



Corrosion resistance of high-manganese austenitic steels

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High-manganese austenitic steels belong to the second generation of modern high strength steels for automotive industry [1]. Their main advantage over first generation steels with a matrix based on A2 lattice structure [2-4] is the great susceptibility of austenite on plastic deformation, during which dislocation glide, mechanical twinning, and strain-induced martensitic transformation can occur. The group of high-manganese steels includes alloys with 15-30% manganese content. Two main conceptions of chemical composition projecting had been worked out so far. The first includes alloys with different Mn concentration and 0.5 to 0.8% carbon content [5, 6]. The function of carbon is stabilization of γ phase – the same as Mn – and hardening of solid solution. In the second group, the concentration of carbon is decreased to about 0.1%, whereby there is an addition up to 4% Al and/or 4% Si [7-9]. The solid solution strengthening caused by the presence of Al and Si compensates smaller carbon concentration. Moreover these elements have an impact on SFE (Stacking Fault Energy) of austenite, deciding which mechanism of steel deformation will be dominant. Silicon – same as Mn up to about 15% content – decreases SFE, whereas aluminium has an inversely effect, foster austenite stabilization.

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