

## Investigation of Distortion and Impact Strength of 304 L Butt Joint Using Different Weld Groove

**Authors :** A. Sharma, S. S. Sandhu, A. Shahi, A. Kumar

**Abstract :** In this study, the effects of geometric configurations of butt joints i.e. double V groove, double U groove and UV groove of AISI 304L of thickness 12 mm by using Gas Tungsten Arc Welding (GTAW) are investigated. The magnitude of transverse shrinkage stress and distortion generated during welding under the unrestrained conditions of butt joints is the main objective of the study. The effect of groove design on impact strength and metallurgical properties are also studied. The Finite element analysis for the groove design is done and compared the actual experimentation. The experimental results and the FEM results were compared and reveal a very good correlation for distortion and weld groove design for multipass joint with a standard analogy of 80%. In the case of VV groove design it was found that the transverse stress and cumulative deflection have the lowest value. It was found that the UV groove design had the maximum ultimate and yield tensile strength, VV groove had the highest impact strength. Vicker's hardness value of all the groove design was measured. Micro structural studies were carried out using conventional microscopic tools which revealed a lot of useful information for correlating the microstructure with mechanical properties.

**Keywords :** weld groove design, distortion, AISI 304 L, butt joint, FEM, GTAW

**Conference Title :** ICMEM 2015 : International Conference on Mechanical Engineering and Manufacturing

**Conference Location :** Toronto, Canada

**Conference Dates :** June 15-16, 2015