sif tips

Sifbronze was established in 1925 and is one of the last companies who continue to manufacture welding consumables here in the UK.

In February 2008 they became a wholly owned company within the WWS Group and now feature as part of the combined WELDABILITY SIF product range.

The company has kindly offered to provide a series of technical advice documents for the welding sales engineer and AWD members, following the traditional SIFTIPS format which was originally started in 1932.

Steel

As a general statement, steel is readily weldable by the majority of welding processes. With alloy steels, it is necessary to select an appropriate filler metal for the material and service situation that the weld will be subjected to. As a guide, carbon content is the first consideration, followed by silicon and manganese. If there are other elements such as chromium, molybdenum etc, then these will usually take priority over carbon.

In today's world, the first thought for welding steel is to use the MIG process and SIFMIG SG2 wire, or perhaps if a higher UTS is required SIFMIG SG3. In fact, welding is symbolised by a MIG welder and a 'shower of sparks'!

Having touched on the MIG process, if deposition rate is important, then Sifcored E71T-1 flux cored wire should be considered. It should also be borne in mind that steel can be MIG brazed, as in the automotive industry on manganese boron steel with SIFMIG 968. Our other copper alloy wires SIFMIG 8 and 328 are also suitable for MIG brazing.

TIG filler rods are available for a range of mild and alloy steels. A frequently asked question is 'what do we use on 4130 (0.3C, 0.3Si, 0.5Mn, 1.0Cr, 0.2Mo)'; the answer is Sifsteel A32. With spring and high carbon steels, Sifsteel Stainless 312 is often the answer. For joining steel to stainless, consider Sifsteel Stainless 309LSi.
It is also worth remembering that TIG brazing with Sifphosphor Bronze No 8, Sifalbronze No 32 or Sifsilcopper No 968 can be very useful with difficult steel applications, dissimilar joints or where heat must be kept to a minimum.
The Sifbronze business developed due the ability of Sifbronze No 1, No 101 and No 2 to 'bronze weld' and braze steel, with minimum of distortion and producing a neat fillet joint, especially on tubular structures. Perhaps we should also add silver solder for those steel to brass/copper joints. From a gas welding point of view, the filler rod is Sifsteel No 11, which is also referred to as CCMS.

Now to arc welding electrodes, which come with three different types of coating. The most common and popular electrode, such as Hilco Red Extra, Velveta and Velora have a 'rutile' coating, which is predominantly titanium oxide to decrease spatter and improve slag removal. Cracking in steels is often due to the formation of minute quantities of steam from hydrogen in the electrode combing with oxygen from the air. This can be overcome by using 'basic' coated electrodes (Hilco Basic Super and Basic 55), also known as 'low hydrogen'. Finally, for high deposition rates, iron powder is added to the coating to substantially increase the amount of material deposited compared with a rutile type electrode. They are referred to as 'high recovery', such as Hilco Regina 160.

Cast Iron

Oxy-Acetylene Welding with Super Silicon No. 9

Broken castings should be aligned and tack-welded into position before pre-heating. All castings must be carefully supported on firebricks with a space of at least three inches beneath and preheated in a muffle to between 600ºC and 800ºC.

An oxy-acetylene flame, of ample capacity for the thickness of metal to be welded, is adjusted to a neutral condition. The edges of the fracture, or the sides of the vee groove, are melted by flame application; a little SIF Cast Iron Flux sprinkled in the weld area assists in forming a fluid pool of metal.

It is recommended that, on completion of welding, the casting should be brought once again to a uniform temperature of 600ºC-800ºC and then allowed to cool very slowly inside the muffle. Cast iron welds correctly made by the oxy-acetylene process using Super Silicon No. 9 rods can be relied upon to provide a soft and easily machinable deposit with full physical properties similar to those of the parent metal.