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Leak - Proof Flow & Control Solution Partner

The Best Partner
for Value Creation

S-LOK® Tube Fittings

HanSun

한선엔지니어링(주)
HANSUN ENGINEERING CO., LTD.



S-LOK® Tube Fittings have been designed specifically for the many demanding applications such as chemical, petroleum, power generating, pulp, paper and various types of manufacturing industries. They provide a highly reliable, leak proof and torque free seal on all tubing connections. **S-LOK**® Tube Fittings are commonly used on instrumentation, process and control systems, where high quality tube fittings are required.





Certificate List



GOOD DESIGN
Good design



N



NPT



NS



API Spec. Q1



API Monogram



API ISO/TS 29001



KS



ABS



Lloyd's



DNV

INTRODUCTION OF S-LOK TUBE FITTING

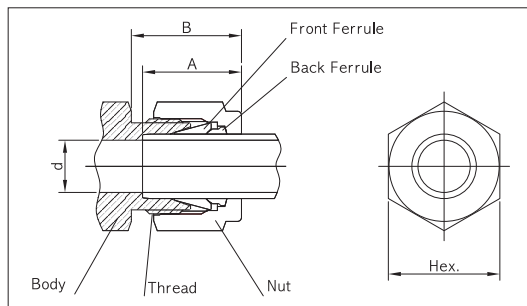
S-LOK tube fittings are manufactured under very strict quality control to assure maximum reliable performance. S-LOK tube fittings require no special tools assembly. Connections can be quickly and easily made by simple insertion and tightening the nuts.

S-LOK tube fitting has been specifically designed for use on instrumentation, process and control systems and equipment employed in chemical, petroleum, power generating and pulp and paper plants. S-LOK tube fittings could also be used in extensive applications of other fields where very high quality tube fittings are required.

CONSTRUCTION OF S-LOK TUBE FITTINGS

S-LOK tube fittings are composed of four precision parts; body, nut, front ferrule and back ferrule.

By screwing the nut onto the body, the nut is tightened against the tapered area of the body and its edge is compressed tightly against the tube by curling inward. The back ferrule is also located between the body and nut. As the front ferrule rolls, the back ferrule rolls up and bites into the tube resulting in the connection of tube and the fitting as well as a non-leakage effect.



The twin ferrule design achieves the leak proof sealing by assembly motion being transmitted axially through the tubing. This results in no radial movement of the tubing upon assembly. Therefore, the tube is not stressed and the mechanical integrity is maintained. This is the result of close tolerance control in machining, surface smoothness and hardness of each and every part of S-LOK tube fittings. Through this swaging action, S-LOK tube fittings are mechanically integrated with the tube connected.

S-LOK Fractional Tube End Dimensions Unit:mm

Size No.	Tube O.D	S-LOK Thread	A	B	d	Hex.
2	1/8	5/16-20UN	12.70	15.24	2.28	11.10
3	3/16	3/8-20UN	13.70	16.00	3.04	12.70
4	1/4	7/16-20UNF	15.24	17.78	4.80	14.20
5	5/16	1/2-20UNF	16.25	18.54	6.35	15.80
6	3/8	9/16-20UN	16.76	19.30	7.10	17.40
8	1/2	3/4-20UNEF	22.86	21.84	10.40	22.20
10	5/8	7/8-20UNEF	24.38	21.84	12.70	25.40
12	3/4	1-20UNEF	24.38	21.84	15.70	28.60
14	7/8	1-1/8-20UN	25.90	21.84	18.20	31.80
16	1	1-5/16-20UN	31.24	26.41	22.40	38.10

S-LOK Metric Tube End Dimensions Unit:mm

Size No.	Tube O.D	S-LOK Thread	A	B	d	Hex.
3M	3mm	5/16-20UN	12.9	15.3	2.4	12.0
4M	4mm	3/8-20UN	13.7	16.1	2.4	12.0
6M	6mm	7/16-20UNF	15.3	17.7	4.8	14.0
8M	8mm	1/2-20UNF	16.2	18.6	6.4	16.0
10M	10mm	5/8-20UN	17.2	19.5	7.9	19.0
12M	12mm	3/4-20UNEF	22.8	22.0	9.5	22.0
15M	15mm	7/8-20UNEF	24.4	22.0	11.9	25.0
16M	16mm	7/8-20UNEF	24.4	22.0	12.7	25.0
18M	18mm	1-20UNEF	24.4	22.0	15.1	30.0
20M	20mm	1-1/8-20UN	26.0	22.0	15.9	32.0
22M	22mm	1-1/8-20UN	26.0	22.0	18.3	32.0
25M	25mm	1-5/16-20UN	31.3	26.5	21.8	38.0

FITTING MATERIALS

S-LOK tube fittings are made of stainless steel (usually SS316), brass and alloy steel (Monel or others).

SUITABLE TUBING MATERIALS

S-LOK tube fittings can be used with the following tube specifications.

Stainless steel tube;

- TP304 and TP316 of ASTM A269 or A213, or equivalent.
- SUS304TP and SUS316TP of JIS G3459 or equivalent.
- The wall thickness selection should be based on the operation pressure, temperature and shock conditions. Fully annealed tubing is recommended.

Stainless steel tubing having a hardness of Rockwell B80 or less should be used.

- Specific recommendation-See Table 1.(page 5)

Typical Raw Material List

Fitting Material	Bar Stock	Forging	Tubing
Stainless Steel Type 316	ASTM A479 ASTM A276 JIS G4303	ASTM A182 F316 JIS G3214	ASTM A269 ASTM A213 ASTM A249
Brass	ASTM B16 Alloy 360 ASTM B453 Alloy 345 JIS H3250 Alloy C3604	ASTM B124 Alloy 377 JIS H3250 Alloy C3771	ASTM B68 ASTM B75 ASM B88 DIN 1786
Carbon Steel	JIS G4051 S20C-S48C	JIS G4051 S20C-S48C	ASTM A161 ASTM A179 DIN 2391
Alloy 400	ASTM B164	ASTM B164	ASTM B165

Tubing

Suitable tubing selection is essential in performance of tubing system. For safe, reliable and leak-free seals tubing should be considered as a fitting component. S-LOK tube fittings perform best when good quality tubing is used. When selecting tubing material including size and wall thickness, customer must consider pressure, flow, temperature, environment and compatibility of system.

- General Rules.

1. For leak-free sealing, the tubing surface is very important. The tubing must have a good surface free from scratches, draw mark, flat spots or dirt.
2. In case of welded tubing, it should not have a visible poor bead on its outside diameter.
3. Tubing and fitting material is essential for the thermal compatibility and corrosion resistance. The tubing and material should be compatible with the process fluid, temperature and environment.
4. Tubing must be softer than fitting material. When tubing and fittings are made of the same material, the metal tubing must be fully annealed.
5. Tubing hardness must be selected according to the information in the table 2 to 4.
6. Do not select a too thin or too thick wall. A too thin wall may collapse and a too thick wall may not properly be deformed by the ferrule action. The wall thickness selection should be based on the applicable pressure, temperature, shock and vibration.

- Consideration facts at the selection of tube.

1. Quality of the tube material and manufacturing method.
2. Hardness of tube.
3. Surface treatment of tube.
4. O.D and tolerance.
5. Wall thickness and tolerance.
6. Concentricity of tube.
7. Ovality. (Shape)

Tubing Temperature Ratings

The maximum and minimum operating temperatures for various tubing material.

Tubing Material	Temperature Range
Stainless Steel 316	-321°F to 1200°F (-196°C to 649°C)
Carbon Steel	-65°F to 799°F (-53°C to 426°C)
Copper	-40°F to 400°F (-40°C to 205°C)
Alloy 400	-324°F to 800°F (-198°C to 427°C)
Alloy C276	-320°F to 1000°F (-195°C to 537°C)
Alloy 600	-205°F to 1200°F (-130°C to 648°C)
Titanium	-320°F to 600°F (-195°C to 315°C)
Teflon	0°F to 150°F (-17°C to 65°C)

Allowable working temperature

When Elastomer seal is used in the fitting, care must be taken for allowable working temperature. See working temperature below.

Elastomer seal material	Working Temperature
NBR (e. g. perbunan [®])	-40°C to 110°C (-40°F to 230°F)
FKM (e. g. Viton [®])	-28°C to 204°C (-20°F to 400°F)
PTFE (e. g. Teflon [®])	-60°C to 204°C (-76°F to 464°F)

Temperature De-rating Factors

The allowable working pressure is determined by various temperatures.

To determine the working pressure at the specific temperatures, multiply the working pressure at ambient temperature shown in table 2~4 by the factor shown in table 1.

Table 1. Temperature De-rating Factors

Temp. °F (°C)	Stainless Steel ASTM A269		C.Steel ASTM A179	Copper ASTM B75	Alloy 400
	304	316			
100 (37)	1.00	1.00	1.00	1.00	1.00
200 (93)	1.00	1.00	0.95	0.80	0.88
300 (148)	1.00	1.00	0.90	0.78	0.82
400 (204)	0.93	0.96	0.86	0.50	0.79
500 (206)	0.87	0.90	0.82	0.13	0.79
600 (315)	0.82	0.85	0.77	-	0.79
700 (370)	0.80	0.82	0.73	-	0.76
800 (426)	0.76	0.79	0.59	-	0.76
900 (480)	0.73	0.78	-	-	-
1000 (537)	0.69	0.76	-	-	-
1200 (649)	0.30	0.37	-	-	-

Example: Tube SS316 3/8 O.D. x 0.035" at 700°F.
 3.300psi x 0.82 = 2.706psi
 Therefore 2.706psi is the maximum allowable working pressure of SS316 3/8" O.D x 0.035" wall tubing.

Stainless steel Tubing :

Fully annealed 304 or 316 high quality seamless steel tube to ASTM A269 or equivalent.

Hardness : Rb80 or less

Table2. Stainless steel Tubing

Stainless Steel Fractional Tubing																				
Tube O.D (inches)	Tube Wall Thickness in Inches																			
	0.010	0.012	0.014	0.016	0.020	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120	0.134	0.156	0.188				
1/16"	5,600	6,800	8,100	9,400	12,000															
1/8"						8,500	10,900					Working Presssure in psig								
3/16"						5,400	7,000	10,200												
1/4"						4,000	5,100	7,500	10,200											
5/16"									4,000	5,800	8,000									
3/8"									3,300	4,800	6,500									
1/2"	For gas service, applying						2,600	3,700	5,100	6,700										
5/8"	tube wall thickness only									2,900	4,000	5,200	6,000							
3/4"	on outside of shade boundary									2,400	3,300	4,200	4,900	5,800						
7/8"										2,000	2,800	3,600	4,200	4,800						
1"												2,400	3,100	3,600	4,200	4,700				
1 1/4"												2,400	2,800	3,300	3,600	4,100	4,900			
1 1/2"														2,300	2,700	3,000	3,400	4,000	4,900	
2"																2,000	2,200	2,500	2,900	3,600

Stainless Steel Metric Tubing																	
Tube O.D (mm)	Tube Wall Thickness in Inches																
	0.71 (0.028)	0.89 (0.035)	1.00	1.25 (0.049)	1.50	1.65 (0.065)	2.0	2.11 (0.083)	2.41 (0.095)	2.50	2.77 (0.109)	3.00	3.05 (0.120)	3.50	4.00	4.50	
3	10,800	13,800	15,300											Working Presssure in psig			
4	7,900	10,100	11,500	14,400													
6	5,000	6,500	7,400	9,400	11,500	12,700											
8		4,700	5,800	6,800	8,400	9,300											
10		3,700	4,200	5,300	6,500	7,300											
12		3,000	3,400	4,400	5,300	5,900	6,600	7,000									
16				2,500	3,200	3,900	4,300	5,300	5,700	6,600	6,800						
18				2,800	3,400	3,800	4,700	5,000	5,800	6,000	6,700						
20	For gas service,			2,500	3,000	3,400	4,200	4,400	5,100	5,300	6,000						
22	applying tube wall			2,300	2,800	3,000	3,800	4,000	4,600	4,800	5,400						
25	thickness only on			2,000	2,400	2,700	3,300	3,500	4,000	4,200	4,700	5,100	5,200				
38	outside of shade boundary									2,300	-	2,900	-	3,400	3,900	4,400	

- Working pressures are based on allowable stress value of 20,000psi (137,800kPa=1,378bar) as specified by ASME B31.3-1999 over the temperature range of -29°C to 37°C (-20°F to 100°F).
- Safety Factor=3.75:1, considering ultimate tensile strength 75,000psi (516,700kPa=5,167bar)
- Pressure calculations are based on Maximum O.D. and minimum wall thickness and no allowance is made for corrosion and erosion. e.g. ASTM A269 1/2 O.D x 0.035" OD tolerance ± 0.005", W.T. ± 10%. Calculations are based on 0.050" OD x 0.035" W.T.
- To determine bar, Multiply psig by 0.0689. To determine kPa, multiply psig 6.89.
- To convert bar to psig, multiply bar by 14.51
- For working pressure per ASME B31.1, multiply value by 0.94

Welded stainless steel Tubing

Based on ASME B31.3-1999 for weld integrity a de-rating factor must be applied to welded tubing.
 For double butt seam tubing multiply by 0.85
 For single butt seam tubing multiply by 0.80.

Copper tubing :

High quality soft annealed seamless copper tube to ASTM B-75 or equivalent.
 Hardness : Rockwell 15T 60 or less

Table3. Copper Tubing

Copper Fractional Tubing										
Tube O.D. (inches)	Tube Wall Thickness in Inches									
	0.010	0.012	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120
1/16"	1,700	3,800	5,400	6,000						
1/8"			2,700	3,400						
3/16"			1,800	2,300	3,400					
1/4"			1,300	1,600	2,500	3,500				
5/16"				1,300	1,900	2,700				
3/8"				1,000	1,600	2,200				
1/2"	For gas service, applying			800	1,100	1,600	2,200			
5/8"	tube wall thickness only on				900	1,200	1,600	1,900		
3/4"	outside of shade boundary				700	1,000	1,300	1,500	1,800	
7/8"					600	800	1,100	1,300	1,500	
1"					500	700	900	1,100	1,300	1,500

Copper Metric Tubing													
Tube O.D. (mm)	Tube Wall Thickness in Millimeters(inches)												
	0.71 (0.028)	0.89 (0.035)	1.0	1.25 (0.049)	1.5	1.65 (0.065)	2.0	2.11 (0.083)	2.41 (0.095)	2.5	2.77 (0.109)	3.0	3.05 (0.120)
3	3,465	4,400	4,900										
4	2,520	3,230	3,670	4,610									
6	1,6110	2,070	2,350	3,020	3,670	4,060							
8		1,510	1,710	2,790	2,680	2,990							
10		1,190	1,350	1,710	2,090	2,320							
12		970	1,100	1,410	1,710	1,900	2,350	2,500					
16			810	1,030	1,260	1,390	1,710	1,810	2,100	2,190			
18	For gas service,			915	1,100	1,220	1,510	1,600	1,840	1,930	2,160		
20	applying tube wall			810	990	1,090	1,350	1,420	1,650	1,710	1,920		
22	thickness only on outside			740	900	990	1,200	1,290	1,480	1,550	1,730		
25	of shade boundary			640	780	870	1,060	1,120	1,290	1,350	1,490	1,640	1,670

- Working pressures are based on allowable stress value of 6000psi(413bar=41,300kPa) as specified by ASME B31.3-1999 over the temperature range of -29°C to 37°C (-20°F to 100°F).
- Safety Factor=5:1, considering ultimate tensile strength 30,000psi (2067bar=206,700kPa)
- Pressure calculations are based on Maximum O.D. and minimum wall thickness and no allowance is made for corrosion and erosion.
- For working pressure per ASME B31.1, multiply value by 0.94

Alloy 400 Tubing

Fully annealed seamless Alloy 400 tubing to ASTM B165 or equivalent.
Hardness : Rb75 or less

Table 4. For seamless Alloy400 Tubing

Tube O.D. (inches)	Tube Wall Thickness in Inches									
	0.010	0.012	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120
1/8"			7,900	10,100						
1/4"			3,700	4,800	7,000	9,500				
3/8"				3,100	4,400	6,100		Working Presssure in psig		
1/2"				2,300	3,200	4,400				
3/4"					2,200	3,000	4,000	4,600		
1"						2,200	2,900	3,400	3,900	4,300

- Working pressures are based on allowable stress value of 18,700psi (128,000kPa=1288bar) as specified by ASME B31.3-1999 over the temperature range of -29°C to 37°C (-20°F to 100°F).
- Safety factor=3.75:1, considering ultimate tensile strength 70,000psi (482,300kPa=4,823bar)
- Pressure calculations are based on maximum O.D. and minimum wall thickness and no allowance is made for corrosion and erosion.
- For working pressure per ASME B31.1, multiply value by 0.94

Special Alloy Tubing

When special alloy tubing is selected, we recommend:

Fully annealed seamless (or welded and cold-drawn, where permitted) alloy tubing to the ASTM specification as shown below. Tubing should be free of scratches for bending or flaring.

S-LOK material Designator	Tube Material	ASTM Number	Tubing	
			Type	Maximum hardness
HC	Alloy C276	B622	Seamless	RB 90
In	Alloy 600	B167	Seamless	RB 90
Ti	Titanium-Grade2	B338	Seamless or Welded	RB 90

Pressure Rating Equivalents:

- 1) 1bar = 100kPa = 14.51psi
- 2) 1kPa = 0.01bar = 0.1451 psi
- 3) 1psi = 0.069bar = 6.89kPa
- 4) 1 kg/cm² = 0.98bar = 14.22psi

Tubing for Gas application

S-LOK tube fittings are designed for a wide range of leak-free application including gas leak proof and vacuum service. Gases can escape even the most minute leakpath due to their small molecules. Tube must therefore be carefully handled not to get scratched.

Use heavier wall tubing for gas service. Heavy wall tubing resists ferrule action by coining out minor defects of the tube surface and thin wall tubes may collapse with little resistance to ferrule action.

For gas service, use the tubing of the un-shadowed section in table 2 - 4

Cryogenic Service

S-LOK fittings in S316 stainless steel provide highly reliable performance from cryogenic temperatures to high temperature levels.

S316 Stainless steel temperature rating : -321°F to 1200°F (-196°C to 649°C)

Cryogenic temperature are considered to be temperatures below : -100°F (-73°C)

Pipe Thread

Many S-LOK tube fittings have a male or female pipe end. These ends sometimes have a lower pressure rating than the pressure rating of the tube fitting end.

Table5. Pipe End Pressure Rating

Size Designator	ISO/NPT Pipe Size	Stainless Steel 316				Brass				Carbon Steel			
		Male		Female		Male		Female		Male		Female	
		pisg	bar	pisg	bar	pisg	bar	pisg	pisg	pisg	bar	pisg	pisg
1	1/16	11,000	758	6,700	462	5,500	379	3,300	227	11,000	758	6,700	462
2	1/8	10,000	689	6,500	448	5,000	345	3,200	221	10,000	689	6,500	448
4	1/4	8,000	551	6,600	455	4,000	276	3,300	227	8,000	551	6,600	455
6	3/8	7,800	538	5,300	365	3,900	269	2,600	179	7,800	538	5,300	365
8	1/2	7,700	531	4,900	338	3,800	262	2,400	165	7,700	531	4,900	338
12	3/4	7,300	503	4,600	317	3,600	248	2,300	159	7,300	503	4,600	317
16	1	5,300	365	4,400	303	2,600	179	2,200	152	5,300	365	4,400	303
20	1-1/4	6,000	414	5,000	345	3,000	207	2,500	172	6,000	414	5,000	345
24	1-1/2	5,000	345	4,600	317	2,500	172	2,300	159	5,000	345	4,600	317
32	2	3,900	269	3,900	269	1,900	131	1,900	131	3,900	269	3,900	269

- The ratings shown above are based on ASME B31.3-1999
- Female pipe ends have lower ratings than male pipe in a given size due to the inner and outer diameters of female threads being larger than those of male pipe ends.
- The ratings shown above are reference only.

Pipe Thread Sealant

Pipe thread sealant is essential to ensure leak-free seal.

Since the Teflon™ tape is commonly used, we provide information of recommended tape width, as well as the numbers of thread to be wrapped. The Teflon™ tape fills the voids between threads and prevents galling on pipe threads. The sealant usually contains a lubricant.

Table 6.

Unit : inches

Nominal Pipe Size	Recommended Tape Width	Effective Thread Length (External) L*	Approx.# of Thread	
1/8	1/8-1/4	0.2639	7	
1/4	1/4	0.4018	7-1/4	
3/8	1/4	0.4075	7-1/3	
1/2	1/4-1/2	0.5337	7-1/2	
3/4	1/4-1/2	0.5457	7-2/3	
1	1/4-1/2	0.6828	8	

※ASME B1.20.1-NPT

Note

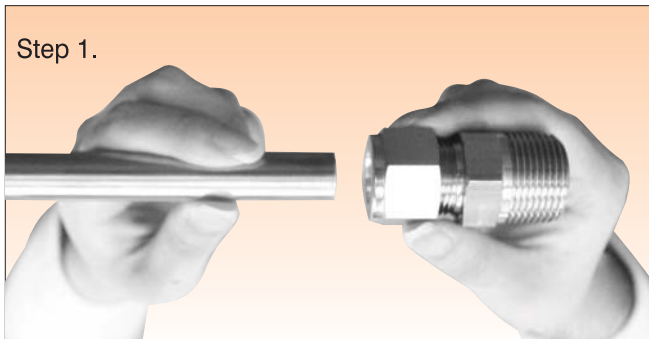
- 1.Wrap Teflon™ tape clockwise from first thread. Do not overhang the first thread, as the tape may get into the fluid system.
- 2.Teflon™ tape has a temperature limit of 230°C (450°F)

Note

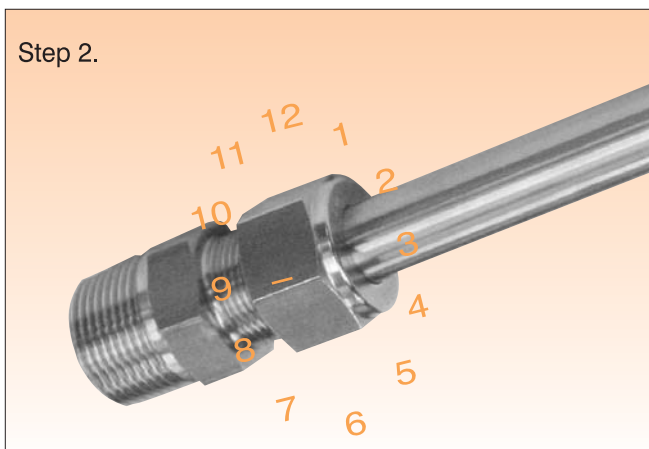
The information shown in table 1-6 are not for design purpose, but for reference only. The accuracy of information is not the liability of our company.

INSTALLATION INSTRUCTIONS

S-LOK is supplied finger-tight and ready for immediate use. Therefore fitting disassembly is not necessary for installation.



Make sure the nut is finger-tight. Put the tubing into the S-LOK tube fitting until the tube end bottoms on the shoulder inside the fitting.



Tighten the nut 1-1/4 turn with a wrench by holding the fitting body with a back up wrench.

Marking the nut at the 9:00 o' clock position may be necessary for counting the number of turns as the mark will stop at the 12 o' clock position after 1-1/4 turns.

*Only 3/4 turn from finger tight is required for sizes 1/8", 3/16", 3mm and 4mm.

Re-assembly Instructions

S-LOK connections can be used many times. Prior to re-assembly, ensure the components are clean and free of defects.

Step 1.

Insert the tubing with pre-swaged ferrules and a nut into the body until the front ferrule seats firmly in the fitting body.

Step 2.

Hand tighten the nut. Then rotate the nut with a wrench to the original 1-1/4 tight position (sharp rise in torque is felt at the original position) and snug slightly with a wrench.

Tube handling during installation

1. Do not force the tubing into the fitting when it does not smoothly go in. It may be a deformed oval or have burrs at the tubing end.
2. It is important to use the proper tube cutter and maintain a sharp cutting wheel on it always.

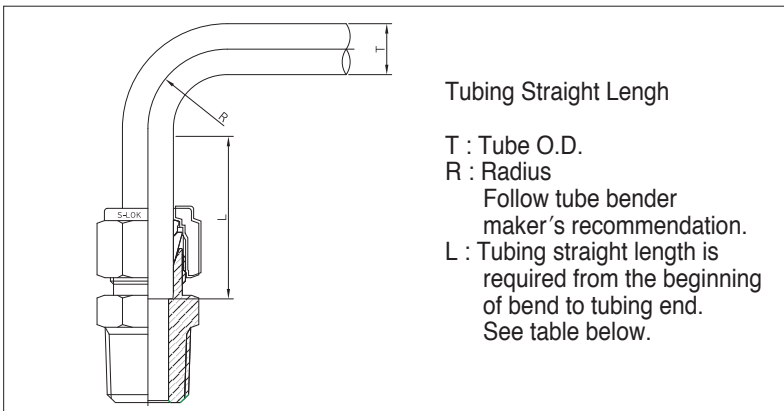
Proper Tube Handling

Good handling practices can greatly save the good surface finish of the tubing supplied.

- Tubing should never be dragged out of a tubing rack.
- Tubing should never be dragged across cement, asphalt, gravel or any other rough surface.
- Tubing cutter wheel and hacksaw blade should always be sharp.
- Try not to take deep cuts with each turn of the cutter or stroke of the saw.
- Tube end should always be deburred.
- Tubing should be stored to avoid collection of dirt and contamination.
- If possible, tubing ends should be plugged so any foreign materials will not fall inside.

Tube bending

For leak tight installation, In case of bending tubing near at S-LOK fittings, there should be enough lineal distance from bending point to the fittings. When tube bend is too close to a fitting, the deformed section at bend shall enter the fitting and it may result in leaks. Also, the bending radius should not be too short of bending radius may affect the working pressure and may cause insufficient flow. Minimum bending radius is usually recommended by the tube bender manufacture.



• Straight length of Fractional tubing Unit:Inch

Tube O.D	Straight Length	
	L1	L2
1/16	2/1	13/32
1/8	23/32	19/32
3/16	3/4	5/8
1/4	13/16	11/16
5/16	7/8	23/32
3/8	15/16	3/4
1/2	13/16	31/32
5/8	1-1/4	1-1/32
3/4	1-1/4	1-1/32
7/8	1-5/16	1-1/32
1	1-1/2	1-9/32
1-1/4	2	1-13/16
1-1/2	1-13/32	2-7/32
2	3-1/4	3-1/32

• Straight length of Metric tubing Unit:mm

Tube O.D	Straight Length	
	L1	L2
3	19	16
6	21	17
8	23	18
10	25	20
12	31	24
14	32	25
16	32	25
18	32	25
20	34	6
22	34	27
25	40	33
32	51	47
38	60	55

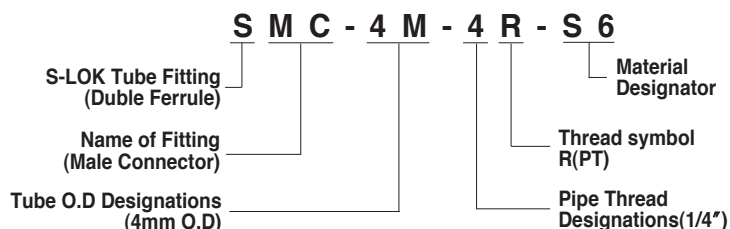
Note

L1=Recommended straight length of tubing required
L2=Absolute minimum straight length of tubing required

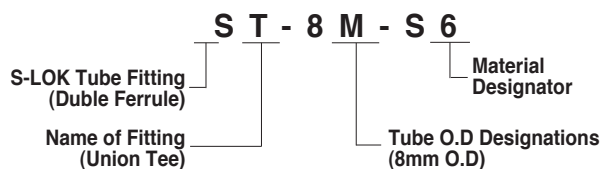
ORDERING INFORMATION

The symbols in the part number column on each page represent the shape and size of individual fittings.

Example 1 : Tube to Pipe ends

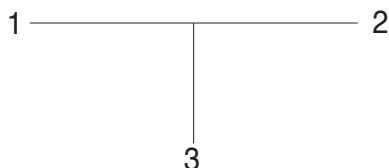


Example 2 : Tube to Tube ends

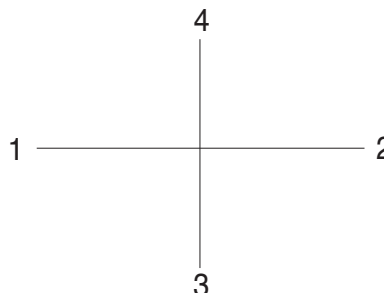


Example 3 : Tee & Cross

Tees are described by first the run (1 and 2) and next the branch(3)



Cross are described by first the run (1 and 2) and next the branch (3 and 4)



• Tube O.D. Designator

Inch O.D	Identifier	Metric O.D	Identifier
1/16	1	2mm	2M
1/8	2	3mm	3M
3/16	3	4mm	4M
1/4	4	6mm	6M
5/16	5	8mm	8M
3/8	6	10mm	10M
1/2	8	12mm	12M
5/8	10	16mm	16M
3/4	12	20mm	20M
1/8	14	22mm	22M
1	16	25mm	25M
1-1/4	20	28mm	28M
1-1/2	24	32mm	32M
2	32	38mm	38M

• Pipe Thread Size Designator

Nom. Size	Identifier
1/8 "	2
1/4 "	4
3/8 "	6
1/2 "	8
3/4 "	12
1 "	16
1-1/4 "	20
1-1/2 "	24
2 "	32







• Fitting Material Designator

Material	Identifier
SS316	S6
SS316L	6L
SS304	S4
Carbon Steel	CS
Brass	BS
Alloy400	MO











• Pipe Thread Symbol

Type	Taper Threads		Parallel Threads	
Symbol	R	N	G	U
Specification	ISO 7/1, BS21(BSPT), JIS B 0203(PT), DIN2999	ANSI B1.20.1 (NPT)	ISO228/1, BS 2779(BSPP), JIS B0202(PF)	American Standard Unified Screw Threads

Tube to Tube Union






Union SU		14
Union Elbow SL		15
Reducing Union SUR		16,17
Union Tee ST		18
Union Cross SX		19
Bulkhead Union SUB		20

Tube to Male Pipe








Male Connector SMC-N		21
Male Connector SMC-R		22
Thermocouple Connector SMCT		22
Male Connector for Bonded Seal SMC-G		23
Male Connector for Metal Gasket SOM		25, 26
Bulkhead Male Connector SMCB		27
45° Male Elbow SLBM		27
Male Elbow SLM		28, 29
Male Run Tee STRM		30, 31
Male Branch Tee STBM		32, 33

Tube to Female Pipe




Female Connector SCF		34, 35
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Gauge Connector SCG		36
Bulkhead Female Connector SCBF		36
Female Elbow SLF		37
Female Run Tee STRF		38
Female Branch Tee STBF		39



Stub Tube Connector






Reducer SR		40, 41
Bulkhead Adapter SAB		42
Male Adapter SAM		42, 43
Female Adapter SAF		44
Female Adapter SAG		45
Port Connector SCP		46
Reducing Port Connector SCRCP		46

Tube to AN Tube






AN Union SUA		47
AN Bulkhead Union SUBA		47
AN Adapter SAA		47

Tube to SAE O-Ring Seal

SAE Male Connector SMCS		49
Positionable SAE Male Elbow SLS		49

Positionable 45° SAE Male Elbow SLBS		50
Positionable SAE Male Run Tee STRS		50
Positionable SAE Male Branch Tee STBS		50
O-Seal Straight Thread Connector SCOS		52
O-Seal Pipe Thread Connector SCOP		52






Tube to Weld End

Male Pipe Weld Connector SCW		53
Male Pipe Weld Elbow SLW		54
Tube Socket Weld Connector SCSW		54
Tube Socket Weld Elbow SLSW		54
Welding Bulkhead Union SBUW		55

Plug and Cap

Plug SP		56
Cap SC		56

Spare Parts

Tube Insert SI		57
Nut SN		57
Front Ferrule SFF		58
Back Ferrule SFB		58
Ferrule Set SFS		58