

Набережний А.

MANUFACTURING CONSIDERATIONS OF WELDING

Welding is the process of permanently joining two or more metal parts, by melting both materials. The molten materials quickly cool, and the two metals are permanently bonded. Spot welding and seam welding are two very popular methods used for sheet metal parts.

Spot welding is primarily used for joining parts that normally upto 3 mm (0.125 in) thickness.

Spot-weld diameters range from 3 mm to 12.5 mm (0.125 to 0.5 in) in diameter.

- Low carbon steel is most suitable for spot welding. Higher carbon content or alloy steels tend to form hard welds that are brittle and could crack. This tendency can be reduced by tempering.

- Austenitic Stainless steels in the 300 series can be spot welded as also the Ferritic stainless steels. Martensitic stainless steels are not suitable since they are very hard.

- Aluminums can be welded using high power and very clean oxide free surfaces. Cleaning the surface to be oxide-free, adds extra costs (that can be avoided with low carbon steel).

- Dissimilar materials cannot be spot welded due to different melt properties and thermal conductivities. Plated steel welding takes on the characteristics of the coating. Nickel and chrome plated steels are relatively easy to spot weld, whereas aluminum, tin and zinc need special preparation inherent to the coating metals.

- Thickness of the parts to be welded should be equal or the ratio of thicknesses should be less than 3:1.

- Adequate access for spot welding should be considered. Small flanges in U channels for example may restrict the electrode from entering the part.

- Flat surfaces are easier to spot weld due to easy access. Multiple bends impose access restrictions, and special fixtures may have to be designed to handle the parts, if access is not a problem.

- Prior to finishing, the spot welds have to be sanded or ground to blend the welds with the rest of the surface.

- It is best to choose the same spot weld size, to minimize setups and increase throughput.

- Plating of spot welded assemblies can cause problems when the sheet metal is overlapped. This can cause plating salts to be trapped-requiring special cleaning, or potential long-term corrosion problems. By carefully designing the assembly to allow easy draining of plating solutions this can be avoided.

- The mating parts can be self-jigged for easy location prior to welding. This can be done by lancing one part and locating in a corresponding slot in the other part; or by boss type extrusion, weld buttons, in part locating to a slot in the other. This type of design can often eliminate the need for external fixtures.