Technical Data Sheet

Date: 01.02.2021

INSTRUMENTATION TUBE FITTINGS - STAINLESS STEEL AISI 316

MECALINE Instrumentation 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. The twin ferrule fittings with top quality technical and functional characteristics, such as the silver finishing of the internal part of the threads, are alternative and interchangeable with the most known brands (Swagelok, A-LOK Parker, HY-LOK) for medium and high pressures. All the products are in stainless steel AISI 316 and are completely dedicated to the industrial instrumentation and oil & gas.

MECALINE Instrumentation tube fittings are manufactured under strict quality control parameters in order to guarantee the maximum safety of use, high level of performances and a total reliability (100% Leak Proof). The tube fittings do not need any special tool for their assembly and are studied to balance eventual variation of material, hardness and wall thickness of the seamless steel tubes used.

CERTIFICATION:

- ✓ AMERICAN BUREAU OF SHIPPING
- ✓ LLOYD'S REGISTER
- ✓ KOREAN REGISTER OF SHIPPING
- ✓ BUREAU VERITAS
- ✓ DNV-GL
- ✓ CHINA CLASSIFICATION SOCIETY
- ✓ RMRS

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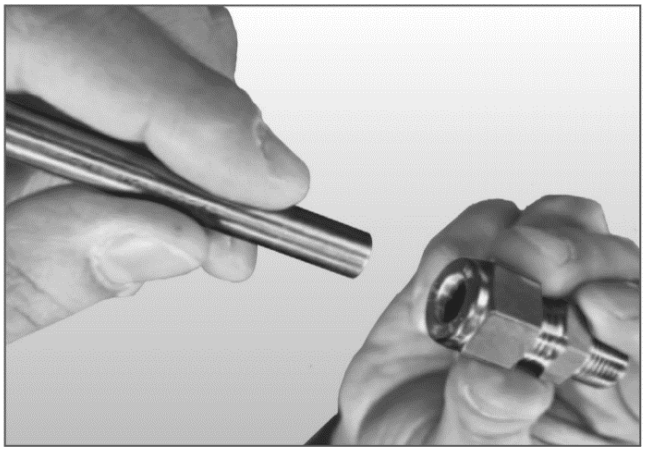
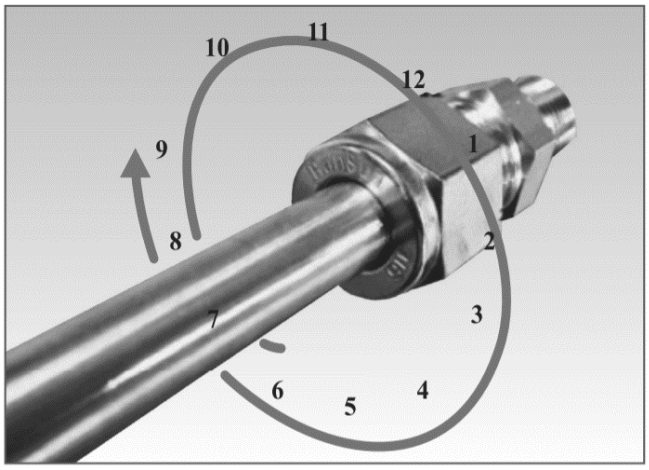
Installation Instruction

- 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).

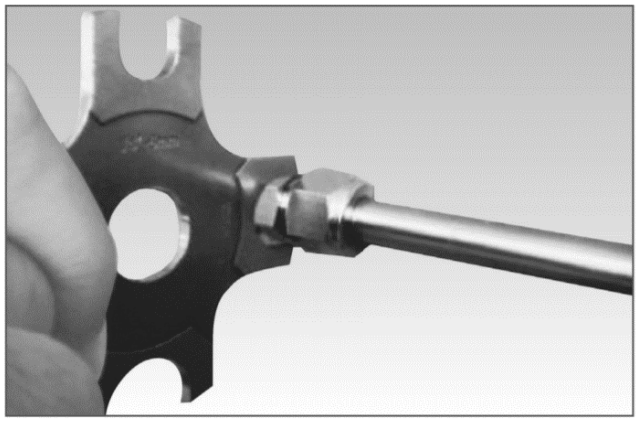


- Mark the nut at the 6 o'clock position before placing the spanner.



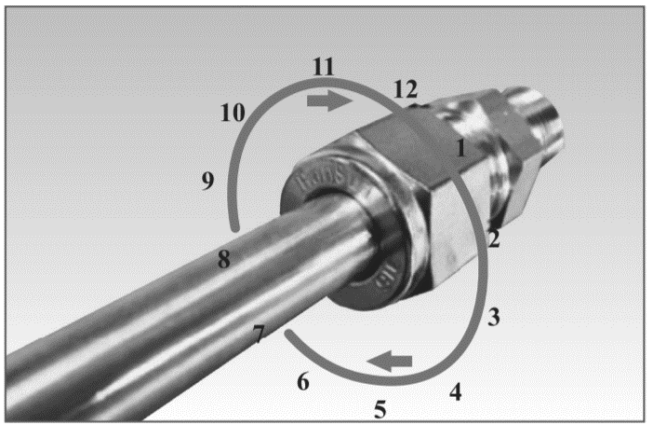
- While holding the fitting body steady, tight the nut with the spanner by turning 1-1/4 clockwise.
- Make sure that the spanner's starting point at 6 o'clock is being positioned at 9 o'clock after tightening 1-1/4 clockwise.
- Tighten the nut only 3/4 turn to the 3 o'clock position for 1/16″, 1/8″ and 3/16″(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.

Gaugeability



- Gap inspection gauge assures the installer or the inspector that the instrument has been sufficiently tightened during the first installation inspection.
- Place gap inspection gauge at the gap between the nut and body.
- When the gauge does not fit into the gap, it means that the fitting is sufficiently tightened.
- When the gauge fits into the gap, it means that it needs to be tightened more.

Reassembly Instruction



- Instrument tube fittings 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.

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Stainless Steel Tubing

Fully annealed 304 or 316 high quality seamless steel tube to ASTM A269 or equivalent.
Hardness : HRB 90 or less

Stainless Steel Metric Tubing

Tube O.D (mm)	Tube Wall Thickness (mm)														
	0.3	0.8	1.0	1.2	1.5	1.8	2.0	2.2	2.5	2.8	3.0	3.5	4.0	4.5	5.0
2	210	660													
3		670									Working pressure (bar)				
4		500	660												
6		310	420	540	710										
8			310	390	520										
10			240	300	400	510	580								
12			200	250	330	410	470								
14			160	200	270	340	380	430							
15			150	190	250	310	360	400							
16				170	230	290	330	370	400						
18				150	200	260	290	320	370						
20				140	180	230	260	290	330	380					
22				140	180	200	230	260	300	340					
25						180	200	230	260	290	320				
28							180	200	230	260	280	330			
30		For gas service, applying tube wall thickness should only be selected from the outside of the shaded boundary.					170	180	210	240	260	310			
32							160	170	200	220	240	290	330		
38								140	160	190	200	240	270	310	
50											150	180	210	240	270

- Working pressure are based on allowable stress value of 20,000psi (137,800kPa) as specified in ASME B31.3 within the temperature range of -29°C to 37°C (-20°F to 100°F), considering ultimate tensile strength 75,000psi (516,700kPa).
- Pressure calculation are based on Maximum O.D and minimum wall thickness and no allowance is made for corrosion and erosion.
- Welded 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.

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Carbon Steel Tubing

Soft annealed seamless carbon steel tube to ASTM A179 or equivalent.
Hardness : HRB 72 or less

Carbon Steel Metric Tubing

Tube O.D (mm)	Tube Wall Thickness (mm)												
	0.8	1.0	1.2	1.5	1.8	2.0	2.2	2.5	2.8	3.0	3.5	4.0	4.5
3	630	790											
6	290	370	460	590						Working pressure (bar)			
8		270	330	430									
10		210	260	330									
12		170	210	270	330	380	420						
14		150	180	230	280	320	350						
15		140	170	210	260	290	330						
16		130	150	200	240	270	300	350					
18			140	170	210	240	270	310					
20			120	160	190	210	240	270	310				
22			110	140	170	190	210	240	280				
25			100	120	150	170	180	210	240	260			
28	For gas service, applying tube wall thickness should only be selected from the outside of the shaded boundary.					150	160	190	210	230	270		
30						140	150	170	200	210	250		
32						130	140	160	180	200	230	270	
38							120	130	150	160	190	230	260

- Working pressure are based on allowable stress value of 15,700psi (108,2000kPa) as specified in ASME B31.3 within the temperature range of -29°C to 37°C (-20°F to 100°F), considering ultimate tensile strength 47,000psi (324,000kPa).
- Pressure calculation are based on Maximum O.D and minimum wall thickness and no allowance is made for corrosion and erosion.

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Copper Tubing

High quality soft annealed seamless copper tube to ASTM B75 or equivalent.
Hardness : HR15T 60 or less

Copper Metric Tubing

Tube O.D (mm)	Tube Wall Thickness (mm)									
	0.8	1.0	1.2	1.5	1.8	2.0	2.2	2.5	2.8	3.0
3	200									
4	140	200						Working pressure (bar)		
6	110	140	170	220						
8		100	120	160						
10		80	100	130						
12		60	80	100	130	140				
14		50	60	90	110	120				
15			60	80	100	110	120			
16				70	90	100	110	120		
18				60	80	90	100	110		
20	For gas service, applying tube wall thickness should only be selected from the outside of the shaded boundary.			60	70	80	90	100	110	
22				50	60	70	80	90	100	
25				40	50	60	70	80	90	100
28					40	50	60	70	80	90

- Working pressure are based on allowable stress value of 6,000psi (41,300kPa) as specified in ASME B31.3 within the temperature range of -29°C to 37°C (-20°F to 100°F), considering ultimate tensile strength 30,000psi (206,700kPa).
- Pressure calculation are based on Maximum O.D and minimum wall thickness and no allowance is made for corrosion and erosion.

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Alloy 400 Tubing

Fully annealed seamless Alloy 400 tube to ASTM B165 or equivalent
Hardness : HRB 75 or less

Alloy 400 Metric Tubing

Tube O.D (mm)	Tube Wall Thickness (mm)									
	0.8	1.0	1.2	1.5	1.8	2.0	2.2	2.5	2.8	3.0
3	630									
4	400						Working pressure (bar)			
6	310	390	490	620						
8		290	350	450						
10		220	280	350						
12		180	230	290						
14		180	190	240	270					
15			190	240	290	330	330			
16			170	220	270	310	320			
18			150	200	240	270	300			
20	For gas service, applying tube wall thickness should only be selected from the outside of the shaded boundary.			180	210	240	270	290		
22				170	200	230	250	290	310	
25					170	190	210	240	270	290
28										

- Working pressure are based on allowable stress value of 20,000psi (137,800kPa) as specified in ASME B31.3 within the temperature range of -29°C to 37°C (-20°F to 100°F), considering ultimate tensile strength 70,000psi (482,300kPa).
- Pressure calculation are based on Maximum O.D and minimum wall thickness and no allowance is made for corrosion and erosion.

Special Alloy Tubing

When special alloy tubing is selected, we recommend: Full 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 of flaring.

Tube Material	ASTM code	MAX. Hardness
Alloy C-276	B622	HRB 100
Alloy 20	B729	HRB 95
Alloy 600	B167	HRB 92

Tube Material	ASTM code	MAX. Hardness
Alloy 625	B444	HRC 25
Alloy 825	B163	HR15T 90
Alloy 6Mo	A269	HRB 96

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Cryogenic Service

MECALINE Instrumentation tube fittings in 316 stainless steel provide highly reliable performance from cryogenic temperatures to high temperature levels. 316 stainless steel temperature range : -196°C to 649°C.
Cryogenic temperature are considered to be temperatures below : -73°C

Proper Tube Handling

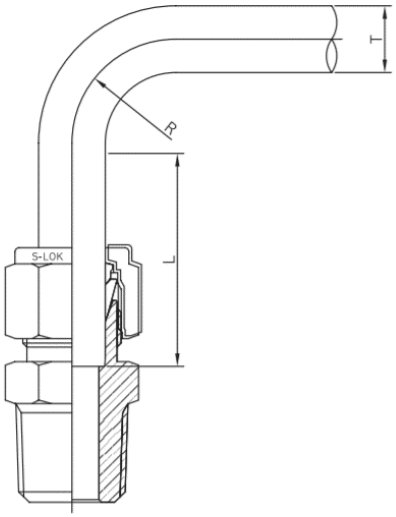
Good handling practices can greatly save the good surface finish of the supplied tube.

- 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 de burred.
- 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 bending manufacturer.

Tube O.D (T) (mm)	Straight Length (L)
3	19
6	21
8	23
10	25
12	31
14	32
15	32
16	32
18	32
20	34
22	40
25	46
28	50
32	54
38	63
50	80



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.

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Pressure Rating

Many 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 rating.

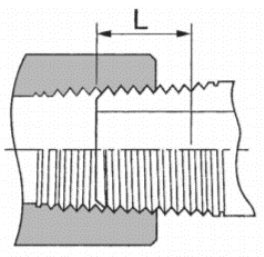
NPT/ISO Pipe Size (inch)	Stainless Steel 316				Brass				Carbon Steel			
	Male		Female		Male		Female		Male		Female	
	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar
1/16	11,000	758	758	462	462	378	3,300	227	11,000	758	6,700	462
1/8	10,000	689	689	448	448	345	3,200	221	10,000	689	6500	448
1/4	8,000	551	551	455	455	276	3,300	227	8,000	551	6,600	455
3/8	7,800	538	538	365	365	269	2,600	179	7,800	538	5,300	365
1/2	7,700	531	531	338	338	262	2,400	165	7,700	531	4,900	338
3/4	7,300	503	503	317	317	248	2,300	159	7,300	503	4,600	317
1	5,300	365	365	303	303	179	2,200	152	5,300	365	4,400	303
1-1/4	6,000	414	414	345	345	207	2,500	172	6,000	414	5,000	345
1-1/2	5,000	345	345	317	317	172	2,300	159	5,000	345	4,600	317
2	3,900	269	269	269	269	131	1,900	131	3,900	269	3,900	269

- The ratings shown above and based on ASME B31.3.
- 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.

Nominal Pipe Size	Recommended Tape Width	Effective Thread External Length (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



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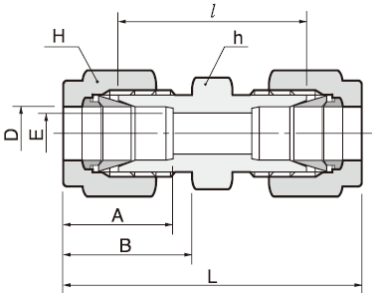
Male Union Straight

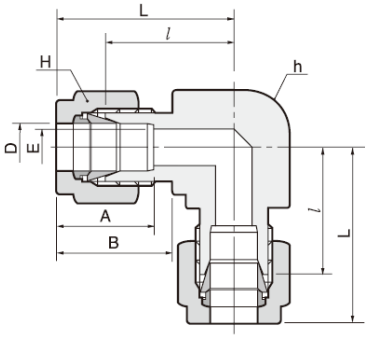
Code	D	E min.	h	H	A	B	l	L
884736	4	2.4	12	12	13.7	16.1	24.1	37.3
884737	6	4.8	14	14	15.3	17.7	26.2	41.0
884738	8	6.4	15	16	16.2	18.6	28.2	43.2
884733	10	7.9	18	19	17.2	19.5	31.0	46.2
884734	12	9.5	22	22	22.8	22.0	31.0	51.2
884735	16	12.7	24	25	24.4	22.0	31.8	52.0



Dimension mm

Male Union Elbow

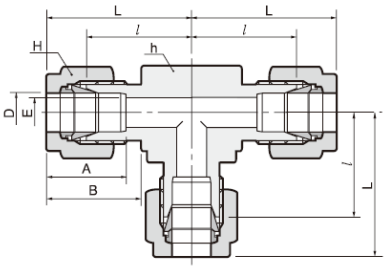
Code	D	E min.	h	H	A	B	l	L
884749	6	4.8	12.7	14	15.3	17.7	19.6	27.0
884750	8	6.4	14.3	16	16.2	18.6	21.3	28.8
884746	10	7.9	17.5	19	17.2	19.5	23.9	31.5
884747	12	9.5	20.6	22	22.8	22.0	25.9	36.0
884748	16	12.7	25.4	25	24.4	22.0	28.7	38.8



Dimension mm

Male Union Tee

Code	D	E min.	h	H	A	B	l	L
884743	6	4.8	12.7	14	15.3	17.7	19.6	27.0
884744	8	6.4	14.3	16	16.2	18.6	21.3	28.8
884740	10	7.9	17.5	19	17.2	19.5	23.9	31.5
884741	12	9.5	20.6	22	22.8	22.0	25.9	36.0
884742	16	12.7	25.4	25	24.4	22.0	28.7	38.8



Dimension mm

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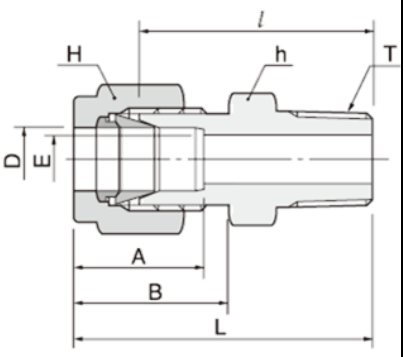
Male Taper Straight

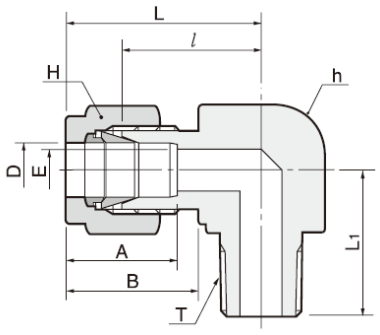
Code	D	T	E min.	h	H	A	B	l	L
884722	6	R1/4	4.8	14	14	15.3	17.7	30.2	37.6
884723	8	R1/4	6.4	15	16	152	18.6	31.2	38.7
884724	8	R3/8	6.4	18	16	16.2	18.8	31.8	39.2
884725	10	R1/4	7.1	18	19	17.2	19.5	33.3	40.9
884726	10	R3/8	7.9	18	19	17.2	19.5	33.3	40.9
884727	10	R1/2	7.9	22	19	17.2	19.5	38.1	45.7
884728	12	R1/4	7.1	22	22	22.8	22	33.3	43.4
884729	12	R3/8	9.5	22	22	22.8	22	33.3	43.4
884730	12	R1/2	9.5	22	22	22.8	22	38.1	48.2
884731	16	R1/2	11.9	24	25	24.4	22	38.9	49



Dimension mm

Male Taper Elbow

Code	D	T	E min.	h	H	A	B	l	L	L1
884757	6	R1/4	4.8	12.7	14	15.3	17.7	19.6	27.0	23.4
884758	8	R1/4	66.0	14.3	16	16.2	18.6	21.3	28.8	24.4
884752	10	R1/4	7.1	17.5	19	17.2	19.5	23.9	31.5	26.2
884753	10	R3/8	7.9	17.5	19	17.2	19.5	23.9	31.5	26.2
884754	12	R1/4	7.1	20.6	22	22.2	22.0	25.9	36.0	28.2
884755	12	R1/2	9.5	20.6	22	22.8	22.0	25.9	38.0	33.0
884756	16	R1/2	11.9	25.4	25	24.4	22.0	27.9	38.0	35.1



Dimension mm

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