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.

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**UNI-LUBE® coating**

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**

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**

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**

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

**Electro-less nickel (EN) plating**

Suitable for both hard disk drive components and electronic components, electro-less nickel (EN) plating is an autocatalytic 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  
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  
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  
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  
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  
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**

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**

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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The information provided may be subject to change without prior notice.