

Development of dual heat sink method for GMAW welding to reduce distortion

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ABSTRACT

Distortion of welding results needs to be minimized in welding, considering that distortion can reduce the accuracy of weld dimensions, increase the repair process and increase production costs. This study aims to study the dual heat method and its effect on mechanical properties.

The heat sink uses hollow stainless steel rods filled with running water at a temperature of ± 27 oC which is applied simultaneously with the welding process. The heat sink which functions as a heat sink is placed on the top side of the welding line which is 10 mm from the welding center. The single heat sink is characterized by the heat sink being above the workpiece, while the dual heat sink is characterized by the heat sink above and below the workpiece.

The results showed that the treatment of single heat sink and dual heat sink was able to reduce the distortion value which was quite significant, reaching 58% and 66%, respectively. Tensile test results show a tendency for the same value between as welded, single heat sink and dual heat sink, which is about 480 N/mm² (480 Mpa), so that the welding treatment does not reduce the tensile strength of the weld metal and HAZ. The results of the as-welded and dual heat sink bending tests also showed that the bending test passed the AWS criteria. Impact test results show a decrease in the toughness of the weld metal due to heat sink treatment.

Kata Kunci: *heat sink, GMAW, distortion*