

Study of Shrinkage Porosity in Spheroidal Graphite Cast Iron

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This study aims at identifying the relationship between the shrinkage cavities and the solidification structure in spheroidal graphite cast iron. Cast samples specially designed to contain shrinkage cavities were used. The solidification macrostructure was revealed by using the DAAS method while the solidification microstructure was revealed by using color etching. At the midsection of the pieces the shrinkage cavities and the solidification structure were observed jointly. Disperse porosity develops inside the solidifying austenite grains, in coincidence with the location of the last to freeze melt. The study showed that the classification of shrinkage porosity found in literature does not correspond to the ductile iron solidification model recognized by most of the scientific community. Early solidification models, and therefore shrinkage formation mechanisms, were proposed in instances when there was not a thorough knowledge of the morphology of the solid phases during solidification. At the present time, defects formation mechanisms can be described with higher accuracy. Therefore, an updated classification of shrinkage porosity for spheroidal graphite iron is proposed in this study.

Keywords: Ductile Iron, Solidification Structure, Shrinkage Porosity.

Article available in the International Journal of Cast Metals Research