

Jacketed Tubing and Insulated Tubing



Features

- 1/4 to 1/2 in. and 6 to 12 mm tubing sizes available in 316/316L stainless steel and copper
- Seamless and welded tubing available in stainless steel
- Low-temperature PVC jacket helps protect tubing from external corrosion and abrasion
- Fibrous glass insulation reduces heat loss and helps protect personnel

Jacketed Tubing

Swagelok® jacketed tubing helps provide increased protection against galvanic and atmospheric corrosion. In addition, it helps protect the tubing against wear and abrasion.

Features

- 316/316L stainless steel and copper instrumentation tubing
- 1/4 to 1/2 in. and 6 to 12 mm tubing sizes
- Low-temperature, UV-resistant PVC jacket
- Service temperatures from -40 to 220°F (-40 to 104°C)



Technical Data

Fractional

Tube OD in.	Nominal Wall Thickness in.	Max Process Temperature °F (°C)	Min Service and Installation Temperature °F (°C)	Pressure Rating at -20 to 100°F (-28 to 37°C) psig (bar)		Min Bend Radius in. (cm)	Support Centers ft (m)		Weight lb/ft (kg/m)	Jacket OD in. (mm)	Max Bulk Length ^① ft (m)	
				Seamless	Welded		Horiz	Vert			Seamless	Welded
Stainless Steel (ASTM A269, A213[®] (TP 316/316L))												
1/4	0.035	220 (104)	-40 (-40)	5100 (351)	4080 (281)	8.00 (20.3)	6.00 (1.80)	15.0 (4.60)	0.12 (0.18)	0.32 (8.1)	2200 (671)	2500 (762)
3/8				3300 (227)	2640 (181)						1300 (396)	
1/2	0.035 ^③			2600 (179)	2080 (143)						1000 (305)	800 (244)
	0.049			3700 (254)	2960 (203)						750 (229)	1000 (305)
Copper (ASTM B68, B68M, B75, UNS 12200)												
1/4	0.030	220 (104)	-40 (-40)	1400 (96.4)	—	8.00 (20.3)	6.00 (1.80)	15.0 (4.60)	0.12 (0.18)	0.32 (8.1)	2600 (792)	—
3/8	0.032			900 (62.0)							2000 (610)	
1/2	0.035 ^③			800 (55.1)							1000 (305)	
	0.049			1100 (75.7)							1000 (305)	

Metric

Tube OD mm	Nominal Wall Thickness mm	Max Process Temperature °C (°F)	Min Service and Installation Temperature °C (°F)	Pressure Rating at -28 to 37°C (-10 to 100°F) bar (psig)		Min Bend Radius cm (in.)	Support Centers m (ft)		Weight kg/m (lb/ft)	Jacket OD mm (in.)	Max Bulk Length ^① m (ft)	
				Seamless	Welded		Horiz	Vert			Seamless	Welded
Stainless Steel (ASTM A269, A213[®] (TP 316/316L))												
6	1.0	104 (220)	-40 (-40)	420 (6095)	336 (4876)	20.3 (8.00)	1.80 (6.00)	4.60 (15.0)	0.18 (0.12)	7.9 (0.31)	610 (2000)	305 (1000)
10				240 (3483)	192 (2786)						335 (1100)	90 (295)
12				200 (2902)	160 (2322)						275 (902)	
Copper (ASTM B68, B68M, B75, UNS 12200)												
6	1.0	104 (220)	-40 (-40)	94.0 (1364)	—	20.3 (8.00)	1.80 (6.00)	4.60 (15.0)	0.18 (0.12)	7.9 (0.31)	915 (3000)	—
10				60.0 (870)							305 (1000)	
12				1.0 ^③							54.0 (783)	

① Tolerance for bulk-length tubing is ±10 %.

② Nominal wall thickness, not minimum wall thickness. Seamless metric sizes also meet DIN 17458 test 1 class material 1.4401/1.4404.

③ Not recommended for use with tube fittings in gas service.

For jacket properties information, see page 4.

Tubing Data

For additional information, see Swagelok *Tubing Data*, MS-01-107.

Insulated Tubing

Swagelok insulated tubing is designed for use in applications such as steam supply, condensate return, and gas and liquid transport lines, where weatherproofing and energy conservation are important. Swagelok insulated tubing helps protect personnel from hot process and steam lines, reduces heat loss, and offers a cost-effective alternative to field-installed insulation of small-diameter tubing systems.

Features

- 316/316L stainless steel and copper instrumentation tubing
- 1/4 to 1/2 in. and 6 to 12 mm tubing sizes
- Low-temperature, UV-resistant PVC jacket
- Absorption-resistant fibrous glass insulation
- Insulation contains less than 100 ppm of water-soluble chlorides
- Marked with part number and batch number



Technical Data

Fractional

Tube OD in.	Nominal Wall Thickness in.	Max Process Temperature °F (°C)	Min Service Temperature °F (°C)	Pressure Rating at 400°F (204°C) psig (bar)		Min Bend Radius in. (cm)	Support Centers ft (m)		Weight lb/ft (kg/m)	Nominal OD in. (mm)	Max Bulk Length ^① ft (m)	
				Seamless	Welded		Horiz	Vert			Seamless	Welded
Stainless Steel (ASTM A269, A213[®] (TP 316/316L))												
1/4	0.035	400 ^③ (204)	-30 (-34) ^④	4896 (337)	3916 (269)	8.00 (20.3)	6.00 (1.80)	15.0 (4.60)	0.20 (0.30)	1.00 (25.4)	1100 (335)	1250 (381)
3/8				3168 (218)	2534 (174)						1300 (396)	
1/2	0.035 ^⑤	400 ^③ (204)	-30 (-34) ^④	2496 (171)	1996 (137)	8.00 (20.3)	6.00 (1.80)	15.0 (4.60)	0.45 (0.67)	1.25 (31.8)	1000 (305)	800 (244)
	0.049			3552 (244)	2841 (195)						750 (229)	
Copper (ASTM B68, B68M, B75, UNS 12200)												
1/4	0.030	400 ^③ (204)	-30 (-34) ^④	700 (48.2)	—	8.00 (20.3)	6.00 (1.80)	15.0 (4.60)	0.26 (0.39)	1.00 (25.4)	1300 (396)	—
3/8	0.032			450 (31.0)					0.34 (0.51)		1.13 (28.7)	
1/2	0.035 ^⑤	400 ^③ (204)	-30 (-34) ^④	400 (27.5)	—	8.00 (20.3)	6.00 (1.80)	15.0 (4.60)	0.43 (0.64)	1.25 (31.8)	1000 (305)	—
	0.049			550 (37.8)					0.50 (0.74)			

Metric

Tube OD mm	Nominal Wall Thickness mm	Max Process Temperature °C (°F)	Min Service Temperature °C (°F)	Pressure Rating at 204°C (400°F) bar (psig)		Min Bend Radius cm (in.)	Support Centers m (ft)		Weight kg/m (lb/ft)	Nominal OD mm (in.)	Max Bulk Length ^① m (ft)		
				Seamless	Welded		Horiz	Vert			Seamless	Welded	
Stainless Steel (ASTM A269, A213[®] (TP 316/316L))													
6	1.0	204 (400) ^③	-34 ^④ (-30)	403 (5849)	322 (4673)	20.3 (8.00)	1.80 (6.00)	4.60 (15.0)	0.40 (0.27)	24.9 (0.98)	610 (2000)	305 (1000)	
10				230 (3338)	184 (2670)				0.57 (0.38)		28.7 (1.13)		335 (1100)
12				192 (2786)	153 (2220)				0.63 (0.42)		30.7 (1.21)		275 (902)
Copper (ASTM B68, B68M, B75, UNS 12200)													
6	1.0	204 (400) ^③	-40 ^④ (-40)	47.0 (682)	—	20.3 (8.00)	1.80 (6.00)	4.60 (15.0)	0.40 (0.27)	24.9 (0.98)	455 (1490)	—	
10				30.0 (435)					0.55 (0.37)		28.7 (1.13)		305 (1000)
12				27.0 (391)					0.64 (0.43)		30.7 (1.21)		

① Tolerance for bulk-length tubing is ±10 %.

② Nominal wall thickness, not minimum wall thickness. Seamless metric sizes also meet DIN 17458 test 1 class material 1.4401/1.4404.

③ The maximum jacket surface temperature is 140°F (60°C) with a process temperature of 400° F (204°C) and an ambient temperature of 80°F (26°C) and a 10 mph (16 km/h) of wind.

④ -10°F (-23°C) installation temperature.

⑤ Not recommended for use with tube fittings in gas service.

⚠ Seal insulation ends to prevent contamination of the insulation.

For jacket properties information, see page 4.

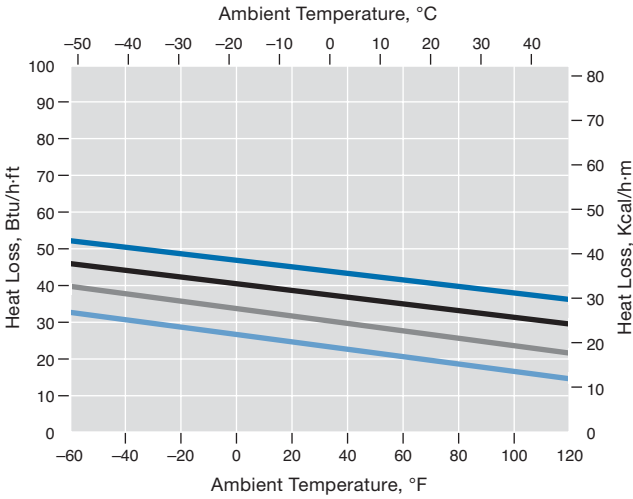
Tubing Data

For additional information, see Swagelok *Tubing Data*, MS-01-107.

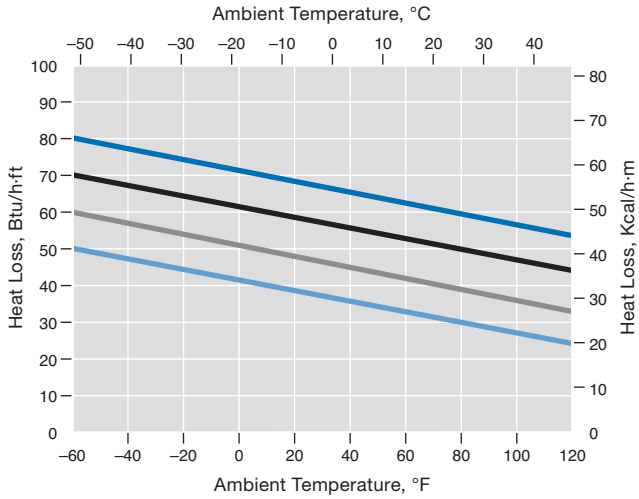
Insulated Tubing Heat Loss

The information presented represents typical performance data for low-temperature PVC and urethane jackets for the conditions given. Actual results may vary with the conditions of installation. Heat loss calculated with 25 mph (40 km/h) wind.

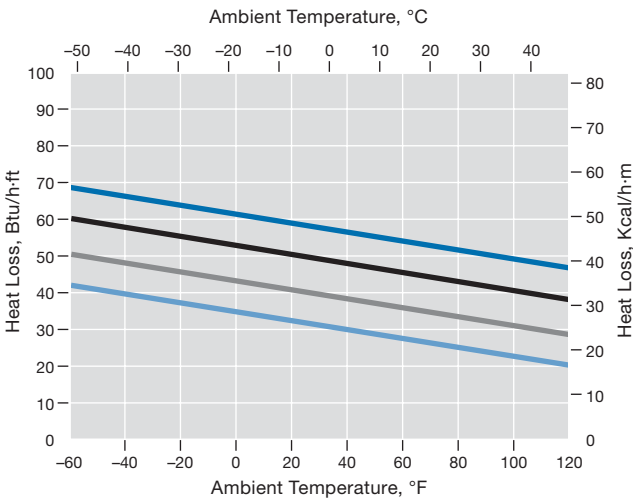
1/4 in. and 6 mm Tubing



1/2 in. and 12 mm Tubing



3/8 in. and 10 mm Tubing



Legend

- 200 psig (13.7 bar) steam 388°F (197°C)
- 125 psig (8.6 bar) steam 353°F (178°C)
- 50 psig (3.4 bar) steam 299°F (148°C)
- 15 psig (1.0 bar) steam 250°F (121°C)

Jacket Properties

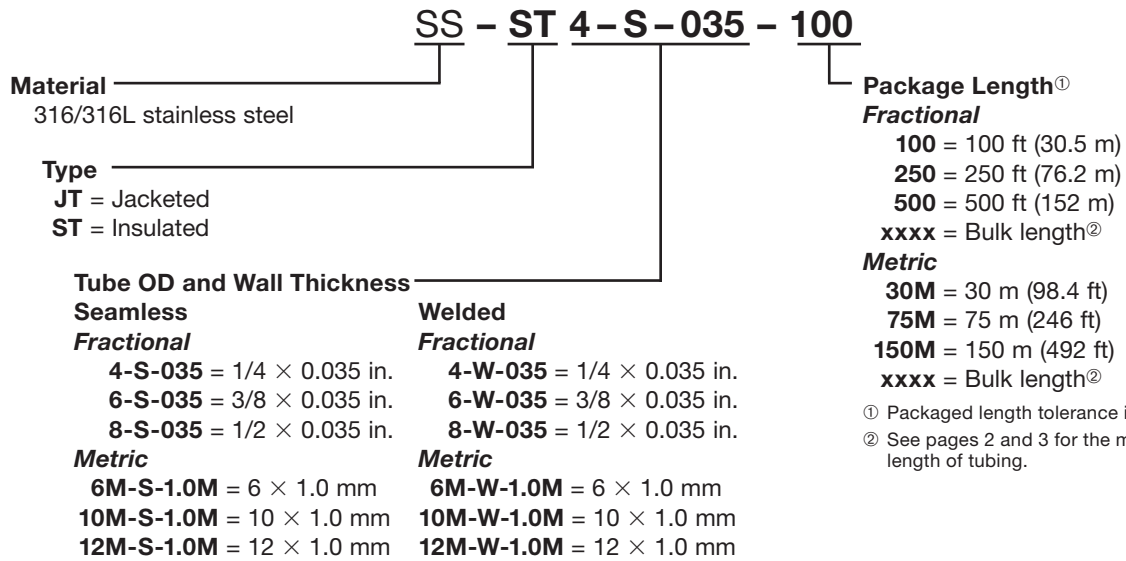
Jacket Properties	Low-Temperature PVC	Optional Urethane
Tensile strength	2200 psi (151 bar)	3800 psi (261 bar)
Elongation	350 %	700 %
Hardness, Shore A	80	80
Maximum temperature	220°F (104°C)	200°F (93°C)
Minimum installation temperature	-40°F (-40°C) ^①	-40°F (-40°C)
Minimum service temperature	-40°F (-40°C) ^②	-60°F (-51°C)
Halogenated (chlorides)	Yes	No
Water absorption	0.10 %	1.2 to 1.4 %
Flame resistance	24 rating in accordance with ASTM D2863	V2 in accordance with UL94
UV resistance	750 h in accordance with UL-1581	2000 h in accordance with QUV aging test

① -10°F (-23°C) for insulated tubing.
 ② -30°F (-34°C) for insulated tubing.

Ordering Information

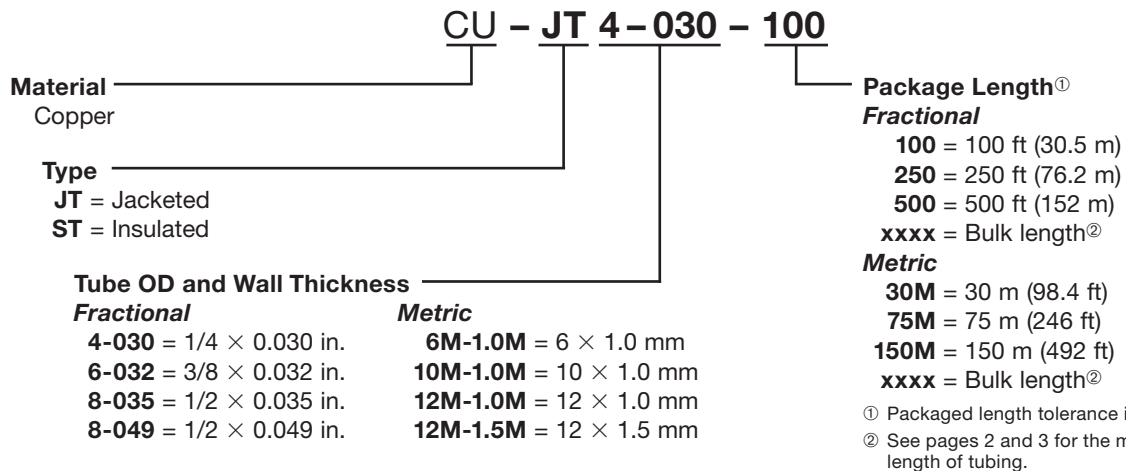
Stainless Steel Tubing

Build a stainless steel jacketed or insulated tubing ordering number by combining the designators in the sequence shown below.



Copper Tubing

Build a copper jacketed or insulated tubing ordering number by combining the designators in the sequence shown below.



Options

Urethane Jacket (Insulated Tubing)

This optional jacket material is a nonhalogenated thermoplastic urethane that has excellent low- and high-temperature characteristics. It also offers improved resistance to abrasion, aromatic hydrocarbons, and UV light. See page 4 for jacket properties. To order, add **-U** to the ordering number.

Example: SS-ST4-S-035-100-**U**

Jacket Colors (Insulated Tubing)

The standard jacket is black. For other colors, contact your authorized Swagelok sales and service representative.

Tubing Material and Size (Jacketed Tubing and Insulated Tubing)

Other materials and sizes are available. Contact your authorized Swagelok representative.

Accessories

Bending Tool

Similar to a common electrical conduit bender, this tool is compact and easy to use and has the required 8 in. (20.3 cm) minimum bending radius. A 3/4 in. NPT threaded handle is needed.

Ordering number: **MS-BBT**

Heat-Shrink End-Seal Boots

Made of thermally stabilized, modified polyolefin, these heat-shrinkable boots provide a weatherproof end seal for all sizes of insulated tubing and protect against moisture ingress. Each kit contains 20 end-seal boots.

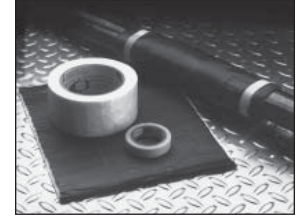
Ordering number: **MS-HSB-KIT**



Jacket Patch Kit

The jacket patch kit can be used to seal a splice in tubing or to repair any incidental field damage to insulation and jacket. Each kit contains thermal insulation, fiberglass tape, and a self-sealing patch.

Ordering number: **MS-JP-KIT**



Caps

Protective end caps for temporarily sealing tubing ends during storage and installation. Each kit contains 20 caps.

Tube OD		Ordering Number
in.	mm	
1/4	6	MS-46-CAP-KIT
3/8		
1/2	10	MS-8-CAP-KIT
	12	

Silicone Sealant

This silicone RTV sealant can be used to seal ends of insulated tubing from moisture, and offers excellent resistance to weather, oil, and many chemicals. One tube will seal approximately 10 ends; each kit contains 8 tubes.

Service Temperature: -60 to 400°F (-51 to 204°C)

Cure Time: approximately 24 h at 77°F (25°C) and 50 % relative humidity

Ordering number: **MS-RTV-SEAL-KIT**

Weatherproof Strip Insulation

Weatherproof strip insulation provides an effective method of temporarily insulating components.

The jacketed insulation is universal and easy to install. It is approximately 4 in. (102 mm) wide and 1/2 in. (12.7 mm) thick and is available in standard lengths of 10, 30, and 50 ft (3.0, 9.1, and 15.2 m) packages.

Insulation Item	Ordering Number
10 ft (3.0 m) insulation strip	MS-SI-10
30 ft (9.1 m) insulation strip	MS-SI-30
50 ft (15.2 m) insulation strip	MS-SI-50
25 insulation tie straps	MS-SITS-KIT

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.