SHIELDING GASES FOR WELDING

KEY ■ Suggested Thickness ■ Suitable Thickness

AIR LIQUIDE

TIG Welding Stainless Steel

Shielding gas	Typical application and effects	Material thickness in mm															Components			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	14 plus	Argon	Hydrogen	Helium	EN 439 class
Argon	For use on thin sections. This has a stable arc with easy starting. Suitable for all grades of material.	■	■	■	■	■	■	■	■								99.998%			I1
Hylar 2	For use on thin to medium thickness sections in the 300 austenitic range. This has a stable arc with easy starting. Can be used for mechanised welding.		■	■	■	■	■	■	■	■	■	■	■				98%	2%		R1
Hylar 5	For use on medium thickness sections in the 300 austenitic range. This has a stable arc with easy starting. An excellent purge gas for these sections.	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	95%	5%		R1
Stellar 30	Mainly used for thin to medium thickness sections, where greater welding speed (than Argon) is required. The arc is quite stable. Argon/Helium mixes are especially suitable for Ferritic Stainless Steels.	■	■	■	■	■	■	■	■	■	■	■	■				70%		30%	I3
Stellar 50	Used for medium thickness sections. The arc is reasonably stable. It is often preferred to Stellar 75 as being more manageable.			■	■	■	■	■	■	■	■	■	■	■	■	■	50%		50%	I3
Stellar 75	Mainly used for medium to thick sections.						■	■	■	■	■	■	■	■	■	■	25%		75%	I3

TIG Welding Aluminium

Argon	For use on thin and medium thickness sections. This has a stable arc with easy starting.	■	■	■	■	■	■	■	■	■	■						99.998%			I1
Stellar 30	Mainly used for thin to medium thickness sections, where greater welding speed (than Argon) is required. The arc is reasonably stable.	■	■	■	■	■	■	■	■	■	■	■	■				70%		30%	I3
Stellar 50	Used for medium thickness sections. The arc is reasonably stable.			■	■	■	■	■	■	■	■	■	■	■	■	■	50%		50%	I3
Stellar 75	Mainly used for medium to thick sections, or when less passes are required, giving excellent penetration and speed.				■	■	■	■	■	■	■	■	■	■	■	■	25%		75%	I3

TIG Welding Mild Steel

Argon	For use on thin sections. This has a stable arc with easy starting. Often used for mechanised orbital welding.	■	■	■	■	■	■	■	■								99.998%			I1
Stellar 30	Mainly used for thin to medium thickness sections, where greater welding speed (than Argon) is required. The arc is reasonably stable.	■	■	■	■	■	■	■	■	■	■	■	■				70%		30%	I3
Stellar 50	Used for medium thickness sections. The arc is reasonably stable. It is often preferred to Stellar 75 as being more manageable.			■	■	■	■	■	■	■	■	■	■	■	■	■	50%		50%	I3
Stellar 75	Mainly used for medium thickness to thick sections.						■	■	■	■	■	■	■	■	■	■	25%		75%	I3

PLEASE NOTE: This chart is designed as a guide only, the nature and position of the workpiece may effect the choice of gas, as will any preheat in large castings.
The welding of material thicker than 4 mm (especially Steels) will often require more than one pass.
Suggested shielding gas flow rates: 6 - 12 litres per min, dependant on current and ceramic diameter, and whether or not a gas lense is fitted.
Shielding gas flow rates for mechanised welding may be higher than for manual welders.
Hylar cylinders have a LEFT HAND threaded BS4 cylinder connection, use a Hydrogen service regulator, remember this will also have a 3/8BSP left hand outlet.
Frequent tack welding is recommended with Stainless Steels to reduce distortion, as is back purging to eliminate 'coking'.

BSI REGISTERED FM12962

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SHIELDING GASES FOR WELDING

KEY ■ Suggested Thickness ■ Suitable Thickness

AIR LIQUIDE

MIG (MAG) Welding Mild Steel

Shielding gas	Typical application and effects	Material thickness in mm															Components				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	14 plus	Argon	Oxygen	Carbon Dioxide	Helium	EN 439 class
Argon/CO_2 Welding Mix 5	For use on thin sections. Low spatter and good weld appearance. Useable in all positions. Also suitable for pulsed arc and some robotic use.	■	■	■	■	■	■	■	■								93%	2%	5%		M14
Argon/CO_2 Welding Mix 8	Mainly used for thin sections, this gas can also be used at high currents for high deposition rates.	■	■	■	■	■	■	■	■	■	■					■	92%		8%		M21
Exellar 5	For use on thin and medium thickness sections. Ideal for pulsed and spray transfer welding. Excellent for robotic and automated welding.	■	■	■	■	■	■	■	■	■	■	■					95%	5%			M22
Argon/CO_2 Welding Mix SM	Suitable for a wide range of thicknesses, smooth arc with low spatter levels.	■	■	■	■	■	■	■	■	■	■	■	■	■	■		85%	1.5%	13.5%		M24
Argon/CO_2 Welding Mix 14	Rounded root penetration. Low weld bead contamination. Good pulse welding gas.			■	■	■	■	■	■	■	■	■	■	■	■	■	86%		14%		M21
Argon/CO_2 Welding Mix 20	For use on thick sections. Not generally used for pulsed arc, but excellent with many cored wires.					■	■	■	■	■	■	■	■	■	■	■	78%	2%	20%		M24
Argon/CO_2 Welding Mix 210	Suitable for thick plate. Low weld bead contamination. ASME compliant.					■	■	■	■	■	■	■	■	■	■	■	80%		20%		M21
Carbon Dioxide	Used in dip transfer on thin and galvanised sections. Recommended for some cored wire.	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			99.9%		C1

MIG (MAG) Welding Stainless Steel

Argon/CO_2 Welding Mix 3	Suitable for most sections (multi passes). Reduced levels of surface oxidation compared to Argon/Oxygen mixes. Very cost effective.		■	■	■	■	■	■	■	■	■	■	■	■	■	■	97.5%		2.5%		M12
Exellar 2	For use on thin and medium thickness sections. Can be used in spray or dip transfer, some surface oxidation. Can be used for Stainless to Mild Steel joints.	■	■	■	■	■	■	■	■	■							98%	2%			M13
Stellar 1	Excellent for dip transfer when high quality positional work is required, with a clean bead and good profile.	■	■	■	■	■	■	■									13%		2%	85%	M12(3)
Stellar 6	For use with thicker sections. Suited to spray and pulse transfer and where appearance is important.		■	■	■	■	■	■	■	■	■	■	■	■	■		63%		2%	35%	M12(2)

MIG (MAG) Welding Aluminium

Argon	For use on thin and medium thickness sections. Good arc control, used with or without pulse.	■	■	■	■	■	■	■	■	■	■	■	■	■			99.998%				I1
Stellar 30	Helium mixtures provide extra heat which produces a flatter, broader, weld bead profile with the potential for faster welding and reduced distortion, compared to Argon. Higher Helium levels are suitable for thicker sections.		■	■	■	■	■	■	■	■	■	■	■	■	■		70%			30%	I3
Stellar 50	See Stellar 30.			■	■	■	■	■	■	■	■	■	■	■	■	■	50%			50%	I3
Stellar 75	See Stellar 30.				■	■	■	■	■	■	■	■	■	■	■	■	25%			75%	I3

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PLEASE NOTE: This chart is designed as a guide only, the nature and position of the workpiece may effect the choice of gas.
The welding of material thicker than 8mm will often require more than one pass.
Mild and Stainless Steel suggested shielding gas flow rates: < 200amps 14 litres per min, 200 to 350 amps 14-18 litres per min, > 350 amps 20 litres, add 20% flow for Aluminium.
Shielding gas flow rates for robots may be higher than for manual welders, due to increased wire 'stick out'.
For cored wires consult the wire manufacturer as to which is the preferred shielding gas and gas flow rate.

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