SURFACE TREATMENTS

It's what on the outside that differentiates Unisteel from our competitors

Underlying every product that is delivered to customers is the surface treatment that differentiates Unisteel from our competitors. With in-house capabilities and strong R&D acumen, customers have come to rely on our expertise in high-end surface treatments ranging from cosmetic finishes that improve aesthetics to treatments that enhance product reliability and performance.

As a key component of our three business segments, Unisteel provides a comprehensive range of high-end surface treatment technologies that deliver optimum performance in every application.

Surface Treatment Capabilities	Fasteners	Precision Metal Components	Precision Plastic & Optical Components
UNI-LUBE®	■		
Electro-polishing	■	■	
Passivation	■	■	
Aqueous washing	■	■	■
Electroless nickel (EN) plating	■	■	
Nickel / Zinc plating	■	■	
Heat treatment	■		
Physical Vapor Deposition (PVD)	■	■	
Optical coating			■
UV coating			■
Pad printing			■
Spray painting			■

UNI-LUBE® coating

Fasteners

UNI-LUBE® coating is a proprietary product of Unisteel, which utilizes a polymer coating on the surface of screw to reduce the harsh effects of friction and improve surface cleanliness. It provides an excellent substitute for EN-PTFE coating.

Benefits

- RoHS-compliant coating
- Improves lubricity
- Lowers particle contamination
- Corrosion resistance
- Improves surface cleanliness
- Reduces thread galling
- Increases clamp load with lower torque
- Lowers thread and under head friction by 50%

Electro-polishing

Fasteners/Metal Components

Widely used in the hard disk drive industry, electro-polishing is a non-mechanical process of controlled electrochemical removal of surface metal by anodic oxidation and chemical dissolution, otherwise known as 'reverse plating". This process has a leveling effect by removing protruding parts of a surface profile; resulting in a smoother and reflective surface.

Benefits

- Gives a brilliant and shiny appearance
- Offers superior cleanliness and low particle contamination
- Excellent deburring results in microscopically smooth surface
- Enhances fatigue strength

Passivation

Fasteners/Metal Components

Applicable to both hard disk drive components and electronic components, passivation uses alkaline to remove traces of grease before using nitric acid to protect against corrosion.

Benefits

- Preserves original properties of stainless steel components
- Improves corrosion resistance through removal of surface contaminants
- Economical process requiring only a chemical bath without the need for electrical currents

Aqueous (AQ) wash

Fasteners/Metal Components/Plastic & Optical Components

Aqueous wash refers to a cleaning technique that primarily uses water, sometimes combined with a variable level of organic and/or inorganic additives. Components that have undergone AQ wash are usually packed in vacuum-sealed double bag – in Class 100 clean room - to prevent particle contamination.

Benefits

- Lowers liquid particle count (LPC)
- Reduces ion contamination (IC)
- Leaves zero organic residue

Electro-less nickel (EN) plating

Fasteners/Metal Components

Suitable for both hard disk drive components and electronic components, electro-less nickel (EN) plating is an auto-catalytic chemical reduction process that does not use any electrical current. A pre-treatment process of cleaning and activation usually precedes the plating to remove surface contamination.

Benefits

- Offers excellent resistance to corrosion
- Ensures uniform plating thickness
- Provides excellent adhesion
- Provides excellent wear and hardness performance
- Has low coefficient of friction

Nickel / Zinc plating

Fasteners/Metal Components

Carbon steel screws may undergo zinc/ nickel plating to prevent corrosion. Different types of plating will yield different corrosion resistance properties and these are tested using in-house salt spray machines.

Benefits

- Improves corrosion resistance
- Enhances lubricity (nickel)
- Provides excellent ductility & adhesion (zinc)

Heat treatment

Fasteners

Heat treatment is usually done on screws made of carbon steel as it helps to improve the hardness of the screws so that the threads can cut into the pilot hole.

Benefits

- Improves material hardness

Physical Vapor Deposition (PVD) hard coating

Fasteners/Metal Components

PVD is a vacuum coating process to produce a conformal metal-based thin film that can be uniformly deposited on electrically conductive surfaces. Using the sputtering method, a single coating layer provides ample coverage without modifying the surface profile.

Benefits

- Provides superior resistance to wear and corrosion
- PVD coating has a high level of hardness
- Enhances aesthetics appearance through the use of color deposits

Optical coating

Plastic & Optical Components

Depending on the material applied on optical components, optical coating alters the way in which the optic reflects and transmits light. Unisteel offers anti-reflective coating (AR) that reduces reflection of optical surfaces.

Benefits

- Minimizes unwanted reflections on optical components
- Offers excellent resistance to scratch
- Provides protection against chemical, mechanical and environmental influences

UV coating

Plastic & Optical Components

UV coating is a process of applying a protective layer to protect the underlying material from the harmful effects of ultraviolet radiation. With a fully automated line, the coating is cured by UV and transforms from a complete liquid into a solid form on exposure to UV light. Suitable for plastics as it is a low heat generating process that will not distort its physical properties, UV coating is a fast curing process that imparts a variety of properties to polymeric surfaces and enhances the shelf life of plastic components.

Benefits

- Provides superior resistance to wear and scratch
- Provides high gloss and smoothness
- Offers excellent resistance to chemical
- Boosts production efficiency as it is an instantaneous curing process that requires no drying time
- Environmentally safe

Pad printing

Plastic & Optical Components

Pad printing is a printing process that can transfer a 2-D image onto 3-D surfaces. This technique is made possible by the unique properties of the soft silicone pad, enabling it to pick the image up from a flat plane and transferring it to a variety of surfaces including flat, cylindrical, spherical, compound angles, textures, concave and convex surfaces, with precise accuracy. Equipped with multiple pads, Unisteel also offers multiple color pad printing capability.

Benefits

- Enables printing on irregular shapes and surfaces
- It can be custom designed to suit any graphic needs including logos, part numbers and directions

Spray painting

Plastic & Optical Components

Spray painting is a painting technique where a device sprays a coating (paint, ink, varnish, etc.) through the air onto a surface. Fully equipped with both automated and manual lines, Unisteel offers spray painting to add aesthetic appeal to substrates such as plastic or metal components. Close control of the painting environment is maintained in terms of temperature, humidity and air replacement filtration to ensure superior and consistent coverage.

Benefits

- Superior aesthetic finish
- Available in wide range of colors
- Consistent paint coverage

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