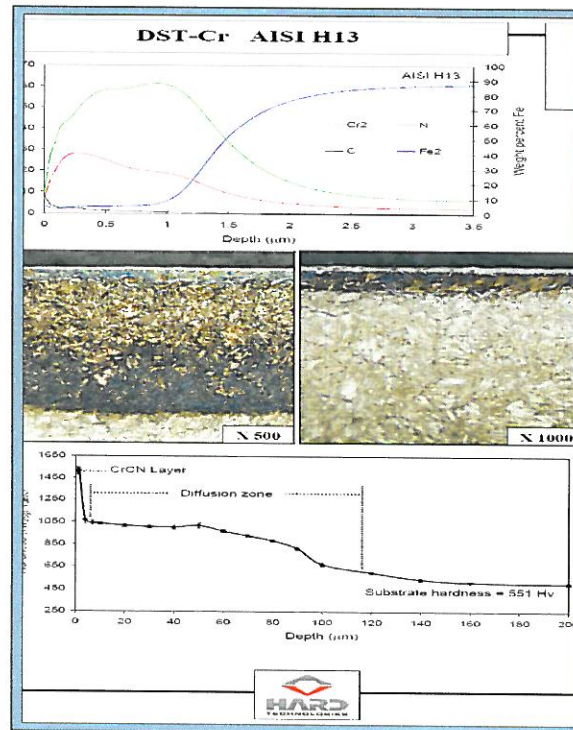




**DYNAMIC**  
SURFACE TECHNOLOGIES

## DYNA-MAX Cr

The DYNA-MAX Cr process is a duplex diffusion process incorporating our DYNA-BLUE Ferritic Nitrocarburizing process with a low temperature (575°C) chromium thermoreactive deposition layer. This duplex process forms a hard chromium carbonitride surface layer that is diffused into the steel. This process is accomplished via a diffusion alloying reaction between the nitrogen from the nitrocarburized layer and the deposited chromium metal. The low temperature used does not soften the hardened steel matrix. Because the DST-Cr process forms a Chromium, Titanium, etc layer that is diffused into the surface, it alleviates flaking, peeling, and delamination associated with PVD coatings. PVD Titanium Nitride, Chromium Nitride, and Chromium Carbide, are coatings that are deposited on the surface with no support or metallurgical bond. When the substrate goes into "plastic deformation or deflection" the hard coating flakes off. With the DST-Cr Process, support is provided with the ferritic nitrocarburizing process beneath the extremely hard surface. There is no egg shell effect. This provides superior wear resistance to PVD and CVD coatings with no distortion.

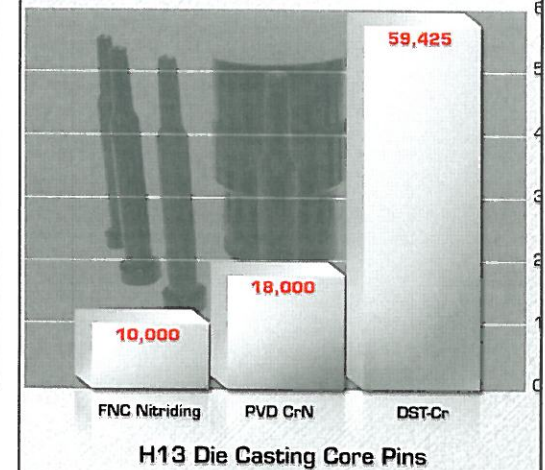


GDOS Testing shows the depth of the Chromium layer to be 2 microns.

Vickers hardness testing revealed the surface layer to be 1520 Hv and a diffusion zone from 1050 to 650 Hv. This also revealed that the nitrocarburized diffusion layer was retained after the DYNA-MAX Cr process with a gradual hardness transition down to the core. This deep diffusion layer provides good support for the hard Chromium layer. It is also evident that the original core hardness of the H-13 steel was maintained..

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## LIFE IMPROVEMENT



### PERFORMANCE TESTING

A tool performance study was done by a die cast facility to provide real life test data of Ferritic Nitrocarburizing, DST-Cr and a PVD Chromium Nitride processes. This test revealed that the DST-Cr process had the greatest increase in tool life. The test tool was a die cast core located near an end gate with an extreme amount of wear. The FNC process yielded 10,000 shots, while the DYNA-MAX Cr yielded 59,425. The typical life for PVD Chromium Nitride was 18,000 shots.

- Maximum Wear Resistance
- Dimensionally Stable
- Resists Heat Checking, Soldering, & Washout
- Decreases Thermal Fatigue
- Capacity 24" x 42"