

Influence of Material State on Austenitic Transformation in HSLA-type Steel

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The paper presents the results of research on the influence of the material state on the course of austenitic transformation in HSLA-type steel. The as-cast steel with the following chemical composition was tested: 0.18% C, 1.94% Mn, 1.12% Si, 0.014% P, 0.019% S, 0.028% Cr and 0.2% Mo. In order to reveal the actual phases occurring in the steel during the individual stages of austenitic transformation, dilatometric tests were carried out. The samples were tested using a Bähr 805 A/D dilatometer with induction heating and a vacuum chamber. In order to determine the influence of hot plastic deformation on the course of the austenitic transformation, plastometric tests were carried out using the Gleeble 3800 thermomechanical simulator. The axisymmetric test sample was continuously compressed to a strain of 0.7. In the next step, microscopic examinations were carried out using the Observer.Z1m optical microscope by Zeiss and the Supra 25 scanning electron microscope by Zeiss. for detailed microstructure analysis.

The conducted tests showed significant differences in the course of austenitic transformation for steel in two different states. Especially for newly developed steels, the knowledge of phase transformations of supercooled austenite is extremely important [1, 2]. Therefore, the aim of this work is to try to explain the unusual course of austenitic transformation for HSLA steel in the as-cast state, which goes far beyond the classical values of critical temperatures, so far encountered in the literature.

1. M. Morawiec, A. Wojtacha, M. Opiela, *Materials*, **2021**, vol 14, 1–12.
2. A. Wojtacha, M. Opiela, *Advances in Science and Technology Research Journal*, **2022**, vol 16, 64–73.