Corrosion Resistance of Plasma Nitrided Structural Steels

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The plasma nitriding technology was mostly used in the past primarily to increasing of surface hardness a fatigue limit. Additional feature of nitrided steel surface is possibility of corrosion resistance increasing. This additional feature is leading to the increase of lifetime of steel parts and components. This study is focused on the evaluation of corrosion resistance of plasma nitrided AISI 1045 and AISI 4340 steels. The steel samples were plasma nitrided and some of them were additionally oxidised. The corrosion resistance evaluation was performed in a fog of a neutral sodium chloride solution (NSS) according to the ISO 9227 standard. The created nitride and oxinitride layers were metallographically documented (using the light and laser confocal microscopy) and evaluated by measuring of microhardness profiles (Vickers method) under load of $HV_{0,5}$. The thickness of compound surface layers of plasma nitrided and oxidized compound layers was documented by light microscopy and verified by measuring of concentration profiles by the GDOES.

Keywords: Plasma nitriding, corrosion resistance, structural steel

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