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OPTIMIZATION OF EXTRUSION PROCESS OF ALLOY 6063 USING TAGUCHI TECHNIQUE

A. CHENNAKESAVA REDDY

Abstract

The yield and ultimate tensile strengths and ductility decrease with increase in the section thickness of extruded products. T6 imparts larger strengths. 15% of area of deformation gives maximum ultimate tensile and yield strengths. Heat treatment T6 results in lower ductility. The ductility decreases with increase in percent deformation of extruded specimens. The fracture energy decreases with the increase in the section thickness. The fracture energy for heat treatment T4 and T6 are higher than that of T5. The fracture energy decreases with deformation of extruded specimens. The increase in the tensile strength and yield strength is due to vacancies assisted diffusion mechanism and formation of metastable β'' and β' precipitates. Extrusions of larger cross-sections, which contain Mg_2Si particles, have lower strengths. T6 reduces microsegregation by diffusion of magnesium and silicon throughout the structure and transforms the insoluble eutectic phases to the equilibrium phase α-AlFeSi.Mg_2Si particles large enough have low ductility.

Keywords : 6063, extrusion, mechanical properties, Taguchi technique