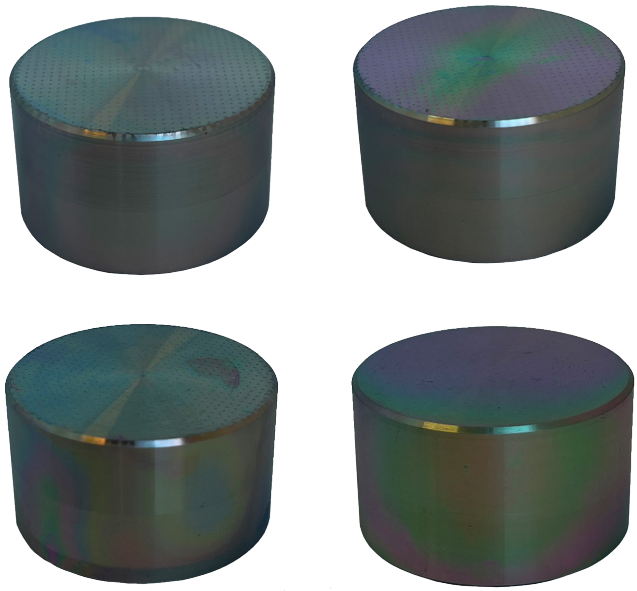
Siltride® 1000

SilcoTek's most robust coating technology.

The Siltride® coating process deposits a chemically protective barrier of hydrogenated amorphous silicon oxynitride that is excellent for improved corrosion, dielectric, and durability performance. Siltride is applied via chemical vapor deposition (CVD), enabling excellent corrosion protection on complex part geometries and blind areas with ease.

Siltride-coated parts may vary in appearance based on coating thickness and substrate material. All pictured samples (right) meet technical specifications, 800-2000 nm.



Semiconductor

Corrosion Resistance

Chemical Processing

Energy

Applications & Benefits

- Achieve exotic alloy corrosion performance on stainless steel at lower costs
- Maintain performance and stability in high temperature environments
- Improve electrical insulation properties
- Create a hydrophilic and carbon-free surface

Siltride® Properties

Coating Composition:	Hydrogenated amorphous silicon oxynitride (a-SiO_xN_y:H)
Deposition Process:	Thermal chemical vapor deposition (not-plasma enhanced)
Maximum Temperature:*	700° C
Substrate:	Compatibility: Stainless steel, exotic alloys, ceramics Size: Typical parts up to 80" (203 cm), contact us for larger jobs Geometry: Any shape, including complex geometries
Typical Thickness:	500 - 2000 nm
Hydrophobicity (contact angle):	≤40°
Allowable pH Exposure:	0 - 14

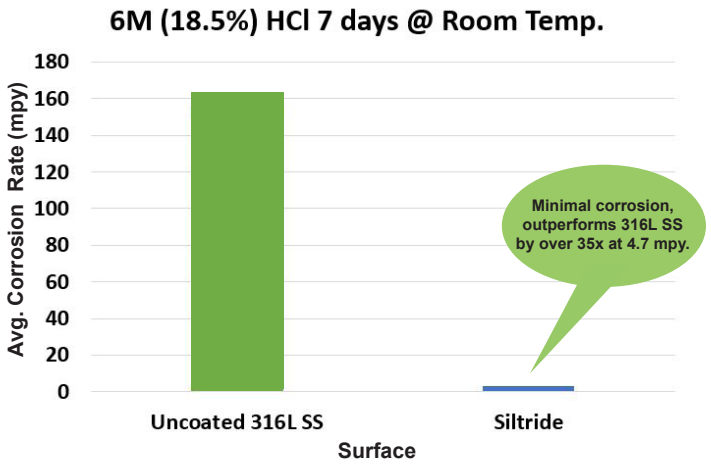
Improved Dielectric Properties

Siltride exhibits the highest electrical resistivity and lowest dielectric loss among SilcoTek coatings.

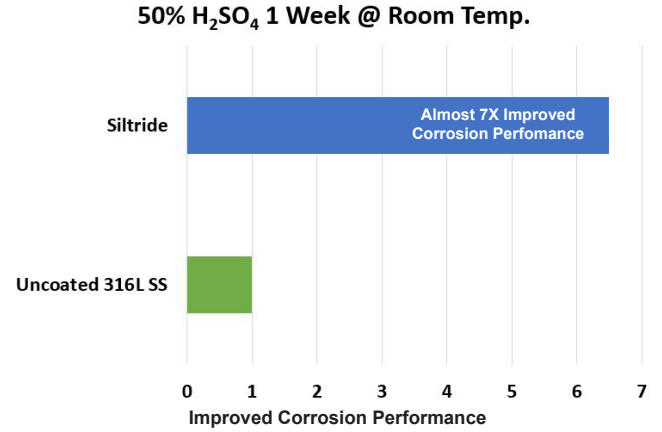
	Bulk Resistivity (Ω·cm)	Relative permittivity (error)	Dielectric loss tan δ (error)	Breakdown field 1 (MV/cm)	Breakdown field 2 (MV/cm)	Weibull Modulus
Silcolloy® (a-Si:H)	10^8	18.9 (2.3)	0.4 (0.04)	0.09 - 0.1	0.15 - 0.2	4.3
Dursan® (a-SiO_X:CH_Y)	10^{12}	6.9 (1.2)	0.6 (0.6)	N.A.	5.9- 9.6	4.6
Siltride (a-SiO_XN_Y:H)	10^{13}	8.3 (0.6)	0.04 (0.05)	4.2	6.6 - 7.7	14.6

Increased Corrosion Protection

Siltride shines as a coating for corrosion protection. The graphs below show it outperforming uncoated coupons and various other SilcoTek coatings.



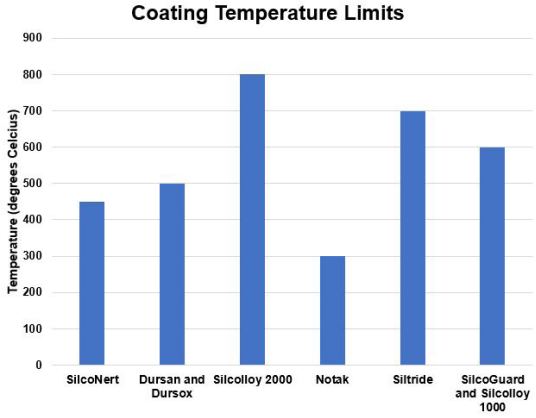
6M (18.5% HCl) 7 days at room temp. - Coupons were immersed in 6M HCl for 7 days at room temp. (ASTM G31). This test shows an aggressive environment testing the limits of Siltride. In these conditions, Siltride performed well with minimal corrosion while considerably outperforming uncoated 316L SS.

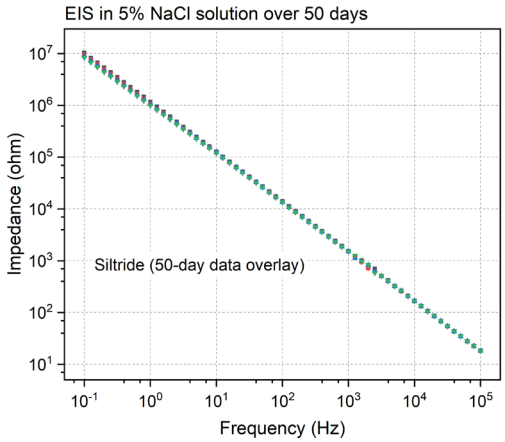


50% H_2SO_4 1 Week - Coupons were immersed in 50 wt% H_2SO_4 for 168 hours at room temp. (ASTM G31).When measuring the average corrosion rate (mpy), Siltride showed a nearly 7x improvement over uncoated 316L SS.

High Temperature Stability

Siltride maintains its performance up to 700°C making it one of SilcoTek's best high temperature coatings.

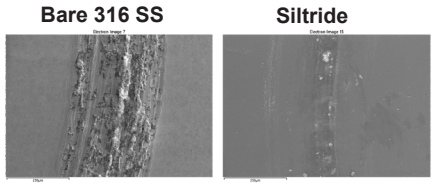


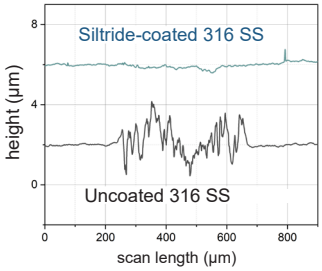


EIS in 5% NaCl - Coupons were exposed to 5% NaCl solution for 50 days and monitored via Electrical Impedance Spectroscopy (ASTM G106). Siltride shows a high impedance value at low frequencies, maintaining excellent stability and protection.

Improved Wear Resistance

Wear track SEM images (both taken at 500X) of bare SS and Siltride after pin-on-disk test (top), and wear track cross-sectional profiles (bottom left) show Siltride has more than double the wear resistance and hardness of bare SS.





	Pin-on-disk (1N and 15 minutes)	
Surface	Bare 316 SS	Siltride
Wear track cross section (µm²)	113.132	44.411
Wear rate x 10^{-5} (mm³/Nm)	**9.428**	**3.701**
Hardness (GPa)	4-6	10

*Siltride® refers to the Siltride process, a thermal CVD that is performed on customer parts to have the properties identified above.