

ABSTRACT

The aim of this project is to examine the impact of welding parameters on tensile shear fracture load, nugget geometry and microstructure of resistance spot welds (RSW) of austenitic stainless steel AISI 316 L and duplex stainless steel 2205 under lap shear loading condition. Three welding parameters mainly welding current of 9 kA, heating cycle of 9 and electrode tip diameter of 7 mm were discovered as most effectual parameters on the tensile shear load and microstructure of weldments. Weld Metal Zone (WMZ) Microstructure confirmed that thickness of austenite layers increased with heat input. Also, an unmixed zone in the microstructure identified as Heat Affected Zone (HAZ) which contains delta ferrite. Scanning Electron Microscope (SEM) images in the nugget zone for different welding parameters confirmed that Intra-Granular Austenite (IGA) highly developed at higher welding current. SEM fractograph for the tensile sheared specimens at higher and lower heat input confirmed the ductile type fracture even failed at Inter-Facial (IF) mode.

Keywords: Dissimilar joints, resistance spot welding, optimization, DSS 2205, AISI 316L.