

Abstract

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Hydrogen, bifilms and mechanical properties of Al castings

Recent research has suggested that H dissolved in an Al melt could diffuse into double oxide films (bifilms), increasing their size and forming oxide related hydrogen containing porosity, which was found to decrease the Weibull moduli of the tensile properties of castings. In this work, the Weibull moduli of the tensile properties of two Al castings, both expected to contain oxide films of approximately the same amount and age, were compared. The results showed that, when the H content of the castings was reduced to ,50%, from 0?18 to 0?08 cm³/100 g Al, there was an increase in the Weibull moduli of the ultimate tensile strength (UTS) and the % elongation by ,400% and 200% respectively. The increased Weibull modulus was thought to be brought about by holding the moulds under vacuum and thus reducing H pick-up by the metal, from the solvent and the resin in the sand moulds.