Experimental validation of error in temperature measurements in thin walled ductile iron castings

An experimental analysis has been performed to validate the measurement error of cooling curves measured in thin walled ductile iron castings. Specially designed thermocouples with Ø0.2 mm thermocouple wire in Ø1.6 mm ceramic tube was used for the experiments. Temperatures were measured in plates with thicknesses between 2 and 4.3 mm. The thermocouples were accurately placed at the same distance from the surface of the casting for different plate thicknesses. It is shown that when measuring the temperature in plates with thickness between 2 and 4.3 mm the measured temperature will be parallel shifted to a level about 20°C lower than the actual temperature in the casting. Factors affecting the measurement error (oxide layer on the thermocouple wire, penetration into the ceramic tube and variation in placement of thermocouple) are discussed. Finally, it is shown how useful cooling curve may be obtained in thin walled castings.

General information
Publication status: Published
Organisations: Department of Management Engineering
Contributors: Pedersen, K. M., Tiedje, N. S.
Pages: 84-89
Publication date: 2007
Peer-reviewed: Yes

Publication information
Journal: International Journal of Cast Metals Research
Volume: 20
Issue number: 2
ISSN (Print): 1364-0461
Ratings:
Scopus rating (2007): SJR 0.516 SNIP 0.855
Web of Science (2007): Indexed yes
Original language: English
Keywords: Cast iron, Temperature measurement, Thin-walled castings, Thermocouple, White eutectic
Electronic versions:
Experimental validation of error in temperature measurements in thin walled ductile iron castings.pdf
DOIs:
10.1179/136404607X226838

Bibliographical note
Publishers homepage: www.ingentaconnect.com/content/maney
Source: orbit
Source-ID: 201526
Research output: Contribution to journal › Journal article – Annual report year: 2007 › Research › peer-review