Possibilities of Using Al-Si-Mg Alloys with Higher Fe Content for Demanding Castings

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The present article describes the effect of adding iron into melt, and its impact on the microstructure, chemical composition and mechanical properties of AlSi7Mg0.3 alloy. Higher iron content is typical of the so-called secondary alloy, which becomes increasingly used by a growing number of manufacturers in the production process of high-quality castings. The behaviour of AlSi7Mg0.3 alloy with high Fe content has not been scientifically investigated and sufficiently described, therefore working with secondary alloy is very problematic when focusing on high-sophistication castings for the automotive industry. In general, iron is unwanted in aluminium alloys, and its content should be kept as low as possible. The only exception is the process of pressure die casting where we can tolerate iron content up to 1 wt. %. In gravity casting of Al-Si-based alloys, the critical iron content changes mainly depending on the silicon content. The experimental part of this article investigates the impact of gradual addition of iron into AlSi7Mg0.3 alloy on the content of the main alloying elements such as, in particular, Si and Mg. In order to eliminate the negative effect of iron in the alloy, we used in the experiment the correctors Ni and Cr in the form of AlNi20 and AlCr20 master alloys.

Keywords: AlSiMg alloy, iron, correctors

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Paper number: M201664