

# Influence of partitioning effects on the retained austenite content and properties of a martensitic stainless steel

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The typical heat treatment of martensitic stainless steels consists of hardening and subsequent tempering once or several times. During tempering the common tempering mechanisms occur, such as carbide precipitation, relaxation of the fresh martensite, destabilisation of the retained austenite and subsequent transformation of austenite into martensite. In the case of low-alloyed steels, Quenching & Partitioning (Q&P) can be carried out as a heat treatment, whereby a certain retained austenite content is set and subsequently stabilised. Such partitioning effect can also take place in martensitic stainless steels. In this study, different retained austenite contents are set for martensitic stainless steels using a Q&P-typ heat treatment and then the effect of the retained austenite on the steels properties is investigated. For this purpose, samples were heat treated by dilatometer as well as in furnaces in order to set specific retained austenite contents in the microstructure after tempering. This is mainly possible by varying the quenching temperature in combination with different tempering temperatures. Even small temperature variations can have an influence on the retained austenite content. After the heat treatment of the samples, hardness and impact toughness were determined and the values were compared with each other. Additional microstructural investigations were performed including XRD and optical metallography.

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