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Weldability of dissimilar joint of Steel/ 1100 Aluminum alloy and its quality

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Joining of dissimilar materials has found a wide use especially in power plants, nuclear reactors, chemical and gas industries; this will produce a desirable properties and weight reduction. However, the welding of dissimilar metal faces big challenges due to the difference in the thermo mechanical, chemical and physical properties of the two metals to be joined following one welding procedure. Unsymmetrical deformation has been observed with respect to the plane of the joint interface; the formation of intermetallic compound may increase the sensitivity for the cracks and reduce the ductility as well increasing the susceptibility to corrosion. Tungsten Inert Gas TIG welding is one of the possible processes in order to join dissimilar metals such as steel and aluminum alloys by conducting self-brazing technique due to its possibility to produce partial penetration weld in steel sheet. Currently, welding-brazing of steel to aluminum alloys has become a point of research method in heterogeneous metals joining, which includes ARC welding brazing and laser welding-brazing with the filler metal. Dissimilar weld is mainly required to form different chemical and physical properties of metals; this is to reduce the material cost, increase the performance and minimize the susceptibility to failure and maintenance. Nowadays there is a high demand of the use of welding techniques to join dissimilar metals, mainly ferrous with non-ferrous.

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