

**THE EFFECT OF TIME VARIATION AND PLASMA NITRIDATION
TEMPERATURE ON THE STEEL HARDNESS OF THE TURBOFAN
COMPRESSOR BLADE MATERIAL ON STAGE 13**

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Abstract

Plasma nitridation is known as surface treatment. This process is done by adding nitrogen elements to the surface.

This study aimed to identify the variation of the time and temperature of plasma nitridation to the compressor blade hardness. The time parameters used were 2 hours, 3 hours, 4 hours and the temperature of 300°C, 400°C at a constant pressure of 1.6 mbar. Reparation was done before carrying out the specimen testing. Hardness testing used a micro hardness tester in which the initial hardness value was 174.04 VHN.

The hardness after plasma nitridation with a time parameter of 2 and 3 hours up did not increase significantly. The optimum hardness was obtained by 4 hours with a value of 325.18 VHN (increased 151.14% from the raw material). The temperature rise from 300°C to 400°C in the plasma nitridation process with a susceptibility of 3 to 4 hours caused the decrease in surface hardness to 260.6 VHN. The Scanning Electron Microscope (SEM) testing measured the thickness of the layer formed in the cross section of the material. The maximum thickness was 2.62 µm and the minimum thickness was 595 nm.

Keywords: *plasma nitridation, nitriding parameters, turbofan compressor materials*

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