

# Modelling and experimental validation of SG cast iron solidification for different cooling rates

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## ABSTRACT

This work presents an experimental and numerical study of the solidification process of an eutectic ductile cast iron [1]. The effect of the cooling rate on the thermal-microstructural response is particularly analyzed. To this end, experiments as well as numerical simulations were carried out. The experiments consisted in a solidification test in a cylindrical casting with different diameters such that different cooling rates were measured at specific positions along the part. A metallographic analysis was also performed in five locations of the sample with the aim of obtaining the number and size of graphite nodules at the end of the process. The numerical simulations were made using a 3D multinodular-based model. Good experimental-numerical agreements have been obtained for both the cooling curves and the graphite nodule counts.

## REFERENCES

- [1] Escobar, A., Celentano, D., Cruchaga, M., Lacaze, J., Schulz, B., Dardati, P., & Parada, A. "Experimental and numerical analysis of effect of cooling rate on thermal-microstructural response of spheroidal graphite cast iron solidification". *International Journal of Cast Metals Research*, **27**(3), 176-186 (2014).