Ferritic Nitrocarburizing (FNC)

Benefits

- High level of wear resistance
- Low distortion
- Improved fatigue properties
- Greater corrosion resistance
- Uniform appearance

Process

FNC produces a compound layer on the surface of the parts typically .0001”-.0015”. The compound layer is formed by diffusing nitrogen and carbon into the surface of the steel. The hardness of this layer ranges from HRC 58 to as high as HRC 70 depending on the steel grade being processed.

There is a layer of diffused nitrogen beneath the compound layer. The compound and nitrogen diffusion layer produce the wear resistance and improved fatigue properties that make FNC an alternative to carbonitriding and sometimes carburizing.

Processing temperatures are 950-1250°F and cycle times are short compared to other case hardening processes. The temperature of the steel is well below the critical temperature and no phase transformation takes place. Quenching is not required to achieve the high hardness of the compound layer. All of these factors contribute to reduced / low heat-treating distortion.

The compound layer is not a coating, but it can provide the same corrosion protection. Additional processing such as post oxidation, polishing and oiling can improve the corrosion protection and appearance. FNC is a green alternative to chrome and other coatings.

Materials

FNC can be used on low, high carbon, alloy steels, and cast irons. Pre-hardened steels may be used, however the strength/hardness of the steel is affected by the FNC processing temperature.

Applications

FNC is best used in applications where a part will be exposed to wear, such as:

- Crankshafts
- Gears
- Camshafts
- Transmission components
- Brake components
- Seating components
- Tubing
- Hydraulic cylinders
- Shock absorbers