

THERMO-MECHANICAL PROCESSING OF CARBIDE FREE STEELS

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ABSTRACT

Given their high energy absorption capacity and fatigue strength, hot formed Dual Phase (DP) Steels are particularly well suited for automotive structural and safety parts such as longitudinal beams, cross members and reinforcements. An ultrafine grained microstructure in DP steels was produced by use of large strain hot deformation and subsequent intercritical annealing. The suitable intercritical annealing parameters have been worked out by performing dilatometer tests. The final microstructure consists of fine martensite islands embedded in ferrite matrix. Microstructure evolution during intercritical annealing was investigated by means of scanning optical and electron microscopy (SEM). The study reveals that increasing the Al content from 0.89 to 1.92 mass% is highly beneficial for the formation of martensite.

KEYWORDS: Thermo, Mechanical Process, Free Carbide Steel, Al and Silicon Additions, Post Cooling Rates