

Qualitative and Quantitative Assessment of γ and α Phases in Duplex Stainless Steel Weldments by the X-Ray Diffraction Technique

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Abstract : This paper is focused on the quantitative and qualitative characterization of austenitic-ferritic stainless steel welds by the X-ray diffraction technique. The first weldment realized by gas tungsten arc welding process GTAW with ER2209 electrode, the second weldment by shielded metal arc welding process SMAW with E2209-15 electrode. The results show that the presence of two phases, austenite γ and ferrite α without any precipitation of secondary phases either in the base metal BM or in the two welded zones. Moreover, there is an increase in the ferrite content and the existence of non-uniform compressive stress in the GTAW weld zone.

Keywords : welding, X-ray diffraction technique, duplex stainless steel, ferrite and austenite