

Influence of Dry-Film Lubricants on Bond Strength and Corrosion Behaviour of 6xxx Aluminium Alloy Adhesive Joints for Automotive Industry

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Abstract : The application of dry lubricant on aluminium for automotive industry is indispensable for a high-quality forming behaviour. To provide a short production time those forming aids will not be removed during the joining step. The aim of this study was the characterization of the influence of dry lubricants on the bond strength and the corrosion resistance of an 6xxx aluminium alloy for automotive applications. For this purpose, samples with a well-defined surface were lubricated with 1 g/m² dry lubricant and joined with a commercial thermosetting 1K-epoxy structural adhesive. The bond strength was characterized by means of lap shear test. To evaluate the corrosion resistance of the adhered aluminium samples an immersion test in 5 w% NaCl-solution was used. Based on fracture pattern analysis, the corrosion behaviour could be described. Dissolved corrosion products were examined using ICP-MS and NMR. By means of SEM/EDX the elementary composition of precipitated solids was determined. The results showed a dry lubricant independent bond strength for standard testing conditions. However, a significant effect of the forming aid, regarding the corrosion resistance of adhered aluminium samples against corrosive infiltration of the metal-adhesive-interface, was observed

Keywords : aluminium alloys, dry film lubricants, automotive industry, adhesive bonding, corrosion

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