

The Effect of Annealing Temperature on Microstructure and Mechanical Properties of Lightweight Steel with Increased Aluminium Content

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A demand for enlightening of constructions in an automotive industry resulted in an intensive development of high strength steels and in attempts to decrease the weight of the steel by intensive alloying by lighter elements. This work used chemical concept of AHSS (advanced high strength steel) TRIP (transformation induced plasticity) steel with 0.2%C and micro-alloyed by 0.06%Nb and increased manganese content to 4% and aluminium to 6.5% to produce lightweight steel, which was cast and re-forged and subsequently annealed at various temperatures in the range of 300°C – 800°C. The resulting microstructures were analysed by light microscopy, laser scanning confocal microscopy, scanning electron microscopy and X-ray diffraction phase analysis and mechanical properties were measured by a tensile test. Tensile strengths in the region of 600 MPa – 757 MPa and total elongations around 20% were obtained for annealed samples.

Keywords: aluminium alloyed steel, light-weight steel, annealing, microstructure

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