

Nitriding Double Composite Martensitic- Austenitic Alloy Steel

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Abstract

The microstructure, phase composition, mechanical and tribological properties of the nitrided, double composite martensitic - austenitic (α' + γ) alloy steel H21M2T2A (Fe-Ni-Al-Ti) are studied.

The diffusion of nitriding occurs more easily at (α - γ) boundaries, which are the places of crystal lattice defects of concentration. Transition from single (α') to two phases (α' + γ) structure, increases the plasticity of the alloy. As a result, the nitrided layers have a high surface hardness, high strength and good plasticity.

The thickness of the diffusion layers was studied, along with the phases and the microstructure and composition, across the depth in diffusion zone. The obtained results proved the effect of nitriding system in the growth of the diffusion layers on surface of double composite martensitic - austenitic alloy steel.

Analysis of mechanical and tribological characteristics of treated double composite steel under dry friction was also studied. It was found that diffusion treatment had a significant influence on work capacity of tested alloy. Stability of alloy after nitriding was (2.5-4) times higher in magnitude compared to untreated alloy.

Keywords: Double composite alloy steel, hardening and tempering, gas nitriding, diffusion layers, microstructure and phase composition, surface hardness, mechanical and tribological properties.

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