

Abstract

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Effect of Casting Conditions on the Fracture Strength of Al-5Mg Alloy Castings

During the transient phase of filling a casting running system, surface turbulence can cause the entrainment of oxide films into the bulk liquid. Previous research has suggested that the entrained oxide film would have a rious effect on the reproducibility of the mechanical properties of Al cast alloys. In this work, the Weibull moduli for the ultimate tensile strength (UTS) and % elongation of sand cast bars produced under different casting conditions were compared as indicators of casting reliability which was expected to be a function of the oxide film content. The results showed that the use of a thin runner along with the use of filters can significantly eliminate the surface turbulence of the melt during mould filling which would lead to avoiding the generation and entrainment of surface oxide films and in turn produce castings with more reliable and reproducible mechanical properties compared to the castings produced using conventional runner systems.