DLV SURFACE TECHNOLOGIES

Nitriding

- A heat treatment process that diffuses nitrogen into the surface of a metal to create a case hardened surface.

Liquid Nitriding

- Liquid Nitriding is a non pollutive sulphur accelerated Liquid Nitriding and Nitrocurburising process, performed at 565 ± 5 deg C.
- DLV surface technologies specializes in surface modification technologies to combat problems of wear, seizure and corrosion, encountered by components in industry.
- Liquid Nitriding produces a combination of a very hard compound zone and a diffusion zone. The compound zone becomes harder and more compact depending on the carbon and alloy contents of the substrate.

Resistance to wear

- Liquid Nitriding produces epsilon nitride in the compound zone. This increases the resistance to adhesive wear significantly. The wear resistance is better than that of other processes, like gas nitriding, case hardening phosphating etc.

Resistance to seizure

- The component treated by Liquid Nitriding gets excellent seizure resistance by the formation of iron sulphide. The microscopic voids due to the presence of sulphur in the bath enhance the anti – welding properties.

Resistance to Fatigue

- Due to high nitriding potential of the bath, the residual compressive stresses are significantly increased. This results in increase of the fatigue limit. Both the bulk fatigue and superficial fatigue which result in pitting are suppressed.

Resistance to corrosion

- Liquid Nitriding increases the resistance to atmospheric corrosion depending on the type of materials treated. En8 components withstand about 50 hours in the salt spray test in accordance with ASTM B 117.
- For application requiring higher corrosion resistance, Nitriding treatment can be followed up with a OXIDISING treatment in a separate salt bath. The combination of Liquid Nitriding and Oxidation treatment is another process of DLV surface Technologies.

Materials treated

- Carbon steels, Low alloy steels, High speed steels, Stainless steels and Cast Iron including SG irons.
- Liquid Nitriding can advantageously by utilised to replace shallow depth case hardening processes, like carbonitriding and carburizing.

Precautions

- Components have to be stabilized for a period of three hours at a minimum temperature of 590 deg C before final machining. No machining or grinding should be done after treatment. However, super finishing operations like polishing, buffing or any other process to improve the surface finish may be applied.

Oxidation

A Thermo chemical Surface treatment to improve resistance to wear, seizure, scuffing and corrosion.

Characteristics of the process

- Oxidation is a process which combines thermo chemical diffusion in molten salt baths with passivation and finishing treatment to produce a surface having exceptional resistance to wear, seizure, scuffing, corrosion and fatigue.
- In addition to an extensive range of original applications, OXIDATION may enable a duplex treatment cycle (e.g. heat treatment + surface finishing) to be replaced by a single treatment providing superior properties at a significantly lower cost.
- OXIDATION also eliminates any risk of failure due to Hydrogen Embrittlement– a major problem encountered with many plating processes.

Treatment Parameters

- Where exceptional problems of wear, seizure, scuffing and corrosion are encountered OXIDATION is ideal low cost treatment. Subject to engineering, quality, environmental or cost consideration, OXIDATION can be considered as an alternative to traditional applied coatings such as nickel, chromium, cadmium, zinc, etc.

Characteristics and Properties

- The treatment produces a duplex surface layer consisting of epsilon iron nitride and iron oxides the depth of which is dependent on the composition of the substrate. For general engineering ferrous materials the thickness is between 10 and 25 microns.
- The duplex layer consists of a porous zone at the surface, beneath which is a compact layer of epsilon iron nitride and iron oxides – zone 1.
- Beneath the surface layer is a deep zone of nitrogen diffusion, the hardness and depth of which will depend on the alloy content of the substrate. The compressive stresses created in this zone give rise to a significant increase in fatigue resistance – zone 2.
- The ductility of the surface layers enables excellent compatibility with mating surfaces without surface cracking or exfoliation of the surface layers.

Corrosion Resistance

- High Corrosion resistance is obtained by a combination of oxidation of the porous surface layer followed by passivation and impregnation with organic compounds. In certain specific instances impregnation may be adjusted to give particular tribological properties. For Maximum resistance to corrosion, parts for treatment must be free from burrs, surface discontinuities, welded or brazed joints and work hardened surfaces.

Resistance to Seizure, Scuffing, and Wear

The exceptional surface properties associated with nitrocarburised(Nitriding) layers(resistance to seizure,scuffing and wear)are retained by the Oxidation process. By careful selection of the impregnation material, certain properties may be further improved e.g. lower coefficient of friction.

Resistance to Fatigue

- Significant increase in fatigue strength is obtained from the compressive stresses created in the zone of Nitrogen diffusion. In order to obtain the best results from OXIDATION treatment a few simple precautions may need to be taken during manufacture and treatment.

Dimensional Stability

- Where precise dimensions are essential, especially with parts of complex shape, stabilization at 580 to 600 degree centigrade will be necessary prior to finish machining. Machining allowances may be necessary for very precise parts.

Surface Finish

- This is largely dependent on the surface finish of the components prior to the treatment. Surfaces of roughness 1.0 - 1.2 microns will be same after treatment. Surfaces smoother than 0.5 microns will be slightly roughened. Surface finish of the components will be Black in colour.
- OXIDATION treated parts must not be machined or degreased as some, or all, of the surface properties will be lost.
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MOLY COAT

A Bonded Dry Film Lubricant Coating with Corrosion Resistance.

Characteristics of the Process

- A unique coating for excellent corrosion resistance, reduced frictional torque, easy and frequent dismantling, cleanliness & long time storage.
- Moly coat is a Speciality bonded lubricant containing molybdenum disulphide MOS_2.
- Moly coating is applied by conventional painting techniques like spraying, dipping or brushing after suitable dilution using a special solvent molysol followed by oven curing. It can be applied to all metallic components. Being a dry film lubricant Moly coating does not pickup dust as compared to conventional oils and greases. Moly coating has excellent corrosion resistance compared to conventional plating processes like zinc, chromium, cadmium, nickel etc.
- Moly coating helps to bring down the frictional torque of coated surfaces. Hence is reduces operator fatigue.
- Moly coating helps easy dismantling of components. It is useful for components to be stored for long periods and requiring marine transport.

Process

- Moly coating is a special organic coating with solid lubricants. The lubricant is diluted for appropriate viscosity using specially formulated Molysol solvents and is applied by conventional painting techniques like spraying, dipping or brushing on well prepared metallic substrates. The coating is subsequently baked to achieve the optimum properties.

Properties

- Excellent corrosion resistance as compared to plating.
- Does not pickup dirt / dust like oils or greases.
- Can withstand high contact loads as compared to conventional oils or greases.
- Helps in easy dismantling
- Reduces frictional torque
- Low co-efficient of friction
- Enables storage for long periods especially suitable for marine transportation.
- Surface finish of the processed components will be dark grey in colour.

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