

Tubing and Available Coatings

Restek sets the standard in tubing for analytical and process applications. Complete your system with precleaned or treated tubing and treated fittings and valves for an inert, corrosion-resistant pathway.

Available tubing coatings include:

- **Silcosteel®-CR**—A corrosion resistant layer that increases the lifetime of system components in acidic environments containing hydrochloric acid, nitric acid, or seawater.
- **Sulfinert®**—A required treatment for metal components when analyzing for parts-per-billion levels of organo-sulfur compounds.

Frequently Asked Questions

1. Can treated tubing be bent?

Treated tubing can be bent into curves with a bend radius greater than 1 inch for 1/16-inch OD tubing, 2 inches for 1/8-inch OD tubing, or 4 inches for 1/4-inch OD tubing. The treatment layer will remain intact as long as the tubing isn't stretched dramatically. If tight bends are necessary, use a treated elbow union or bend untreated tubing and send it to Restek for custom treatment.

2. Can compression fittings be used without crushing the treatment layer?

Yes. The layer is thin and permeates the surface. It compresses with minimal damage.

3. Is welding possible after treatment?

Yes. The coating does not interfere with the welding of two coated components. The coating is lost at the weld and in the heat affected zones approximately 2 to 5 mm on either side of the weld.

4. Is any additional chemical deactivation necessary?

A Sulfinert® or Silcosteel® layer leaves few exposed active sites, so there usually is no need for additional treatment. Chemical deactivation is useful in chromatographic applications in which water will be vaporized on the Silcosteel®-treated surface, but is not necessary for Sulfinert®-treated surfaces. Parts used in high-temperature applications (>400 °C) cannot be chemically deactivated.

5. What are the temperature constraints of these surface treatments?

On stainless steel, a Silcosteel® layer is stable to 600 °C. Parts treated with a secondary polymeric layer are limited to temperatures of 400 °C in inert atmospheres and 250 °C when oxygen is present, the temperature maximums for the polymer. Temperatures above 600 °C can be used under certain conditions—please contact us for information.

6. Why use Sulfinert® or Silcosteel® treatment instead of PTFE coating?

Three reasons: 1) Sulfinert® and Silcosteel® layers are nonpolymeric, so they do not exhibit the problems associated with gas permeability. 2) PTFE coating often flakes off the surface, while the Sulfinert® or Silcosteel® layer is tightly integrated into the substrate lattice. 3) PTFE coating is limited to 280 °C, while Silcosteel®-treated stainless steel tubing and fittings can be used to 600 °C.

7. Why use Sulfinert®-treated tubing for transfer lines?

Sulfinert®-treated stainless steel tubing offers all of the advantages of glass or fused silica tubing for the transfer of active compounds (e.g., sulfurs), but is far more durable and flexible.

8. Is treated tubing similar to glass-lined tubing (GLT)?

No. Sulfinert® or Silcosteel®-treated tubing is flexible and can be bent without heating. Also, the Sulfinert® or Silcosteel® layer is highly inert, unlike impure glass.

9. How can I clean the surface of a treated part after use?

Most often, a mild organic solvent (methylene chloride, methanol, hexane) or water is sufficient. Mild sonication may assist and accelerate the process. Do not use caustic, abrasive, or high pH (pH>8) cleaners, as they will damage or dissolve the layer. Steam cleaning in the presence of oxygen or air could create surface activity, and also should be avoided.

10. What materials should I avoid using with Silcosteel®-treated parts?

The Silcosteel® coating is silicon-based and is prone to attack by hydrofluoric acid or by basic compounds. The surface should not be exposed to media with pH>8.

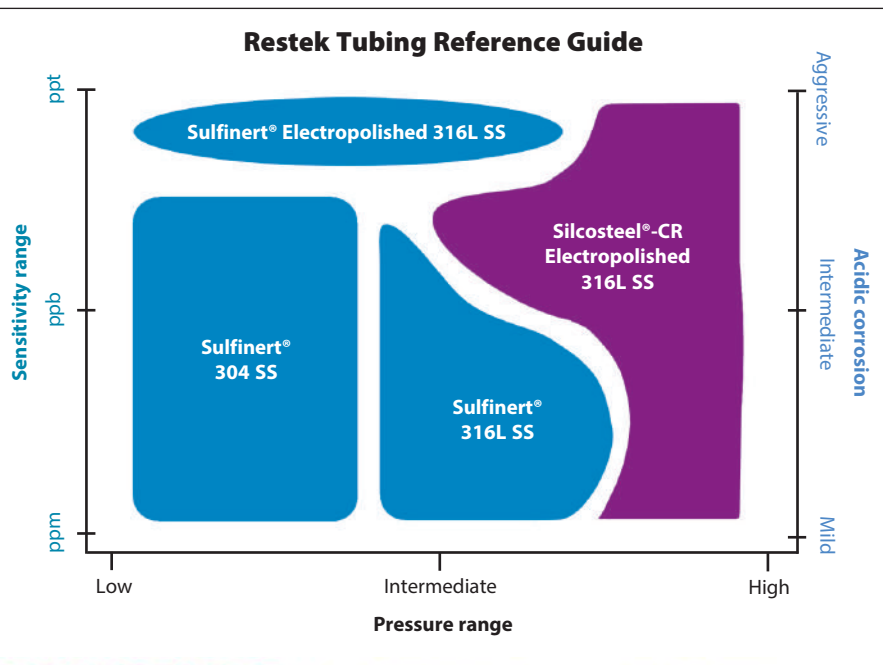
11. Siltek® and Sulfinert®: What's the Difference?

Siltek® is the name for the patented deposition process. When the Siltek® process was developed, the application that showed the greatest benefit was the storage and transfer of low ppb level active sulfur compounds, such as hydrogen sulfide and mercaptans. Because there was (and continues to be) demand for a reliable surface treatment for this application, the name Sulfinert® is used to describe Siltek®-treated products created specifically for this purpose.

frequently asked question

Which treated tubing should I use?

This chart will help you determine the tubing best suited to your application with respect to pressure, sensitivity of your analysis, and acidic environment exposure.



Rinsed and Cleaned 304 Stainless Steel Tubing

Use for providing carrier, fuel, make-up, or auxiliary gases to laboratory instruments.

ID (in.)	OD (in.)	6 Feet cat.#	10 Feet cat.#	15 Feet cat.#	Length				
					20 Feet cat.#	25 Feet cat.#	50 Feet cat.#	100 Feet cat.#	>100 Feet cat.#*
0.01"	1/16"	29000	29001	29002	29003	21500	29004	29005	21502
0.02"	1/16"	29006	29007	29008	29009	21503	29010	29011	21505
0.03"	1/16"	29012	29013	29014	29015	21506	29017	29018	21508
0.04"	1/16"	29019	29020	29021	29022	21509	29023	29024	21511
0.085"	1/8"	29025	29026	29027	29028	21512	29029	29030	21514
0.21"	1/4"	29031	29032	29033	29034	21515	29035	29036	21517

*The availability of long lengths is subject to inventory constraints. Lead times may vary depending on the continuous length needed. Please inquire before ordering. Maximum continuous lengths are: 2,000 ft (cat.# 21502, 21505, 21508, 21511), 1,500 ft (cat.# 21514), and 750 ft (cat.#21517). Pricing for lengths of 101 ft or more is on a per foot basis.



An extra charge is applied for cutting and/or straightening stainless steel and/or copper tubing, calculated from the total number of pieces produced for each line item.

Copper Tubing

- Use for plumbing GC systems.
- Cleaned to remove residual organics.

ID	OD	Wall	Max Operating Pressure	qty.	cat.#
0.065"	1/8"	0.030"	2,800 psig	50 ft	22628
0.190"	1/4"	0.030"	1,000 psig	50 ft	22629

Minimum Bend Radius for Coated Tubing

OD	Min. Bend Radius
1/16"	1" (2.5 cm)
1/8"	2" (5.1 cm)
1/4"	4" (10.2 cm)
3/8"	6" (15.2 cm)

ordering note

Required length in meters x 3.2808
= length in feet.

did you know?

A smoother internal surface is less adsorptive.



Top: electropolished finish, surface roughness average number: 10-15.

Bottom: conventional finish, surface roughness average number: approx. 23-27.

Treated Seamless Electropolished 316L Grade Stainless Steel Tubing

Our highest performing tubing. Recommended for:

- Demanding/corrosive environments.
- High temperatures.
- Ultimate inertness.

ID	OD	Wall Thickness	Length							
			6 Feet cat.#	10 Feet cat.#	15 Feet cat.#	20 Feet cat.#	25 Feet cat.#	50 Feet cat.#	100 Feet cat.#*	>100 Feet cat.#*
Silcosteel®-CR Treated (Coiled)										
0.085" (2.16 mm)	1/8" (3.18 mm)	0.020"	29037	29038	29039	29040	29041	29042	—	29043
0.180" (4.57 mm)	1/4" (6.35 mm)	0.035"	29044	29045	29046	29047	29048	29049	29050	29051
Sulfinert Treated (Coiled)										
0.085" (2.16 mm)	1/8" (3.18 mm)	0.020"	29052	29053	29054	29055	29056	29057	—	29058
0.180" (4.57 mm)	1/4" (6.35 mm)	0.035"	29059	29060	29061	29062	29063	29064	29065	29066

*1/8" OD: 95 ft in one continuous coil; 1/4" OD: 300 ft in one continuous coil. Longer lengths will be more than one coil. Pricing for lengths of 101 ft or more is on a per foot basis.

Note: required length in meters x 3.2808 = length in feet

did you know?

Other lengths and diameters of treated tubing are available on a custom basis.

Call for availability of lengths greater than 1,000 ft.

An extra charge is applied for cutting Sulfinert® or Silcosteel®-CR tubing. The charge is calculated from the total number of pieces produced for each line item

Treated Welded/Drawn 304 Grade Stainless Steel Tubing

Our most popular grade of tubing. Recommended for:

- Chromatography applications.
- Gas delivery systems.
- Lower pressures.
- Inert applications.

Maximum temperature of 450 °C in an inert atmosphere.

ID	OD	Wall Thickness	Length							
			6 Feet cat.#	10 Feet cat.#	15 Feet cat.#	20 Feet cat.#	25 Feet cat.#	50 Feet cat.#	100 Feet cat.#	>100 Feet cat.#*
Sulfinert® Treated (Coiled)										
0.011" (0.28 mm)	0.022" (0.56 mm)		29194	29195	29196	29197	29198	29199	29200	29201
0.021" (0.53 mm)	0.029" (0.74 mm)		29202	29203	29204	29205	29206	29207	29208	29209
0.010" (0.25 mm)	1/16" (1.59 mm)		29210	29211	29212	29213	29214	29215	29216	29217
0.020" (0.51 mm)	1/16" (1.59 mm)		29218	29219	29220	29221	29222	29223	29224	29225
0.030" (0.76 mm)	1/16" (1.59 mm)		29226	29227	29228	29229	29230	29231	29232	29233
0.040" (1.02 mm)	1/16" (1.59 mm)		29234	29235	29236	29237	29238	29239	29240	29241
0.085" (2.16 mm)	1/8" (3.18 mm)	0.020"	29242	29243	29244	29245	29246	29247	29248	29249
0.210" (5.33 mm)	1/4" (6.35 mm)	0.020"	29250	29251	29252	29253	29254	29255	29256	29257

*The availability of long lengths is subject to inventory constraints. Lead times may vary depending on the continuous length needed. Please inquire before ordering. Maximum continuous lengths are: 200** ft (cat.# 29201, 29209), 2,000 ft (cat.# 29217, 29225, 29233, 29241), 1,150 ft (cat.# 29249), and 750 ft (cat.# 29257). Pricing for lengths of 101 ft or more is on a per foot basis.

**Contact us if longer length is needed for cat.# 29201 or 29209.

Treated Seamless 316L Grade Stainless Steel Tubing

High durability tubing. Recommended for:

- Inert applications.
- High temperatures.
- High pressures.
- Corrosive environments.
- Zero bleed.

ID	OD	Wall Thickness	Length							
			6 Feet cat.#	10 Feet cat.#	15 Feet cat.#	20 Feet cat.#	25 Feet cat.#	50 Feet cat.#	100 Feet cat.#	>100 Feet cat.#*
Silcosteel®-CR Treated (Coiled)										
0.055" (1.40 mm)	1/8" (3.18 mm)	0.035"	29091	29092	29093	29094	29095	29096	29097	29098
0.180" (4.57 mm)	1/4" (6.35 mm)	0.035"	29099	29100	29101	29102	29103	29104	29105	29106
0.277" (7.04 mm)	3/8" (9.52 mm)	0.049"	29107	29108	29109	29110	29111	29112	29113	29114
Sulfinert® Treated (Coiled)										
0.055" (1.40 mm)	1/8" (3.18 mm)	0.035"	29067	29068	29069	29070	29071	29072	29073	29074
0.180" (4.57 mm)	1/4" (6.35 mm)	0.035"	29075	29076	29077	29078	29079	29080	29081	29082
0.277" (7.04 mm)	3/8" (9.52 mm)	0.049"	29083	29084	29085	29086	29087	29088	29089	29090

*The availability of long lengths is subject to inventory constraints. Lead times may vary depending on the continuous length needed. Please inquire before ordering. 1/8" OD: 1,500 ft in one continuous coil; 1/4" OD: 750 ft in one continuous coil; 3/8" OD: 250 ft in one continuous coil. Longer lengths will be more than one coil. Pricing for lengths of 101 ft or more is on a per foot basis.

ordering note

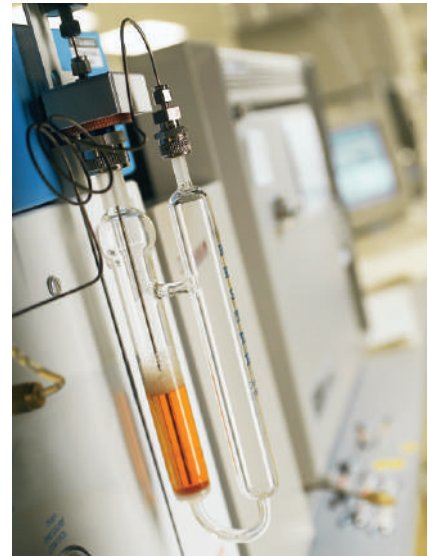
Required length in meters x 3.2808 = length in feet.

Treated Straight, 6-Foot Length Stainless Steel Tubing

Individual 6-foot ($\pm 1/2"$) straight pieces.

In response to customer requests, we offer 6-foot straight lengths of $1/8$ -, $1/4$ -, and $3/8$ -inch treated tubing. This tubing can be cut to your exact requirements using a standard tubing cutter.

ID	OD	Wall Thickness	qty.	cat.#
Silcosteel®-CR Treated, 316L Grade				
0.055" (1.40 mm)	$1/8$ " (3.18 mm)	0.035"	ea.	22898
0.180" (4.57 mm)	$1/4$ " (6.35 mm)	0.035"	ea.	22899
0.277" (7.04 mm)	$3/8$ " (9.52 mm)	0.049"	ea.	22900
Sulfinert® Treated, 316L Grade				
0.055" (1.40 mm)	$1/8$ " (3.18 mm)	0.035"	ea.	22901
0.180" (4.57 mm)	$1/4$ " (6.35 mm)	0.035"	ea.	22902
0.277" (7.04 mm)	$3/8$ " (9.52 mm)	0.049"	ea.	22903



Sulfinert® treated tubing is recommended for purge & trap and headspace systems.

Treated Hydroguard® Deactivated Stainless Steel Tubing

Hydroguard® deactivation creates a high-density surface that is not readily attacked by aggressive hydrolysis.

ID	OD	Wall Thickness	Length (per-foot pricing on 101 feet or more)							
			6 Feet cat.#	10 Feet cat.#	15 Feet cat.#	20 Feet cat.#	25 Feet cat.#	50 Feet cat.#	100 Feet cat.#	>100 Feet cat.#
Silcosteel® Treated, 304 Grade										
0.010" (0.25 mm)	$1/16$ " (1.59 mm)		29186	29187	29188	29189	29190	29191	29192	29193
0.020" (0.51 mm)	$1/16$ " (1.59 mm)		29178	29179	29180	29181	29182	29183	29184	29185
0.030" (0.76 mm)	$1/16$ " (1.59 mm)		29170	29171	29172	29173	29174	29175	29176	29177
0.040" (1.02 mm)	$1/16$ " (1.59 mm)		29162	29163	29164	29165	29166	29167	29168	29169
0.085" (2.16 mm)	$1/8$ " (3.18 mm)	0.020"	29154	29155	29156	29157	29158	29159	29160	29161
0.210" (5.33 mm)	$1/4$ " (6.35 mm)	0.020"	29146	29147	29148	29149	29150	29151	29152	29153
Silcosteel® Treated, Seamless 316L Grade										
0.055" (1.40 mm)	$1/8$ " (3.18 mm)	0.035"	29138	29139	29140	29141	29142	29143	29144	29145
0.180" (4.57 mm)	$1/4$ " (6.35 mm)	0.035"	29130	29131	29132	29133	29134	29135	29136	29137
Silcosteel® Treated, Electropolished 316L Grade										
0.085" (2.16 mm)	$1/8$ " (3.18 mm)	0.020"	29123	29124	29125	29126	29127	29128	—	29129
0.180" (4.57 mm)	$1/4$ " (6.35 mm)	0.035"	29115	29116	29117	29118	29119	29120	29121	29122

An extra charge is applied for cutting Sulfinert®, Silcosteel®, or Silcosteel®-CR tubing. The charge is calculated from the total number of pieces produced for each line item.