Surface Treatments
General Information
Silcosteel®
Siltek®
Sulfinert®
Silcosteel®-AC
Silcosteel®-CR
Silcosteel®-UHV
Placing & Tracking Orders

General Information

Restek Surface Treatments

Restek passivation and surface protection layers are deposited using a chemical vapor deposition (CVD) process in which the item to be treated is heated under vacuum in a large oven. Our current capacity enables us to treat items up to 6 feet long, or continuous lengths of coiled tubing exceeding 2000 feet (600 meters). Items that can be evacuated, such as gas chambers, can have a volume of up to 3.5 cubic feet.

When the item has been heated to the appropriate temperature, the reacting gases that form the protective surface are introduced, depositing a durable, amorphous layer that grows and overlays itself multiple times. 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 in the layer. By controlling the variables in the process, we control the layer type and thickness. Layer thickness ranges from 0.03µm to 30µm, controlled to our specifications.

As strong as steel, as inert as glass.

Restek's surface treatments are:

Silcosteel®	A general-purpose passivation layer for steel and stainless steel. U. S. patent 6,511,760.
Siltek®	The ultimate passivation for treated components, from glass to high nickel alloys of steel. U.S. patent 6,444,326.
Sulfinert®	A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds. U.S. patent 6,444,326.
Silcosteel®-AC	Dramatically reduces carbon buildup on stainless steel components. U.S. patent 6,444,326.
Silcosteel®-CR	A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, sulfuric acid, or seawater. Patent pending.
Silcosteel®-UHV	Greatly reduces outgassing from components of ultra-high vacuum systems. Patent pending.

Surface Passivation

Restek Performance Coatings

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Silcosteel® Surface Treatment

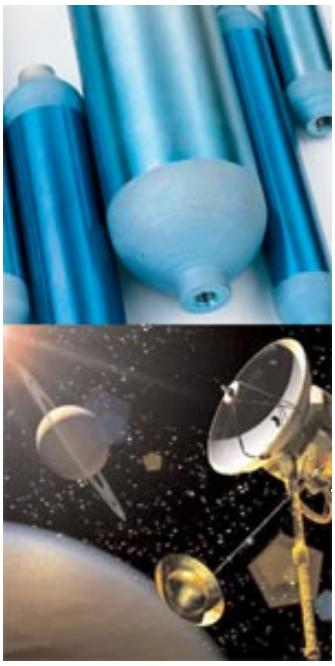
General Purpose Inert Layer

Silcosteel® is an effective, general-use passivation treatment that meets the needs of many analysts, for tubing, fittings, valves, and other system components that require passivation.

A general-purpose passivation layer for steel and stainless steel.

If you're storing, transferring, or analyzing relatively inactive compounds such as hydrocarbons, or working with parts-per-million levels of active molecules (e.g., sulfur compounds), Silcosteel® treated glass, stainless steel, steel or high performance alloy system components will assure you of the inertness you need. Silcosteel® treatment does not, however, offer ultimate inertness often required in chromatography systems, sample storage vessels, process pathways, or similar applications. For ultimate inertness, we recommend Siltek® surface treatment.

Examples of Silcosteel®-treated systems and components include: Silchrome™ Saturn Ion Traps for Varian GC-MS systems, cylinders for sampling sulfur gases at parts-per-million levels, and tubing/fittings used in flow-through systems with short residence times.



Custom Products

Custom Treatment Request Form

Stock Products

Fittings
Tubing

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Siltek® Surface Treatment

Ultimate Surface Inertness

Siltek® is our most chemically inert surface. It is prepared through the same process as Sulfinert® treatment, and pricing is equal, but, for emphasis, we use the Sulfinert® name to describe our inert surface specifically intended for sampling, storing, transferring, or analyzing parts-per-billion levels of active sulfur compounds (e.g., hydrogen sulfide). One of the more popular applications for Siltek® treatment is the passivation of inlet liners for gas chromatography, and the many GC applications performed using Siltek®-treated liners are a testament to the inertness of this surface.

The ultimate passivation for treated components, from glass to high nickel alloys of steel.

If you're storing, transferring, or analyzing parts-per-billion levels of active sulfur compounds, chlorinated pesticides (especially endrin and/or 4,4'-DDT), semivolatile compounds, or other chemically active molecules, we recommend you request Siltek® treatment for your glass, stainless steel, steel, or high performance alloy system components.

Examples of Siltek®-treated systems and components include inlet seals for injection systems in gas chromatographs, and inlet liners for GC analysis of chlorinated pesticides.

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Sulfinert® Surface Treatment

Inertness to Sulfur Compounds

Because they contribute to air pollution and are known catalyst poisons, sulfur compounds are increasingly being targeted for monitoring to extremely low levels in air and in ethylene/propylene. Strict limits for sulfur content in gasoline and diesel fuel are to be achieved by 2007.

Many key organo-sulfur compounds are adsorbed to or react with steel or stainless steel surfaces. To address this issue Restek developed the Sulfinert® surface treatment process. Sulfinert® treatment eliminates interaction between organo-sulfur compounds and steel. The figures demonstrate the benefit of using Sulfinert®-treated components for sampling and storing organo-sulfur compounds

Prevent surface interactions with reactive organo-sulfur compounds at parts-per-billion levels.

Refineries and petrochemical plants use Sulfinert®-treated components for sampling, and for transferring sample streams. Natural gas and liquid propane gas manufacturers and transfer companies rely on Sulfinert®-treated systems to accurately quantify sulfur-containing odorants in natural and liquid propane gas streams. Sulfinert®-treated sampling equipment is specified in International Society of Beverage Technologists methods for determining sulfur impurities in beverage grade carbon dioxide. (ISBT procedure 1.0)

A wide variety of Sulfinert®-treated items are available from stock, including tubing, fittings, sample cylinders, valves and sampling components. If you have other requirements, please see Custom Coating Services.

The Ideal Substrate for Holding and Transferring Reactive Sulfur Compounds

Sulfinert®-treated sample vessel outperforms electropolished stainless steel under dry and humid sampling conditions.

Custom Products

Custom Treatment Request Form

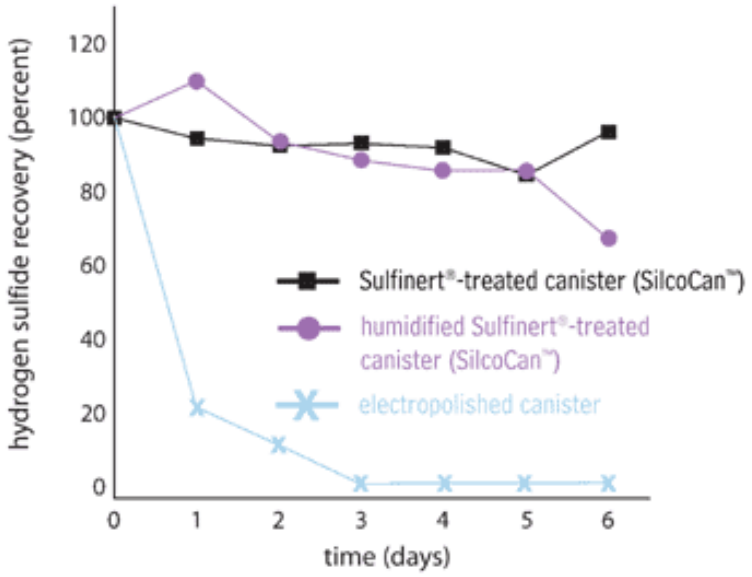
Stock Products

Fittings
Tubing
Sample Loops
Sample Cylinders & Valves

Articles

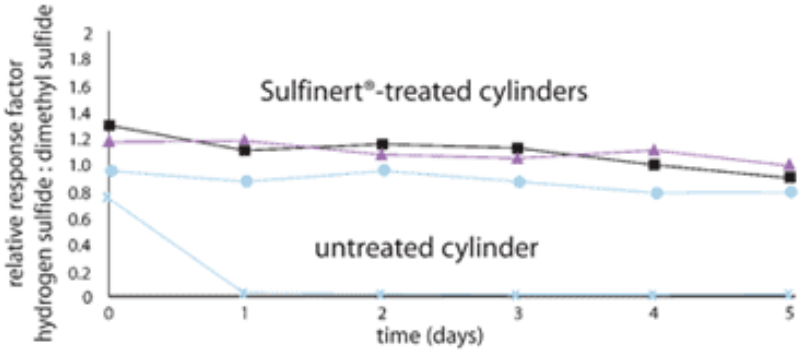
Sulfinert® Treated Systems Preserve ppb Levels of Active Sulfur Compounds

Free Literature



Excellent Long-Term Stability of Sulfur Compounds

Sulfinert®-treated sample cylinders show good recovery of sulfur compounds at 17ppbv. Untreated cylinders exhibit complete loss within 1 day.



Introducing Sulfinert® Coatings
Lit. Cat.# 59203-INT
Document Type: Product Flyer
Download (438k PDF)

Sulfinert™-Treated Sample Cylinders
Lit. Cat.# 59618A
Document Type: Product Flyer
Download (101k PDF)

Use of Sulfinert™ Sample Cylinders Increases Holding Time for the Analysis of Sulfur Compounds
Lit. Cat.# 59164A
Document Type: Applications Note
Download (73k PDF)

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Silcosteel®-AC Surface Treatment

Coking Control

A major problem in hydrocarbon processing systems is the buildup of carbon on the surface of steel or stainless steel components—coking. Coking often is initiated by catalytic action of nickel or carbon impurities or additives in the steel used to construct the processing system components.

Restek chemists are working in conjunction with the Fuel Science Program at the Pennsylvania State University to quantify the effects of Siltek® and Silcosteel® treatments on the formation of coke.(1) A Silcosteel®-treated system exhibits a 4-fold reduction in coke formation, compared to untreated stainless steel, but a modified Silcosteel® treatment, Silcosteel®-AC, can provide an 8-fold reduction. The Silcosteel®-AC or Silcosteel® layer forms a barrier between the hot hydrocarbon stream and the coking-susceptible steel substrate, and eliminates catalytic breakdown in the hydrocarbon stream. With the elimination of surface catalytic activity, carbon will not chemically adhere to the surface.

Reduce coking up to 8-fold

Current work indicates that the only mechanism of carbon formation in a Restek-treated system is the result of coking within the fluid phase. This material settles on the surface without adhering, and is easily removed by agitating the surface. Now, instead of “burning” out coke with oxygen at high temperatures, deposited carbon can simply be rinsed away.

Applications for Silcosteel®-AC coking control treatment include fuel injection nozzles, jet engine nozzles, engine valves, and engine cylinders.

Silcosteel®-AC treatment eliminates the need for “burning out” hydrocarbon processing equipment.

We continue to investigate other coatings specifically designed to reduce coking. The figures shown here illustrate the amount of coking occurring on various substrates and the table compares the performance of Silcosteel®-AC, Silcosteel®, Sulfinert®, and prototype treatments. Silcosteel®-AC-treated 304 stainless steel shows dramatic reduction in coking vs. non-treated 304 stainless steel.

Carbon Build-up Tests

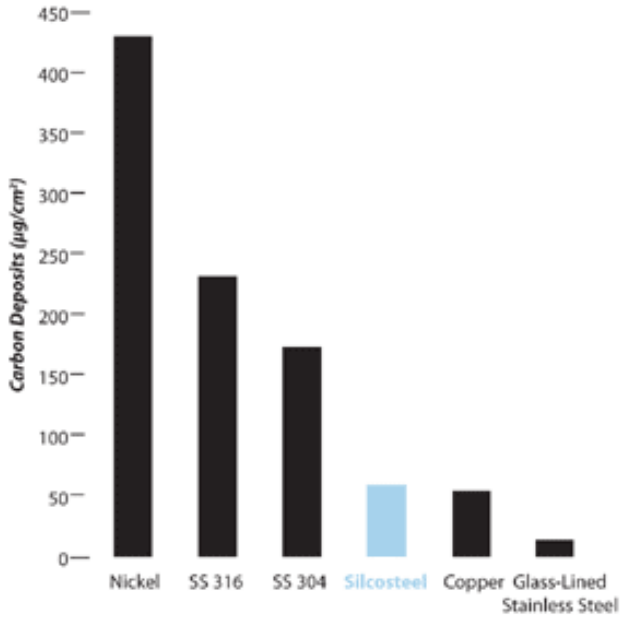
Custom Products

Custom Treatment Request Form

References

(1) Altin, O.; Venkataraman, A.; Eser, S. *Analysis of Solid Deposits from Thermal Stressing of a JP-8 Fuel on Different Surfaces in a Flow Reactor* Symposium on Structure of Jet Fuel V, Division of Petroleum Chemistry, Inc., 216th National Meeting, ACS, August 23-27, 1998).

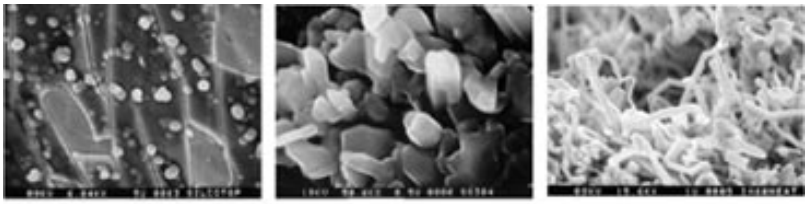
Carbon deposit from JP-8 fuel on various types of tubing (500° C, 500psi, 1cc/min. flow rate).



Silcosteel®-AC-treated 304 grade stainless steel components exhibit the greatest reduction in coking.

Surface	Carbon Buildup (µg/cm2)
Silcosteel®	15.4
Sulfinert®	11.9
Prototype B	7.8
Silcosteel®-AC	7.4

Silcosteel®-AC prevents catalytic formation of metal sulfides and filamentous carbon deposits. (JP-8 fuel stressed at 500°C, 500psi, for 5 hours.)



Silcosteel®-AC | 304 Stainless Steel | Competitor A

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Silcosteel®-CR Surface Treatment

Corrosion Control

Corrosion currently costs the United States economy $276 billion per year (1) and costs the world economy even more. In acidic environments it is critical to engineer solutions to account for the depreciation of equipment caused by corrosion. Current commercial solutions that address corrosion are specialized alloys, such as Inconel®, Monel® and Hastelloy®—or coatings.

We developed Silcosteel®-CR treatment to protect equipment exposed to hydrochloric acid, nitric acid, sulfuric acid, or marine environments. Silcosteel®-CR treatment upgrades the corrosion resistance of 300-grade stainless steels by an order of magnitude.

Silcosteel®-CR, an effective, durable solution at lower cost than specialty alloys.

An advantage of Silcosteel®-CR treatment over super-alloy solutions is cost. Many of the high nickel super-alloys, such as Inconel®, Monel® and Hastelloy® are expensive and machining costs are higher for these soft materials than for 300-grade stainless steels.

Silcosteel®-CR treatment also offers major advantages over traditional coatings. Our chemical vapor deposition process incorporates the treatment into the stainless steel lattice. Traditional overlay coatings rely primarily on primers or surface tension to remain in contact. The Silcosteel®-CR process eliminates delamination, a common problem with overlay coatings.

Silcosteel®-CR treatment protects equipment exposed to hydrochloric acid, nitric acid, sulfuric acid, or marine environments.

A Silcosteel®-CR layer is both durable and flexible. The layer builds from many starting points on the steel surface. Repeated overlaying as the deposition grows on the surface creates a dense, impenetrable layer. This layering process also creates flexibility—treated components can be worked into place without cracking, chipping, or otherwise damaging the layer.

A selection of Silcosteel®-CR treated fittings and tubing are available from stock. For custom treatment, refer to Custom Coating Services.

Custom Products

Custom Treatment Request Form

Stock Products

Fittings
Tubing

Articles

Improve Corrosion Resistance of Stainless Steel Tenfold, or More

Free Literature

Silcosteel®-CR
Lit. Cat.# 59956
Document Type: Fast Facts
Download (254k PDF)

References

(1) *Corrosion Costs and Preventive Strategies in the United States U.S. Department of Transportation Federal Highway Administration*, Publication No. FHWA-RD-01-156.

Pitting and Crevice Corrosion Tests
In studies of exposure to 6% w/w ferric chloride, Silcosteel®-CR treated 316L stainless steel outperformed untreated 316L steel by a factor of 10. This test was conducted per ASTM G48, Method B.

4000 Hour Salt Spray Tests
Silcosteel®-CR treated 316L stainless steel coupons show no sign of attack after 4000-hour salt spray exposure, per ASTM B117.

Condensing Humidity Tests
Silcosteel®-CR treated 316L steel withstands environments simulating outdoor exposure, per ASTM D 4585.

Cyclic Polarization Electrochemical Tests
Electrochemical corrosion testing of Silcosteel®-CR treated 316L stainless steel yielded the following corrosion and pitting potentials in neutral and acidic conditions, per ASTM G61.

Breakdown or pitting potential, Eb, in millivolts.		
Neutral Solution	**Silcosteel®-CR**	**Bare Steel**
100ppm chloride	>3000	674
3000ppm chloride	1460	370
5000ppm chloride	1590	285
Acidic Solution (1N H2SO4)		
100ppm chloride	1128	580
3000ppm chloride	927	370
5000ppm chloride	983	563

Corrosion of Silcosteel®-CR treated 316L stainless steel versus bare stainless steel at 3000ppm Cl- concentration.			
Neutral Solution	**Silcosteel®-CR**	**Bare Steel**	**Improvement**
Corrosion Rate, mpy	0.0009	0.04	45X
Breakdown Potential, Eb	1460	370	
Acidic Solution (1N H2SO4)			
Corrosion Rate, mpy	0.05	0.83	17X
3000ppm chloride	927	370	

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Silcosteel®-UHV Surface Treatment

Ultra-High Vacuum

R&D 100

R&D Magazine recognized Silcosteel®-UHV as one of the 100 most technologically significant products introduced in 2003.

Ultra-high vacuum (UHV) environments are critical for many analytical instruments and particle accelerators used to analyze the properties of materials and atoms. UHV systems are characterized as requiring a vacuum of 10^{-9} torr or better. At this level of vacuum even steel components outgas large quantities of moisture. Massive pumping systems are needed to remove molecules as they are generated.

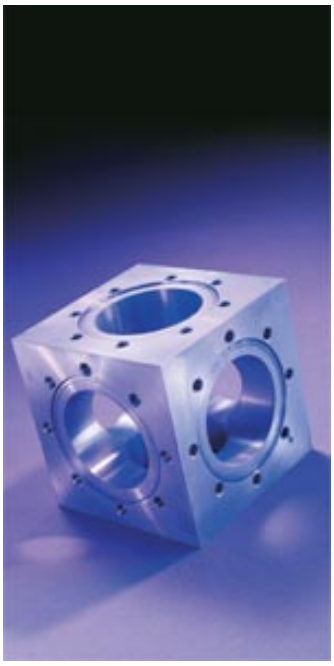
We developed Silcosteel®-UHV treatment specifically to significantly reduce outgassing by steel components in UHV systems. A Silcosteel®-UHV layer over the steel surface is a barrier that keeps moisture isolated from the UHV environment. The Silcosteel®-UHV layer does not liberate any atmosphere of its own. The figures below demonstrate the superior evacuation profile sustained by using Silcosteel®-UHV-treated components vs. non-treated components in a UHV assembly. Clearly, Silcosteel®-UHV treatment makes it possible to maintain a UHV environment with less pumping capacity.

Dramatically reduce outgassing and pump-down time.

Further, when not under vacuum, the Silcosteel®-UHV surface is far less likely to accrue a coating of water and other airborne molecules than is a non-treated surface. This greatly reduces the length of time required to re-attain a UHV environment.

Silcosteel®-UHV treatment is available as a custom service. For information, refer to Custom Coating Services.

Significantly Reduce Pump-Down Time
Silcosteel®-UHV-treated vacuum system components show significantly less outgassing, compared to heat-cleaned components.



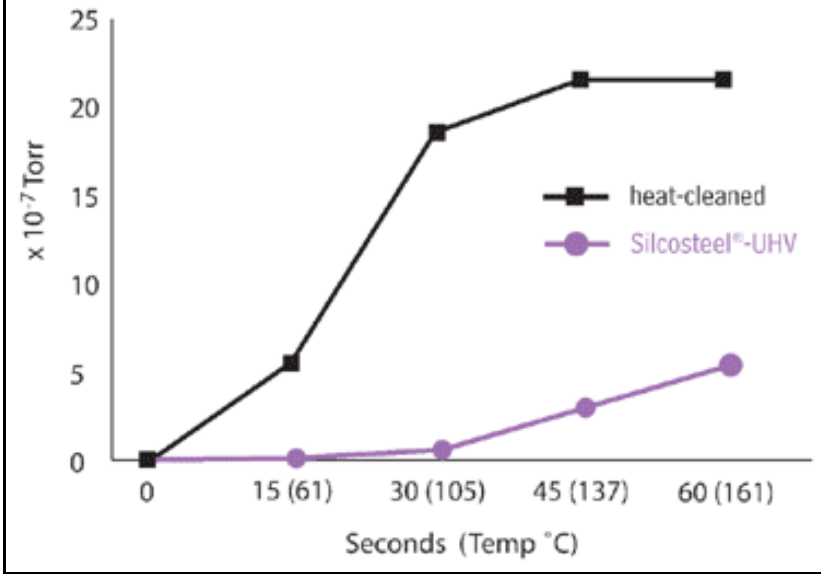
Custom Products

Custom Treatment Request Form

Features & Benefits

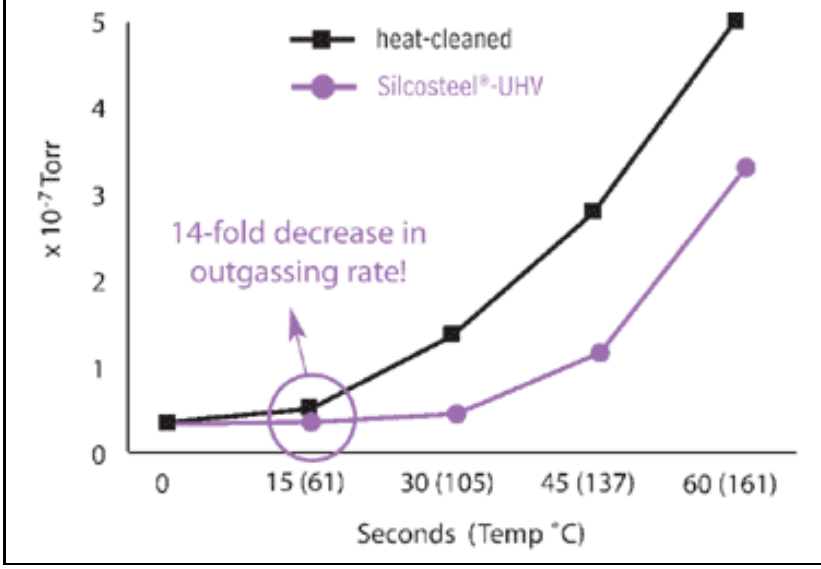
Maintain Seal Integrity
The durable Silcosteel®-UHV layer will withstand the sealing requirements of UHV, maintaining knife edge integrity.

Pressure Increase with Heat After 1 hr Under Vacuum



Significantly Reduce Outgassing
After 10 hours under vacuum, Silcosteel®-UHV-treated components continue to show significantly less outgassing. Note change in y-axis scale compared to figure above.

Pressure Increase with Heat After 10 hr Under Vacuum



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Custom Coating Services

SUBMIT A QUOTE

We will work with you to meet your surface treatment needs. Please contact us to discuss unique requirements.

What can we treat?

- Parts that can tolerate a sustained temperature of 400°C, with pressurization/evacuation.
- Substrates: stainless steels, steels, steel alloys, high-performance nickel alloys, glass, ceramics
- Parts: fittings, valves, frits, custom parts with complex topography (inside and out) largest vessel: 1ft. ID x 4ft. cylinder w/ 10in. opening (30.5 x 122cm, 25.4cm opening)
- Tubing: 0.004in. to 0.5in. ID (0.10–12.7mm); continuous lengths to 2000+ ft. / 600+ meters*

*Please allow 6 inches of extra tubing on each end if the final tubing length is critical.

What can't we treat?

- aluminum (heat-dependent), copper, brass, gold- or silver-plated components, magnesium, nickel (we can treat most high-performance alloys).
- elastomers.

Process

1. **Receive:** Document receipt of items—first customer contact
2. **Clean:** standard: caustic ultrasonic bath, two systems; custom: as needed or requested
3. **Process:** silicon-based materials, chemical vapor deposition—vacuum, 400°C
4. **Clean:** standard: ultrasonic bath; custom: as needed or requested
5. **Ship:** document process—second customer contact—pack and ship

Quotations will be prepared and returned within 24 hours of our receipt.

If you accept our quote, contact Restek Corporation for an authorization number. This number is required for any package shipped to Restek. Any package received without an authorization number will be returned to the sender.

Turnaround time for most custom treated items is 10 days or less.

2-Touch™ Program

The Restek Performance Coatings Division has developed the 2-Touch™ Program to ensure that customers are kept up to date with progress of their parts during the treatment process. The first touch will be contact on receipt of your job, to discuss questions or anticipate concerns that could arise during processing, and to give you a completion date. The second touch will be at the completion of the treatment process, to

notify you of the results and give you an option to update return shipment information.

Many of our current customers have found this service very helpful, and we will continue to adapt the 2-Touch™ Program to meet the needs of all customers.

Other highlights of the 2-Touch™ Program:

- Each job is tracked and recorded, using a unique lot number. Digital photos are taken of all items in each job at arrival and prior to return shipment. These records will be available to you, should you ever have need of them.
- Each item is individually packaged for maximum protection.
- Treatment certifications are supplied for each job.

SUBMIT A QUOTE

To print and fax a quote request please use the following downloadable PDF files:

Custom Silcosteel® Worksheet
Custom Sulfinert® Worksheet

Fax the completed form to Restek Corporation at 814-353-1309 or contact your local Restek representative.

Custom Silcosteel® Treatment Request Form

Complete a copy of this worksheet for each type of item to be treated.

Name:

Company Name: **Restek Account #:**

Billing Address:

Shipping Address:

Phone: **Fax:** **e-mail:**

Internal Use Only
Date contacted:
Date quoted:
Quote number:

This form only applies to custom Silcosteel® treatment. Please use the form on page 193 or call for custom Sulfinert™ treatment pricing and details.

Check box and fill in quantities of items to be quoted for Silcosteel® coating.
Copy and fax back to 814-353-1309 or contact your local Restek representative.
Delivery is twelve (12) working days from receipt of items, unless otherwise notified.

❑ **Compression/pipe fittings**
1/32"–1/4" (≤6mm)
cat.# 57035-279
Quantity_____

❑ **Compression/pipe fittings**
3/8"–1/2" (>6mm–13mm)
cat.# 57288-279
Quantity_____

❑ **Pre-bent tubing sections, coated internally**
≤1/4" (6mm) OD, length <18" (45cm)
cat.# 57287-279
Quantity_____

❑ **Pre-bent tubing sections, coated internally**
≤1/4" (6mm) OD, length 18" (45cm)–50" (127cm)
cat.# 57286-279
Quantity_____

❑ **Tubing, coated internally**
1/16, 3/16, 1/8, 1/4" OD (≤6mm)
Minimum length: 50 ft. (15m)
Coil diameter: <3 ft. (1m)
cat.# 51541
50-499 ft.
500-999 ft.
1000+ ft.
Quantity_____

❑ **Tubing, coated internally**
3/8" OD (10mm)
Minimum length: 50 ft. (15m)
Coil diameter: <3 ft. (1m)
cat.# 51542
50-499 ft.
500-999 ft.
1000+ ft.
Quantity_____

❑ **Tubing, coated internally**
1/2" OD (13mm)
Minimum length: 50 ft. (15m)
Coil diameter: <3 ft. (1m)
cat.# 53392
1-999 ft.
1000+ ft.
Quantity_____

❑ **Straight tubing, coated internally and externally**
<2" OD (50mm)
Length: <10"
cat.# 57285-279
Quantity_____

Length: 10"–18"
cat.# 57282-279
Quantity_____

Length: 18"–60"
cat.# 57284-279
Quantity_____

❑ **Valves (ball, plug, needle, or 1/4-turn), up to 1/4" fitting**
Must be received disassembled
cat.# 57022-279
1–9 qty.
10+ qty.
Quantity_____

❑ **Sample loops, coated internally**
cat.# 57289-279
Quantity_____

❑ **Sample cylinders, ≤500cc internal volume**
cat.# 54044
Quantity_____

❑ **Sample cylinders, 1000cc internal volume**
cat.# 57036-279
Quantity_____

❑ **Dip tubes for sample cylinders**
cat.# 54852
Quantity_____

❑ **Sample cylinder pressure relief valves, up to 1/4" fittings**
Must be received disassembled
cat.# 57290-279
Quantity_____

❑ **Varian Injection Ports**
cat.# 54045
Quantity_____

❑ **Regulators (includes regulator body, internal wetted parts, CGA fitting, and diaphragm)***
Must be received disassembled
cat.# 57291-279
Quantity_____

❑ **In-line filters with stainless steel frits, up to 1/4" fitting**
Must be received disassembled
cat.# 57292-279
Quantity_____

❑ **Item not listed****

Description:

For other custom Silcosteel® pricing, please call us!

For pricing outside the U.S., please call your local Restek representative.

Disclaimer

Customer acknowledges that the extreme heat needed to Silcosteel®-treat any product may cause damage to the product. Customer waives any claim for damages to their product as a result of Restek's handling of the product and, specifically, waives any claims for damages caused by the heating process.

_____ Please initial for agreement.

*Not liable for warping of stainless regulators due to process heat.

**A dimensional drawing or scaled photograph and quantity to be coated must accompany this sheet for quotation to be issued.

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Info & Support

Recommended Care of Treatment Layers

Since 1987, the Restek Performance Coatings Team has been offering leading edge passivation and barrier coating technology to the scientific, analytical, and process markets. You may 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

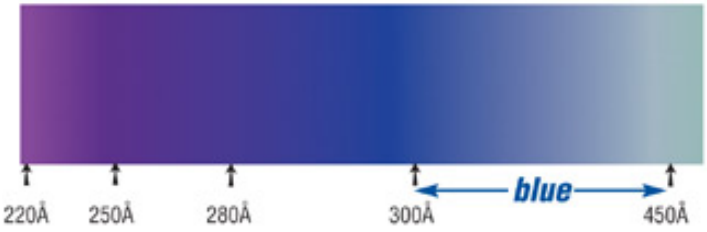
Layer appearance and surface finish can vary from lot to lot. Small variations in surface thickness (measured in angstroms) can impact layer appearance. The surface finish should be bright and free of defects, but original surface condition can have a major impact on final surface quality.

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

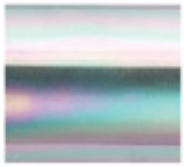
General thickness ranges are:

Product	Coating thickness	Color
Silcosteel®	300Å–350Å	Blue
Siltek®, Sulfinert®, Silcosteel®-AC	1200Å–2500Å	Rainbow
Silcosteel®-CR, Silcosteel®-UHV	5+ µm	Gray

Colors associated with layer thickness are:



Thick depositions used in our Silcosteel®-CR and Silcosteel®-UHV processes are 5µm to 20µm deep and have a silver/metallic grey appearance. The photos below show colors created by Sulfinert® (left) and Silcosteel®-CR (right) deposition.



Rainbow
minimum 1200Å
(0.12µm)

Gray
minimum 5µm

Cleaning

When cleaning a treated part, rinse with a solvent compatible with the contaminants you intend to remove (i.e., use nonpolar solvents with hydrocarbon surface contaminants, more polar solvents with more active contaminants). Do not use basic solutions with

pH>8.

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.

Avoid steam cleaning of components and lines as this can damage the layer.

Galling
As with any threaded fitting, galling may occur when assembling two treated parts. To prevent thread damage, use a thread lubricant or Teflon® tape. Galling potentially can be reduced when assembling a treated part and an untreated part.

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 impede 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	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 Restek Performance Coatings e-mail us, or contact our technical service department at 800-356-1688.

Restek Surface Treatment Processes
Restek passivation and surface protection layers are deposited using a chemical vapor deposition (CVD) process. In the process, the item to be treated is heated under vacuum in a large convection oven. 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 3.5 cubic feet.

When the item has been heated to the appropriate temperature, the reacting gases that form the protective surface are introduced, depositing a durable, amorphous layer that grows and overlays itself multiple times. By controlling the variables in the process, we control the layer type and thickness. Layer thickness ranges from 0.03µm to 20µm.

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.

Restek 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.

About Us
Restek'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, Restek's coatings experts have developed a family of surface treatments to address other specific needs and thereby enhance the performance of system components. These treatments are:

- Silcosteel®
- Silcosteel®-CR
- Silcosteel®-UHV
- Silcosteel®-AC
- Siltek®
- Sulfinert®

Click here for
Restek Chromatography

Phone: 800-356-1688 or 814-353-1300

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