Extend Process Component Lifetime and Enhance Durability

Restek Surface Treatments Improve Sampling and Transfer Component Performance

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- Economical—lower cost than specialty alloys, more durable than traditional stainless steels.
- Versatile—suitable in a variety of environments and temperature ranges.
- Simple—can be applied to existing equipment; stock tubing and fittings also available.

When surface activity or corrosion are a concern, solutions must be engineered. The Restek Performance Coatings group offers a family of surface treatments that address activity and corrosion concerns over a wide spectrum of applications. Table 1 lists applications in which a Restek Performance Coating treatment of sample pathway components prevents adsorption of active compounds, thereby contributing toward reliable and accurate information, or greatly reduces corrosion.

Adsorption problems in sample pathways often can be traced to the tubing and fittings used to transfer the sample to the analytical instrument. Always use deactivated tubing and fittings for applications involving active compounds. For special requirements, ensure maximum inertness and minimal surface area by applying the deactivating treatment to electropolished tubing. Figure 1 shows uptake and release curves for 500ppbv of methyl mercaptan, an active sulfur compound, in a gas stream passing through a variety of tubing substrates.[1] Siltek®/Sulfinert® treated tubing reduces uptake by orders of magnitude, relative to untreated stainless steel tubing.

In corrosive environments, Silcosteel®-CR treated tubing is an excellent alternative to expensive alloys. Silcosteel®-CR treatment extends the lifetime of the tubing, reducing the frequency of preventive maintenance and helping to ensure the purity of the process or sample stream.†

Silcosteel®-CR improves corrosion resistance by up to 10X over untreated 316 stainless steel (per ASTM G48 Method B, see graph below).

Silcosteel®-CR treated stainless steel outperforms uncoated metal
by an order of magnitude!
(ASTM G 48, Method B).

RESTEK PRODUCTS

- **Restek Performance Coatings**
  Treated Swagelok® Fittings

  Silcosteel®-CR Treated Coiled Stainless Steel Tubing

ALSO OF INTEREST

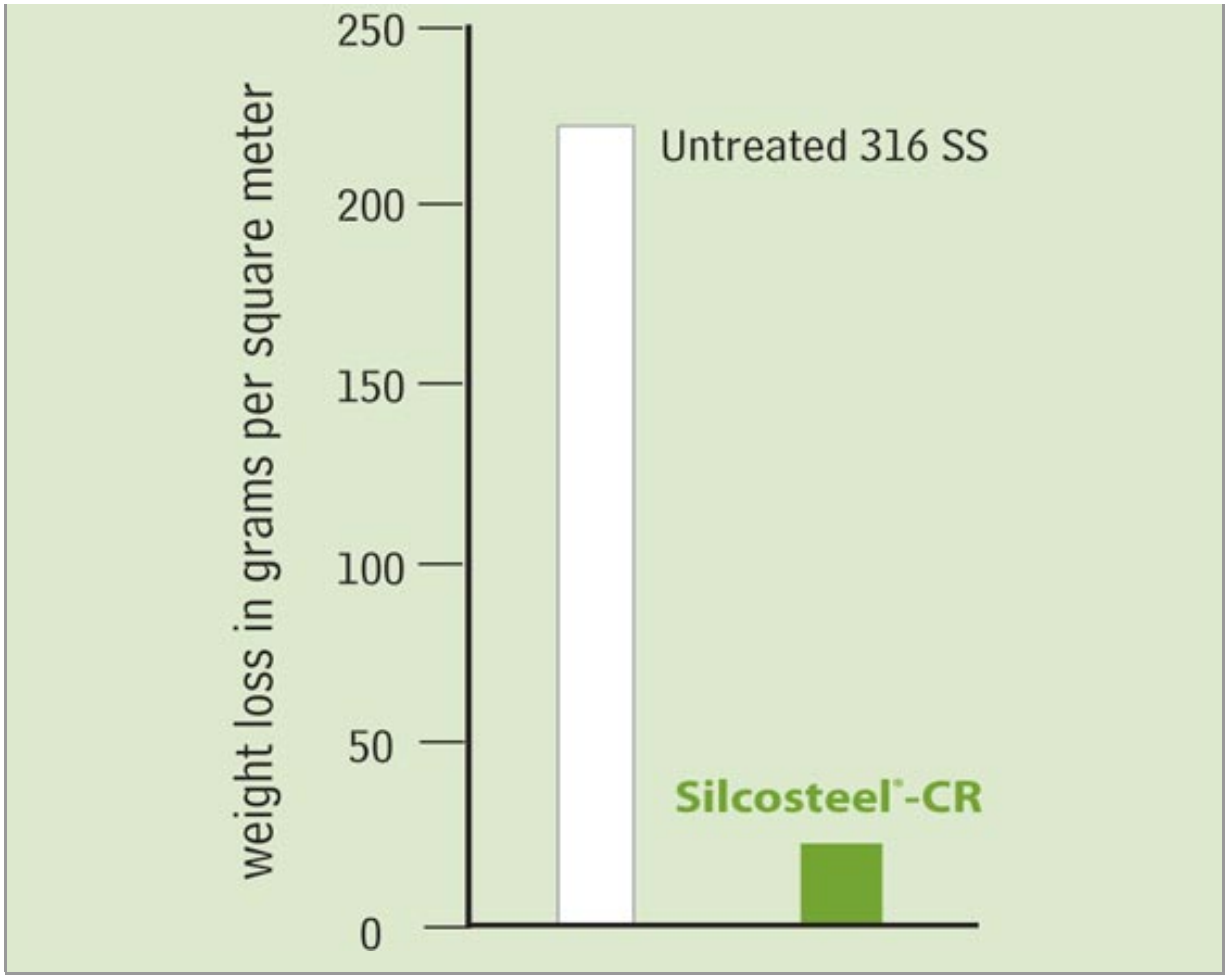
- Superior Protection Against Corrosion: Silcosteel®-CR

REFERENCES

1 *Relative Response Time of True Tube™ when Measuring Moisture Content in a Sample Stream* Test Report, Haritec Scientific & Engineering Support, Calgary, Alberta, Canada, May 2004. Reference courtesy of O'Brien Canada, available on request from Restek.

RESTEK TECHNICAL ARTICLES

- View all articles



Summary
Surface treatments from the Restek Performance Coatings group prevent corrosion or adsorption of active compounds in delivery systems, and always should be considered in applications in which corrosive or active streams are to be sampled, transferred, or analyzed.

†Note that with any corrosive stream, regular inspections are needed to confirm there are no leaks or breakthroughs.

Table 1 Applications in which Restek treated sample pathway components minimize corrosion** or prevent adsorption of active compounds*.

Sulfur compounds in:*
automotive exhaust
beverage grade CO2
diesel fuels
environmental samples
ethylene
gasoline
liquefied petroleum gas
natural gas (odorants)
propylene
stack gas emissions
wines and beers

Nitric oxide (NOx) compounds in:*
automotive exhaust
stack gas emissions

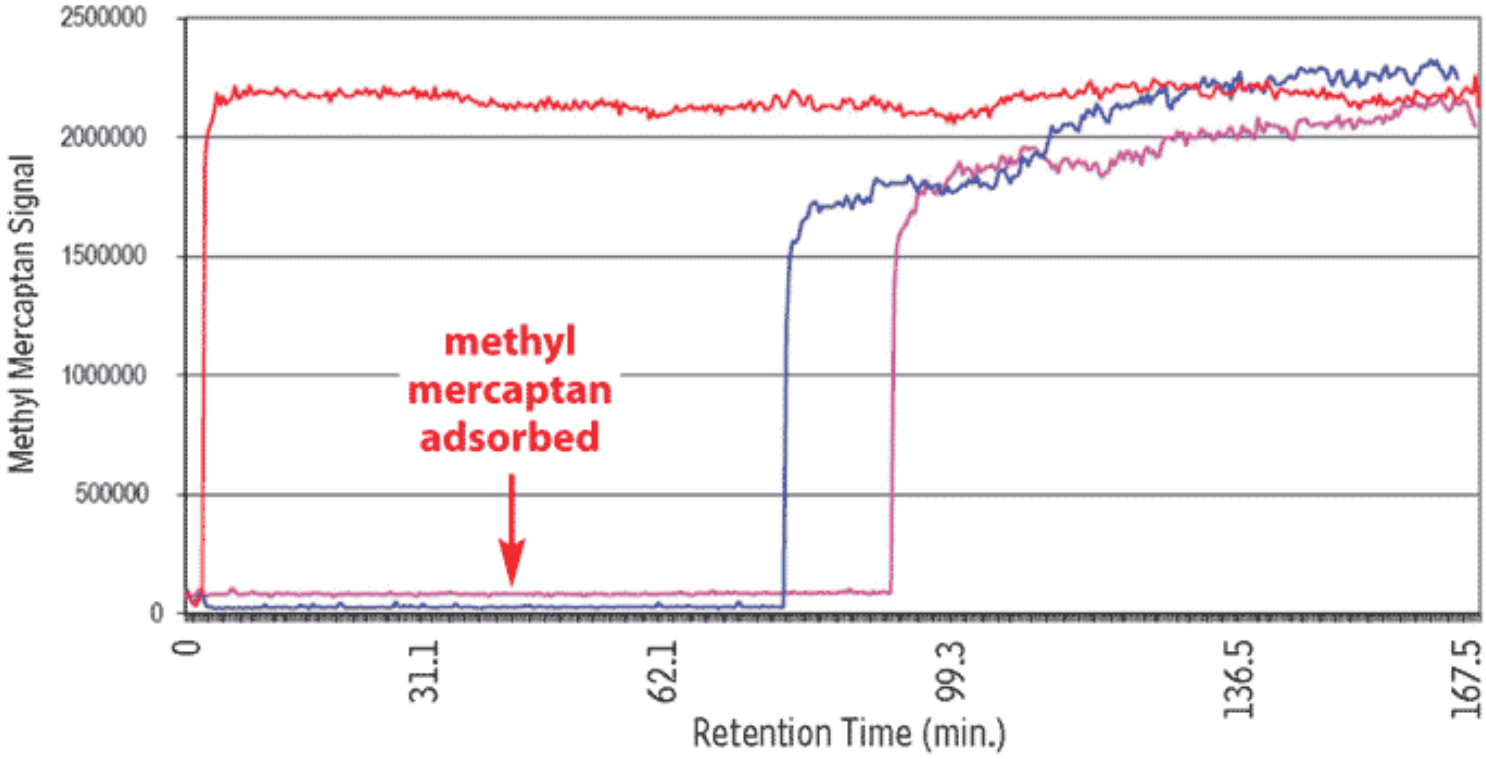
Mercury compounds in:*
crude oil
environmental samples
exhaust
stack gas emissions from coal fired electric power plants

Corrosive environments:**
hydrochloric acid
hydrogen peroxide
seawater

Moisture hold-up in high purity sampling lines**
sample systems
gas delivery systems
process systems

*Siltek®/Sulfinert® treatment.
**Silcosteel®-CR treatment.

Figure 1 Sulfinert® treated electropolished seamless stainless steel tubing (red) does not adsorb methyl mercaptan (500ppbv).
Blue-untreated electropolished tubing; violet-raw tubing.



Economical solutions for varied sample stream challenges

Restek surface treatments are:

Silcosteel®—A general-purpose passivation layer for steel and stainless steel. U.S. patent 6,511,760.

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, or seawater. U.S. patent 7,070,833.

Silcosteel®-UHV—Greatly reduces outgassing from components of ultra-high vacuum systems. U.S. patent 7,070,833.

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.