

## Mechanical Properties of Titanium-Aluminium Base Nanomultilayer Coatings

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**Titanium-aluminium base nanomultilayer (NML) coatings are deposited by cathodic arc evaporation using pure titanium and aluminium with eighteen percent silicon cathodes. Each multilayer Ti-Al-Si-N structure consists of 49 bi-layers with different thickness. The external deposited layer is with five times longer growing period. The coatings are deposited at the pressure of 2 Pa and the substrate temperature of 400 °C. Polished steel discs (Ø 20 mm × 5 mm thick) are used as the substrate material.**

**This article presents an investigation of the surface morphology and mechanical properties of the coatings, particularly the adhesion and nanohardness. The AFM analysis indicates that the coatings are dense, with an average surface roughness in the range of 33 ÷ 58 nm. The coating with the smaller value of average surface roughness exhibited a maximum hardness of 43 GPa. High calculated value of plasticity index ( $H/E$ ) is 0.104. The scratch test results revealed that all the investigated coatings have very good adhesion in the normal loading interval from 1 N to 40 N.**

**Keywords:** cathodic arc evaporation, Ti-Al-Si-N, surface morphology, multilayer, hardness, adhesion.

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