

## Influence of Nb Micro-alloying on TRIP Steels Treated by Continuous Cooling Process

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TRIP (transformation induced plasticity) steels are low alloyed steels with multiphase microstructure consisting of ferrite, carbide-free bainite and retained austenite. They are typically produced by thermo-mechanical treatment, which involves the hold in bainite transformation region. The hold ensures enough bainite in the final microstructure and also helps to stabilize higher amount of retained austenite. Due to transformation induce plasticity effect; TRIP steels possess very good combination of high strength and high ductility. In response to industrial demands, C-Mn-Si and C-Mn-Si-Nb TRIP steels were subjected to thermo-mechanical treatment with continuous cooling which corresponded to real rolling mill processing of the steel with similar chemical compositions. Typical TRIP microstructures with 10-15% of retained austenite were achieved for both steels after optimization of cooling schedules. However, cooling by two different cooling rates had to be applied to C-Mn-Si steel to obtain the convenient microstructure. Beneficial effect of Nb micro-alloying on low sensitivity of TRIP steel to variations in cooling parameters has been found out. Mechanical properties of the most convenient microstructures were very promising, ultimate tensile strength reached 850MPa with ductility  $A_{5mm}$  around 25%.

**Keywords:** TRIP steel, continuous cooling, retained austenite

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