3M | Speedglas™ Welding Safety

Identifying respiratory hazards for welders

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The right equipment for each job

It is the employer's responsibility to identify all welding hazards in their workplace, to explain those hazards to their welders, and to develop a documented welder safety protection plan.

That protection plan needs to be specific and cover all variables that a welder may encounter. Those variables can include changes to base metals, electrodes, the amount of sparks or splatter generated, fume intensity, the location of the weld, ventilation limitations, and so on.

The protection plan must then instruct welders how these variables impact their selection of personal protective equipment (PPE) for specific welding applications.

Fortunately, the 3M™ Speedglas™ team has developed a wide range of PPE, so welders can select the right equipment for each job. That means meeting several of the welder's protection needs – plus empowering welders to perform at their highest levels.

Identify the hazards

Make a list of all the risks in your welding environment (arc radiation, sparks, fumes, noise, trip hazards, falling objects, etc). 3M can help identify consultants and measurement tools.

Assess the risk levels

By evaluating every risk, you can prioritise their prevention. See more details in each section of this catalog. If there are any doubts or ambiguities, always consult a professional safety engineer.

Select the right PPE

Now that you know the levels of protection needed for a specific application, you can select the right level of PPE to protect each vulnerability: eye, face, head, hearing, and respiratory system.

Within the appropriate level of protection, let welders choose on matters of personal preference regarding comfort, style, and ease of maintenance. These personalised comfort choices help to maximise user acceptance of PPE.

Training, motivation and maintenance

For maximum benefit from any piece of PPE, it pays to focus on user acceptance and proper use. 3M can help:

- 3M eAcademy - the flexible way to discover and learn throughout your busy day: **www.3m.com/3M/en_US/3m-academy/log-in**
- Other techniques, such as Toolbox Talks, educational posters for your facilities, online videos, etc.

What's happening to me as a welder?

What do increased clumsiness, ulcers, and flu symptoms have in common? They – and many more symptoms – might be caused by overexposure to welding fumes.

Potential immediate health effects of certain welding fumes

- Eye, nose and throat irritation
- Dizziness
- Nausea
- Headaches
- Metal fume fever. Notably, it is more likely to occur after time away from the job (weekends, holidays, etc.)[1)]

Potential long-term health effects of certain welding fumes

- Lung function abnormalities, including bronchial asthma, chronic obstructive pulmonary disease (COPD), pneumoconiosis and other pulmonary fibrosis (chronic beryllium disease, cobalt lung), and lung cancer.[2)]
- Larynx and urinary tract cancers.[3)]
- Certain fumes can lead to stomach ulcers, kidney damage, and nervous system damage.[3)]

FACTS:

40–50 welders

in UK are hospitalised every year with pneumonia caused by welding fume. Two of these welders die every year.[4)]

Inadequate respiratory protection is the 3rd most frequently cited workplace violation.[5)]

1) "Prevalence and association of welding related systemic and respiratory symptoms in welders," Occupational & Environmental Medicine, El-Zein M., Malo J-L., Infante-Rivard C., Gautrin D., 2003;60:655-661.

2) "Welding-Related Respiratory Diseases" article, (translated from) Medycyna Pracy (Occupational Medicine), Wittczak T., Walusiak J., Pałczyński C., 2009;60(3):201-8.

3) "Controlling Hazardous Fumes and Gases during Welding," OSHA Fact Sheet, U.S. Department of Labor, DSG FS-3647, March, 2013.

4) Source: www.hse.gov.uk/welding/illness.htm (02.03.2017)

5) Top 10 Most Frequently Cited Standards, OSHA, U.S. Department of Labor, for 2020.

An overview of metals, welding processes, and respirator protection selection

The following is a general outline to the type of 3M™ Respiratory Protection that may be appropriate for your welding applications.

The overview looks at the metals to be joined, welding processes, welding fume and ventilation conditions. It then lists the types of respiratory protection that your Industrial Hygienist may recommend as determined by their hazard assessments.

⚠ **Classified as IDLH**
Powered and supplied air respirators must never be used in atmospheres Immediately Dangerous to Life or Health (IDLH). Always consult your Safety Engineer.

Particle filtration via disposable respirator, reusable respirator, or powered air respirator with a high efficiency particulate filter installed.

Particle and gas filtration via powered air respirator with both a high efficiency particulate gas and/or vapor filter installed.

Supplied air via regulator and filtration unit.

Material to be welded	Welding method	Low concentration of welding fumes (particles)	Higher concentration of welding fume (particles and gases)	Breathing air (oxygen above 19,5%) impacted by narrow space
Aluminium	MIG			
	TIG			
	MMA (stick)			
Stainless steel	MIG			
	TIG			
	MMA (stick)			
	PLASMA (Welding and Cutting)			
Steel not coated or painted	MIG/MAG			
	STICK WELDING			
	PLASMA (Welding and Cutting)			
Steel painted (lead based paints)	MIG/MAG			
	MMA (stick)			
	PLASMA (Welding and Cutting)			
Steel galvanised	MIG/MAG			
	MMA (stick)			
	PLASMA (Welding and Cutting)			
Steel coated with 2-component paints or insulated with 2-part polyurethanes (risk of isocyanates)	MIG/MAG			
	MMA (stick)			
	PLASMA (Welding and Cutting)			
Material cleaned with trichloroethylene	MIG			
	TIG			
	MMA (stick)			
	PLASMA (Welding and Cutting)			

Do you, as a welder, know what's in your air?

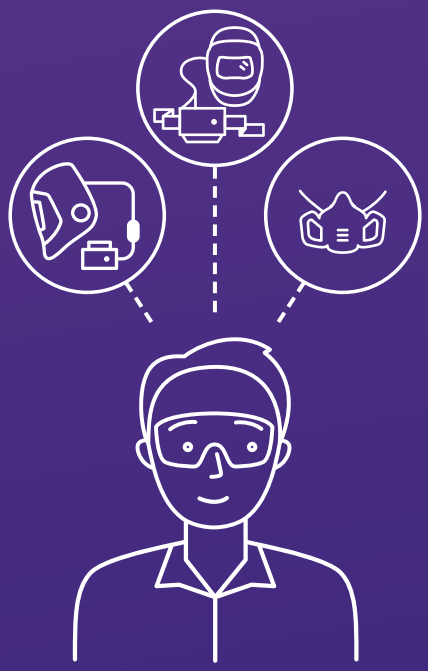
Follow the path to protection

1. Detect

We believe welders deserve to feel safe and comfortable during their workday.

Clean air is critical to employee safety, but you won't know if you have appropriate protection without monitoring and understanding what's in your air.

Different welding methods and environments requires different levels of protection – let us help you on the path to safety



2. Select

Establishing a thorough respiratory protection program requires both selecting the correct respirators and a plan to change out your gas/ vapor cartridges.

Selecting the welding PPE include various parameters such as protection, comfort and performance. Each situation and welding environment have their unique challenges

It doesn't matter how good your protective equipment is if nobody uses it. We make helmets that are comfortable, good-looking, and promote welders' performance.

3. Protect

Risk remains constant. You'll need a consistent program that can also adapt to new challenges, and we want to help you establish one.

We've developed tools and guidelines to help you maintain your equipment and make the most out of it.

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