Medium-Pressure Tubing

Heavy-Wall Annealed
Cold-Drawn 1/8-Hard

- Sizes 1/4, 3/8, and 1/2 in. outside diameter
- Working pressures up to 15 000 psig (1034 bar)
- 316 / 316L stainless steel
- Marked to indicate size, material, condition, and heat number

Swagelok

Technical Data

Material Standards and Mechanical Properties

Cold-drawn 1/8-hard tubing is more robust and allows for reduced wall thickness and enhanced flow through the same diameter tube.

Heavy-Wall Annealed 316 / 316L Stainless Steel Seamless Tubing

Grade	UNS	Specification
316 / 316L, 1.4401 / 1.4404	S31600 / S31603	ASTM A213①, A269
		ASME SA213①
		EN 10216-5②
SUS 316LTP / SUS 316TP	—	JIS G3459

① Nominal wall thickness, not minimum wall thickness.
② Appearance in accordance with ASTM / ASME standards.

Cold-Drawn 1/8-Hard 316 / 316L Stainless Steel Seamless Tubing

Grade	UNS	Specification	Yield Strength at 0.2 % Offset③ ksi	Tensile Strength③ ksi	Elongation in 2 inches③ % min
316 / 316L, 1.4401 / 1.4404	S31600 / S31603	ASTM A213①, A269	75 to 110	105 to 140	20
		ASME SA213①			
		EN 10216-5②			

① Nominal wall thickness, not minimum wall thickness.
② Appearance in accordance with ASTM / ASME standards.
③ Exception to the standards.

Chemical Composition

Element	Specification	
	ASTM / EN	JIS
	Composition, wt. %	
Chromium	16.5 to 18.0	16.0 to 18.0
Nickel	11.0 to 13.0	12.0 to 14.0
Molybdenum	2.00 to 2.50	2.00 to 3.00
Manganese	2.00 max	
Silicon	1.00 max	
Carbon	0.030 max	
Sulfur		

Bend Radius

Minimum tube length, bend radius, and wall thickness limits required to make a 90° bend in heavy-wall annealed or cold-drawn 1/8-hard stainless steel seamless tubing are listed below.

Tube OD in.	Minimum Tube Length in. (mm)	Minimum Bend Radius in. (mm)	Wall Thickness Dimensions, in.	
			Heavy-Wall Annealed Stainless Steel Seamless	Cold-Drawn 1/8-Hard Stainless Steel Seamless
1/4	7.0 (178)	1.4 (35.6)	0.095	0.065
3/8			0.134	0.083
1/2			0.188	0.109

⚠ **Do not use hand tube bender for bending heavy-wall annealed or cold-drawn 1/8-hard stainless steel tubing. Use steel bend shoes with the Swagelok® bench top tube bender.**

Ordering Information and Dimensions

Heavy-Wall Annealed 316 / 316L Stainless Steel Seamless Tubing

ASTM / EN Tubing

Tube OD in.	Nominal Wall Thickness in.	Ordering Number	Nominal Length	Weight	Pressure Rating
Fractional Length			ft	lb/ft (kg/m)	psig (bar)
1/4	0.095	SS-T4FK-S-095-20-S	20	0.16 (0.24)	15 000 (1034)
3/8	0.134	SS-T6FK-S-134-20-S		0.35 (0.52)	
1/2	0.188	SS-T8FK-S-188-20-S		0.64 (0.95)	
Metric Length			m	kg/m (lb/ft)	bar (psig)
1/4	0.095	SS-T4FK-S-095-6M-S	6	0.24 (0.16)	1034 (15 000)
3/8	0.134	SS-T6FK-S-134-6M-S		0.52 (0.35)	
1/2	0.188	SS-T8FK-S-188-6M-S		0.95 (0.64)	

JIS Tubing

Tube OD in.	Nominal Wall Thickness in.	Ordering Number	Nominal Length m	Weight kg/m (lb/ft)	Pressure Rating bar (psig)
1/4	0.095	SS-T4FK-S-095-2MJ-S	2	0.24 (0.16)	1034 (15 000)
		SS-T4FK-S-095-4MJ-S	4		
3/8	0.134	SS-T6FK-S-134-2MJ-S	2	0.52 (0.35)	
		SS-T6FK-S-134-4MJ-S	4		
1/2	0.188	SS-T8FK-S-188-2MJ-S	2	0.95 (0.64)	
		SS-T8FK-S-188-4MJ-S	4		

Cold-Drawn 1/8-Hard 316 / 316L Stainless Steel Seamless Tubing

ASTM / EN Tubing

Tube OD in.	Nominal Wall Thickness in.	Ordering Number	Nominal Length	Weight	Pressure Rating
Fractional Length			ft	lb/ft (kg/m)	psig (bar)
1/4	0.065	SS-T4FK-SH-065-20-S	20	0.13 (0.19)	15 000 (1034)
3/8	0.083	SS-T6FK-SH-083-20-S		0.26 (0.39)	
1/2	0.109	SS-T8FK-SH-109-20-S		0.47 (0.70)	
Metric Length			m	kg/m (lb/ft)	bar (psig)
1/4	0.065	SS-T4FK-SH-065-2M-S	2	0.19 (0.13)	1034 (15 000)
		SS-T4FK-SH-065-4M-S	4		
		SS-T4FK-SH-065-6M-S	6		
3/8	0.083	SS-T6FK-SH-083-2M-S	2	0.39 (0.26)	
		SS-T6FK-SH-083-4M-S	4		
		SS-T6FK-SH-083-6M-S	6		
1/2	0.109	SS-T8FK-SH-109-2M-S	2	0.70 (0.47)	
		SS-T8FK-SH-109-4M-S	4		
		SS-T8FK-SH-109-6M-S	6		

Options and Accessories

Bench Top Tube Bender

For optimal bending ability, use the Swagelok bench top bender with **steel bend shoes**. See the Swagelok *Tools and Accessories* catalog, MS-01-169, for more information.

Fittings

See the Swagelok *Medium-Pressure Gaugeable Tube Fittings and Adapter Fittings* catalog, MS-02-335, for more information.

Safe Product Selection
When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.

Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit swagelok.com or contact your authorized Swagelok representative.

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