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# Influence of graded compositions and carbon diffusivities in buttering on structural integrity of dissimilar metal welds

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## Abstract

*Aim of the paper is to understand the effect of heterogeneity (graded composition) in buttering on the structural and mechanical properties in terms of integrity assessment of the dissimilar metal weld (DMW) joints. The metallurgical, microstructural and mechanical properties investigation of four types of DMW joints between SA508Gr.3Cl.1 (low alloy steel) and SS304LN (stainless steel) using an intermediate layer of Ni-Fe alloy in buttering as a graded composition have been carried out. The graded compositions and carbon diffusivities governs the microstructure in buttering deposits and that could directly affect the mechanical properties of the weld joints. These behaviours were investigated and explained in connection with the microstructural features those were changed due to mixed (graded) weld chemistry. The weld chemistry variations due Ni-Fe layer have significantly affects the distortion behaviour of the joints. The graded composition and associated carbon diffusivities due to Ni-Fe layers have confirmed the positive changes in the yield strength mismatch behaviour, plastic instability strength, tensile properties, interfacial properties and metallurgical properties. The measure of yield strength ratio has been modified in accordance to the distinctive*

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