

Parameter Optimization of Preheating Method on Aluminium-Stainless Steel Metal Inert Gas (Mig) Dissimilar Welding

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ABSTRACT

This paper investigates the parameter optimization of a preheating method on stainless steel SUS304 prior to aluminium-stainless steel dissimilar welding. The welding method used was metal inert gas (MIG) with butt joint type weld. The Taguchi L9 orthogonal array was used to investigate the optimum parameter, while the mechanical strength was investigated using tensile test. Optimum levels of the process parameters were analyzed using the Taguchi parametric design approach. Parameter analysis of the tensile test results indicate that the preheated specimen with 90°C have the maximum ultimate tensile strength of 111.27 MPa. This value is in close proximity to the calculated value of 109.02 MPa with 2% error. Through analysis of variance (ANOVA), the welding current was the dominant contributing factor with 40%. It can be concluded that the highest tensile value (111.27 MPa) for AA6061-SS304 dissimilar welding was obtained using 90 °C preheating, voltage of 17.5 V and current of 110 A of current.

KEYWORDS: Aluminium, Stainless steel, Dissimilar, Joining, Welding, Preheating, Taguchi method

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