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Poster 2

Effects of welding parameters on sigma phase precipitation in 25Cr-5Ni-1Mo-2.5Cu-1Mn-0.18N duplex stainless steel



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ABSTRACT:

Recently, a new grade of duplex stainless steel, UNS S82551 (25Cr- 5Ni-1Mo-2.5Cu-0.18N), has been developed to overcome the drawbacks in super martensitic stainless steel, conventional 22Cr and 25Cr super duplex stainless steels in terms of productivity and cost. The characteristic of the alloy design of S82551 is to use Cu, instead of Mo, to ensure comparable corrosion resistance and strength. In addition, due to the significant decrease in Mo content, S82551 is expected to be less sensitive to sigma phase precipitation during single or multi-pass welding. This work investigated the effect of weld thermal cycling on sigma phase precipitation behaviour in S82551 welds comparing with S31803 and S32750. In addition, based on the isothermal kinetics of sigma phase precipitation, the amount of sigma phase precipitated during thermal cycle can be predicted by applying the additivity rule to the physical model.



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