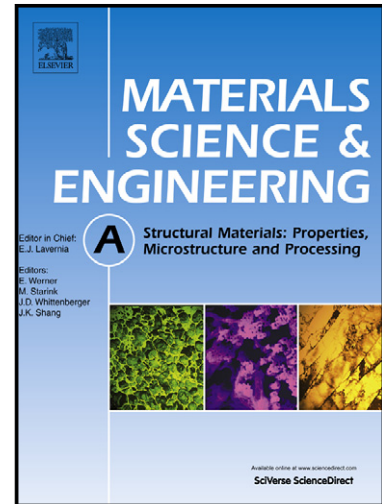


Author's Accepted Manuscript

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www.elsevier.com/locate/msea

PII: S0921-5093(14)01558-5
DOI: <http://dx.doi.org/10.1016/j.msea.2014.12.058>
Reference: MSA31875

To appear in: *Materials Science & Engineering A*

Received date: 3 December 2014
Revised date: 14 December 2014
Accepted date: 15 December 2014

Cite this article as: Shan-Guang Liu, Fu-Yang Cao, Xin-Yi Zhao, Yan-Dong Jia, Zhi-Liang Ning, Jian-Fei Sun, Characteristics of mould filling and entrainment of oxide film in low pressure casting of A356 alloy, *Materials Science & Engineering A*, <http://dx.doi.org/10.1016/j.msea.2014.12.058>

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Characteristics of mould filling and entrainment of oxide film in low pressure casting of A356 alloy

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Abstract:

The effect of pressurizing speed of low pressure casting on mould filling and mechanical properties of A356 alloy was studied. The mould filling behavior was calculated by two phase flow model using VOF (Volume of Fluid) method. In order to evaluate the accuracy of simulated results, the real mould filling process observed by X-ray radiography was compared. The results show that during mould filling the gate velocity first increased dramatically, then kept unchanged under relatively low pressurizing speed, or increased slowly under relatively high pressurizing speed. High gate velocity causes melt falling back under gravity with high speed. The falling velocity and the resultant relative rotating vortex are the main causes of oxide film entrainment in low pressure casting. The mechanical properties of the as-cast A356 alloy were measured by four-point bend test. Weibull probability plots were used to assess the fracture mechanisms under different pressurizing speeds. The results obtained in this paper illuminate on designing suitable pressurizing speed for mould filling in low pressure casting.

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