

# GEN<sup>4</sup> WELDING TYPES

## TUNGSTEN INERT GAS (TIG) WELDING

Also known as Gas Tungsten Arc Welding (GTAW), TIG welding uses a tungsten electrode, a filler metal and an inert shielding gas (such as argon or helium) during the welding process. This method requires a highly skilled welder, as the manual technique requires two hands to utilize the equipment and apply the filler metal to create the weld joint. TIG welding is typically used with stainless steels and non-ferrous metals, on thinner section of metal, and provides the welder greater control over the properties of the weld versus other similar processes. It has the disadvantage of being relatively slow due to its complexity and multi part process.

## METAL INERT GAS (MIG) WELDING

Also known as Gas Metal Arc Welding (GMAW), the MIG welding process employs a welding gun, a power supply, an electrode (alloy wire) and a shielding gas. The welding procedure is uncomplicated, with the welding gun bringing all the required components (power, filler metal, shielding gas) together at the weld point. Compared to other methods, training for MIG welding requires less time to develop a usable skill level in the field. It is the preferred welding method in most industrial applications, and can be easily adapted to automation if required. Issues with dross and porosity of welds can affect the quality of the finished welds, so additional scrutiny of materials and cleanliness is required.

## SUBMERGED ARC (SAW) WELDING

Often called Sub-Arc Welding, the SAW welding process is primarily an automated method of welding that isolates the arc zone below (sub) the surface of a molten flux, eliminating atmospheric contamination. The process uses a continuous feed of consumable welding wire in either a single or multiple wire/alloy combination. SAW has the advantage of a high deposition rate and deep weld penetration, making for a high ft/min welding rate. It also allows for single pass welds with thicker material. SAW is limited by the plane of the welding operation (straight welds are preferred) and can result in the need for an added slag removal step.

Wire Diameters by Welding Type

MIG (GMAW) Diameters		TIG (GTAW) Diameters		SUB ARC (SAW) Diameters		Sample Sizes of Diameters
Imperial in.	Metric mm	Imperial in.	Metric mm	Imperial in.	Metric mm	
0.023	0.6	1/16	1.6	5/64	2	● 1/16
0.030	0.8	3/32	2.4	3/32	2.4	● 5/64
0.035	0.9	1/8	3.2	1/8	3.2	● 3/32
0.045	1.14	5/32	4.0	5/32	4	● 1/8
0.047	1.2	3/16	4.8			● 5/32
1/16	1.6					● 3/16

Note: Unless a customer specifies that the exact metric size is required, standard imperial size will be substituted. For example, 0.045 inches will be supplied for 1.2mm wire unless exact metric size is specified at the time of order.