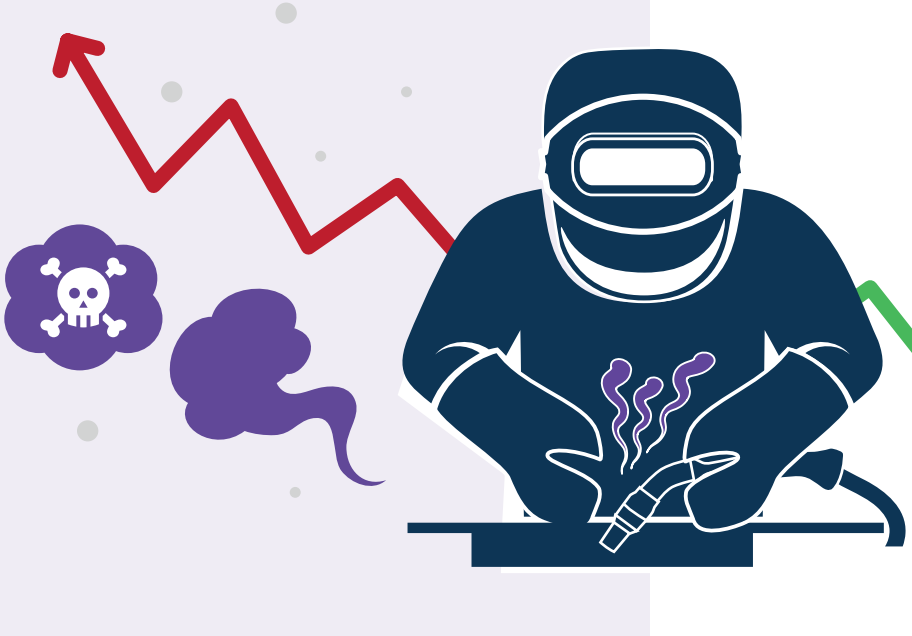
^Please be aware that it is an employer's legal responsibility to reduce welding fume exposure to as low as reasonably practicable for all persons, not just the welder. These results are only applicable to situations where there are no other people sharing the environment with the welder/s.




## #1 POWERED AIR PURIFYING RESPIRATOR (PAPR)

### #1 Welding Helmet with Integrated Powered Air Purifying Respirator (PAPR)

The Welding Helmet with an Integrated Powered Air Purifying Respirator was by far the most effective control measure in protecting the welder from welding fume exposure when compared to On-Gun Fume Extraction and Hooded Capture Local Exhaust Ventilation (LEV)*.



**AT LEAST**
**99.96%**
**REDUCTION**

## At Least 99.96% Reduction in Exposure

The Welding Helmet with PAPR reduced exposure to welding fume - a known carcinogen - by at least 99.96%*.

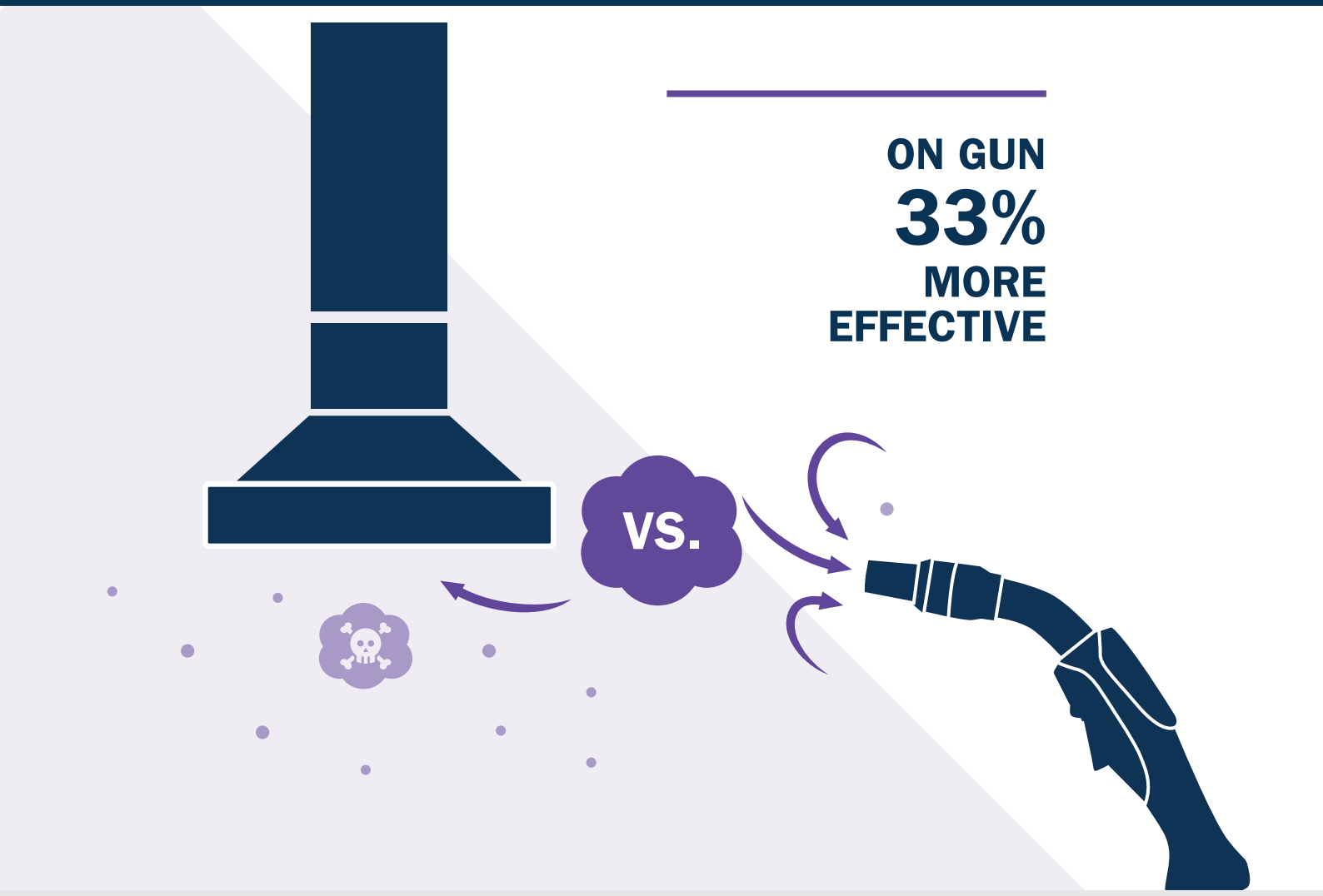
**AT LEAST**
**2,600**
**EFFECTIVE PROTECTION FACTOR (EPF)**

## EPF at least 2,600

The Welding Helmet with an Integrated Powered Air Purifying Respirator provided an Effective Protection Factor (EPF) of at least 2,600. Meaning a PAPR could reduce welding fume exposure to at least 1/2600th of the outside concentration. The results of this study show a level of performance at least 52 times better than the Required Minimum Protection Factor (RMPF) of 50 as specified in the Australian and New Zealand standard AS/NZS 1715:2009*.

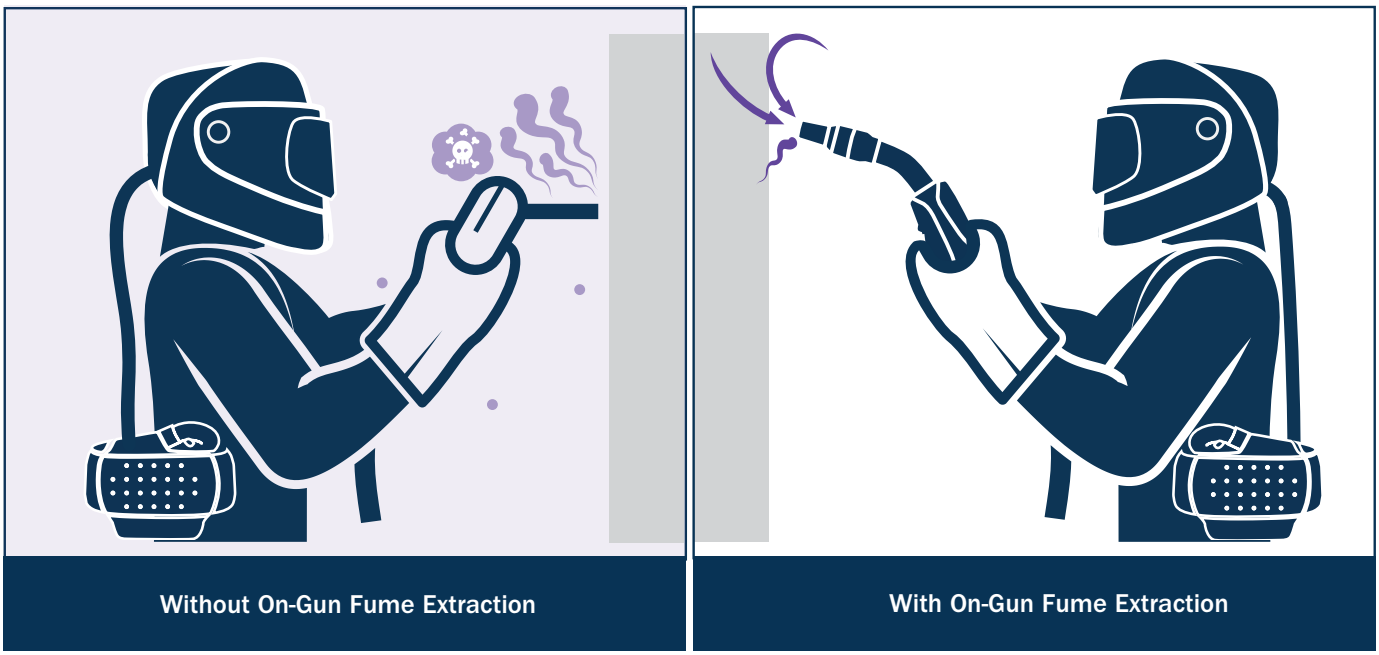
MOST EFFECTIVE METHOD TO

# REMOVE WELDING FUME FROM THE ENVIRONMENT




## On-Gun Fume Extraction 33% more effective than Hooded Capture LEV Extraction

On-Gun Fume Extraction was 33% more effective than Hooded Capture LEV in extracting welding fume from the environment*.




# ON GUN UP TO 97% CAPTURE RATE

## On-Gun Fume Extraction Captures up to 97% of Welding Fume

On-Gun fume extraction was able to extract up to 97% of the welding fume with an average of 90% across all tests*.


## Hooded Capture: Exposure doubles from 30cm to 50cm

Exposure to welding fume approximately doubled when the capture hood distance from the arc increased from 30cm^ to 50cm. This has large implications for welders who do not remain stationary or for those who are doing long welds*.

^30cm was the correct distance from the arc based on manufacturer's instructions.

# PRACTICAL GUIDANCE

Based on the conclusions of the 2022 welding fume product control study, the following product control guidance is offered to reduce welding fume exposure to as low as reasonably practicable when welding using the most common materials (aluminium, steel, stainless steel, galvanised steel etc.) in environments with good ventilation.

This guidance assumes that all efforts to mitigate risk associated with welding fume through elimination, substitution, and isolation controls have been carried out*.

## Protecting only the welder from welding fume^:

Introduce Welding Helmets with integrated Powered Air Purifying Respirators (PAPR).

Ensure staff are trained in the proper use and maintenance of the PAPR. Many suppliers offer in-person and online training programs for free.

Remove surface coatings and look to mitigate risk by using a welding technique that produces less fume or introduce less hazardous materials where possible.

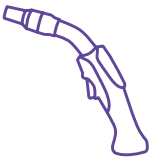
Welders should position themselves to ensure they keep their heads away from the plume where possible and take advantage of any ventilation available.

^Please be aware that it is an employer's legal responsibility to reduce welding fume exposure to as low as reasonably practicable for all persons, not just the welder. This guidance is only applicable to situations where there are no other people sharing the environment with the welder/s.

## Protecting the welder and surrounding workers from welding fume:

Introduce a dedicated area for welding away from other workers and restrict access to this area where possible.

Introduce Local Exhaust Ventilation in combination with a Welding Helmet with an integrated Powered Air Purifying Respirator to protect the welder and control the spread of welding fume throughout the environment. If suitable for the application, on-gun fume extraction is the most effective and practical engineering LEV welding fume control*.

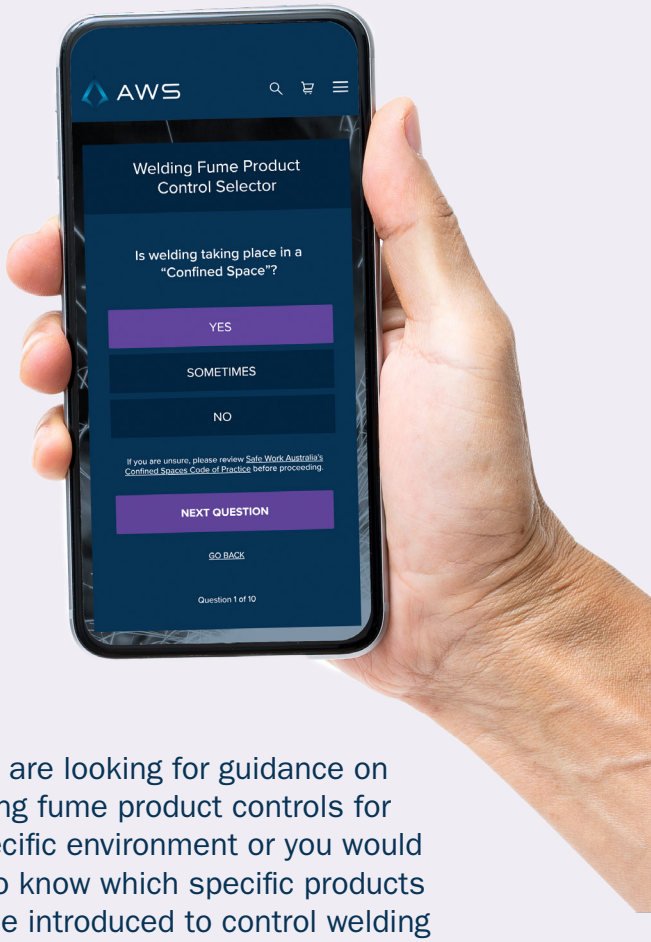


Have staff trained in the proper use and maintenance of the PAPR and LEV system. Many suppliers offer in-person and online training programs for free.

Remove surface coatings and look to mitigate risk by using a welding technique that produces less fume or introduce less hazardous materials where possible.

Welders should position themselves to ensure they keep their heads away from the plume (if applicable) where possible.

# WELDING FUME PRODUCT CONTROL SELECTOR




If you are looking for guidance on welding fume product controls for a specific environment or you would like to know which specific products can be introduced to control welding fume at your workplace – please try the Welding Fume Product Control Selector using the QR code or website link below.

The solutions generated in this selector are based on the results of the Australian independent scientific study that was conducted in 2022 to compare the effectiveness of welding fume product controls.

Scan to use the **Welding Fume Product Control Selector**

**apexweldingsafety.com.au/welding-fume-tool**

## * IMPORTANT

The findings are unique to the study parameters and conditions. All guidance is provided to give an example of how to control welding fume and is provided as a basic guideline only. It should not be used as the only means of selecting a respirator or control method. It's always recommended to have a welding fume product control expert visit your premises as onsite variables can impact product control effectiveness (eg. weld position, and environmental factors).

Powered and supplied air respirators must never be used in atmospheres Immediately Dangerous to Life or Health (IDLH). Always consult your Safety Engineer or Occupational Hygienist. Air monitoring should take place if you are unsure about the level of welding fume exposure to workers.

Brands and product names have been omitted to keep this paper focused solely on the different forms of product controls as opposed to pushing specific brands or products. However, it's important to note that the results are only applicable to the brands and products used in the study – these can be made available upon request.

The key results and the guidance within this document do not address confined spaces. Confined spaces should be avoided where possible. All of today's current welding fume product controls have their limitations in a confined space. There should be a suitably trained and knowledgeable person doing the assessment and design of a safe system for any confined space entry. Consultation with a welding fume product control expert should always be carried out to understand the limitations of each product control within a confined space.

This publication contains work health and safety information and is provided as guidance, it should not be relied upon as legal compliance. It includes obligations under legislation that health and safety regulators administer. To ensure you comply with your legal obligations you must refer to the appropriate legislation. This publication does not represent a comprehensive statement of the law as it applies to particular problems or to individuals or as a substitute for legal advice. You should seek independent legal advice if you need assistance on the application of the law to your situation.

## For more information:

Welding Fume
Product Control Selector
**www.apexweldingsafety.com.au**

Welding Fume
Product Control
White Paper
**www.apexweldingsafety.com.au**

AWS

Apex Welding Safety Pty Ltd
W: www.apexweldingsafety.com.au
T: (02) 9439 0111
E: sales@apexweldingsafety.com.au

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