

The Effect of Different Surface Cleaning Methods on Porosity Formation and Mechanical Property of AA6xxx Aluminum Gas Metal Arc Welds

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Abstract : Porosity is the main issue during welding of aluminum alloys, and surface cleaning has a critical influence to reduce the porosity level by removing the oxidized surface layer before fusion welding. Developing an optimum and economical surface cleaning method has an enormous benefit for aluminum welding industries to reduce costs related to repairing and repeating welds as well as increasing the mechanical properties of the joints. In this study, several mechanical and chemical surface cleaning methods were examined for butt joint welding of 2 mm thick AA6xxx alloys using ER5556 filler metal. The effects of each method on porosity formation and tensile properties are evaluated. It has been found that, compared to the conventional mechanical cleaning method, the use of chemical cleaning leads to an important reduction in porosity level even after a significant delay between cleaning and welding. The effect of the higher porosity level in the fusion zone to reduce the tensile strength of the welds is shown.

Keywords : gas metal arc welding (GMAW), aluminum alloy, surface cleaning, porosity formation, mechanical property

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