

Influence of Impurities and Gassing on the Tensile Properties of 2xx Sand Cast Al - Cu Alloys

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Abstract

Alloys A2xx (AlCu4) are the strongest aluminum casting alloys with tensile properties approaching those of ferritic ductile iron. These alloys are normally degassed before pouring but regassing of the melt might take place during handling. Also, returns used in the charge will cause an increase in impurity content (Fe, Si) and a consequent downgrading of alloy A206 to the 204 grade. In order to assess the effect of gassing on the tensile properties, well fed step castings, 6 mm, 13 mm and 25 mm in thickness were poured with degassed high purity A206 alloy and degassed and gassed alloy 204; the tensile properties for the three conditions were measured in the T4 and T7 tempers. The subsequent metallurgical study included metallographic analyses, grain size and microporosity measurements. The detrimental effect of tramp elements and gassing could be quantified by comparing the tensile properties of the alloys investigated. The drop in tensile strength observed was found to be more pronounced in the T7 tempers than in the T4 condition.

Keywords: Aluminium-copper alloys; sand casting; heat treatment; tensile properties.