

# Microstructure and Mechanical Properties of 0.63C-12.7Cr Martensitic Stainless Steel

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## Abstract

Abstract. Microstructure and mechanical properties of 0.63C-12.7Cr martensitic stainless steel during various tempering treatments were investigated in this study. Results demonstrate that finely distributed primary carbides were observed on 0.63C-12.7Cr martensitic stainless steel. It was also found that the hardness of 0.63C-12.7Cr martensitic stainless steel after 300°C tempered treatment for 60 minutes can still reach to 679Hv. The variation of measured hardness was found not significant during tempering treatments (200°C-500°C). The matrix phase of 0.63C-12.7Cr martensitic stainless steel tempered below 500 °C was identified as martensite. However, the matrix structure of mixed ferrite and martensite can be observed when tempered at 500 °C and 600 °C. On the other hand, mixed of M7C3 and M23C6 carbide particles were observed on specimen when tempered at 200-600 °C. The amount of M7C3 carbides was found decreased as increase the tempering temperature.

Keyword : Martensitic stainless steel, Carbide, Tempering treatment, Hardness