An overview of metals, welding processes and respirator selection

3M™ Speedglas™ offers a wide range of personal respiratory protection, providing unequalled comfort and protection in the toughest conditions.

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

How to use this guide:

Identify the material to be welded and the welding process to be used. The concentration levels of the pollutants are affected by the ventilation conditions in the workplace. Choose the appropriate description of the working environment to determine a suitable type of respiratory protection.[1)]

P = Powered air respirator with particle filter (P).

P + A = Particle and gas filtration via powered air respirator with both a high efficiency particulate filter (P) and an A1 gas filter installed.

S = Supplied air via regulator and filtration unit.

Material to be welded	Welding method	Ventilation conditions of your working environment			
		Good environment, with forced ventilation	Limited ventilation	Restricted space - Note: Not suitable for Confined Spaces as defined by AS2865.	Classified as IDLH
Aluminium	MIG	P	P / P + A	S	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.
	TIG	P	P / P + A	S	
	MMA (stick)	P	P / P + A	S	
Stainless steel	MIG	P	P / P + A	S	
	TIG	P	P / P + A	S	
	MMA (stick)	P	P / P + A	S	
	PLASMA (Welding and Cutting)	P	P + A / S	S	
Steel not coated or painted	MIG/MAG	P	P	S	
	STICK WELDING	P	P	S	
	PLASMA (Welding and Cutting)	P	P / S	S	
Steel painted (lead based paints)	MIG/MAG	P	P	S	
	MMA (stick)	P	P	S	
	PLASMA (Welding and Cutting)	P	P / S	S	
Steel galvanised	MIG/MAG	P	P	S	
	MMA (stick)	P	P	S	
	PLASMA (Welding and Cutting)	P	P / S	S	
Steel coated with 2-component paints or insulated with 2-part polyurethanes (risk of isocyanates)	MIG/MAG	P	S	S	
	MMA (stick)	P	S	S	
	PLASMA (Welding and Cutting)	P	S	S	
Material cleaned with trichloroethylene	MIG	S	S	S	
	TIG	S	S	S	
	MMA (stick)	S	S	S	
	PLASMA (Welding and Cutting)	S	S	S	

1) 3M accepts no liability for the incorrect choice of respiratory protective equipment. This chart is only an outline. It is designed to help focus on the most appropriate respirators in the 3M range for particular applications. It should not be used as the only means of selecting a respirator. Details regarding performance and limitations are set out on the respirator packaging and user instructions.

Respiratory filter guide

Code Type of filter

E	Acid gases.
A	Organic gases, boiling point >65°C.
AX	Organic gases, boiling point <65°C.
P	Particle filter.
B	Inorganic gases.

Remarks

H = The chemical can be absorbed through the skin.

K = The chemical can be cancer-inducing.

S = The chemical can be a sensitiser.

1. Argon and helium are inert gases which are not generally absorbed by canister type filters. These gases are not in themselves hazardous but can displace oxygen from the air when present in confined spaces.
2. Ozone is not readily filtered by absorption type filters. However, ozone reverts back to normal oxygen upon contact with solid surfaces. The use of a Speedglas Welding Helmet or Protective Visor with the Adflo Respirator (particle filtration) will reduce ozone exposure. (For further information please contact AWS).
3. Chemical constituents of a welding fume with very low Occupational Exposure Limits can pose special hazards and are sometimes best protected against by using a Supplied Air Regulator System. Always ask an appropriately qualified safety professional, such as an Occupational Hygienist for respiratory protection advice if you are unsure.

Occupational Exposure Limits (OELs) are given in each individual country's national safety requirements.

Suggested Filter Type				
Chemical	Particle	Gas	Supplied Air	Remarks
Aluminium	P			
Argon			Supplied Air	1
Beryllium	P		Supplied Air	K, S 3
Bromine		B		
Cadmium	P			K
Carbon Dioxide			Supplied Air	
Carbon Monoxide			Supplied Air	
Chlorine		B		H
Chlorine Dioxide		B		
Chromium Hexavalent	P			K
Chromium Trivalent	P			
Copper	P			
Fluorides	P			
Fluorine			Supplied Air	
Helium			Supplied Air	1
Isocyanates			Supplied Air	S
Hydrogen Chloride		B	Supplied Air	3
Hydrogen Cyanide		B	Supplied Air	H3
Hydrogen Fluoride		B	Supplied Air	3
Hydrogen Sulphide		B		
Iron Oxide	P			
Lead	P			
Magnesium	P			
Manganese	P			
Nickel	P			S
Nitrogen Dioxide			Supplied Air	
Nitric Oxide			Supplied Air	
Ozone	P	A		2
Phosgene			Supplied Air	3
Phosphine			Supplied Air	
Silicon Dioxide	P			
Sulphur Dioxide		E		
Trichloroethylene		A		K
Vanadium Oxide	P			
White Spirit		A		
Zinc	P			
Zinc Chloride	P			
Zinc Oxide	P			