Evaluation of porosity of AlZn5Mg castings made by squeeze casting technology



Abstract

The paper shows the results of research aimed to assess the impact of high squeeze pressure on the porosity of AlZn5Mg alloy castings, including its distribution in slab-type castings with dimensions of 25 x 100 x 200 mm. The research was carried out on castings made by two methods: squeeze casting and gravity casting. The pressing was conducted at a pressure of 100 MPa at an initial mould temperature of 200°C. The research identified the middle and outer parts of the casting. Experimental research was preceded by numerical simulation of the casting solidification, then a porosity assessment was carried out using the hydrostatic weighing method, which was supplemented by structural observations. The results of the research showed a two-fold decrease in the porosity in the middle part of the casting which is most exposed to the occurrence of shrinkage voids formed in the final clotting phase. Structural tests revealed the occurrence of dispersed porosity in castings, mainly of shrinkage and / or shrinkage-gas origin. The impact of pressure of 100 MPa during solidification caused fragmentation of the primary structure of castings, which resulted in a higher grain density.

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