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Effect of Welding Current on Mechanical Properties and Microstructure of Tungsten Inert Gas Welding of Type-304 Austenite Stainless Steel

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Abstract : The aim of this paper is to study the effect of welding current on the microstructure and the mechanical properties. Material characterizations were conducted on a 6 mm thick plates of type-304 austenite stainless steel, welded by TIG welding process at two different welding currents of 150 A (Sample F3) and 170 A (Sample F4). The tensile strength and the elongation obtained from sample F4 weld were approximately 584 MPa and 19.3 %; which were higher than sample F3 weld. The average microhardness value of sample F4 weld was found to be 235.7 HV, while that of sample F3 weld was 233.4 HV respectively. Homogenous distribution of iron (Fe), chromium (Cr) and nickel (Ni) were observed at the welded joint of the two samples. The energy dispersive spectroscopy (EDS) analysis revealed that Fe, Cr, and Ni made up the composition formed in the weld zone. The optimum welding current of 170 A for TIG welding of type-304 austenite stainless steel can be recommended for high-tech industrial applications.

Keywords : microhardness, microstructure, tensile, MIG welding, process, tensile, shear stress TIG welding, TIG-MIG welding
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