SilcoTek® Treatment Processes

SilcoTek passivation and surface protection layers are deposited using a patented chemical vapor deposition (CVD) process. The reaction layer penetrates into the lattice of the treated piece and binds solidly. Consequently, it is possible to work a piece, such as bending a length of treated tubing, without creating cracks, flakes, or other flaws which would compromise the layer. Layer thickness ranges from 100nm to 1600nm.

SilcoTek surface treatment processes do not rely on line-of-sight deposition. The chemical vapor deposition process ensures all surfaces are treated uniformly—even at corners, holes, and machined ridges. Our current capacity enables us to treat items up to 6 feet in length. Evacuated items, such as gas chambers, can have a volume of up to 43 cubic feet.

About Us

SilcoTek's involvement with surface coatings began in 1987, when we developed a treatment that made stainless steel surfaces inert to low-level reactive organic compounds. Since this initial project, SilcoTek's coating experts have developed a family of surface treatments to address other specific needs and thereby enhance the performance of system components. These treatments are:

- SilcoNert®1000 (Silcosteel®)— A general purpose passivation layer for steel and stainless steel. (US patent 6,511,760.)
- Silcolloy®1000(Silcosteel®-CR) — A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric,nitric, or sulfuric acid, or seawater. (US patent 7,070,833.)
- SilcoGuard®1000(Silcosteel®-UHV)— Used to reduce outgassing by components of ultra-high vacuum systems. (US patent 7,070,833.)
- SilcoKlean®1000(Silcosteel®-AC) — Dramatically reduces carbon buildup (coking) on stainless steel components. (US patent 6,444,326.)
- SilcoNert®2000(Siltek®)—Provides the ultimate passivation of treated components, from glass to high nickel alloys of steel. (US patent 6,444,326.)
- SilcoNert®2000(Sulfinert®)—A required layer on metal components when analyzing for parts-per-billion levels of organo-sulfur compounds. (US patent 6,444,326.)
- Dursan®—A high durability, corrosion resistant, inert coating ideal for refinery, chemical process, oil & gas applications. (US patent pending)

SilcoTek®surface treatments are now used in many applications, spanning multiple industries and market areas. Let us solve your surface activity problems. Contact us at 814-353-1778, e-mail Silcod@SilcoTek.com or visit us online at www.SilcoTek.com.

Go to the website to see our coating specifications at www.SilcoTek.com/specifiications

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Lit Cat # ST-005-B

Recommended Care of Treatment Layers

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Congratulations!

You have purchased the finest in performance surface treatments! Since 1987, the SilcoTek Team has been offering leading edge passivation and barrier coating technology to the scientific, analytical, and process markets. Please e-mail TechService@SilcoTek.com if you have questions regarding the appearance, performance, and maintenance of the treated surface. Here are a few tips to keep your treated products working at peak performance.

Appearance

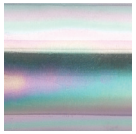
Layer appearance and surface finish can vary from lot to lot. Small variations in surface thickness can impact layer appearance. The surface finish should be bright and free of defects, but original surface condition can have a major impact on final surface quality.

Your parts are cleaned after treatment; however, the surface may contain some trace silicon (black particles) as a by product of the treatment process. Residual silicon can be removed by rinsing with a solvent or by sonication in water.

General thickness ranges are:

Product	Coating Thickness	Color
SilcoNert®1000 (Silcosteel®) SilcoNert®2000(Siltek®/Sulfinert®) SilcoKlean®(Silcosteel®-AC)	100-500nm	Rainbow
Silcolloy®(Silcosteel®-CR)	180nm to 800nm	Gray
SilcoGuard®(Silcosteel®-UHV)	180nm to 600nm	Gray
Dursan®	400nm to 1600nm	Rainbow

Colors associated with layer thickness are:



The different colors of the coating can be attributed to angstrom-level thickness variations across the surface. All SilcoTek coatings have a thickness of <1.5µm. Certain coating processes (e.g. Silcolloy, SilcoGuard) result in a thicker layer and have a silver/matte gray appearance, while thinner coatings (e.g. SilcoNert) exhibit the "rainbow" colors.

Cleaning

When cleaning a treated part, rinse with a solvent that will dissolve probable surface contaminants (i.e., use a nonpolar solvent to remove hydrocarbon contaminants, or a more polar solvent to remove more active contaminants).

Avoid using cleaners containing abrasives as they can scratch the layer. Mild sonication may assist in contaminant removal, but do not oversonicate—this could damage the layer.

Solids can be removed with a soft nylon bristle brush using light pressure.

Caution! Do not use basic solutions or soaps with pH>8.

Do not steam clean any SilcoTek® treated components or line(s), as this could damage the layer.

Galling

Galling can occur when two parts of similar material are connected under compression and the heat generated "cold welds" the parts together. Customers have observed Galling when two Silco'd treated compression fittings or NPT fittings are assembled. For that reason SilcoTek does not recommend coating the nuts or ferrules from compression fittings and recommends that the coating either be removed with Scotch Brite or apply Teflon tape when two NPT fittings are connected. Galling has never been reported when a non coated and Silco'd coated fitting is mated. If both mating parts must be coated, then SilcoTek recommends using anti-seize compounds made from silver, moly or nickel: For sample cylinder applications refer to the instructions pertaining to the use of Teflon tape on the valve NPT prior to installation.

Treatment Layer Troubleshooting

Under normal use, your treated items should deliver outstanding performance for years to come. However, effective lifetime is dependent on the severity of the environment. Factors that can reduce performance are:

Contamination	Failure to properly clean the surface can allow increased surface activity. If performance changes, thoroughly clean the surface and inspect the layer for damage.
Erosion	Contact with abrasives can accelerate surface wear.
Bases	Contact with a base (pH 8 or higher) can accelerate deterioration of the layer.

Surface finish and color should stay consistent throughout the life of the product. Changes in the finish or color may indicate a partial loss of the layer. To prevent further loss, ensure no exposure to bases or abrasives.

For additional information about SilcoTek®treatments and to view our demonstration and process videos, visit our website at www.SilcoTek.com. Contact our technical service department at 814-353-1778, or e-mail SilcoD@SilcoTek.com.