

The Suitability of 42SiCr Steel for Quenching and Partitioning Process

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QP (quenching and partitioning) heat and thermo-mechanical treatment was applied to middle carbon, low alloyed CMnSiCr steel. Various numbers of deformation steps and different heating and cooling rates were tested for this steel. Two QP treatments were accompanied by subsequent annealing step at 250°C (QP-T processing). The effect of several processing strategies on mechanical properties and microstructures was determined by tensile tests and microstructure analysis was carried out by the means of scanning electron microscopy. Volume fraction of retained austenite was further established by X-ray diffraction phase analysis. The final microstructures were mostly martensitic with 18-24% of retained austenite and small amounts of fine bainite. High strengths above 1900 MPa were obtained for all of the treatments with ductility A_{5mm} in the range of 12-19%.

Keywords: QP process, partitioning hold, retained austenite, chromium

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