

INFLUENCE OF CRYSTALLIZATION PARAMETERS ON THE STRUCTURE AND PROPERTIES OF Al-Mg-Si-Mn CASTING ALLOYS

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Thesis: 88 pages, 28 figures, 12 tables, 58 references.

The object of study - Casting Al-Mg-Si-Mn alloy.

The subject of study- Influence of change of different crystallization parameters on mechanical properties and microstructure of the alloys.

The purpose of the study- Obtaining a cast aluminum alloy with better mechanical properties by changing different methods of crystallization, to further expand the scope of Al-Mg-Si-Mn alloys.

Research methods – Using different casting methods and changing the conditions of die casting, adding Mg, Mn, Ti, Sc to change the microstructure and properties of the alloys, computer simulation.

The results of the study – Experimental alloy have better mechanical properties after high-pressure die casting. The alloy has the best mechanical properties at the molding pressure is 100MPa. Adding Mg to the M59 base alloys does not significantly change the mechanical properties of the alloys. The addition of Mn makes little effect on the yield strength and tensile strength of the alloys, but greater effects on elongation. The addition of Ti to the alloy also produced a slight change in the its mechanical properties, and intermetallic Al₃Ti compounds were found in the alloys. The addition of Sc can significantly improve the mechanical properties of the alloys.

Degree of implementation – Laboratory tests and simulations.

Areas of application – Car manufacturing

Predictive assumptions about the development of the object of study - Further studies of the effect of different additives, such as grain refiners, modifiers and microalloying elements still not clear.

CAST ALUMINUM ALLOY, Al-Mg-Si-Mn, SOLIDIFICATION, ALLOYING, CRYSTALLIZATION, AlMg5Si2Mn, STRENGTHENING.