Plasma nitriding Fundamentals

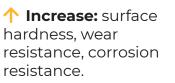
O1 O1 WHAT IS PLASMA	Also known as ion nitriding , it is a thermochemical process based on the diffusion of nitrogen atoms across the surface of the steel to form hard compounds called nitrides and introduce internal compression stresses.	E B
02 •	The process is used to enhance the surface properties of components made ofSteelsStainless SteelsCast IronTitaniumNickel Alloys	
TYPE OF PROCESS	Thermochemical: The aim is to diffuse nitrogen into the the part surface to form nitrides in combination with its different alloying elements. Result: hard compounds with great surface properties without altering those of the core.	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
04 • RANGES	From a couple microns on highly alloyed materials, up to: 0.7 mm on low alloyed ones.	
05 O	The process runs at temperatures between: 350 - 600 °C Steel > 850 °C Titanium	
06 • PHASE CONSIDERATIONS	At the temperature that the process is held, nitrogen diffusion occurs in the ferritic phase of the steel, thus, no phase transformation occurs during cooling of the substrate.	Ì
HARDNESS 07 •	The surface hardness of the materials being treated highly depends on the material composition. It ranges from 400 Hv on carbon steels up to 1400 HV in highly alloyed grades.	
08 • BEST USE	Best used in components that need adhesive wear and fatigue resistance properties, parts that need masking of certain areas, and where final grinding after heat treatment is undesired.	L
09 ENVIRONMENTAL ISSUES	Plasma nitriding uses hydrogen and nitrogen as process gasses. As they are non-corrosive, ensure an efficient and clean process. Important: Avoid usage of	E)

toxic gas and chemicals such as ammonia or cyanide salts.

ADVANTAGES

10 (•

Plasma nitriding is a highly advanced process with high technological development in its instrumentation. This means that it is sufficient to apply the correct recipe **to obtain repeatable results:**



↓ **Decrease:** fatigue, corrosion, galling, wear and premature failures.

✓ Avoid: conventional heat treatment distortions and extra grinding operations.





