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EFFECT OF DIFFERENT FLUXES ON HARDNESS AND MICROSTRUCTURE OF SS 304 IN GTAW WELDING

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ABSTRACT

Gas tungsten arc welding (GTAW) is a popular technique for joining thin materials in the manufacturing industries. This type of welding achieves a high quality weld for stainless steels and non-ferrous alloys. TIG welding is fundamental in those industries where it is important to control the weld bead shape and its metallurgical characteristics. However, compared to the other arc welding process, the shallow penetration of the TIG welding restricts its ability to weld thick structures in a single pass, thus its productivity is relativity low. From the industrial point of view stainless steel 304 is a very commonly used material due to its property of resistant to corrosion and better creep rupture strength. The use of activating flux effects the different properties of the joint produced by the welding. In this work, Fe_2O_3, $MgCl_2$, MnO_2, and ZnOwere used as activating flux to investigate the effect of activated tungsten inert gas (activated TIG) process on microstructure and hardness of grade 304 stainless steels. Since the activated TIG welding showed non uniformly cooled unidirectional grains with size varying from fine to coarse in the weld zone in their microstructure characteristics. The results show that MnO_2 flux can only led to increase in the hardness (306Hv) in weld zone except the other flux used.

KEYWORDS: Activated Flux, Hardness, Microstructure, TIG Welding