Identification of Intermetallic Phases in the Alloy AlSi6Cu4

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Presented work focuses on the influence of Mn and Fe in different ratios on the structural characteristics of AlSi6Cu4 alloys and identification of present intermetallic phases by means of EDX analysis in addition to the light microscopy. The intermetallic phases whatever of type never contribute to strain transfer in matrix and in this view are harmful in the structure. From an economic perspective it is desirable to use cheaper secondary alloys, but to guarantee the required strength properties of the material used for castings, it is needed to control the morphology of intermetalic phases. From the professional literature and practice, relationship between the content of iron and manganese (Mn/Fe≥ 0.7) is well known to guarantee the exclusion of intermetallic Fe in the form/shape of a "Chinese script characters" and not dangerous spindles (needles). It was discovered that this ratio affects the presence of Mn/Fe also in the intermetallic phases. With increasing Sr content in the experiments conducted, the percentage of Mn/Fe ratio in intermetallic phase in form of "Chinese script characters" reduces. It was found that under certain circumstances, also the ratio Mn/Fe = 0.7 does not guarantee the presence of intermetallic Fe phases only in the form of "Chinese script characters" in areas of highest stress of castings, i.e. on the castings of cylinder heads in the area of combustion chambers.

Keywords: Casting alloy, AlSi6Cu4 (A319), ratio Mn/Fe, intermetallic phase, EDX analysis

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