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NASA TECH BRIEF

Effects of Surface Preparation on Quality of Aluminum Alloy Weldments

The effects of surface preparation and surface contamination on the welding of 2014 aluminum were investigated. Surfaces prepared using conventional aerospace industry procedures were characterized in terms of weld-defect potential.

Several methods of surface analysis were employed to identify the surface properties conducive to weld defects. These methods are radioactive evaporation (Meseran), spectral reflectance, mass spectrometry, gas chromatography, and spark-emission spectroscopy. "As-machined" surfaces were found to result in defect-free welds. Conventional surface treatments such as solvent degreasing, chemical cleaning, and water rinsing promote the formation of porosity during welding. The porosity-forming agents are adsorbed solvent, hydrogen, and water. Anodizing and silicone coating produce extremely detrimental conditions for welding. These results and testing procedures are considered to be preliminary at this time. Further work is planned to develop and standardize analytical methods and to measure a greater variety of surface conditions. The ultimate goal will be to select and develop surface preparations that will provide consistently high weld quality.

Note:

Inquiries concerning this investigation may be directed to:

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Reference: B68-10302

Patent status:

No patent action is contemplated by NASA.

Source: D. Kizer and Z. Saperstein
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