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Effect of Multipass on Microstructure and Intergranular Corrosion Behavior of DSS 2205 Shielded Metal Arc Weld Thick Sections

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Abstract

Duplex stainless steel (DSS) consists of dual structure, austenite and ferrite in equal proportion, which exhibits excellent resistance to corrosion. Various industries, i.e., pharmaceutical, marine, petrochemicals, etc., are facing challenges in thick section DSS welding to acquire preferred corrosion resistance properties. The present work aims to identify microstructure and intergranular corrosion behavior of DSS 2205 thick plate by multipass shielded metal arc welding using E2209 electrode. Weldment was examined for ferrite content, microstructure and intergranular corrosion (IGC) behavior by cutting across the weld. Microscopic results of weld zone revealed the presence of Widmanstätten austenite, intergranular austenite and grain boundary austenite, while partially transformed austenite was noticed at heat-affected

zone. Degree of sensitization (DOS) at three distinguished weldment zones has been identified by electrochemical potentiokinetic reactivation test and found in good agreement with the standard and finding of more susceptibility of IGC in higher ferrite zone.

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