

عنوان مقاله:

Effects of Welding Cycles on Microstructural Characteristics and Mechanical Properties of SAF 2507 Super Duplex Stainless Steel

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خلاصه مقاله:

Unique characteristics of SAF 2507 (UNS S32750) super duplex stainless steels alloy such as its high mechanical properties and strong corrosion resistivity behavior led to its widely applications in sea water and other highly corrosive media in oil & gas industries, however, its known that it has also got its own drawbacks particularly the impact and consequences that the number of heating/cooling cycles during its welding or welding repairs may have on its functional characteristics. While international standards/codes are not defining any limitation on weld repairs and/or permitted numbers of weld repairs on duplex stainless steel materials, some owners and clients are limiting the number of permitted repairs to maximum two (just to be in safe side) hence always motivating the question if the number of repairs become more than two, whether and how that could affect the microstructural characteristics and mechanical properties of a welded duplex material. This subject has also never been discussed in any of the earlier investigations. The current proposed article scrutinizing the effect of number of welding repairs on functional characteristics of an SAF 2507 welded plate. 4 samples have been welded by GTAW process using rod ER2594 filler metal with 0 to 3 numbers of repairs on them to evaluate the effect of various numbers of heating/cooling cycles caused by different numbers of repairs on the weldment. Mechanical properties and microstructural characteristics of the samples have been analyzed to observe the excessive presence of any detrimental intermetallic phases and also to see whether any changes in the value of mechanical properties have been occurred or not. It has been concluded that the number of weld repairs (up to 3 times as been examined here and even higher) on welded samples has got no (negligible) negative impacts on the strength of weldments or other mechanical / microstructural characteristics of the weldment, if done properly.

کلمات کلیدی:

Duplex Stainless Steel, SAF 2507 SDSS (UNS S32750), Repair Welding, Microstructural Characteristics, mechanical properties, Intermetallic phases

