

EFFECT OF FILLER METAL TYPES ON MICROSTRUCTURE AND MECHANICAL BEHAVIOR OF HSLA-X70/304L SS DISSIMILAR WELDS

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Abstract

The aim of this study is to investigate the effect filler metal types on microstructure and mechanical properties of dissimilar welds between HSLA-X70 high strength steel alloy and 304L austenitic stainless steel produced by automatic tungsten arc welding (TIG). The weld joints were prepared using E304L, E316L, E2209L, and E7010 filler metal. The mechanical characteristics obtained from hardness, tensile and impact testing, were correlated to the optical and SEM microscopy, to establish a relationship between filler metal composition and the microstructures in different weld regions. It is concluded that E2209 filler metal lead to improve in the resilience characteristics and tenacity with a slight reduction in the ultimate tensile strength and hardness.

Key words: Dissimilar weld; HSLA-X70; 304L; Microstructure; Mechanical property.