SilcoTek Coating Success and Care Guide

Maintaining and Troubleshooting Coated Parts

Troubleshooting Coated Parts

Under normal use, SilcoTek-coated parts should deliver excellent performance for years to come. However, effective lifetime is dependent on the severity of the environment. Factors that can affect performance include:

- Contamination – Failure to properly clean the surface can allow increased surface activity. If performance changes, properly clean the surface and inspect the layer for damage.
- Erosion – Contact with abrasives can accelerate surface wear and ruin coating performance.
- Bases – Contact with a base (>8 pH) can accelerate deterioration of silicon coating layers (SilcoNert, Silcolloy, SilcoKlean) and ruin coating performance.
- Surface Finish – Surface finish and color should stay consistent throughout the life of the product. Changes can indicate a partial loss or a chemical change of the coating layer.
- Abuse – Damage to parts may require part and coating replacement.

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 as this could damage the layer.
- Solids can be removed with a soft nylon bristle brush using light pressure.
- Do not use basic solutions or soaps with pH>8.
- Your parts are inspected to meet our quality standards and cleaned after treatment; however, the surface may contain some trace silicon (black dust particles) as a byproduct of the treatment process. Residual silicon can be removed by rinsing with a solvent like IPA or sonication in water.

Steam Cleaning and Autoclave Exposure

In order to gain a better understanding of the effects of steam and autoclave environments on SilcoTek coatings, SilcoTek performed a series of tests on coated coupons to measure water contact angle (WCA), coating thickness, and FT-IR spectroscopy. The following suggestions are made with those test results in mind.

Coating Family	Summary	Stability in Steam/Autoclave Environment
Silco- coatings (SilcoNert and Silcolloy variations)	No appreciable thickness change, significant surface e oxidation, significant decrease in WCA, measurable increase in Si-O-Si absorbance.	Poor
Dur- coatings (Dursan and Dursox variations)	No appreciable thickness change, slight decrease in WCA and slight increase in Si-OH functionality.	Good
Siltride coatings	No appreciable thickness change or FT-IR spectra effects. Excellent resilience.	Excellent

Siltride Hydrophilic Surface Restoration

Like most hydrophilic surfaces, Siltride is susceptible to gradual increased water contact angle while stored in air over time, due to adsorption of organic species from the atmosphere. SilcoTek recommends annealing in air or an inert atmosphere at ≥ 400°C (for a few minutes to up to an hour) or exposing the coated surface to a dilute (e.g. 5%) NaOH solution for a few minutes to restore the original water contact angle.

Galling and Sealing Considerations

Galling can occur when two parts of similar material are connected under compression and the heat generated essentially "cold welds" the parts together. Customers have occasionally observed galling when two SilcoTek treated compression fittings or NPT fittings are assembled. Occasionally, mating coated threaded parts can cause leaks. Galling and leaking do not occur when uncoated threads are mated to SilcoTek-coated threads.

- SilcoTek does not recommend coating the nuts or ferrules from compression fittings.
- SilcoTek recommends removing the coating from male threads with Scotch Brite or applying PTFE tape when two NPT fittings are connected.
- If both mating parts must be coated, 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 PTFE tape on the valve NPT prior to installation.

Important Reminder

Please review this guide with your salesperson to discuss any questions or concerns before sending your parts to SilcoTek for the first time. Customers can reach the team by calling +1 814-353-1778 or emailing SilcoTek at TechService@SilcoTek.com.