Evaluation of dissimilar joint properties of A321 austenitic stainless steel to A537CL1 carbon steel by GTAW process

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(Received 10 April 2016 ; Accepted 9 November 2016)

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Abstract
In this research, the microstructure and mechanical behavior of dissimilar joint of AISI 321 stainless steel to ASTM A57CL1 were studied. For this purpose, the GTAW process and ER 308L filler metal with diameter of 1.8 mm were used. In order to study the microstructure and fracture surface of weld samples, optical microscope and scanning electron microscope (SEM) were used. Also, the mechanical behavior of the joint was examined by impact, tension and microhardness tests. It was found that the microstructure of weld metal was austenite with skeletal ferrite. Also in some areas the lacy ferrite was seen. All samples were fractured from ASTM A537CL1 steel with a ductile manner during the tension test. The weld metal indicated high impact energy about 205 J.

Keywords: Dissimilar Joint, GTAW Welding, Austenitic Stainless Steel, Carbon Steel, Mechanical Properties, Microstructure.