

## **The effect of rotational speed on flow behavior and weld properties in friction stir welding of pure aluminum**

### **Abstract**

Friction stir welding is a solid state green welding technique. Its key benefit is to allow welding of aluminum that cannot be readily done by fusion arc welding. In this study, two pure aluminum strips of 2mm thick were friction stir welded together. For all welding pairs, three rotational speeds of 1000, 1500 and 2000 rpm were used. The traverse speed, axial force and tool geometry were kept constant. Parameters optimization based on the results of the micrographic, macrographic, microhardness and tensile strength, indicated that sound joints with the best mechanical and microstructural properties can be obtained at rotational speed of 1500 rpm and welding transverse speed of 60 mm/min. Microscopic examination and local mechanical properties analysis suggested that mechanical mixing is the major material flow mechanism in the formation of the nugget stirred zone.

### **Keywords**

Dissimilar joints; Friction stir welding; Heat affected zone; Weld nugget