



### Silcosteel®-CR Treatment

Silcosteel®-CR surface treatment protects equipment exposed to hydrochloric acid, nitric acid, or marine environments, upgrading the corrosion resistance of 300-grade stainless steels by an order of magnitude. Silcosteel®-CR treatment provides a significant cost savings, relative to high performance alloys, and offers major advantages over traditional overlay coatings. Traditional coatings rely primarily on primers or surface tension to remain in contact; delamination and blistering are common problems. In contrast, the Silcosteel®-CR layer is incorporated into the stainless steel lattice. The dense, chemically inert surface is both durable and flexible—treated components can be worked into place without chipping, cracking, or otherwise damaging the coating. Silcosteel®-CR treated tubing and many fittings are available from stock on pages 392-396. Contact us for custom coating service.

#### Features

Improves corrosion resistance of 300 grade stainless steels by an order of magnitude.

Durable and flexible layer, incorporated into the surface.

Use to temperature of 600°C.

#### Benefits

Significantly decreased maintenance cycles and costs for components in corrosive environments.

Items can be worked after treatment—no flaking, chipping, or cracking.

Use under conditions in which conventional coatings fail, reducing the need for high-cost super alloys.

### An effective, durable solution to corrosion—achieve specialty alloy performance using austenitic stainless steels!

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 (e.g., Inconel®, Monel®, Hastelloy®) or coatings. A Silcosteel®-CR layer upgrades the corrosion resistance of 300-grade stainless steels by greater than an order of magnitude and are more cost-effective than specialty alloys.

Like all other Restek surface treatments, a Silcosteel®-CR layer is both durable and flexible. The coating builds from many starting points on the steel surface. Repeated overlaying as the coating grows on the surface creates a dense, chemically inert layer. The layering process also creates flexibility—treated components can be worked into place without cracking, chipping, or otherwise damaging the coating.

### Pitting and Crevice Corrosion Testing of Silcosteel®-CR Treated 316L Stainless Steel and Bare Steel, by ASTM G 48, Method B

Each sample was weighed to the nearest 0.0001 gram, then a rubber gasket was wrapped around the center to simulate a crevice. Each sample was immersed in 6% by weight ferric chloride solution for 72 hours, per the ASTM test method. After 72 hours, the sample was recovered and reweighed to the nearest 0.0001 gram, to determine weight loss.

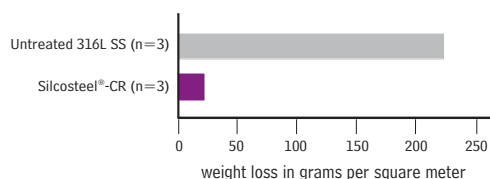
Table I shows Silcosteel®-CR treated 316L stainless steel exhibited an order of magnitude less corrosion, compared to bare stainless steel. Silcosteel®-CR treated stainless steel exhibited no crevice corrosion, while untreated stainless steel exhibited severe crevice corrosion (Figure 1).

**Figure 1** Silcosteel®-CR treated 316L stainless steel shows no crevice corrosion and only slight pitting corrosion, while bare 316L stainless steel exhibits severe crevice corrosion.



**Table I** Silcosteel®-CR treated samples show very little weight loss after exposure to 6% w/w ferric chloride solution.

Sample	Weight Loss (g/m <sup>2</sup> )
Silcosteel®-CR sample 1	19
Silcosteel®-CR sample 2	25
Silcosteel®-CR sample 3	25
Bare Steel sample 1	231
Bare Steel sample 2	209
Bare Steel sample 3	228



## industries served

Marine  
Oil and gas exploration  
Process plants

## it's a fact

A Silcosteel®-CR layer upgrades the corrosion resistance of 300-grade stainless steels by greater than an order of magnitude.