

Effect of Thermo-mechanical Processing Parameters on Phase Transformation and Hardness of Dual Matrix Ductile Iron

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The microstructural changes and hardness exhibited by ductile iron with dual matrix structure (DMS) are investigated. In particular, DMS microstructures are obtained by continuous cooling in the (ferrite + austenite) region followed by quenching to transform the austenite into martensite or by austempering at 375 °C, so as to transform the austenite into ausferrite. Additionally, two deformation steps are applied in the austenite-region. The structure was produced in a thermo-mechanical simulator equipped with a dilatometry system. The dilatometry is used to monitor the structure development throughout the thermo-mechanical processes. The structure was investigated using light optical microscopy and scanning electron microscopy. The influence of introducing ferrite to the microstructure and the deformation magnitude on the structure development and hardness properties are explored.

Keywords: ductile iron, thermo-mechanical processing, dual matrix, phase transformations, dilatometry.

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