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**SCOPE: Aroxy Coating Process For Discs.**

**PRINCIPLE:** Aroxy is a surface nitriding process with epoxy coating on top. It is a case hardening process that involves the diffusion of nitrogen into the surface of the job at a temperature of about 550°C ~ 570°C and diffusion time from 90 to 120 min.

The treatment produces a duplex surface layer, (compact and porous areas) consisting of a  $\epsilon$  – nitrides and Fe, C, N compounds, depth of which is independent on the composition of substrate. The process produces a surface having exceptional resistance to wear, seizure, scuffing, corrosion and fatigue.

**PROCEDURE :**

1. Precleaning carried out at 60°C ~ 80°C by electrically heated bath using standard degreasing alkaline solution. Further cleaning is done by 3-tank process in plain running water.
2. Preheating is done by gas fired furnace prior to surface nitriding especially for the jobs having unit weight more than 1 ~ 2 Kg. The preheating is carried out between 300°C ~ 350°C.
3. Actual Surface nitriding process is carried by using proper fixture, and for required 550°C ~ 570°C temperature for 1.5 hours.
4. Quenching is carried out in cold (room temperature) and hot water bath. The hot water tank is electrically heated (12Kw Capacity) having temperature 70°C ~ 90°C to avoid distortion if any, and removal of salt on the job surface.
5. Washing job in cold water so that 100% salt from job gets cleaned.
6. Epoxy powder coating on the jobs.

**PROPERTIES :**

1. **Resistance to Corrosion:** The corrosion resistance of a single phased compact surface layer which is obtained by combination of passivation and finishing treatment is significantly superior to many conventional anti – corrosion coatings (Chromium, Nickel, Zinc, etc).
2. **Resistance to Wear, Abrasion and Pitting:** These properties are achieved due to the single phase compound layer which is hard and ductile and has good frictional properties. The hardness of the compound layer varies from 600 to 800 HV, which effectively overcomes the problem of wear. Surface finish lead to a notable decrease of the coefficient of friction.
3. **Resistance to Fatigue :** Significant and important increase in fatigue strength is obtained by compressive stresses created in the nitrogen diffusion zone.
4. **No Hydrogen Embrittlement :** Surface nitriding also eliminates risk of failure due to hydrogen embrittlement – a major problem encountered with many applied coatings.

**ADVANTAGES:**

1. Aroxy coating process improves properties such as wear resistance, corrosion resistance to seizure.
2. The Compressive stresses produced on surface due to Aroxy coating process are more than any other method thus improving fatigue strength.
3. Aroxy coating process is a non-polluting, non-poisonous liquid bath nitriding process in which the bath consists of alkaline cyanates and carbonates stabilized by the addition of lithium compounds.

**AROXY COATING ON DISC (PROPERTIES) :**

1. NITRIDING HARD ZONE THICKNESS----- 12  $\pm$  3  $\mu$ .
2. CORROSION RESISTANCE (SALT SPRAY)----- 200 Hours (min).
3. SURFACE NITRIDING HARDNESS----- 600 TO 800 HV.
4. EPOXY COATING THICKNESS ----- 40 – 50 Microns (min).