

Influence of Sr-Modification on Microstructure, Tensile, Impact and Hardness Properties of Secondary AlSi8Cu2Mn Cast Alloy

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Present work is focused on the study of recycled AlSi8Cu2Mn cast alloy. Furthermore, the effect of Sr-modification (0; 0.03 and 0.05 wt. %) on the microstructure, tensile and impact properties (UTS, ductility, hardness and impact energy) were investigated. For study and identification of intermetallic phases were utilized standard, colour and deep etching (in order to reveal the 3D-morphology of the Si-particles and intermetallic phases). For element composition of the specimen was used X-ray analysis. Finally, the effect of Sr-modification on silicon morphology was examined. The results show that the addition of Sr into AlSi8Cu2Mn cast alloy should act as a modifier, so it supposes to change the eutectic Si-morphology. However, its effect as a Si-modifier is not as significant. Higher number of iron (1.1 %) leads to an increase of precipitation of brittle iron phases with platelets (Al₅FeSi) and skeleton-like (Al₁₅(FeMn)₃Si₂) morphology. Al₅FeSi platelets act as preferred crack sites and reduce the tensile and impact properties. Strontium not only refined and modified eutectic Si, but also modified the Al₅FeSi needles and thereby improves tensile (first of all ductility) and impact properties. Sr addition is also associated with porosity formation.

Keywords: Al-Si cast alloy, modification, tensile and impact properties, microstructure.

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