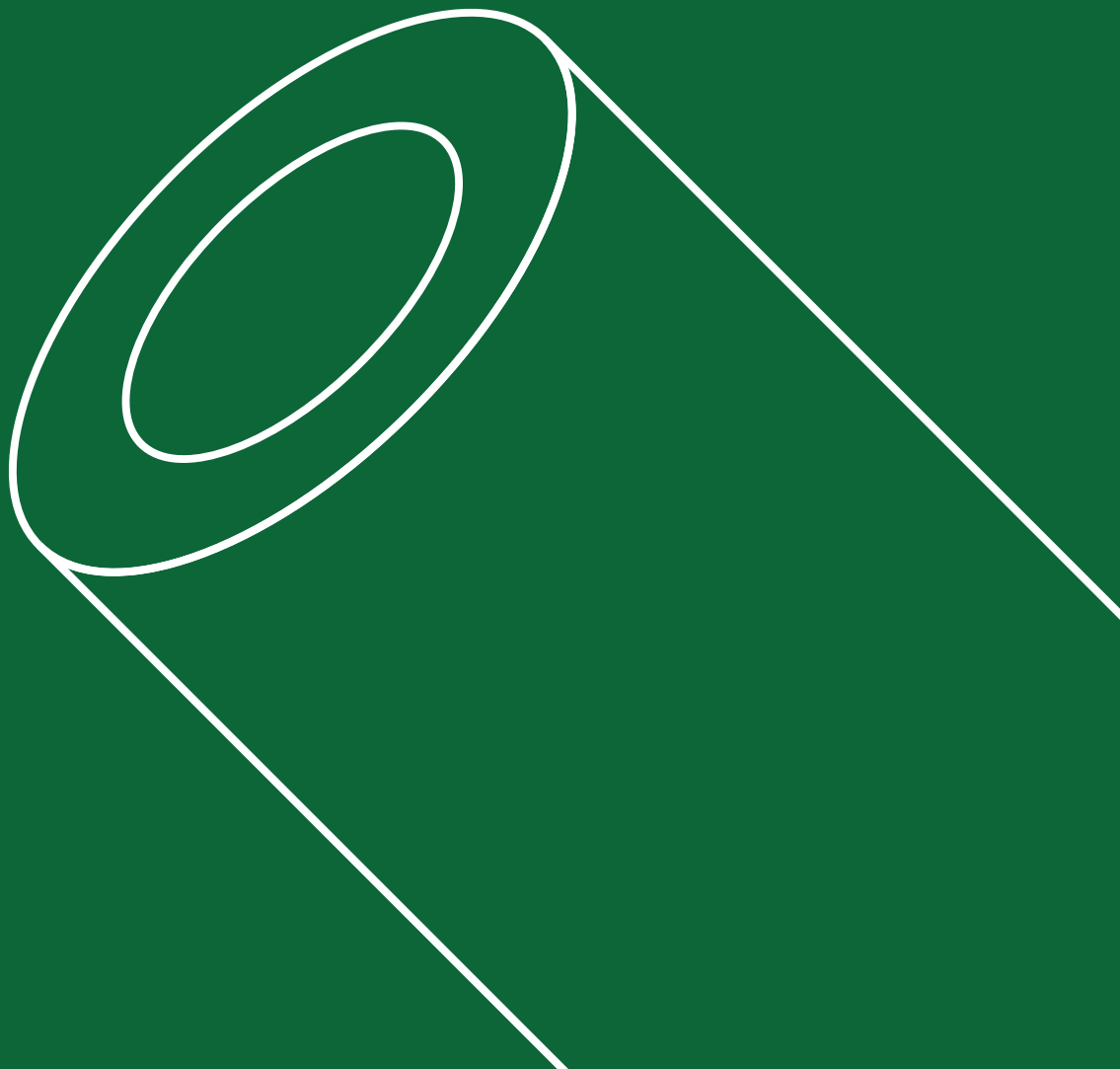




Instrumentation

Tubing





Choose tubing designed to perform and meet the challenges of virtually any industry or application for the heart of your fluid system.

TIKA Instrumentation tubing supplies or sources, based on specific material properties, the following tubing options to meet a variety of application needs.

High Pressure Tubing

Features & Specifications

Material	Stainless steel, other materials can be customized for production.
Size	3 mm-50 mm, 1/8"-2", other sizes can be customized for production.
Working Temperature	-198°C to 537°C (-325°F to 1000°F)

Pickled, bright annealed, or precision cold-worked with subsequent bright annealing, with a mechanically polished external surface.

Custom lengths available according to customer's specific requirements.

Tubing Materials

Our suggested ordering instructions for each type of tubing are shown under the respective tables.

Material	ASTM Standard	Designator	Composition %				Composition %			
			C	Cr	Ni	Mo	Tensile Strength MPa	Yield Strength MPa	Elongation %	Hardness
SS316	A269	SS	1.00	16.0-18.0	10.0-14.0	2.0-3.0	≥515	≥205	≥30	≥187
SS316L	A269	SL	1.00	16.0-18.0	10.0-15.0	2.0-3.0	≥485	≥170	≥30	≥187
SS304	A269	S4	0.08	16.0-20.0	8.0-11.0	-	≥515	≥205	≥30	≥187
SS304L	A269	S4L	0.03	16.0-20.0	8.0-13.0	-	≥485	≥170	≥30	≥187

The recommended allowable working pressure for stainless steel tubing

The specified working pressures in the table pertain exclusively to 316/316L, and 304/304L materials. Regarding seamless tubing, the working pressures are determined according to ASME B31.3 standards. For single butt weld tubing, the pressure rating should be multiplied by 0.8.

Gas Service

Gases (air, hydrogen, helium, nitrogen, etc.) have very small molecules that can escape through even the most minute leak path. Some surface defects on the tubing can provide such a leak path. As tube outside diameter (OD) increases, so does the likelihood of a scratch or other surface defect interfering with proper sealing. The most successful connection for gas service will occur if all installation instructions are carefully followed and the heavier wall thicknesses of tubing on the accompanying tables are selected. A heavy-wall tube resists ferrule action more than a thinwall tube, allowing the ferrules to coin out minor surface imperfections. A thin-wall tube offers less resistance to ferrule action during installation, reducing the chance of coining out surface defects, such as scratches. Within the applicable suggested allowable working pressure table, select a tube wall thickness whose working pressure is outside of the shaded areas.

High PressureTubing Dimensional Tolerance

Composition %	Tube O.D.(D) in. (mm)	O.D. Tolerance in. (mm)	Wall Thickness Tolerance %
SS316/SS316L Enhanced - SS316/SS316L SS304/SS304L 6Mo	D<3/32(2.38)	+0.002(0.05)/-0	+/-10
	3/32(2.38)≤D<3/16(4.76)	+0.003(0.08)/-0	+/-10
	3/16(4.76)≤D≤1(25.4)	+/-0.004(0.1)	+/-10
	1(25.4)<D≤11/2(38.1)	+/-0.005(0.13)	+/-10
	11/2(38.1)<D<2(50.8)	+/-0.008(0.2)	+/-10
	D≥2(50.8)	+/-0.010(0.25)	+/-10

High PressureTubing Metric

Tube O.D. mm	Wall Thickness mm													
	0.8	1	1.2	1.5	1.8	2	2.2	2.5	2.8	3	3.5	4	4.5	5
	Working Pressure bar													
3	670													
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	160	200	230	260	300	340					
25					180	200	230	260	290	320				
28						180	200	230	260	280	330			
30						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
Note: When using HJ Dual Ferrule series tube fittings for gas service, please choose a tube thickness outside of the shaded area.														

Suggested Ordering Information
High-quality, fully annealed (Type 304, 304/304L, 316, 316/316L) stainless steel tubing, EN ISO 1127 or equivalent. Hardness not to exceed 90 HRB or 200 HV. Tubing to be free of scratches, suitable for bending or flaring. OD tolerances not to exceed ± 0.076 mm for 3 mm OD tubing.
Note: Dual-certified grades such as 304/304L and 316/316L meet the minimum chemistry and the mechanical properties of both alloy grades.

High Pressure Tubing Fractional

Tube O.D. mm	Wall Thickness in.											
	0.02	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.12	0.134	0.156	0.188
	Working Pressure psig											
1/8		8500	10900									
3/16		5400	7000	10200	1.8							
1/4		4000	5100	7500	10200							
5/16			4000	5800	8000							
3/8			3300	4800	6500	7500						
1/2			2600	3700	5100	6700						
5/8				2900	4000	5200	6000					
3/4				2400	3300	4200	4900	5800				
7/8				2000	2800	3600	4200	4800				
1					2400	3100	3600	4200	4700			
1 1/4						2400	2800	3300	3600	4100	4900	
1 1/2							2300	2700	3000	3400	4000	4900
2								2000	2200	2500	2900	3600

Note: When using HJ Dual Ferrule series tube fittings for gas service, please choose a tube thickness outside of the shaded area.

High Pressure Tubing Elevated Temperature Factors

Temperature		Factor	
°C	°F	316/316L	304/304L
93	200	1.00	1.00
204	400	0.96	0.93
315	600	0.85	0.82
426	800	0.79	0.76
537	1000	0.76	0.69

1. To determine allowable working pressure at elevated temperature, multiply allowable room temperature working pressure by temperature factor from table above. (elevated temperature factor = suggested allowable working pressure at elevated temperature / suggested allowable working pressure at room temperature.)
2. Based on 375°F (190°C) max.
3. Dual-certified grades such as 304/304L, 316/316L, and 317/317L meet the requirements for the lower maximum carbon content of the L grades and the higher minimum yield and tensile strength of the non-L grades.
4. Based on the lower derating factor for stainless steel, in accordance with ASME B31.3.
5. Use of 2507 super duplex stainless steel at temperatures above 482°F (250°C) causes microstructural changes that lead to embrittlement and loss of corrosion resistance. Derating factor at 482°F (250°C) is 0.90.

Tubing Installation

Tubing properly selected and handled, combined with properly installed **TIKA** tube fittings, will give you a leaktight system and provide reliable service in a wide variety of applications.

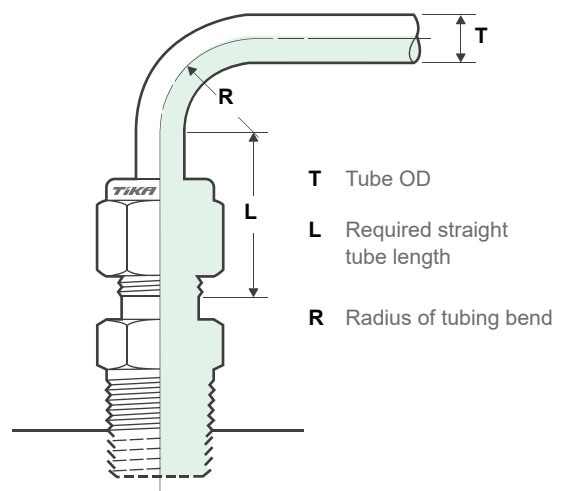
For maximum assurance of reliable performance, use:

- properly selected and handled high-quality tubing—such as provided by **TIKA**
- **TIKA** tube fittings assembled in accordance with catalog instructions
- an appropriate tube support system to limit the movement of tubing and fluid system components.

When installing fittings near tube bends, there must be a sufficient straight length of tubing to allow the tube to be bottomed in the **TIKA** fitting.

Standard Instrumentation Tubing

See the Swagelok Stainless Steel Seamless Tubing—Fractional, Metric, and Imperial Sizes catalog, MS-01-181, for ordering numbers and complete information on 316 / 316L and 304 / 304L standard instrumentation tubing.



Super High Pressure Tubing

Features & Specifications

Made from SS316L stainless steel, this tubing undergoes rigorous chemical cleaning and passivation processes, as well as thermocouple cleaning, to achieve ultrahigh purity. It is ideal for applications requiring exceptional cleanliness and corrosion resistance. Additionally, the tube ends are prepared for orbital welding, facilitating easy and reliable installation.

Material	Stainless steel SS316 / SS316L
Work Pressure	1034 bar (15,000 psig) to 4137 bar (60,000 psig)
Working Temperature	-252°C to 649°C (-423°F to 1200°F)

Cold-drawn seamless tube

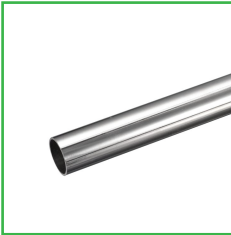
Straight tube length and coned & threaded tube length can be customized according to customer specifications.

Super High Pressure Tubing Dimension Tolerance

Tube O.D. (in.)	O.D. Tolerance (in.)	Wall Thickness Tolerance %
1/8	+/-0.003	+/-10
1/4	+/-0.005	+/-10
3/8	+/-0.005	+/-10
1/2	+/-0.005	+/-10
3/4	+/-0.005	+/-10
1	+/-0.005	+/-10

Instrumentation

I



Medium Pressure

Tubing

WFG1

Tube

Series	Type		Size		Wall Thickness				Length		Material	
					Metric		Fractional					
Code	Code	Spec	Code	Spec	Code	Spec	Code	Spec	Code	Spec	Code	Spec
TI-WFG1	MT	Metric Tube	2	1/8"	0.3	0.3mm	010	0.010"	1m	3.28 ft	SS	316SS
	FT	Fractional Tube	3	3mm or 3/16"	0.4	0.4mm	012	0.012"	2m	6.56 ft	SL	316LSS
			4	1/4"	0.5	0.5mm	014	0.014"	6m	19.68 ft	S4	304SS
			5	5/16"	0.8	0.8mm	016	0.016"			S4L	304LSS
			6	6mm or 3/8"	1.0	1.0mm	020	0.020"				
			8	8mm or 1/2"	1.2	1.2mm	028	0.028"				
			10	10mm or 5/8"	1.5	1.5mm	035	0.035"				
			12	12mm or 3/4"	1.8	1.8mm	049	0.049"				
			14	14mm or 7/8	2.0	2.0mm	065	0.065"				
			15	15mm	2.2	2.2mm	083	0.083"				
			16	16mm or 1"	2.5	2.5mm	095	0.095"				
			18	18mm	2.8	2.8mm	109	0.109"				
			20	20mm or 1 1/4"	3.0	3.0mm	120	0.120"				
			22	22mm	3.5	3.5mm	134	0.134"				
			24	1 1/2"	4.0	4.0mm	156	0.156"				
			25	25mm	4.5	4.5mm	188	0.188"				
			28	28mm	5.0	5.0mm						
			30	30mm								
			32	32mm or 2"								
			38	38mm								
			50	50mm								



WARNING

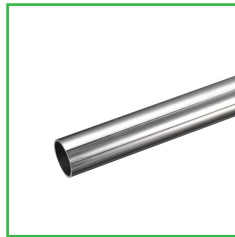
Do not mix/interchange **TIKA** products or components not governed by industrial design standards, including **TIKA** tube fitting end connections, with those of other manufacturers.

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.



Instrumentation



Super High Pressure

SHP

Tubing

T

Tube

T

Code	Tube O.D. in.	Wall Thickness in.	Tube I.D. in.	Working Pressure psig(bar)
TI-SHPT9ft-101-15000	9/16	0.101	0.359	15000(1034)
TI-SHPT12ft-117-15000	3/4	0.3mm	0.010"	15000(1034)
TI-SHPT16ft-156-15000	1	0.4mm	0.012"	15000(1034)
TI-SHPT4ft-070-20000	1/4	0.070	0.109	20000(1379)
TI-SHPT6ft-086-20000	3/8	0.086	0.203	20000(1379)
TI-SHPT9ft-125-20000	9/16	0.725	0.312	20000(1379)
TI-SHPT12ft-156-20000	3/4	0.156	0.438	20000(1379)
TI-SHPT16ft-219-20000	1	0.219	0.562	20000(1379)
TI-SHPT6ft-102-40000	3/8	0.102	0.170	40000(2759)
TI-SHPT9ft-156-40000	9/16	0.156	0.250	40000(2759)
TI-SHPT12ft-281-40000	1	0.281	0.438	40000(2759)
TI-SHPT2ft-043-60000	1/8	0.043	0.041	60000(4137)
TI-SHPT4ft-083-60000	1/4	0.083	0.083	60000(4137)
TI-SHPT6ft-125-60000	3/8	0.125	0.125	60000(4137)
TI-SHPT9ft-187-60000	9/16	0.187	0.187	60000(4137)



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