

Austenite Dendrite Morphology in Lamellar Cast Iron

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Primary austenite has been underestimated in general when the theories of nucleation, solidification, microstructure formation and mechanical properties was established for cast iron and particularly for lamellar cast iron. After extensive use of colour etching during the last two decades it has been found that primary austenite dendrites can be characterized using general morphology parameters like those used for other technical cast alloys with dendritic structure. The present work aims to investigate the primary austenite morphology of as-cast samples of a hypoeutectic lamellar cast iron produced with different cooling rates. Morphological parameters as the area fraction primary austenite, the secondary dendrite arm spacing, the dendrite envelope surface, the coarseness of the primary dendrite expressed as the relation between the volume of the dendrite and its envelope surface and the coarseness of the interdendritic space also known as the hydraulic diameter are measured. Furthermore the role of the size of investigation area is revealed by sequential investigation. A strong relation between all measured morphological parameters and the solidification time have been established excepting the volume fraction of primary austenite which is constant for all cooling conditions.

Keywords: austenite, primary dendrite, dendrite envelope, interdendritic phase.

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