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Leak - Proof Flow & Control Solution Partner

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for Value Creation

S-LOK® Tube Fittings

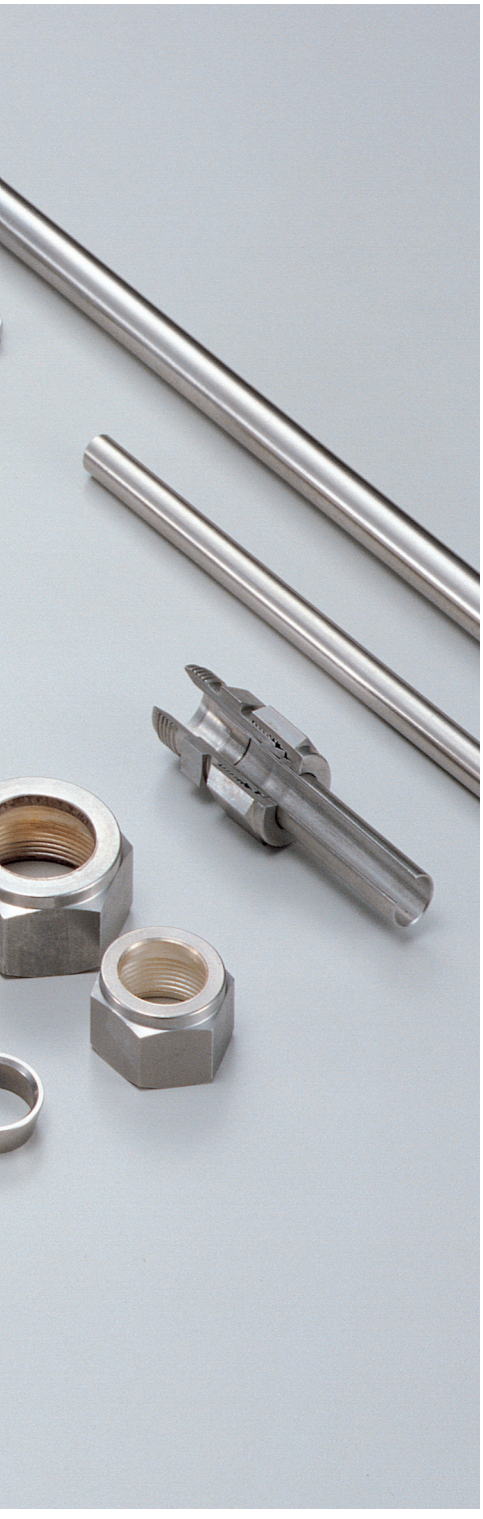
HanSun

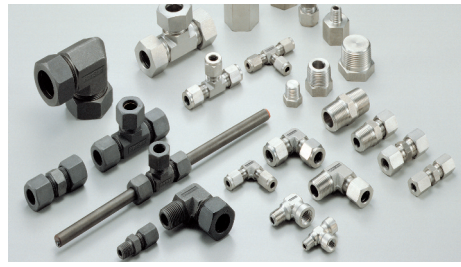
한선엔지니어링(주)
HANSUN ENGINEERING CO., LTD.

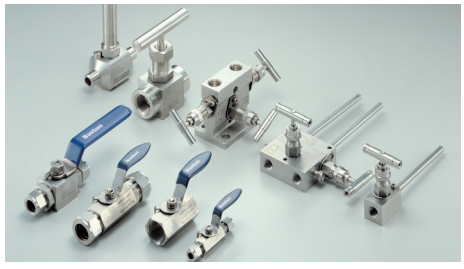
S-LOK® Tube Fittings have been designed specifically for the many demanding applications such as chemical, petroleum, power generating, pulp and paper, and various types of manufacturing industries. They provide a highly reliable, leak proof and torque free seal on all tubing connections. S-LOK® Tube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

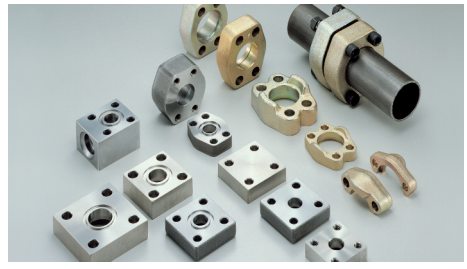
HanSun

S-LOK® Tube Fittings









Certificate List

API Spec.Q1

API Monogram

ABS

Lloyd;s

KR

DNV

GL

BV

CCS

NK

ECE R110 / ISO / 5500 / NGV 3.1 / CSA 12.3

Gost - R

Achilles

Achilles FPAL

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INTRODUCTION OF S-LOK TUBE FITTING

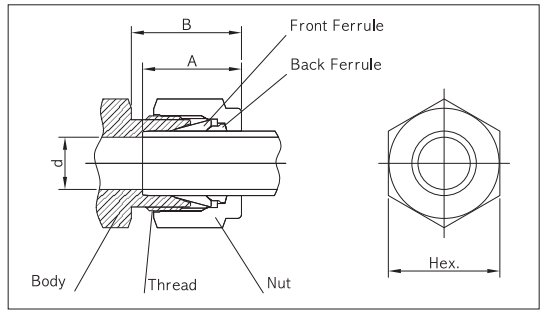
S-LOK tube fittings are manufactured under very strict quality control to assure maximum reliable performance. S-LOK tube fittings require no special tools assembly. Connections can be quickly and easily made by simple insertion and tightening the nuts.

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 monitoring of tolerance control in machining, and 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	13.71	16.00	3.04	12.70
4	1/4	7/16-20UNF	15.24	17.78	4.82	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	7.11	17.40
8	1/2	3/4-20UNEF	22.86	21.84	10.41	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	15.74	28.60
14	7/8	1-1/8-20UN	25.90	21.84	18.28	31.80
16	1	1-5/16-20UN	31.24	26.41	22.35	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 316 stainless steel (S316), brass and alloy steel such as monel or others.

Typical Raw Material List

Fitting Meterial	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

SUITABLE TUBING MATERIALS

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

Stainless steel tube;

a. TP304 and TP316 of ASTM A269 or A213, or equivalent.

b. SUS304TP and SUS316TP of JIS G3459 or equivalent.

c. The wall thickness selection should be based on the operation pressure, temperature and shock conditions. Fully annealed tubing is recommended. Stainless steel tubing with the hardness of Rockwell B90 or less should be used.

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

Tubing

Suitable tube 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 condition with free of scratches, draw mark, flat spots or dirt.
2. In case of welded tubing, it should not have a visible poor bead on its surface.
3. Tubing and fitting material is essential for the thermal compatibility and corrosion resistance. The material should be compatible with the processing fluid, the temperature and the 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. Selecting the wall's thickness should be based on the applicable pressure, temperature, shock and vibration.

- Consider the following in selecting tube.

1. Quality of the tubing 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 Ranges

The maximum and minimum operating temperatures for various tubing material.

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

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 ®)	-35℃ to 110℃(-40°F to 230°F)
FKM (e. g. Viton ®)	-28℃ to 204℃(-20°F to 400°F)
PTFE (e. g. Teflon ®)	-60℃ to 240℃(-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 table1.

Table 1. Temperature De-rating Factors

Temp. °F(℃)	Stainless Steel ASTM A269 304	Stainless Steel ASTM A269 316	C.Steel ASTM A179	Copper ASTM B75	Alloy 400
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 (260)	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 S316 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 S316 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 : HRB90 or less

Table 2. 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 Pressure 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 should only							2,900	4,000	5,200	6,000					
3/4″	be selected from the outside of							2,400	3,300	4,200	4,900	5,800				
7/8″	the shaded boundary							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 mm (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 Pressure 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	For gas service,			2,800	3,400	3,800	4,700	5,000	5,800	6,000	6,700					
20	applying tube wall			2,500	3,000	3,400	4,200	4,400	5,100	5,300	6,000					
22	thickness should only			2,300	2,800	3,000	3,800	4,000	4,600	4,800	5,400					
25	be selected from the			2,000	2,400	2,700	3,300	3,500	4,000	4,200	4,700	5,100	5,200			
38	outside of the shaded 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 in ASME B31.3 within the temperature range of -29℃ to 37℃ (-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″ O.D tolerance ±0.005″,W.T. ±10%. Calculations are based on 0.050″ O.D 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 of ASME B31.1, multiply the above value by 0.94

Welded stainless steel Tubing

Based on ASME B31.3 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

Table 3. 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				Working Pressure in psig		
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 should only				900	1,200	1,600	1,900		
3/4″	be selected from the outside of				700	1,000	1,300	1,500	1,800	
7/8″	the shaded boundary				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 mm (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	3,400	4,400	4,900										
4	2,500	3,200	3,600	4,600						Working Pressure in psig			
6	1,6100	2,000	2,300	3,000	3,600	4,000							
8		1,500	1,700	2,700	2,600	2,900							
10		1,100	1,300	1,700	2,000	2,300							
12	900		1,100	1,400	1,700	1,900	2,300	2,500					
16	For gas service,		800	1,000	1,200	1,300	1,700	1,800	2,100	2,100			
18	applying tube wall thickness			900	1,100	1,200	1,500	1,600	1,800	1,900	2,100		
20	should only be selected			800	900	1,000	1,300	1,400	1,600	1,700	1,900		
22	from the outsi de of the			700	900	900	1,200	1,200	1,400	1,500	1,700		
25	shaded boundary			600	700	800	1,000	1,100	1,200	1,300	1,400	1,600	1,600

- Working pressures are based on allowable stress value of 6000psi(413bar=41,300kPa) as specified in ASME B31.3 within the temperature range of -29℃ to 37℃ (−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 of ASME B31.1, multiply the above value by 0.94

Alloy 400 Tubing

Fully annealed seamless Alloy 400 tubing to ASTM B165 or equivalent.
Hardness : HRB75 or less

Table 4. For seamless Alloy400 Tubing

For seamless Monel 400 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
1/8″			7,900	10,100						
1/4″			3,700	4,800	7,000	9,500		Working Pressure in psig		
3/8″	For gas service, applying			3,100	4,400	6,100				
1/2″	tube wall thickness should only			2,300	3,200	4,400				
3/4″	be selected from the outside of				2,200	3,000	4,000	4,600		
1″	the shaded boundary					2,200	2,900	3,400	3,900	4,300

- Working pressures are based on allowable stress value of 20,000psi (137,800kPa=1,378bar)as specified in ASME B31.3-1999 within the temperature range of -29℃ to 37℃ (-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 of ASME B31.1, multiply the above 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
C276	Alloy C276	B622	Seamless	HRB 100
A600	Alloy 600	B167	Seamless	HRB 92
Ti	Titanium-Grade2	B338	Seamless or Welded	-

Pressure Rating Equivalents:

1) 1bar = 100kPa = 14.51psi
2) 1kPa = 0.01bar = 0.1451 psi
3) 1psi = 0.069bar = 6.89kPa
4) 1 kg/㎠ = 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 316 stainless steel provide highly reliable performance from cryogenic temperatures to high temperature levels.
316 stainless steel temperature range : -321°F to 1200°F (-196℃ to 649℃)
Cryogenic temperature are considered to be temperatures below : -100°F (-73℃)

Pipe Thread

Many S-LOK tube fittings have a male or female pipe end.
These ends occasionally have a lower pressure rating than the pressure rating of the tube fitting end so consider both of the ratings.

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.

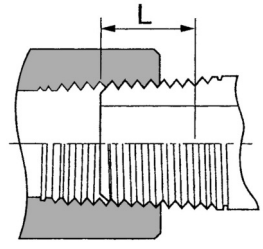
Pipe Thread Sealant

Pipe thread sealant is essential to ensure leak-free seal.
Since the PTFE tape is commonly used, we provide information of recommended tape width, as well as the numbers of thread to be wrapped.
The PTFE 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 PTFE tape clockwise from first thread. Do not overhang the first thread, as the tape may get into the fluid system.
2.PTFE tape has a temperature limit of 230℃(450°F)

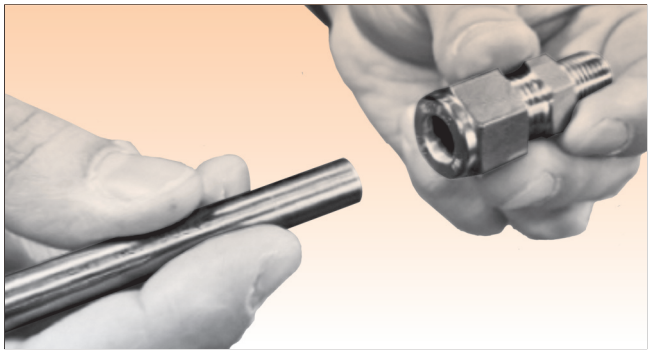
Note

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.

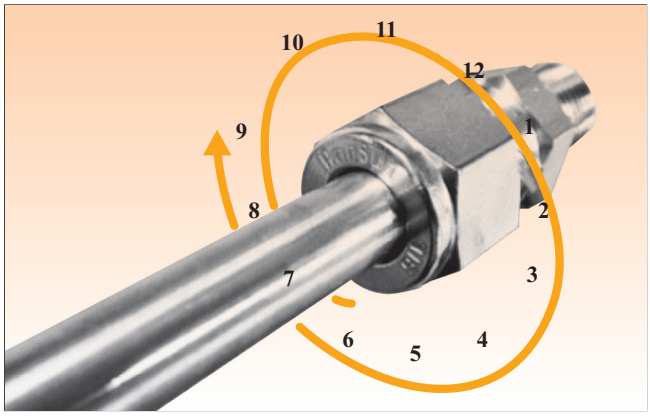
S-LOK® Tube Fitting Instruction Manual

Installation Instruction

Fully insert the tube into the fitting and against the shoulder; tight the nut by finger-tightening. (Caution : The tube may be elliptical or have burrs; foreign material on the surface and/or inside of the tube fitting).



Mark the nut at the 6 o'clock position before placing the spanner.

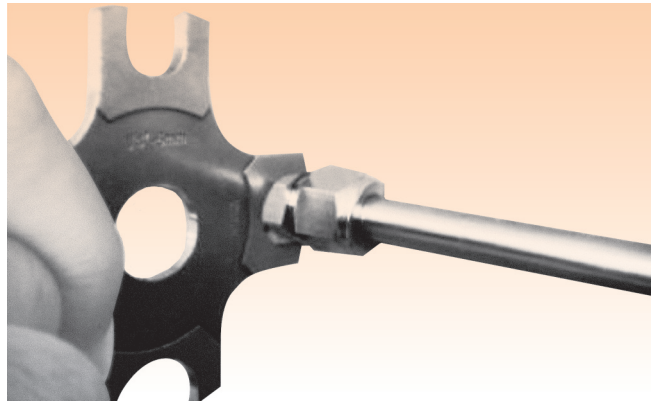


While holding the fitting body steady, tight the nut with the spanner by turning one and one-quarter (1 1/4) clockwise. Make sure that the spanner's starting point at 6 o'clock is being positioned at 9 o'clock after tightening 1 1/4 clockwise.

Tighten the nut only 3/4 turn to the 3 o'clock position for 1/16, 1/8 and 3/16 inch (2mm, 3mm and 4mm) size tube fittings.

When it was tightened 1 1/4 turn clockwise, the tube fitting has been designed to be endurable even from the bursting pressure of the tube, therefore insufficient tightening against the regulation may cause the leakage and bursting while over-tightening makes the reassembly difficult due to deformity.

Gageability

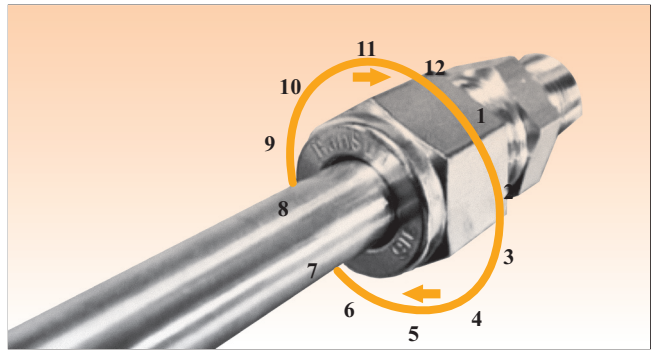


Gap Inspection Gage assures the installer or the inspector that the instrument has been sufficiently tightened during the first installation inspection.

Place Gap Inspection Gage at the gap between the nut and body.

- When the gage does not fit into the gap, it means that the fitting is sufficiently tightened.
- When the gage fits into the gap, it means that it needs to be tightened more.

Reassembly Instruction



S-LOK products can be disassembled and reassembled numerously.

For reassembly, insert the tube with ferrules into the fitting until the front ferrule seats against the fitting body to avoid any damage from foreign objects at the disassembled area.

After hand-tightening the nut while holding the fitting's body steady, tight the nut with a spanner to the previously pulled-up position. At this point, you would feel a significant increase in resistance. Then tight the nut slightly.

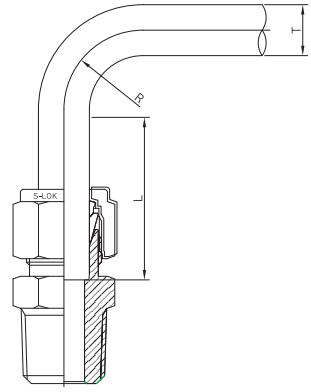
Proper Tube Handling

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

- 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 sealing installation in case of bended tubing being near S-LOK fittings, there should be enough lineal distance from bending point to the fittings. When tube bend is too close to the fitting, the deformed section of the bend may enter the fitting, and it may result in leaking. 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 bending manufacturer.



Tubing Straight Lengh

T : Tube O.D.
R : Radius
Follow the bented tube vendor's recommendation.
L : Straight tubing length is required from the beginning of the bend to the tubing end. See table below.

• Length of straight section of Fractional tubing Unit:Inch

Tube O.D	Straight Lengh	
	L1	L2
1/16	1/2	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	1-3/16	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

• Length of straight section of Metric tubing Unit:mm

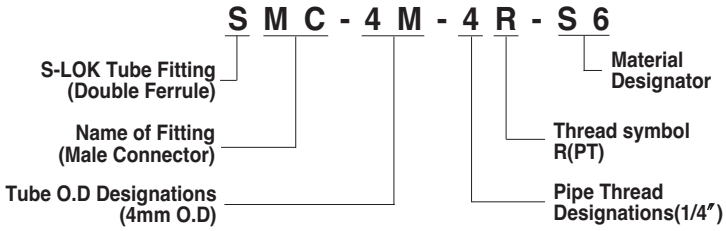
Tube O.D	Straight Lengh	
	L1	L2
3	19	16
6	21	17
8	23	18
10	25	20
12	31	24
14	32	25
16	32	25
18	32	25
20	34	6
22	34	27
25	40	33
32	54	47
38	63	55

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

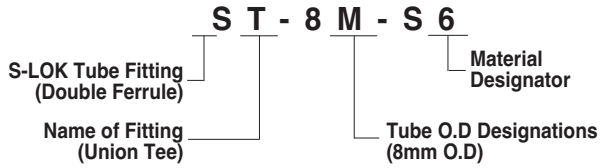
ORDERING INFORMATION

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

Example 1 : Tube to Pipe ends

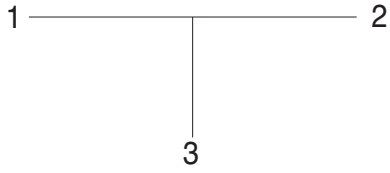


Example 2 : Tube to Tube ends

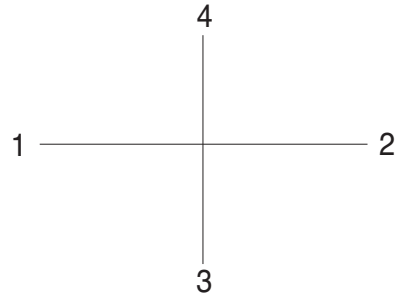


Example 3 : Tee & Cross

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
7/8	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
S316	S6
S316L	S6L
S304	S4
Carbon Steel	CS
Brass	BS
Alloy400	A400

• 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

Tube to Male Pipe

Tube to Female Pipe

Stub Tube Connector

Tube to AN Tube

Tube to SAE O-Ring Seal

Tube to Weld End

Plug and Cap

Spare Parts