The Effect of Preheat on Gtaw Welding Using Cu-DHP Material on Joint Strength, Hardness Value and Microstructure

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Abstract:

The condenser manufacturing process generally uses copper as the material and is carried out using the GTAW (Gas Tungsten Arc Welding) welding process. Copper is a material that has good thermal conductivity, which affects the welding ability. However, in the welding process, there are problems with hot crack and incomplete penetration defects which can be caused by not carrying out the preheat process. This study aims to evaluate the impact of the preheat process and variations in preheat temperature on welding properties, which include the level of hardness, the geometric shape of the weld (macro), changes in microstructure, and the strength of the welded joint.

The material used is copper type Cu-DHP (Phosphorus deoxidized copper) with hardness type R240, R250 and is carried out with GTAW welding process with variable preheat, namely no preheat, and preheat at a temperature of 300°C, 400°C, 500°C. For the tests carried out, namely Non Destructive Test with visual test method, and penetrant test for Destructive Test with fracture test method, hardness test, macro and micro test.