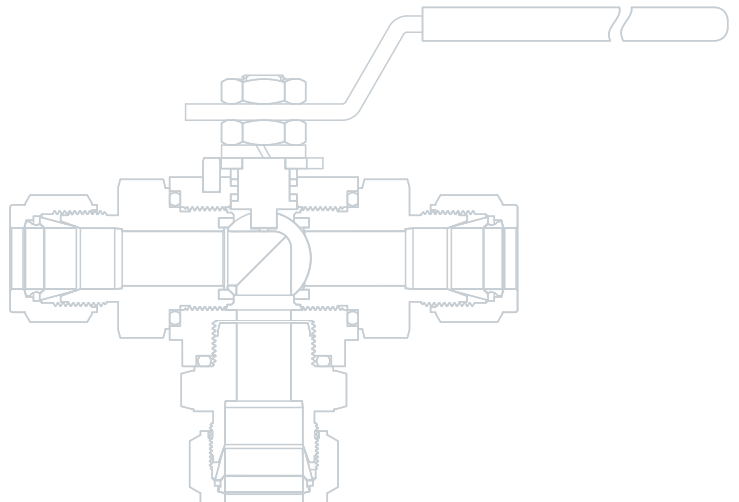
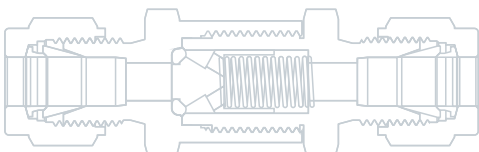
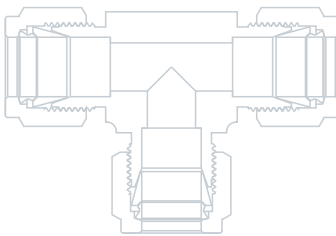


# FITOK

Valves and Fittings

Full Technical Catalog  
For General Instrumentation

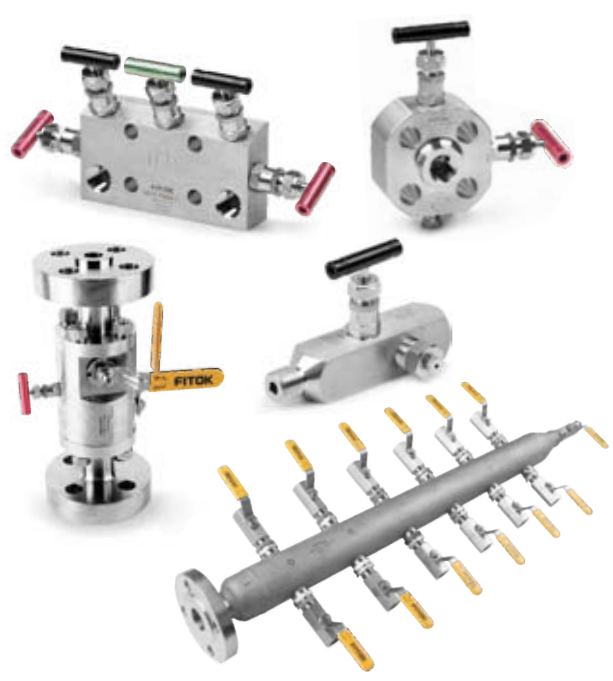


FITOK Full Technical Catalog  
For General Instrumentation

# Fittings



# Manifolds



# Hoses and Quick-connects





# A

## Fittings

6 Series Tube Fittings	A-02
37° Flared Tube Fittings	A-88
VL Series Vacuum Tube Fittings	A-104
6 Series Pipe Fittings	A-110
6 Series Weld Fittings	A-144

# B

## Valves and Filters

Ball Valves	B-02
Plug Valves	B-54
Needle Valves	B-60
Metering Valves	B-103
Bellows-sealed Valves	B-114
Check Valves	B-126
Proportional Relief Valves	B-142
Bleed Valves	B-152
Purge Valves	B-157
Filters	B-162

# C

## Manifolds

Gauge Valves and Instrumentation Manifolds	C-02
Block and Bleed Valves	C-25
Air Headers and Distribution Manifolds	C-50

# D

## Hoses and Quick-connects

Hoses and Connectors	D-02
Quick-connects	D-25

# E

## Vessels and Sample Cylinders

Condensate Pots and Vessels	E-02
Sample Cylinders and Accessories	E-09
Sample Cylinders Compliant with TPED	E-21

# F

## Tubing, Tubing Tools and Other Elements

Tubing	F-02
Tubing Tools	F-17
Syphons	F-24

# Tube Fittings

6 Series Tube Fittings



A-02

37° Flared Tube Fittings



A-88

VL Series Vacuum Tube Fittings



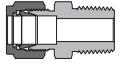
A-104





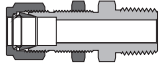
# Contents

## Male Connectors - CM



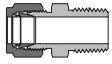
A-13

## Bulkhead Male Connectors - BCM



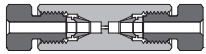
A-24

## Thermocouple Connectors - TCM



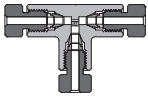
A-25

## Chromatograph Fittings - U



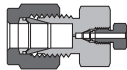
A-26

## Chromatograph Fittings - TTT



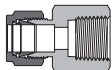
A-26

## Column End Fittings - U



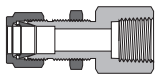
A-27

## Female Connectors - CF



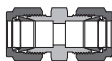
A-27

## Bulkhead Female Connectors - BCF



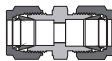
A-32

## Unions - U



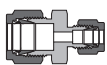
A-33

## Conversion Unions - U



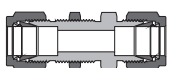
A-34

## Reducing Unions - U



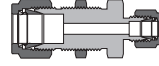
A-35

## Bulkhead Unions - BU



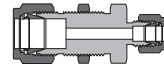
A-36

## Bulkhead Reducing Unions - BU



A-36

## Bulkhead Conversion Unions - BU



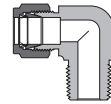
A-37

## Bulkhead Locknuts - BN



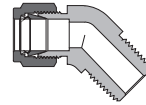
A-37

## Male Elbows - LM



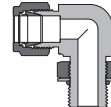
A-38

## 45° Male Elbows - VM



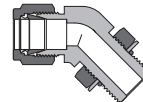
A-41

## Adjustable Male Elbows - LP



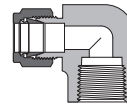
A-42

## 45° Adjustable Male Elbows - VP



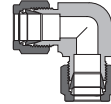
A-44

## Female Elbows - LF



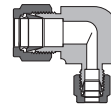
A-45

## Union Elbows - LU



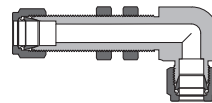
A-46

## Union Reducing Elbows - LU



A-47

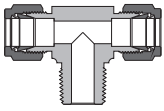
## Bulkhead Union Elbows - BBLU



A-48

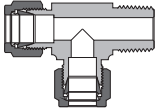
# Contents

Male Branch Tees - TTM



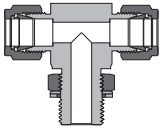
A-49

Male Run Tees - TMT



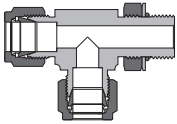
A-50

Adjustable Male Branch Tees - TTP



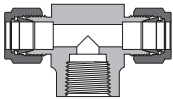
A-51

Adjustable Male Run Tees - TPT



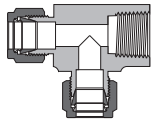
A-52

Female Branch Tees - TTF



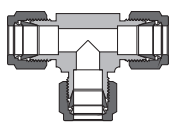
A-53

Female Run Tees - TFT



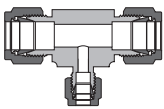
A-54

Union Tees - TTT



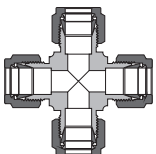
A-55

Reducing Union Tees - TTT



A-56

Union Crosses - C



A-58

Caps - TC



A-58

Plugs - TP



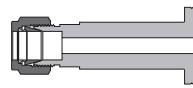
A-59

Vent Protectors - VPF



A-59

Lapped Flange Connectors - LFC



A-59

Nuts - N



A-60

Knurled Nuts



A-60

Male Nuts - MN



A-60

Front Ferrules - FF



A-61

Rear Ferrules - RF



A-61

Nuts + Ferrules - NFR



A-61

Nuts - Ferrule Sets - NFS



A-62

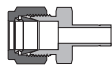
Ferrule Sets - FRS



A-62

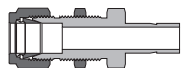
# Contents

## Reducers - R



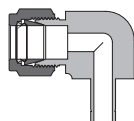
A-63

## Bulkhead Reducers - BR



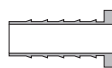
A-65

## Reducer Elbows - LR



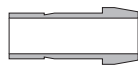
A-65

## Insert for Soft Plastic Tubings - IN



A-66

## Port Connectors - P



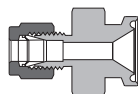
A-66

## Reducing Port Connectors - P



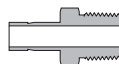
A-67

## Sanitary Flange Fittings - SFF



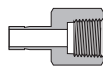
A-67

## Male Adapters - AM



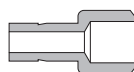
A-68

## Female Adapters - AF



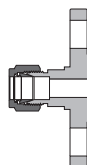
A-73

## Weld Adapters - AW



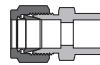
A-76

## Flange Adapters - FA



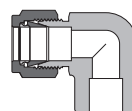
A-77

## Weld Connectors - CW



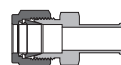
A-79

## Weld Elbows - LW



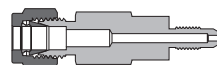
A-80

## Automatic Tube Weld Connectors - CW



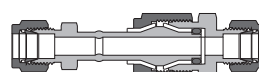
A-81

## Calibration Fittings - FC



A-81

## Dielectric Fittings - DF



A-82

## RS, RSD Gaskets - RS, RSD



A-83

## RP Gaskets - RP



A-83

## RG Gaskets - RG

A-84

## RJ Gaskets - RJ

A-84

## O-rings - VI, BN



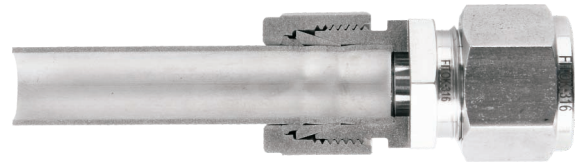
A-85

## Ordering Number Description

A-87

## Features

- ⦿ Sizes range from 1/16" to 2" and 2 mm to 50 mm
- ⦿ Diverse materials and configurations are available
- ⦿ Precision machined components ensure perfect deformation of the ferrules and tubing
- ⦿ Hardened threads with smooth surface finish avoid galling and help to extend the fitting service life
- ⦿ Female nut threads are silver-plated to reduce the friction against the body threads
- ⦿ Radius junction design for elbows provides smooth flow path
- ⦿ Every fitting is marked with size, material and heat number
- ⦿ Fittings are easy to disconnect and retighten



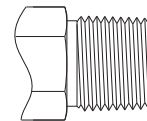
## Technical Data

### ⦿ Thread Ends

#### NPT Threads (NPT)

- ⦿ Comply with ASME B1.20.1, SAE AS71051.

Thread Data						
Thread Size	Thread/in.	Dia. at Reference Plane (mm)			Handtight Engagement	
		Max. Dia.	Pitch Dia.	Min. Dia.	(mm)	Threads
1/16	27	7.894	7.142	6.389	4.064	4.32
1/8		10.242	9.489	8.737	4.102	4.36
1/4	18	13.616	12.487	11.358	5.785	4.10
3/8		17.055	15.926	14.797	6.096	4.32
1/2	14	21.224	19.772	18.321	8.128	4.48
3/4		26.569	25.117	23.666	8.618	4.75
1	11.5	33.228	31.461	29.694	10.160	4.60
1 1/4		41.985	40.218	38.451	10.668	4.83
1 1/2		48.054	46.287	44.520	10.668	4.83
2		60.092	58.325	56.558	11.065	5.01



- 60° thread angle
- Pitch measured in inch
- Truncation of root and crest are parallel
- Taper 1:16
- Type of sealing: thread sealant

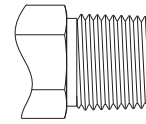
Working Pressures of NPT Thread Ends								
Thread Size	316 Stainless Steel and Carbon Steel				Brass			
	Male		Female		Male		Female	
	psig	bar	psig	bar	psig	bar	psig	bar
1/16	11000	757	6700	460	5500	378	3300	227
1/8	10000	690	6500	447	5000	344	3200	220
1/4	8000	551	6600	454	4000	275	3300	227
3/8	7800	537	5300	365	3900	268	2600	179
1/2	7700	530	4900	337	3800	261	2400	165
3/4	7300	502	4600	316	3600	248	2300	158
1	5300	365	4400	303	2600	179	2200	151
1 1/4	6000	410	5000	344	3000	200	2500	172
1 1/2	5000	344	4600	317	2500	172	2300	158
2	3900	268	3900	268	1900	130	1900	130

Working pressure is based on ANSI/ASME B31.3 at ambient temperature.

## ISO Tapered Threads (R, R1, R2, RC, RT, PT, BSPT, ZG)

© Comply with ISO 7-1, EN 10226-1, BS 21, DIN 2999, JIS B0203.

Thread Data						
Thread Size	Thread/in.	Dia. at Reference Plane (mm)			Gauge Length	
		Max. Dia.	Pitch Dia.	Min. Dia.	(mm)	Threads
1/16	28	7.723	7.142	6.561	4.0	4.4
1/8		9.728	9.147	8.566	4.0	4.4
1/4	19	13.157	12.301	11.445	6.0	4.5
3/8		16.662	15.806	14.950	6.4	4.8
1/2	14	20.955	19.793	18.631	8.2	4.5
3/4		26.441	25.279	24.117	9.5	5.2
1	11	33.249	31.770	30.291	10.4	4.5
1 1/4		41.910	40.431	38.952	12.7	5.5
1 1/2		47.803	46.324	44.845	12.7	5.5
2		59.614	58.135	56.656	15.9	6.9



- 55° thread angle
- Pitch measured in inch
- Truncation of root and crest are round
- Taper 1:16
- Type of sealing: thread sealant

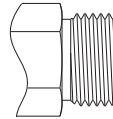
### Working Pressures of ISO Tapered Thread Ends

The working pressures of ISO tapered thread ends are the same as that of the NPT thread ends.

## ISO Parallel Threads (G, RP, PF, BSPP)

© Comply with ISO 228-1, DIN ISO 228-1, JIS B0202, BS 2779.

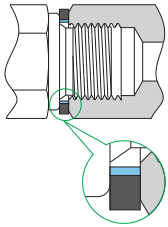
Thread Data				
Thread Size	Thread/in.	Basic Dia. (mm)		
		Max. Dia.	Pitch Dia.	Min. Dia.
1/16	28	7.723	7.142	6.561
1/8		9.728	9.147	8.566
1/4	19	13.157	12.301	11.445
3/8		16.662	15.806	14.950
1/2	14	20.955	19.793	18.631
5/8		22.911	21.749	20.587
3/4		26.441	25.279	24.117
7/8		30.201	29.039	27.877
1	11	33.249	31.770	30.291
1 1/8		37.897	36.418	34.939
1 1/4		41.910	40.431	38.952
1 1/2		47.803	46.324	44.845
1 3/4		53.746	52.267	50.788
2		59.614	58.135	56.656



- 55° thread angle
- Pitch measured in inch
- Truncation of root and crest are round

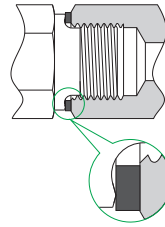
**Types of Sealing for ISO Parallel Threads**

**1. RS Stud End, RS Gasket and RP Port**



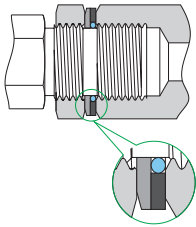
- RS stud end complies with DIN 3852-2 type A
- For RS gasket, see page A-83
- RP port complies with DIN 3852-2 type X

**2. RP Stud End, RP Gasket and RP Port**



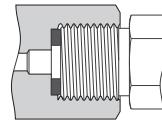
- RP stud end complies with DIN 3852-2 type B
- For RP gasket, see page A-83
- RP port complies with DIN 3852-2 type X

**3. PP Stud End and RP Port**



- PP Stud end complies with ISO 1179-3
- RP port complies with DIN 3852-2 type X

**4. RG Port, RG Gasket and BP Stud End**



- RG port complies with EN 837-1/3
- For RG gasket, see page A-84

**Working Pressures of Adjustable ISO Parallel Thread Ends (PP)**

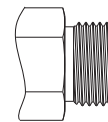
Thread Size	316 Stainless Steel and Carbon Steel	
	psig	bar
1/8	4568	315
1/4		
3/8		
1/2	2320	160
3/4		
1		

**SAE/MS Straight Threads (UN, UNJ)**

☉ Comply with ASME B1.1, ISO R725.

**Thread Data**

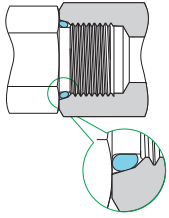
Thread Size	Thread/ in.	Basic Dia. (mm)		
		Max. Dia.	Pitch Dia.	Min. Dia.
5/16-24	24	7.938	7.249	6.792
3/8-24	24	9.525	8.837	8.380
7/16-20	20	11.113	10.287	9.738
1/2-20	20	12.700	11.875	11.326
9/16-18	18	14.288	13.325	12.761
3/4-16	16	19.050	18.019	17.330
7/8-14	14	22.225	21.046	20.262
1 1/16-12	12	26.988	25.613	24.719
1 3/16-12	12	30.163	28.788	27.871
1 5/16-12	12	33.338	31.963	31.046
1 5/8-12	12	41.275	39.901	38.984
1 7/8-12	12	47.625	46.251	45.324
2 1/2-12	12	63.500	62.126	61.209



- 60° thread angle
- Pitch measured in inch
- Truncation of root and crest are parallel

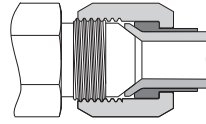
**Types of Sealing for SAE/MS Threads**

**1. ST Stud End and ISO 11926-1 Port**



- ST stud end complies with ISO 11926-3
- For O-ring, see page A-85

**2. 37° Flare (AN) Stud and Flared Tubing**



- The type of sealing complies with SAE J514

**Working Pressures of SAE/MS Thread Ends**

Thread Size	316 Stainless Steel and Carbon Steel			
	Non-adjustable		Adjustable	
	psig	bar	psig	bar
5/16-24	4568	315	4568	315
3/8-24				
7/16-20				
1/2-20			3626	250
9/16-18				
3/4-16	3626	250	2900	200
7/8-14				
1 1/16-12				
1 3/16-12	2900	200	2320	160
1 5/16-12				
1 5/8-12	2320	160	1813	125
1 7/8-12				
2 1/2-12	1813	125	1450	100

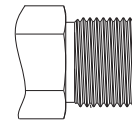
Working pressures are based on ISO 11926-3 at ambient temperature.

**Metric Threads (M)**

© Comply with ISO 261.

**Thread Data**

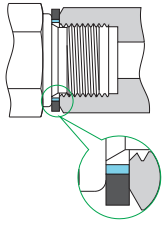
Thread Size	Pitch (mm)	Basic Dia. (mm)		
		Max. Dia.	Pitch Dia.	Min. Dia.
M6 x 1	1	6.000	5.350	4.917
M8 x 1		8.000	7.350	6.917
M10 x 1		10.000	9.350	8.917
M12 x 1.5	1.5	12.000	11.026	10.376
M14 x 1.5		14.000	13.026	12.376
M16 x 1.5		16.000	15.026	14.376
M18 x 1.5		18.000	17.026	16.376
M20 x 1.5		20.000	19.026	18.376
M22 x 1.5		22.000	21.026	20.376
M24 x 1.5		24.000	23.026	22.376
M27 x 2	2	27.000	25.701	24.835
M30 x 2		30.000	28.701	27.835
M33 x 2		33.000	31.701	30.835
M36 x 2		36.000	34.701	33.835
M39 x 2		39.000	37.701	36.835
M42 x 2		42.000	40.701	39.835
M45 x 2		45.000	43.701	42.835
M48 x 2		48.000	46.701	45.835



- 60° thread angle
- Pitch measured in mm
- Truncation of root and crest are parallel

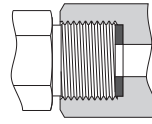
**Types of Sealing for Metric Threads**

**1. MRS Stud End, RS-M gasket and MS Port**



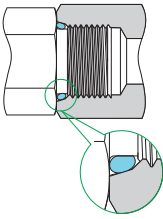
- MRS stud end complies with DIN 3852-1 type A
- For RS-M gasket, see page A-83

**2. MS Stud End, RG-M gasket and MS Port**



- For RG-M gasket, see page A-84

**3. MST Stud End and ISO 6149-1 Port**



- MST stud end complies with ISO 6149-3
- For O-ring, see page A-85

Working Pressures for MST Stud Ends				
Thread Size	Stainless Steel and Carbon Steel			
	Non-adjustable		Adjustable	
	psig	bar	psig	bar
M8 x 1	5800	400	4568	315
M10 x 1				
M12 x 1.5				
M14 x 1.5	4568	315	3626	250
M16 x 1.5				
M18 x 1.5				
M20 x 1.5				
M22 x 1.5	2900	200	2320	160
M27 x 2				
M30 x 2				
M33 x 2				
M42 x 2				
M48 x 2	2320	160	1450	100
M60 x 2				

Working pressures are based on ISO 6149-3 at ambient temperature.

**Working Temperatures**

**Thread Ends**

The working temperatures of the thread ends may be limited by the Teflon tape or thread sealant or, when applicable, the gaskets or O-rings as follows:

Component	Material	Minimum Temperature	Maximum Temperature
RS gasket	Buna N	-13° F (-25° C)	230° F (110° C)
	Fluorocarbon FKM	5° F (-15° C)	400° F (204° C)
RP/RG Gasket	Copper	-325° F (-198° C)	400° F (204° C)
	Stainless Steel	-425° F (-254° C)	1000° F (538° C)
RG Gasket	PTFE	-65° F (-54° C)	450° F (232° C)
	Vulcanized Fibre	-76° F (-60° C)	221° F (105° C)
O-ring	Buna N	-22° F (-30° C)	230° F (110° C)
	Fluorocarbon FKM	-4° F (-20° C)	400° F (204° C)



## Working Pressures

- ⦿ The maximum working pressures of the tube ends at ambient temperature are determined by the maximum working pressure of the FITOK Tubing that is used. Refer to *Tubing* on F-02.
- ⦿ The maximum working pressures of the thread ends at ambient temperature are stated as above.
- ⦿ To get the maximum working pressure at elevated temperature, use the maximum working pressure at ambient temperature to multiply the factors in the table of Elevated Temperature Factors on F-14.
- ⦿ The maximum working pressure of the whole fitting is determined by the end connection with the lowest pressure rating.

## Materials

Material	Bar Stock	Forging	Designator
316 stainless steel	ASTM A276, ASME SA479, EN 1.4401	ASTM A182, ASME SA182, EN 1.4401	SS
304 stainless steel	ASTM A276, ASME SA479, EN 1.4301	ASTM A182, ASME SA182, EN 1.4301	S4
321 stainless steel	ASTM A276, ASME SA479, EN 1.4541	ASTM A182, ASME SA182, EN 1.4541	S1
904L stainless steel	ASTM B649	ASTM A182	904L
Titanium (grade 4)	ASTM B348	ASTM B381	TI
Duplex 2205	ASTM A479	ASTM A182	D5
Duplex 2507	ASTM A479	ASTM A182	D7
Alloy 20	ASTM B473	ASTM B462	A20
Alloy 400	ASTM B164, ASME SB164	ASTM B564, ASME SB564	M
Alloy 600	ASTM B166, ASME SB166	ASTM B564, ASME SB564	INC
Alloy 625	ASTM B446	ASTM B564, ASME SB564	A65
Alloy C-276	ASTM B574	ASTM B564	HC
Carbon steel	ASTM A108	ASTM A105	CS
Aluminum	ASTM B211	ASTM B247	AL
Brass	ASTM B16/B453	ASTM B283	B
Nylon	ASTM D4066	/	PA
PTFE	ASTM D1710	/	T

## Installation Instructions

- FITOK Tube Fittings up to 1" or 25 mm
  1. Loosen the nut 1/4 turn from finger-tight position.
  2. Insert tubing into the tube fitting, make sure that the tubing rests firmly on the shoulder of the port.
  3. Finger-tighten the nut.
  4. Tighten the nut 1 1/4 turns with wrench while holding the body of the fitting or the valve steady (Fig.1).  
For small-sized fittings (1/16", 1/8" and 3/16", 2 mm, 3 mm and 4 mm), tighten the nut 3/4 turn with wrench (Fig.2).
- FITOK Tube Fittings over 1" or 25 mm
  1. Use presetting tool to install the ferrules onto the tube, please refer to the instruction of Hydraulic Presetting Tool for details.
  2. Insert the preset tubing with ferrules and nut into the body of fitting, finger tight.
  3. Tighten the nut one-half turn with wrench.
- Reinstallation (all sizes)
  1. Mark the tube at the back of the nut, mark a line along the nut and fitting body flats.
  2. Insert tubing with preset ferrules into the fitting body until the front ferrule seats.
  3. Then rotate the nut with a wrench to the previous pulled-up position as indicated by the marks on the tube and the flats.
  4. Tighten the nut slightly with wrench.
- Plugs and Port Connectors
  1. Tighten the plug or port connector 1/4 turn from the finger-tight position while holding the body of the fitting steady.  
For small-sized fittings (1/16", 1/8" and 3/16", 2 mm, 3 mm and 4 mm), tighten the nut 1/8 turn with wrench.
  2. Reinstallation: Tighten slightly with a wrench from the finger-tight position.  
The Installation Instructions of the tube adapter end of Port Connectors are the same as the FITOK Tube Fittings.

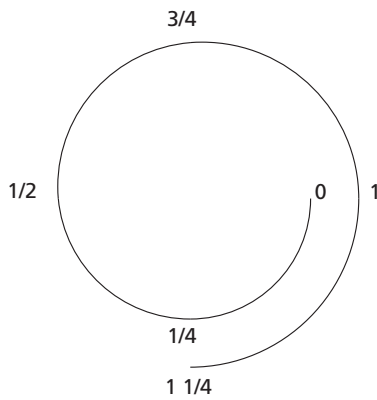


Fig.1

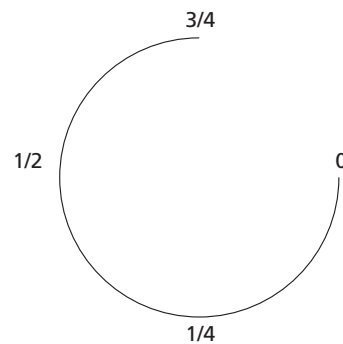


Fig.2

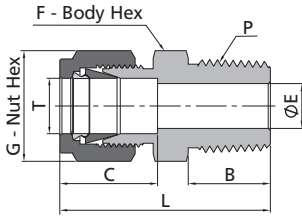
## Cautions:

- Do not loosen or tighten fittings when the system is pressurized.
- Make sure that the tubing rests firmly on the shoulder of the port.
- Always leave enough straight length of the tubing for the fittings.
- Always use an insert for extremely soft plastic tubing.
- Material of the metal tubing should be softer than that of the fitting. For example, stainless steel tubing should not be used with brass fittings. When tubing and fittings are made of the same material, the tubing must be fully annealed.
- The allowable working pressure of the tube fitting is rated to the maximum working pressure of the corresponding tubing, which can be found in FITOK tubing data sheet. For those which can not be found in FITOK tubing data sheet, please contact FITOK Group or our authorized distributors for related information.
- Keep the tubing end and surface clean and smooth.
- Always use proper thread sealants on tapered pipe threads. Make sure that its working temperature does not exceed that of the sealants.
- When assembling the tube fitting, hold the body with a wrench and turn the nut instead of holding the nut.
- When installing a valve with tube fitting end, hold the valve body with a wrench and turn the nut.
- When assembling the fitting to a valve with thread, hold the valve body with a wrench and turn the body of the fitting.

## Dimensions

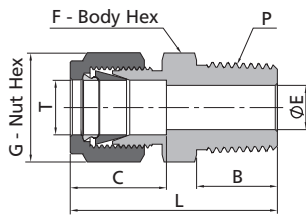
1. Dimensions are for reference only and are subject to change; Dimensions are shown with FITOK nuts finger-tight.
2. The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end and welding end.

### Male Connectors

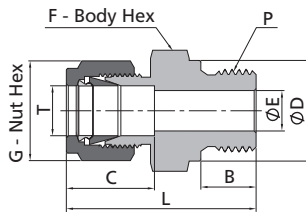


Fractional Tube			NPT Thread						
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	B	C	E	G	F	
1/16	1/16	-CM-FL1-NS1	0.94(23.9)	0.38(9.7)	0.34(8.6)	0.05(1.3)	0.31(7.9)	0.31(7.9)	
1/16	1/8	-CM-FL1-NS2	1.03(26.2)	0.38(9.7)	0.34(8.6)	0.05(1.3)	0.31(7.9)	0.44(11.1)	
1/16	1/4	-CM-FL1-NS4	1.22(31.0)	0.56(14.2)	0.34(8.6)	0.05(1.3)	0.31(7.9)	0.56(14.3)	
1/8	1/16	-CM-FL2-NS1	1.17(29.7)	0.38(9.7)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.44(11.1)	
1/8	1/8	-CM-FL2-NS2	1.20(30.5)	0.38(9.7)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.44(11.1)	
1/8	1/4	-CM-FL2-NS4	1.40(35.6)	0.56(14.2)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.56(14.3)	
1/8	3/8	-CM-FL2-NS6	1.41(35.8)	0.56(14.2)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.69(17.5)	
1/8	1/2	-CM-FL2-NS8	1.66(42.2)	0.75(19.1)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.87(22.2)	
3/16	1/16	-CM-FL3-NS1	1.23(31.2)	0.38(9.7)	0.54(13.7)	0.12(3.0)	0.50(12.7)	0.44(11.1)	
3/16	1/8	-CM-FL3-NS2	1.23(31.2)	0.38(9.7)	0.54(13.7)	0.12(3.0)	0.50(12.7)	0.44(11.1)	
3/16	1/4	-CM-FL3-NS4	1.43(36.3)	0.56(14.2)	0.54(13.7)	0.12(3.0)	0.50(12.7)	0.56(14.3)	
1/4	1/16	-CM-FL4-NS1	1.29(32.8)	0.38(9.7)	0.60(15.2)	0.12(3.0)	0.56(14.3)	0.50(12.7)	
1/4	1/8	-CM-FL4-NS2	1.29(32.8)	0.38(9.7)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.50(12.7)	
1/4	1/4	-CM-FL4-NS4	1.49(37.8)	0.56(14.2)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.56(14.3)	
1/4	3/8	-CM-FL4-NS6	1.51(38.4)	0.56(14.2)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.69(17.5)	
1/4	1/2	-CM-FL4-NS8	1.76(44.7)	0.75(19.1)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.87(22.2)	
1/4	3/4	-CM-FL4-NS12	1.82(46.2)	0.75(19.1)	0.60(15.2)	0.19(4.8)	0.56(14.3)	1.06(27.0)	
5/16	1/8	-CM-FL5-NS2	1.34(34.0)	0.38(9.7)	0.64(16.3)	0.19(4.8)	0.63(15.9)	0.56(14.3)	
5/16	1/4	-CM-FL5-NS4	1.52(38.6)	0.38(9.7)	0.64(16.3)	0.25(6.4)	0.63(15.9)	0.56(14.3)	
5/16	3/8	-CM-FL5-NS6	1.54(39.1)	0.56(14.2)	0.64(16.3)	0.25(6.4)	0.63(15.9)	0.69(17.5)	
5/16	1/2	-CM-FL5-NS8	1.79(45.5)	0.75(19.1)	0.64(16.3)	0.25(6.4)	0.63(15.9)	0.87(22.2)	
3/8	1/8	-CM-FL6-NS2	1.39(35.3)	0.38(9.7)	0.66(16.8)	0.19(4.8)	0.69(17.5)	0.63(15.9)	
3/8	1/4	-CM-FL6-NS4	1.57(39.9)	0.56(14.2)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.63(15.9)	
3/8	3/8	-CM-FL6-NS6	1.57(39.9)	0.56(14.2)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.69(17.5)	
3/8	1/2	-CM-FL6-NS8	1.82(46.2)	0.75(19.1)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.87(22.2)	
3/8	3/4	-CM-FL6-NS12	1.88(47.8)	0.75(19.1)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.06(27.0)	
3/8	1	-CM-FL6-NS16	2.14(54.4)	0.94(23.9)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.37(34.9)	
1/2	1/8	-CM-FL8-NS2	1.53(38.9)	0.38(9.7)	0.90(22.9)	0.19(4.8)	0.87(22.2)	0.81(20.6)	
1/2	1/4	-CM-FL8-NS4	1.71(43.4)	0.56(14.2)	0.90(22.9)	0.28(7.1)	0.87(22.2)	0.81(20.6)	
1/2	3/8	-CM-FL8-NS6	1.71(43.4)	0.56(14.2)	0.90(22.9)	0.38(9.7)	0.87(22.2)	0.81(20.6)	
1/2	1/2	-CM-FL8-NS8	1.93(49.0)	0.75(19.1)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.87(22.2)	
1/2	3/4	-CM-FL8-NS12	1.99(50.5)	0.75(19.1)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.06(27.0)	
1/2	1	-CM-FL8-NS16	2.25(57.2)	0.94(23.9)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.37(34.9)	
5/8	1/4	-CM-FL10-NS4	1.74(44.2)	0.56(14.2)	0.96(24.4)	0.28(7.1)	1.00(25.4)	0.94(23.8)	
5/8	3/8	-CM-FL10-NS6	1.74(44.2)	0.56(14.2)	0.96(24.4)	0.38(9.7)	1.00(25.4)	0.94(23.8)	
5/8	1/2	-CM-FL10-NS8	1.93(49.0)	0.75(19.1)	0.96(24.4)	0.47(11.9)	1.00(25.4)	0.94(23.8)	
5/8	3/4	-CM-FL10-NS12	1.99(50.5)	0.75(19.1)	0.96(24.4)	0.50(12.7)	1.00(25.4)	1.06(27.0)	
3/4	3/8	-CM-FL12-NS6	1.80(45.7)	0.56(14.2)	0.96(24.4)	0.41(10.4)	1.13(28.6)	1.06(27.0)	
3/4	1/2	-CM-FL12-NS8	1.99(50.5)	0.75(19.1)	0.96(24.4)	0.47(11.9)	1.13(28.6)	1.06(27.0)	
3/4	3/4	-CM-FL12-NS12	1.99(50.5)	0.75(19.1)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.06(27.0)	
3/4	1	-CM-FL12-NS16	2.25(57.2)	0.94(23.9)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.37(34.9)	
7/8	1/2	-CM-FL14-NS8	1.99(50.5)	0.75(19.1)	1.02(25.9)	0.47(11.9)	1.25(31.8)	1.19(30.2)	
7/8	3/4	-CM-FL14-NS12	1.99(50.5)	0.75(19.1)	1.02(25.9)	0.62(15.7)	1.25(31.8)	1.19(30.2)	
7/8	1	-CM-FL14-NS16	2.25(57.2)	0.94(23.9)	1.02(25.9)	0.72(18.3)	1.25(31.8)	1.37(34.9)	
1	1/2	-CM-FL16-NS8	2.26(57.4)	0.75(19.1)	1.23(31.2)	0.47(11.9)	1.50(38.1)	1.37(34.9)	
1	3/4	-CM-FL16-NS12	2.26(57.4)	0.75(19.1)	1.23(31.2)	0.62(15.7)	1.50(38.1)	1.37(34.9)	
1	1	-CM-FL16-NS16	2.45(62.2)	0.94(23.9)	1.23(31.2)	0.88(22.4)	1.50(38.1)	1.37(34.9)	
1 1/8	1	-CM-FL18-NS16	2.45(62.2)	0.94(23.9)	1.44(36.7)	0.88(22.4)	1.75(44.5)	1.63(41.3)	
1 1/4	1	-CM-FL20-NS16	3.04(77.2)	0.94(23.9)	1.62(41.1)	0.88(22.4)	1.87(47.6)	1.75(44.5)	
1 1/4	1 1/4	-CM-FL20-NS20	3.04(77.2)	0.94(23.9)	1.62(41.1)	1.09(27.7)	1.87(47.6)	1.75(44.5)	
1 1/2	1 1/2	-CM-FL24-NS24	3.50(88.9)	1.03(26.2)	1.97(50.0)	1.34(34.0)	2.25(57.2)	2.13(54.0)	

Male Connectors

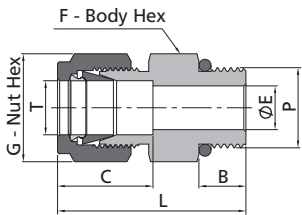
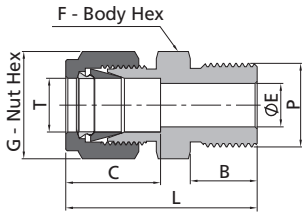
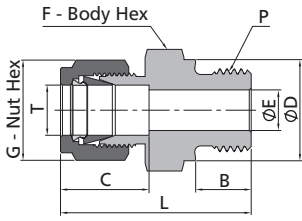


Fractional Tube			ISO Tapered Thread (RT)						
T-Tube O.D. (in.)	P-RT Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	B	C	E	G	F	
1/8	1/8	-CM-FL2-RT2	1.20(30.5)	0.38(9.7)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.44(11.1)	
1/8	1/4	-CM-FL2-RT4	1.40(35.6)	0.56(14.2)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.56(14.3)	
1/4	1/8	-CM-FL4-RT2	1.29(32.8)	0.38(9.7)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.50(12.7)	
1/4	1/4	-CM-FL4-RT4	1.49(37.8)	0.56(14.2)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.56(14.3)	
1/4	3/8	-CM-FL4-RT6	1.51(38.4)	0.56(14.2)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.69(17.5)	
1/4	1/2	-CM-FL4-RT8	1.76(44.7)	0.75(19.1)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.87(22.2)	
5/16	1/8	-CM-FL5-RT2	1.34(34.0)	0.38(9.7)	0.64(16.3)	0.19(4.8)	0.63(15.9)	0.56(14.3)	
5/16	1/4	-CM-FL5-RT4	1.52(38.6)	0.56(14.2)	0.64(16.3)	0.25(6.4)	0.63(15.9)	0.56(14.3)	
3/8	1/8	-CM-FL6-RT2	1.39(35.3)	0.38(9.7)	0.66(16.8)	0.19(4.8)	0.69(17.5)	0.63(15.9)	
3/8	1/4	-CM-FL6-RT4	1.57(39.9)	0.56(14.2)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.63(15.9)	
3/8	3/8	-CM-FL6-RT6	1.57(39.9)	0.56(14.2)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.69(17.5)	
3/8	1/2	-CM-FL6-RT8	1.82(46.2)	0.75(19.1)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.87(22.2)	
3/8	3/4	-CM-FL6-RT12	1.88(47.8)	0.75(19.1)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.06(27.0)	
1/2	1/4	-CM-FL8-RT4	1.71(43.4)	0.56(14.2)	0.90(22.9)	0.28(7.1)	0.87(22.2)	0.81(20.6)	
1/2	3/8	-CM-FL8-RT6	1.71(43.4)	0.56(14.2)	0.90(22.9)	0.38(9.7)	0.87(22.2)	0.81(20.6)	
1/2	1/2	-CM-FL8-RT8	1.93(49.0)	0.75(19.1)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.87(22.2)	
1/2	3/4	-CM-FL8-RT12	1.99(50.5)	0.75(19.1)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.06(27.0)	
5/8	1/2	-CM-FL10-RT8	1.93(49.0)	0.75(19.1)	0.96(24.4)	0.47(11.9)	1.00(25.4)	0.94(23.8)	
3/4	3/4	-CM-FL12-RT12	1.99(50.5)	0.75(19.1)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.06(27.0)	
3/4	1	-CM-FL12-RT16	2.25(57.2)	0.94(23.9)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.37(34.9)	
1	3/4	-CM-FL16-RT12	2.26(57.4)	0.75(19.1)	1.23(31.2)	0.62(15.7)	1.50(38.1)	1.37(34.9)	
1	1	-CM-FL16-RT16	2.45(62.2)	0.94(23.9)	1.23(31.2)	0.88(22.4)	1.50(38.1)	1.37(34.9)	



Fractional Tube			ISO Parallel Thread (RS)						
T-Tube O.D. (in.)	P-RS Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	B	C	E	G	F	D
1/8	1/8	-CM-FL2-RS2	1.18(30.0)	0.28(7.1)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.56(14.3)	0.54(13.7)
1/8	1/4	-CM-FL2-RS4	1.39(35.3)	0.44(11.2)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.75(19.1)	0.71(18.0)
1/8	3/8	-CM-FL2-RS6	1.43(36.3)	0.44(11.2)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.87(22.2)	0.86(21.8)
1/4	1/8	-CM-FL4-RS2	1.27(32.3)	0.28(7.1)	0.60(15.2)	0.16(4.0)	0.56(14.3)	0.56(14.3)	0.54(13.7)
1/4	1/4	-CM-FL4-RS4	1.48(37.6)	0.44(11.2)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.75(19.1)	0.71(18.0)
1/4	3/8	-CM-FL4-RS6	1.53(38.9)	0.44(11.2)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.87(22.2)	0.86(21.8)
1/4	1/2	-CM-FL4-RS8	1.76(44.7)	0.56(14.2)	0.60(15.2)	0.19(4.8)	0.56(14.3)	1.06(27.0)	1.02(25.9)
3/8	1/8	-CM-FL6-RS2	1.49(37.8)	0.28(7.1)	0.66(16.8)	0.16(4.0)	0.69(17.5)	0.63(15.9)	0.54(13.7)
3/8	1/4	-CM-FL6-RS4	1.54(39.1)	0.44(11.2)	0.66(16.8)	0.23(5.9)	0.69(17.5)	0.75(19.1)	0.71(18.0)
3/8	3/8	-CM-FL6-RS6	1.59(40.4)	0.44(11.2)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.87(22.2)	0.86(21.8)
3/8	1/2	-CM-FL6-RS8	1.82(46.2)	0.56(14.2)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.06(27.0)	1.02(25.9)
1/2	1/4	-CM-FL8-RS4	1.68(42.7)	0.44(11.2)	0.90(22.9)	0.23(5.9)	0.87(22.2)	0.81(20.6)	0.71(18.0)
1/2	3/8	-CM-FL8-RS6	1.70(43.2)	0.44(11.2)	0.90(22.9)	0.31(7.9)	0.87(22.2)	0.87(22.2)	0.86(21.8)
1/2	1/2	-CM-FL8-RS8	1.93(49.0)	0.56(14.2)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.06(27.0)	1.02(25.9)
3/4	1/2	-CM-FL12-RS8	1.93(49.0)	0.56(14.2)	0.96(24.4)	0.47(11.9)	1.13(28.6)	1.06(27.0)	1.02(25.9)
3/4	3/4	-CM-FL12-RS12	2.08(52.9)	0.62(15.7)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.31(33.3)	1.26(32.0)
1	1/2	-CM-FL16-RS8	2.19(55.5)	0.56(14.2)	1.23(31.2)	0.47(11.9)	1.50(38.1)	1.37(34.9)	1.02(25.9)
1	3/4	-CM-FL16-RS12	2.27(57.7)	0.62(15.7)	1.23(31.2)	0.63(16.0)	1.50(38.1)	1.37(34.9)	1.26(32.0)
1	1	-CM-FL16-RS16	2.36(59.9)	0.72(18.3)	1.23(31.2)	0.78(19.8)	1.50(38.1)	1.63(41.3)	1.54(39.1)

Male Connectors



Adapt to straight thread boss of SAE J1926-1, ISO 11926-1 and MS 16142.

Fractional Tube			ISO Parallel Thread (RP)						
T-Tube O.D. (in.)	P-RP Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	B	C	E	G	F	D
1/8	1/8	-CM-FL2-RP2	1.18(30.0)	0.28(7.1)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.56(14.3)	0.54(13.8)
1/8	1/4	-CM-FL2-RP4	1.39(35.3)	0.44(11.2)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.75(19.1)	0.70(17.8)
1/4	1/8	-CM-FL4-RP2	1.27(32.3)	0.28(7.1)	0.60(15.2)	0.16(4.1)	0.56(14.3)	0.56(14.3)	0.54(13.8)
1/4	1/4	-CM-FL4-RP4	1.48(37.6)	0.44(11.2)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.75(19.1)	0.70(17.8)
1/2	3/8	-CM-FL8-RP6	1.79(45.5)	0.44(11.2)	0.90(22.9)	0.31(7.9)	0.87(22.2)	0.87(22.2)	0.86(21.8)
1/2	1/2	-CM-FL8-RP8	1.93(49.0)	0.56(14.2)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.06(27.0)	1.02(25.9)
3/4	1/2	-CM-FL12-RP8	1.93(49.0)	0.56(14.2)	0.96(24.4)	0.47(11.9)	1.13(28.6)	1.06(27.0)	1.02(25.9)
3/4	3/4	-CM-FL12-RP12	2.08(52.9)	0.62(15.7)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.31(33.3)	1.26(32.0)
1	1	-CM-FL16-RP16	2.36(59.9)	0.72(18.3)	1.23(31.2)	0.78(19.8)	1.50(38.1)	1.63(41.3)	1.53(38.8)

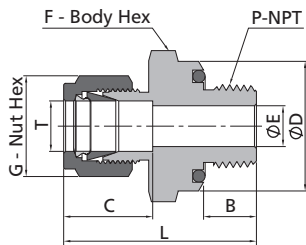
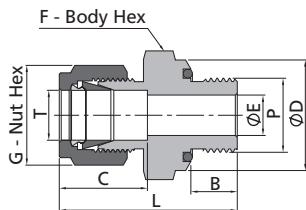
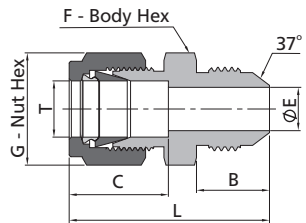
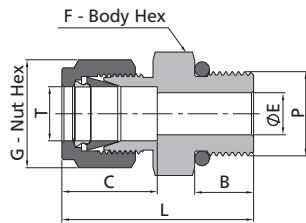
Fractional Tube			ISO Parallel Thread (BP)					
T-Tube O.D. (in.)	P-BP Size	Basic Ordering Number	Dimensions, in. (mm)					
			L	B	C	E	G	F
1/4	3/8	-CM-FL4-BP6	1.51(38.4)	0.56(14.2)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.69(17.5)
3/8	3/8	-CM-FL6-BP6	1.57(39.9)	0.56(14.2)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.69(17.5)

Fractional Tube			SAE/MS Straight Thread					
T-Tube O.D. (in.)	P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)					
			L	B	C	E	G	F
1/16	5/16-24	-CM-FL1-ST5	0.92(23.4)	0.30(7.6)	0.34(8.6)	0.05(1.3)	0.31(7.9)	0.44(11.1)
1/8	5/16-24	-CM-FL2-ST5	1.18(30.0)	0.30(7.6)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.44(11.1)
1/8	7/16-20	-CM-FL2-ST7	1.24(31.5)	0.36(9.1)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.56(14.3)
1/8	9/16-18	-CM-FL2-ST9	1.31(33.3)	0.39(9.9)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.69(17.5)
3/16	3/8-24	-CM-FL3-ST6	1.20(30.5)	0.30(7.6)	0.54(13.7)	0.12(3.0)	0.50(12.7)	0.50(12.7)
1/4	5/16-24	-CM-FL4-ST5	1.27(32.3)	0.30(7.6)	0.60(15.2)	0.12(3.0)	0.56(14.3)	0.50(12.7)
1/4	7/16-20	-CM-FL4-ST7	1.34(34.0)	0.36(9.1)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.56(14.3)
1/4	9/16-18	-CM-FL4-ST9	1.40(35.6)	0.39(9.9)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.69(17.5)
1/4	3/4-16	-CM-FL4-ST12	1.48(37.6)	0.44(11.2)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.87(22.2)
1/4	7/8-14	-CM-FL4-ST14	1.60(40.6)	0.50(12.7)	0.60(15.2)	0.19(4.8)	0.56(14.3)	1.00(25.4)
5/16	1/2-20	-CM-FL5-ST8	1.37(34.8)	0.36(9.1)	0.64(16.3)	0.25(6.4)	0.63(15.9)	0.63(15.9)
3/8	7/16-20	-CM-FL6-ST7	1.40(35.6)	0.36(9.1)	0.66(16.8)	0.20(5.1)	0.69(17.5)	0.63(15.9)
3/8	9/16-18	-CM-FL6-ST9	1.46(37.1)	0.39(9.9)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.69(17.5)
3/8	3/4-16	-CM-FL6-ST12	1.54(39.1)	0.44(11.2)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.87(22.2)
3/8	7/8-14	-CM-FL6-ST14	1.66(42.2)	0.50(12.7)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.00(25.4)
1/2	9/16-18	-CM-FL8-ST9	1.54(39.1)	0.39(9.9)	0.90(22.9)	0.28(7.1)	0.87(22.2)	0.81(20.6)
1/2	3/4-16	-CM-FL8-ST12	1.65(41.9)	0.44(11.2)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.87(22.2)
1/2	7/8-14	-CM-FL8-ST14	1.77(45.0)	0.50(12.7)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.00(25.4)
1/2	1 1/16-12	-CM-FL8-ST17	1.93(49.0)	0.59(15.0)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.25(31.8)
5/8	3/4-16	-CM-FL10-ST12	1.65(41.9)	0.44(11.2)	0.96(24.4)	0.42(10.7)	1.00(25.4)	0.94(23.8)
5/8	7/8-14	-CM-FL10-ST14	1.78(45.2)	0.50(12.7)	0.96(24.4)	0.50(12.7)	1.00(25.4)	1.00(25.4)
3/4	3/4-16	-CM-FL12-ST12	1.81(46.0)	0.44(11.2)	0.96(24.4)	0.42(10.7)	1.13(28.6)	1.06(27.0)
3/4	1 1/16-12	-CM-FL12-ST17	1.93(49.0)	0.59(15.0)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.25(31.8)
3/4	1 5/16-12	-CM-FL12-ST21	1.96(49.8)	0.59(15.0)	0.96(24.4)	0.63(16.0)	1.13(28.6)	1.50(38.1)
7/8	1 3/16-12	-CM-FL14-ST19	1.93(49.0)	0.59(15.0)	1.02(25.9)	0.72(18.3)	1.25(31.8)	1.37(34.9)
1	1 1/16-12	-CM-FL16-ST17	2.10(53.3)	0.59(15.0)	1.23(31.2)	0.66(16.8)	1.50(38.1)	1.37(34.9)
1	1 5/16-12	-CM-FL16-ST21	2.14(54.4)	0.59(15.0)	1.23(31.2)	0.88(22.4)	1.50(38.1)	1.50(38.1)
1 1/4	1 5/8-12	-CM-FL20-ST26	2.69(68.3)	0.59(15.0)	1.62(41.1)	1.09(27.7)	1.87(47.6)	1.87(47.6)
1 1/2	1 7/8-12	-CM-FL24-ST30	3.06(77.7)	0.59(15.0)	1.97(50.0)	1.34(34.0)	2.25(57.2)	2.13(54.0)

Tube Fittings

Male Connectors

Tube Fittings



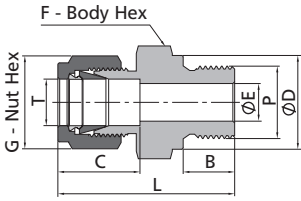
Fractional Tube			SAE/MS Straight Thread						
T-Tube O.D. (in.)	P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	B	C	E	G	F	
1/4	7/16-20	-CML-FL4-ST7	2.26(57.4)	0.36(9.1)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.56(14.3)	
1/2	3/4-16	-CML-FL8-ST12	3.01(76.5)	0.44(11.2)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.87(22.2)	

Fractional Tube			37° Flare (AN)						
T-Tube O.D. (in.)	AN Tube Flare Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	B	C	E	G	F	
1/16	1/8	-CM-FL1-AN2	1.07(27.2)	0.45(11.4)	0.34(8.6)	0.05(1.3)	0.31(7.9)	0.44(11.1)	
1/8	1/8	-CM-FL2-AN2	1.27(32.3)	0.45(11.4)	0.50(12.7)	0.06(1.5)	0.44(11.1)	0.44(11.1)	
1/8	1/4	-CM-FL2-AN4	1.38(35.1)	0.55(14.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.50(12.7)	
3/16	3/16	-CM-FL3-AN3	1.32(33.5)	0.48(12.2)	0.54(13.7)	0.12(3.0)	0.50(12.7)	0.44(11.1)	
1/4	1/4	-CM-FL4-AN4	1.48(37.6)	0.55(14.0)	0.60(15.2)	0.17(4.3)	0.56(14.3)	0.50(12.7)	
5/16	5/16	-CM-FL5-AN5	1.51(38.4)	0.55(14.0)	0.64(16.2)	0.23(5.8)	0.63(15.9)	0.56(14.3)	
3/8	1/4	-CM-FL6-AN4	1.56(39.6)	0.55(14.0)	0.66(16.8)	0.17(4.3)	0.69(17.5)	0.63(15.9)	
3/8	3/8	-CM-FL6-AN6	1.56(39.6)	0.56(14.1)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.63(15.9)	
1/2	1/2	-CM-FL8-AN8	1.81(46.0)	0.66(16.7)	0.90(22.8)	0.39(9.9)	0.87(22.2)	0.81(20.6)	
5/8	5/8	-CM-FL10-AN10	1.93(49.0)	0.76(19.3)	0.96(24.5)	0.48(12.3)	1.00(25.4)	0.94(23.8)	
3/4	3/4	-CM-FL12-AN12	2.10(53.3)	0.86(21.9)	0.96(24.4)	0.61(15.5)	1.13(28.6)	1.13(28.6)	
1	1	-CM-FL16-AN16	2.42(61.5)	0.91(23.1)	1.23(31.2)	0.84(21.3)	1.50(38.1)	1.37(34.9)	

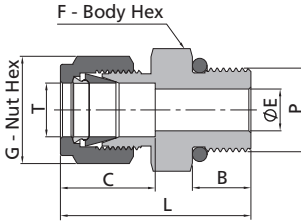
Fractional Tube			O-Seal with SAE/MS Straight Thread							
T-Tube O.D. (in.)	P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)							
			L	B	C	E	G	F	D	
1/16	5/16-24	-CM-FL1-OST5	1.05(26.7)	0.34(8.6)	0.34(8.6)	0.05(1.3)	0.31(7.9)	0.56(14.3)	0.55(14.0)	
1/8	5/16-24	-CM-FL2-OST5	1.29(32.8)	0.34(8.6)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.56(14.3)	0.55(14.0)	
3/16	3/8-24	-CM-FL3-OST6	1.35(34.3)	0.38(9.7)	0.54(13.7)	0.12(3.0)	0.50(12.7)	0.63(15.9)	0.62(15.7)	
1/4	7/16-20	-CM-FL4-OST7	1.51(38.4)	0.41(10.4)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.75(19.1)	0.74(18.8)	
5/16	1/2-20	-CM-FL5-OST8	1.60(40.6)	0.44(11.2)	0.64(16.3)	0.25(6.4)	0.63(15.9)	0.87(22.2)	0.86(21.8)	
3/8	9/16-18	-CM-FL6-OST9	1.67(42.4)	0.47(11.9)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.94(23.8)	0.93(23.6)	
1/2	3/4-16	-CM-FL8-OST12	1.81(46.0)	0.47(11.9)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.13(28.6)	1.12(28.4)	
3/4	1 1/16-12	-CM-FL12-OST17	2.06(52.3)	0.56(14.2)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.50(38.1)	1.49(37.8)	
1	1 5/16-12	-CM-FL16-OST21	2.29(58.2)	0.56(14.2)	1.23(31.2)	0.88(22.4)	1.50(38.1)	1.75(44.5)	1.74(44.2)	

Fractional Tube			O-Seal with NPT Thread						
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	B	C	E	G	F	D
1/8	1/8	-CM-FL2-ONS2	1.29(32.8)	0.28(7.1)	0.34(8.6)	0.09(2.3)	0.47(11.9)	0.75(19.1)	0.74(18.8)
1/4	1/8	-CM-FL4-ONS2	1.38(35.1)	0.28(7.1)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.75(19.1)	0.74(18.8)
1/4	1/4	-CM-FL4-ONS4	1.51(38.4)	0.38(9.7)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.94(23.8)	0.93(23.6)
3/8	1/4	-CM-FL6-ONS4	1.57(39.9)	0.38(9.7)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.94(23.8)	0.93(23.6)
3/8	3/8	-CM-FL6-ONS6	1.63(41.4)	0.41(10.4)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.13(28.6)	1.12(28.4)
3/8	1/2	-CM-FL6-ONS8	1.85(47.0)	0.53(13.5)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.31(33.3)	1.30(33.0)
1/2	1/2	-CM-FL8-ONS8	1.96(49.8)	0.53(13.5)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.31(33.3)	1.30(33.0)

Male Connectors

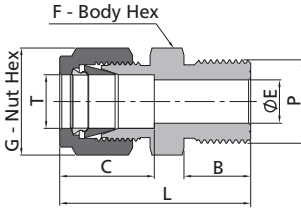


Fractional Tube				Metric Thread (MRS)						
T-Tube O.D. (in.)	P-Metric Thread Size	Basic Ordering Number	Dimensions, in. (mm)							
			L	B	C	E	G	F	D	
1/8	M14 x 1.5	-CM-FL2-MRS14	1.44(36.7)	0.47(12.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.75(19.1)	0.75(19.0)	
1/8	M16 x 1.5	-CM-FL2-MRS16	1.48(37.5)	0.47(12.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.87(22.2)	0.83(21.0)	
1/8	M18 x 1.5	-CM-FL2-MRS18	1.52(38.5)	0.47(12.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.94(23.8)	0.91(23.0)	
1/8	M20 x 1.5	-CM-FL2-MRS20	1.62(41.1)	0.55(14.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	1.00(25.4)	0.98(25.0)	
1/4	M14 x 1.5	-CM-FL4-MRS14	1.50(38.0)	0.47(12.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.75(19.1)	0.75(19.0)	
1/4	M16 x 1.5	-CM-FL4-MRS16	1.57(39.9)	0.47(12.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.87(22.2)	0.83(21.0)	
1/4	M18 x 1.5	-CM-FL4-MRS18	1.61(40.8)	0.47(12.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.94(23.8)	0.91(23.0)	
1/4	M20 x 1.5	-CM-FL4-MRS20	1.72(43.6)	0.55(14.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	1.00(25.4)	0.98(25.0)	
3/8	M14 x 1.5	-CM-FL6-MRS14	1.63(41.3)	0.47(12.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.75(19.1)	0.75(19.0)	
3/8	M16 x 1.5	-CM-FL6-MRS16	1.63(41.3)	0.47(12.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.87(22.2)	0.83(21.0)	
3/8	M18 x 1.5	-CM-FL6-MRS18	1.65(41.8)	0.47(12.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.94(23.8)	0.91(23.0)	
3/8	M20 x 1.5	-CM-FL6-MRS20	1.78(45.1)	0.55(14.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.00(25.4)	0.98(25.0)	
1/2	M16 x 1.5	-CM-FL8-MRS16	1.73(44.0)	0.47(12.0)	0.90(22.8)	0.35(9.0)	0.87(22.2)	0.87(22.2)	0.83(21.0)	
1/2	M18 x 1.5	-CM-FL8-MRS18	1.73(44.0)	0.47(12.0)	0.90(22.9)	0.39(10.0)	0.87(22.2)	0.94(23.8)	0.91(23.0)	
1/2	M20 x 1.5	-CM-FL8-MRS20	1.89(47.9)	0.55(14.0)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.00(25.4)	0.98(25.0)	
1/2	M22 x 1.5	-CM-FL8-MRS22	1.91(48.5)	0.55(14.0)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.06(27.0)	1.06(27.0)	



Adapt to straight thread boss of ISO 6149-1.

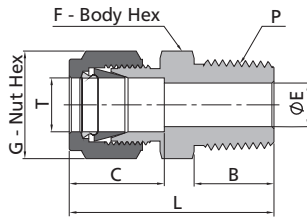
Fractional Tube				Metric Thread (MST)					
T-Tube O.D. (in.)	P-Metric Thread Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	B	C	E	G	F	
1/4	M14X1.5	-CM-FL4-MST14	1.39(35.2)	0.43(11.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.75(19.1)	
3/8	M14X1.5	-CM-FL6-MST14	1.44(36.7)	0.43(11.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.75(19.1)	
3/8	M20X1.5	-CM-FL6-MST20	1.62(41.2)	0.55(14.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.06(27.0)	
1/2	M14X1.5	-CM-FL8-MST14	1.58(40.2)	0.43(11.0)	0.90(22.9)	0.30(7.5)	0.87(22.2)	0.81(20.6)	
1/2	M20X1.5	-CM-FL8-MST20	1.73(44.0)	0.55(14.0)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.06(27.0)	



Fractional Tube				Metric Thread (MS)					
T-Tube O.D. (in.)	P-Metric Thread Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	B	C	E	G	F	
1/16	M5 x 0.8	-CM-FL1-MS5	0.86(21.8)	0.31(8.0)	0.34(8.6)	0.05(1.3)	0.31(7.9)	0.31(7.9)	
1/8	M14 x 1.5	-CM-FL2-MS14	1.37(34.8)	0.51(13.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.63(15.9)	
1/8	M16 x 1.5	-CM-FL2-MS16	1.41(35.8)	0.55(14.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.69(17.5)	
1/8	M18 x 1.5	-CM-FL2-MS18	1.46(37.2)	0.59(15.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.75(19.1)	
1/8	M20 x 1.5	-CM-FL2-MS20	1.50(38.1)	0.63(16.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.87(22.2)	
1/4	M14 x 1.5	-CM-FL4-MS14	1.45(36.9)	0.51(13.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.63(15.9)	
1/4	M16 x 1.5	-CM-FL4-MS16	1.50(38.1)	0.55(14.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.69(17.5)	
1/4	M18 x 1.5	-CM-FL4-MS18	1.56(39.5)	0.59(15.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.75(19.1)	
1/4	M20 x 1.5	-CM-FL4-MS20	1.60(40.7)	0.63(16.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.87(22.2)	
3/8	M10 x 1.0	-CM-FL6-MS10	1.43(36.4)	0.43(11.0)	0.66(16.8)	0.19(4.8)	0.69(17.5)	0.63(15.9)	
3/8	M14 x 1.5	-CM-FL6-MS14	1.55(39.3)	0.51(13.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.63(15.9)	
3/8	M16 x 1.5	-CM-FL6-MS16	1.56(39.7)	0.55(14.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.69(17.5)	
3/8	M18 x 1.5	-CM-FL6-MS18	1.63(41.5)	0.59(15.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.75(19.1)	
3/8	M20 x 1.5	-CM-FL6-MS20	1.67(42.3)	0.63(16.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.87(22.2)	
1/2	M16 x 1.5	-CM-FL8-MS16	1.70(43.2)	0.55(14.0)	0.90(22.9)	0.33(8.4)	0.87(22.2)	0.81(20.6)	
1/2	M18 x 1.5	-CM-FL8-MS18	1.72(43.7)	0.59(15.0)	0.90(22.9)	0.38(9.6)	0.87(22.2)	0.81(20.6)	
1/2	M20 x 1.5	-CM-FL8-MS20	1.77(44.9)	0.63(16.0)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.87(22.2)	
1/2	M22 x 1.5	-CM-FL8-MS22	1.85(47.0)	0.67(17.0)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.94(23.8)	

Tube Fittings

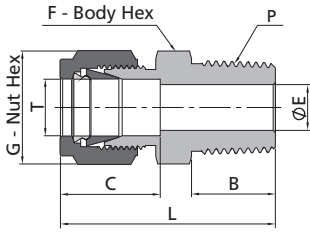
Male Connectors



Metric Tube			NPT Thread						
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	B	C	E	G	F	
2	1/8	-CM-ML2-NS2	30.5(1.20)	9.7(0.38)	12.9(0.51)	1.7(0.07)	12.0(0.47)	12.0(0.47)	
3	1/8	-CM-ML3-NS2	30.5(1.20)	9.7(0.38)	12.9(0.51)	2.4(0.09)	12.0(0.47)	12.0(0.47)	
3	1/4	-CM-ML3-NS4	35.6(1.40)	14.2(0.56)	12.9(0.51)	2.4(0.09)	12.0(0.47)	14.0(0.55)	
4	1/8	-CM-ML4-NS2	31.2(1.23)	9.7(0.38)	13.7(0.54)	2.4(0.09)	12.0(0.47)	12.0(0.47)	
4	1/4	-CM-ML4-NS4	36.3(1.43)	14.2(0.56)	13.7(0.54)	2.4(0.09)	12.0(0.47)	14.0(0.55)	
6	1/8	-CM-ML6-NS2	32.8(1.29)	9.7(0.38)	15.3(0.60)	4.8(0.19)	14.0(0.55)	14.0(0.55)	
6	1/4	-CM-ML6-NS4	37.9(1.49)	14.2(0.56)	15.3(0.60)	4.8(0.19)	14.0(0.55)	14.0(0.55)	
6	3/8	-CM-ML6-NS6	38.4(1.51)	14.2(0.56)	15.3(0.60)	4.8(0.19)	14.0(0.55)	18.0(0.71)	
6	1/2	-CM-ML6-NS8	44.7(1.76)	19.1(0.75)	15.3(0.60)	4.8(0.19)	14.0(0.55)	22.0(0.87)	
8	1/8	-CM-ML8-NS2	34.2(1.35)	9.7(0.38)	16.2(0.64)	4.8(0.19)	16.0(0.63)	15.0(0.59)	
8	1/4	-CM-ML8-NS4	38.7(1.52)	14.2(0.56)	16.2(0.64)	6.4(0.25)	16.0(0.63)	15.0(0.59)	
8	3/8	-CM-ML8-NS6	39.3(1.55)	14.2(0.56)	16.2(0.64)	6.4(0.25)	16.0(0.63)	18.0(0.71)	
8	1/2	-CM-ML8-NS8	45.6(1.80)	19.1(0.75)	16.2(0.64)	6.4(0.25)	16.0(0.63)	22.0(0.87)	
10	1/8	-CM-ML10-NS2	36.3(1.43)	9.7(0.38)	17.2(0.68)	4.8(0.19)	19.0(0.75)	18.0(0.71)	
10	1/4	-CM-ML10-NS4	40.9(1.61)	14.2(0.56)	17.2(0.68)	7.1(0.28)	19.0(0.75)	18.0(0.71)	
10	3/8	-CM-ML10-NS6	40.9(1.61)	14.2(0.56)	17.2(0.68)	7.9(0.31)	19.0(0.75)	18.0(0.71)	
10	1/2	-CM-ML10-NS8	46.5(1.83)	19.1(0.75)	17.2(0.68)	7.9(0.31)	19.0(0.75)	22.0(0.87)	
10	3/4	-CM-ML10-NS12	48.0(1.89)	19.1(0.75)	17.2(0.68)	7.9(0.31)	19.0(0.75)	27.0(1.06)	
10	1	-CM-ML10-NS16	54.6(2.15)	23.9(0.94)	17.2(0.68)	7.9(0.31)	19.0(0.75)	35.0(1.38)	
12	1/8	-CM-ML12-NS2	38.8(1.53)	9.7(0.38)	22.8(0.90)	4.8(0.19)	22.0(0.87)	22.0(0.87)	
12	1/4	-CM-ML12-NS4	43.4(1.71)	14.2(0.56)	22.8(0.90)	7.1(0.28)	22.0(0.87)	22.0(0.87)	
12	3/8	-CM-ML12-NS6	43.4(1.71)	14.2(0.56)	22.8(0.90)	9.5(0.37)	22.0(0.87)	22.0(0.87)	
12	1/2	-CM-ML12-NS8	49.0(1.93)	19.1(0.75)	22.8(0.90)	9.5(0.37)	22.0(0.87)	22.0(0.87)	
12	3/4	-CM-ML12-NS12	49.1(1.93)	19.1(0.75)	22.8(0.90)	9.5(0.37)	22.0(0.87)	27.0(1.06)	
14	1/8	-CM-ML14-NS2	39.9(1.57)	9.7(0.38)	24.4(0.96)	4.8(0.19)	25.0(0.98)	24.0(0.94)	
14	1/4	-CM-ML14-NS4	44.1(1.74)	14.2(0.56)	24.4(0.96)	7.1(0.28)	25.0(0.98)	24.0(0.94)	
14	3/8	-CM-ML14-NS6	44.1(1.74)	14.2(0.56)	24.4(0.96)	9.5(0.37)	25.0(0.98)	24.0(0.94)	
14	1/2	-CM-ML14-NS8	49.0(1.93)	19.1(0.75)	24.4(0.96)	11.1(0.44)	25.0(0.98)	24.0(0.94)	
14	3/4	-CM-ML14-NS12	49.1(1.93)	19.1(0.75)	24.4(0.96)	11.1(0.44)	25.0(0.98)	27.0(1.06)	
15	1/2	-CM-ML15-NS8	49.0(1.93)	19.1(0.75)	24.4(0.96)	11.9(0.47)	25.0(0.98)	24.0(0.94)	
15	3/4	-CM-ML15-NS12	50.5(1.99)	19.1(0.75)	24.4(0.96)	11.9(0.47)	25.0(0.98)	27.0(1.06)	
15	1	-CM-ML15-NS16	57.1(2.25)	23.9(0.94)	24.4(0.96)	11.9(0.47)	25.0(0.98)	35.0(1.38)	
16	1/4	-CM-ML16-NS4	44.1(1.74)	14.2(0.56)	24.4(0.96)	7.1(0.28)	25.0(0.98)	24.0(0.94)	
16	3/8	-CM-ML16-NS6	44.1(1.74)	14.2(0.56)	24.4(0.96)	9.5(0.37)	25.0(0.98)	24.0(0.94)	
16	1/2	-CM-ML16-NS8	49.0(1.93)	19.1(0.75)	24.4(0.96)	11.9(0.47)	25.0(0.98)	24.0(0.94)	
16	3/4	-CM-ML16-NS12	50.5(1.99)	19.1(0.75)	24.4(0.96)	12.7(0.5)	25.0(0.98)	27.0(1.06)	
18	3/8	-CM-ML18-NS6	45.6(1.80)	14.2(0.56)	24.4(0.96)	9.5(0.37)	30.0(1.18)	27.0(1.06)	
18	1/2	-CM-ML18-NS8	50.5(1.99)	19.1(0.75)	24.4(0.96)	11.9(0.47)	30.0(1.18)	27.0(1.06)	
18	3/4	-CM-ML18-NS12	50.5(1.99)	19.1(0.75)	24.4(0.96)	15.1(0.59)	30.0(1.18)	27.0(1.06)	
20	1/2	-CM-ML20-NS8	52.3(2.06)	19.1(0.75)	26.0(1.02)	11.9(0.47)	32.0(1.26)	30.0(1.18)	
20	3/4	-CM-ML20-NS12	52.3(2.06)	19.1(0.75)	26.0(1.02)	15.9(0.63)	32.0(1.26)	30.0(1.18)	
20	1	-CM-ML20-NS16	57.1(2.25)	23.9(0.94)	26.0(1.02)	15.9(0.63)	32.0(1.26)	35.0(1.38)	
22	1/2	-CM-ML22-NS8	52.3(2.06)	19.1(0.75)	26.0(1.02)	11.9(0.47)	32.0(1.26)	30.0(1.18)	
22	3/4	-CM-ML22-NS12	52.3(2.06)	19.1(0.75)	26.0(1.02)	15.9(0.63)	32.0(1.26)	30.0(1.18)	
22	1	-CM-ML22-NS16	57.1(2.25)	23.9(0.94)	26.0(1.02)	18.3(0.72)	32.0(1.26)	35.0(1.38)	
25	1/2	-CM-ML25-NS8	57.5(2.26)	19.1(0.75)	31.3(1.23)	11.9(0.47)	38.0(1.50)	35.0(1.38)	
25	3/4	-CM-ML25-NS12	57.5(2.26)	19.1(0.75)	31.3(1.23)	15.9(0.63)	38.0(1.50)	35.0(1.38)	
25	1	-CM-ML25-NS16	62.3(2.45)	23.9(0.94)	31.3(1.23)	21.8(0.86)	38.0(1.50)	35.0(1.38)	
28	1	-CM-ML28-NS16	72.4(2.85)	23.9(0.94)	36.6(1.44)	21.8(0.86)	46.0(1.81)	41.0(1.61)	
28	1 1/4	-CM-ML28-NS20	73.1(2.88)	23.9(0.94)	36.6(1.44)	21.8(0.86)	46.0(1.81)	46.0(1.81)	
30	1 1/4	-CM-ML30-NS20	77.2(3.04)	23.9(0.94)	39.6(1.56)	26.2(1.03)	50.0(1.97)	46.0(1.81)	
32	1 1/4	-CM-ML32-NS20	79.6(3.13)	23.9(0.94)	42.0(1.65)	28.6(1.13)	50.0(1.97)	46.0(1.81)	
38	1 1/2	-CM-ML38-NS24	91.6(3.61)	26.2(1.03)	49.4(1.94)	33.7(1.33)	60.0(2.36)	55.0(2.17)	



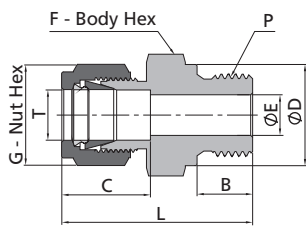
Male Connectors



Metric Tube			ISO Tapered Thread (RT)						
T-Tube O.D. (mm)	P-RT Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	B	C	E	G	F	
2	1/8	-CM-ML2-RT2	30.5(1.20)	9.7(0.38)	12.9(0.51)	1.7(0.07)	12.0(0.47)	12.0(0.47)	
3	1/8	-CM-ML3-RT2	30.5(1.20)	9.7(0.38)	12.9(0.51)	2.4(0.09)	12.0(0.47)	12.0(0.47)	
3	1/4	-CM-ML3-RT4	35.6(1.40)	14.2(0.56)	12.9(0.51)	2.4(0.09)	12.0(0.47)	14.0(0.55)	
4	1/8	-CM-ML4-RT2	31.2(1.23)	9.7(0.38)	13.7(0.54)	2.4(0.09)	12.0(0.47)	12.0(0.47)	
4	1/4	-CM-ML4-RT4	36.3(1.43)	14.2(0.56)	13.7(0.54)	2.4(0.09)	12.0(0.47)	14.0(0.55)	
6	1/8	-CM-ML6-RT2	32.8(1.29)	9.7(0.38)	15.3(0.60)	4.8(0.19)	14.0(0.55)	14.0(0.55)	
6	1/4	-CM-ML6-RT4	37.9(1.49)	14.2(0.56)	15.3(0.60)	4.8(0.19)	14.0(0.55)	14.0(0.55)	
6	3/8	-CM-ML6-RT6	38.4(1.51)	14.2(0.56)	15.3(0.60)	4.8(0.19)	14.0(0.55)	18.0(0.71)	
6	1/2	-CM-ML6-RT8	44.7(1.76)	19.1(0.75)	15.3(0.60)	4.8(0.19)	14.0(0.55)	22.0(0.87)	
8	1/8	-CM-ML8-RT2	34.2(1.35)	9.7(0.38)	16.2(0.64)	4.8(0.19)	16.0(0.63)	15.0(0.59)	
8	1/4	-CM-ML8-RT4	38.7(1.52)	14.2(0.56)	16.2(0.64)	6.4(0.25)	16.0(0.63)	15.0(0.59)	
8	3/8	-CM-ML8-RT6	39.2(1.54)	14.2(0.56)	16.2(0.64)	6.4(0.25)	16.0(0.63)	18.0(0.71)	
8	1/2	-CM-ML8-RT8	45.6(1.80)	19.1(0.75)	16.2(0.64)	6.4(0.25)	16.0(0.63)	22.0(0.87)	
10	1/8	-CM-ML10-RT2	36.3(1.43)	9.7(0.38)	17.2(0.68)	4.8(0.19)	19.0(0.75)	18.0(0.71)	
10	1/4	-CM-ML10-RT4	40.9(1.61)	14.2(0.56)	17.2(0.68)	7.1(0.28)	19.0(0.75)	18.0(0.71)	
10	3/8	-CM-ML10-RT6	40.9(1.61)	14.2(0.56)	17.2(0.68)	7.9(0.31)	19.0(0.75)	18.0(0.71)	
10	1/2	-CM-ML10-RT8	46.5(1.83)	19.1(0.75)	17.2(0.68)	7.9(0.31)	19.0(0.75)	22.0(0.87)	
10	3/4	-CM-ML10-RT12	48.0(1.89)	19.1(0.75)	17.2(0.68)	7.9(0.31)	19.0(0.75)	27.0(1.06)	
12	1/8	-CM-ML12-RT2	38.9(1.53)	9.7(0.38)	22.8(0.90)	4.8(0.19)	22.0(0.87)	22.0(0.87)	
12	1/4	-CM-ML12-RT4	43.4(1.71)	14.2(0.56)	22.8(0.90)	7.1(0.28)	22.0(0.87)	22.0(0.87)	
12	3/8	-CM-ML12-RT6	43.4(1.71)	14.2(0.56)	22.8(0.90)	9.5(0.37)	22.0(0.87)	22.0(0.87)	
12	1/2	-CM-ML12-RT8	49.0(1.93)	19.1(0.75)	22.8(0.90)	9.5(0.37)	22.0(0.87)	22.0(0.87)	
12	3/4	-CM-ML12-RT12	50.5(1.99)	19.1(0.75)	22.8(0.90)	9.5(0.37)	22.0(0.87)	27.0(1.06)	
14	1/8	-CM-ML14-RT2	39.9(1.57)	9.7(0.38)	24.4(0.96)	4.8(0.19)	25.0(0.98)	24.0(0.94)	
14	1/4	-CM-ML14-RT4	44.1(1.74)	14.2(0.56)	24.4(0.96)	7.1(0.28)	25.0(0.98)	24.0(0.94)	
14	3/8	-CM-ML14-RT6	44.1(1.74)	14.2(0.56)	24.4(0.96)	9.5(0.37)	25.0(0.98)	24.0(0.94)	
14	1/2	-CM-ML14-RT8	49.0(1.93)	19.1(0.75)	24.4(0.96)	11.1(0.44)	25.0(0.98)	24.0(0.94)	
14	3/4	-CM-ML14-RT12	50.5(1.99)	19.1(0.75)	24.4(0.96)	11.1(0.44)	25.0(0.98)	27.0(1.06)	
15	1/2	-CM-ML15-RT8	49.0(1.93)	19.1(0.75)	24.4(0.96)	11.9(0.47)	25.0(0.98)	24.0(0.94)	
16	1/4	-CM-ML16-RT4	44.1(1.74)	14.2(0.56)	24.4(0.96)	7.1(0.28)	25.0(0.98)	24.0(0.94)	
16	3/8	-CM-ML16-RT6	44.1(1.74)	14.2(0.56)	24.4(0.96)	9.5(0.37)	25.0(0.98)	24.0(0.94)	
16	1/2	-CM-ML16-RT8	49.0(1.93)	19.1(0.75)	24.4(0.96)	11.9(0.47)	25.0(0.98)	24.0(0.94)	
16	3/4	-CM-ML16-RT12	50.5(1.99)	19.1(0.75)	24.4(0.96)	12.7(0.5)	25.0(0.98)	27.0(1.06)	
18	1/2	-CM-ML18-RT8	50.5(1.99)	19.1(0.75)	24.4(0.96)	11.9(0.47)	30.0(1.18)	27.0(1.06)	
18	3/4	-CM-ML18-RT12	50.5(1.99)	19.1(0.75)	24.4(0.96)	15.1(0.59)	30.0(1.18)	27.0(1.06)	
20	1/2	-CM-ML20-RT8	52.3(2.06)	19.1(0.75)	26.0(1.02)	11.9(0.47)	32.0(1.26)	30.0(1.18)	
20	3/4	-CM-ML20-RT12	52.3(2.06)	19.1(0.75)	26.0(1.02)	15.9(0.63)	32.0(1.26)	30.0(1.18)	
22	3/4	-CM-ML22-RT12	52.3(2.06)	19.1(0.75)	26.0(1.02)	15.9(0.63)	32.0(1.26)	30.0(1.18)	
22	1	-CM-ML22-RT16	57.1(2.25)	23.9(0.94)	26.0(1.02)	18.3(0.72)	32.0(1.26)	35.0(1.38)	
25	1/2	-CM-ML25-RT8	57.5(2.26)	19.1(0.75)	31.3(1.23)	11.9(0.47)	38.0(1.50)	35.0(1.38)	
25	3/4	-CM-ML25-RT12	57.5(2.26)	19.1(0.75)	31.3(1.23)	15.9(0.63)	38.0(1.50)	35.0(1.38)	
25	1	-CM-ML25-RT16	62.3(2.45)	23.9(0.94)	31.3(1.23)	21.8(0.86)	38.0(1.50)	35.0(1.38)	
28	1	-CM-ML28-RT16	72.4(2.85)	23.9(0.94)	36.6(1.44)	21.8(0.86)	46.0(1.81)	41.0(1.61)	
28	1 1/4	-CM-ML28-RT20	73.1(2.88)	23.9(0.94)	36.6(1.44)	21.8(0.86)	46.0(1.81)	46.0(1.81)	
30	1 1/4	-CM-ML30-RT20	77.2(3.04)	23.9(0.94)	39.6(1.56)	26.2(1.03)	50.0(1.97)	46.0(1.81)	
32	1 1/4	-CM-ML32-RT20	79.6(3.13)	23.9(0.94)	42.0(1.65)	28.6(1.13)	50.0(1.97)	46.0(1.81)	
38	1 1/2	-CM-ML38-RT24	91.6(3.61)	26.2(1.03)	49.4(1.94)	33.7(1.33)	60.0(2.36)	55.0(2.17)	

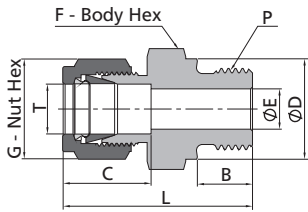
Tube Fittings

Male Connectors

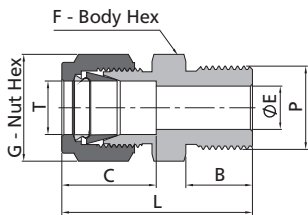


Metric Tube			ISO Parallel Thread (RS)							
T-Tube O.D. (mm)	P-RS Size	Basic Ordering Number	Dimensions, mm (in.)							
			L	B	C	E	G	F	D	
2	1/8	-CM-ML2-RS2	30.0(1.18)	7.1(0.28)	12.9(0.51)	1.7(0.07)	12.0(0.47)	14.0(0.55)	13.7(0.54)	
3	1/8	-CM-ML3-RS2	30.0(1.18)	7.1(0.28)	12.9(0.51)	2.4(0.09)	12.0(0.47)	14.0(0.55)	13.7(0.54)	
3	1/4	-CM-ML3-RS4	35.3(1.39)	11.2(0.44)	12.9(0.51)	2.4(0.09)	12.0(0.47)	19.0(0.75)	18.0(0.71)	
4	1/8	-CM-ML4-RS2	30.7(1.21)	7.1(0.28)	13.7(0.54)	2.4(0.09)	12.0(0.47)	14.0(0.55)	13.7(0.54)	
4	1/4	-CM-ML4-RS4	36.0(1.42)	11.2(0.44)	13.7(0.54)	2.4(0.09)	12.0(0.47)	19.0(0.75)	18.0(0.71)	
6	1/8	-CM-ML6-RS2	32.3(1.27)	7.1(0.28)	15.3(0.60)	4.0(0.16)	14.0(0.55)	14.0(0.55)	13.7(0.54)	
6	1/4	-CM-ML6-RS4	37.6(1.48)	11.2(0.44)	15.3(0.60)	4.8(0.19)	14.0(0.55)	19.0(0.75)	18.0(0.71)	
6	3/8	-CM-ML6-RS6	38.9(1.53)	11.2(0.44)	15.3(0.60)	4.8(0.19)	14.0(0.55)	22.0(0.87)	21.6(0.85)	
6	1/2	-CM-ML6-RS8	44.7(1.76)	14.2(0.56)	15.3(0.60)	4.8(0.19)	14.0(0.55)	27.0(1.06)	25.9(1.02)	
8	1/8	-CM-ML8-RS2	33.2(1.31)	7.1(0.28)	16.2(0.64)	4.0(0.16)	16.0(0.63)	15.0(0.59)	13.7(0.54)	
8	1/4	-CM-ML8-RS4	38.5(1.52)	11.2(0.44)	16.2(0.64)	6.4(0.25)	16.0(0.63)	19.0(0.75)	18.0(0.71)	
8	3/8	-CM-ML8-RS6	39.8(1.57)	11.2(0.44)	16.2(0.64)	6.4(0.25)	16.0(0.63)	22.0(0.87)	21.6(0.85)	
8	1/2	-CM-ML8-RS8	45.6(1.80)	14.2(0.56)	16.2(0.64)	6.4(0.25)	16.0(0.63)	27.0(1.06)	25.9(1.02)	
8	3/4	-CM-ML8-RS12	49.5(1.95)	15.7(0.62)	16.2(0.64)	6.4(0.25)	16.0(0.63)	35.0(1.38)	32.0(1.26)	
10	1/4	-CM-ML10-RS4	39.4(1.55)	11.2(0.44)	17.2(0.68)	5.9(0.23)	19.0(0.75)	19.0(0.75)	18.0(0.71)	
10	3/8	-CM-ML10-RS6	40.6(1.60)	11.2(0.44)	17.2(0.68)	7.9(0.31)	19.0(0.75)	22.0(0.87)	21.6(0.85)	
10	1/2	-CM-ML10-RS8	46.5(1.83)	14.2(0.56)	17.2(0.68)	7.9(0.31)	19.0(0.75)	27.0(1.06)	25.9(1.02)	
12	1/4	-CM-ML12-RS4	42.6(1.68)	11.2(0.44)	22.8(0.90)	5.9(0.23)	22.0(0.87)	22.0(0.87)	18.0(0.71)	
12	3/8	-CM-ML12-RS6	43.1(1.70)	11.2(0.44)	22.8(0.90)	7.9(0.31)	22.0(0.87)	22.0(0.87)	21.6(0.85)	
12	1/2	-CM-ML12-RS8	49.0(1.93)	14.2(0.56)	22.8(0.90)	9.5(0.37)	22.0(0.87)	27.0(1.06)	25.9(1.02)	
12	3/4	-CM-ML12-RS12	52.8(2.08)	15.7(0.62)	22.8(0.90)	9.5(0.37)	22.0(0.87)	35.0(1.38)	32.0(1.26)	
14	1/4	-CM-ML14-RS4	44.2(1.74)	11.2(0.44)	24.4(0.96)	6.4(0.25)	25.0(0.98)	24.0(0.94)	18.0(0.71)	
14	3/8	-CM-ML14-RS6	43.9(1.73)	11.2(0.44)	24.4(0.96)	7.9(0.31)	25.0(0.98)	24.0(0.94)	21.6(0.85)	
14	1/2	-CM-ML14-RS8	49.0(1.93)	14.2(0.56)	24.4(0.96)	11.1(0.44)	25.0(0.98)	27.0(1.06)	25.9(1.02)	
14	3/4	-CM-ML14-RS12	52.8(2.08)	15.7(0.62)	24.4(0.96)	11.1(0.44)	25.0(0.98)	35.0(1.38)	32.0(1.26)	
15	3/8	-CM-ML15-RS6	43.9(1.73)	11.2(0.44)	24.4(0.96)	7.9(0.31)	25.0(0.98)	24.0(0.94)	21.6(0.85)	
15	1/2	-CM-ML15-RS8	49.0(1.93)	14.2(0.56)	24.4(0.96)	11.9(0.47)	25.0(0.98)	27.0(1.06)	25.9(1.02)	
15	3/4	-CM-ML15-RS12	52.8(2.08)	15.7(0.62)	24.4(0.96)	11.9(0.47)	25.0(0.98)	35.0(1.38)	32.0(1.26)	
16	3/8	-CM-ML16-RS6	43.9(1.73)	11.2(0.44)	24.4(0.96)	7.9(0.31)	25.0(0.98)	24.0(0.94)	21.6(0.85)	
16	1/2	-CM-ML16-RS8	49.0(1.93)	14.2(0.56)	24.4(0.96)	11.9(0.47)	25.0(0.98)	27.0(1.06)	25.9(1.02)	
16	3/4	-CM-ML16-RS12	52.8(2.08)	15.7(0.62)	24.4(0.96)	12.7(0.5)	25.0(0.98)	35.0(1.38)	32.0(1.26)	
18	1/2	-CM-ML18-RS8	49.0(1.93)	14.2(0.56)	24.4(0.96)	11.9(0.47)	30.0(1.18)	27.0(1.06)	25.9(1.02)	
18	3/4	-CM-ML18-RS12	52.8(2.08)	15.7(0.62)	24.4(0.96)	15.1(0.59)	30.0(1.18)	35.0(1.38)	32.0(1.26)	
20	1/2	-CM-ML20-RS8	50.5(1.99)	14.2(0.56)	26.0(1.02)	11.9(0.47)	32.0(1.26)	30.0(1.18)	25.9(1.02)	
20	3/4	-CM-ML20-RS12	52.8(2.08)	15.7(0.62)	26.0(1.02)	15.9(0.63)	32.0(1.26)	35.0(1.38)	32.0(1.26)	
22	3/4	-CM-ML22-RS12	52.8(2.08)	15.7(0.62)	26.0(1.02)	15.9(0.63)	32.0(1.26)	35.0(1.38)	32.0(1.26)	
22	1	-CM-ML22-RS16	55.3(2.18)	18.3(0.72)	26.0(1.02)	18.3(0.72)	32.0(1.26)	41.0(1.61)	39.1(1.54)	
25	3/4	-CM-ML25-RS12	57.5(2.26)	15.7(0.62)	31.3(1.23)	15.9(0.63)	38.0(1.50)	35.0(1.38)	32.0(1.26)	
25	1	-CM-ML25-RS16	60.1(2.37)	18.3(0.72)	31.3(1.23)	19.8(0.78)	38.0(1.50)	41.0(1.61)	39.1(1.54)	
28	1	-CM-ML28-RS16	70.1(2.76)	18.3(0.72)	36.6(1.44)	19.8(0.78)	46.0(1.81)	41.0(1.61)	39.1(1.54)	
28	1 1/4	-CM-ML28-RS20	73.9(2.91)	19.8(0.78)	36.6(1.44)	21.8(0.86)	46.0(1.81)	50.0(1.97)	49.0(1.93)	
30	1 1/4	-CM-ML30-RS20	79.2(3.12)	19.8(0.78)	39.6(1.56)	26.2(1.03)	50.0(1.97)	50.0(1.97)	49.0(1.93)	
32	1 1/4	-CM-ML32-RS20	78.9(3.11)	19.8(0.78)	42.0(1.65)	28.6(1.13)	50.0(1.97)	50.0(1.97)	49.0(1.93)	
38	1 1/2	-CM-ML38-RS24	90.8(3.57)	20.6(0.81)	49.4(1.94)	31.8(1.25)	60.0(2.36)	55.0(2.17)	54.7(2.15)	

## Male Connectors

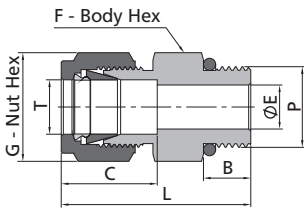


Metric Tube			ISO Parallel Thread (RP)						
T-Tube O.D. (mm)	P-RP Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	B	C	E	G	F	D
3	1/8	-CM-ML3-RP2	30.0(1.18)	7.1(0.28)	12.9(0.51)	2.4(0.09)	12.0(0.47)	14.0(0.55)	13.8(0.54)
3	1/4	-CM-ML3-RP4	35.3(1.39)	11.2(0.44)	12.9(0.51)	2.4(0.09)	12.0(0.47)	19.0(0.75)	18.0(0.71)
4	1/8	-CM-ML4-RP2	30.7(1.21)	7.1(0.28)	13.7(0.54)	2.4(0.09)	12.0(0.47)	14.0(0.55)	13.8(0.54)
6	1/8	-CM-ML6-RP2	32.3(1.27)	7.1(0.28)	15.3(0.60)	4.0(0.16)	14.0(0.55)	14.0(0.55)	13.8(0.54)
6	1/4	-CM-ML6-RP4	37.6(1.48)	11.2(0.44)	15.3(0.60)	4.8(0.19)	14.0(0.55)	19.0(0.75)	18.0(0.71)
6	3/8	-CM-ML6-RP6	38.9(1.53)	11.2(0.44)	15.3(0.60)	4.8(0.19)	14.0(0.55)	22.0(0.87)	21.8(0.86)
6	1/2	-CM-ML6-RP8	44.7(1.76)	14.2(0.56)	15.3(0.60)	4.8(0.19)	14.0(0.55)	27.0(1.06)	26.0(1.02)
8	1/8	-CM-ML8-RP2	33.3(1.31)	7.1(0.28)	16.2(0.64)	4.0(0.16)	16.0(0.63)	15.0(0.59)	13.8(0.54)
8	1/4	-CM-ML8-RP4	38.5(1.52)	11.2(0.44)	16.2(0.64)	5.9(0.23)	16.0(0.63)	19.0(0.75)	18.0(0.71)
8	3/8	-CM-ML8-RP6	39.8(1.57)	11.2(0.44)	16.2(0.64)	6.4(0.25)	16.0(0.63)	22.0(0.87)	21.8(0.86)
8	1/2	-CM-ML8-RP8	45.6(1.80)	14.2(0.56)	16.2(0.64)	6.4(0.25)	16.0(0.63)	27.0(1.06)	26.0(1.02)
10	1/4	-CM-ML10-RP4	39.4(1.55)	11.2(0.44)	17.2(0.68)	5.9(0.23)	19.0(0.75)	19.0(0.75)	18.0(0.71)
10	3/8	-CM-ML10-RP6	42.8(1.69)	11.2(0.44)	17.2(0.68)	7.9(0.31)	19.0(0.75)	22.0(0.87)	21.8(0.86)
10	1/2	-CM-ML10-RP8	46.5(1.83)	14.2(0.56)	17.2(0.68)	7.9(0.31)	19.0(0.75)	27.0(1.06)	26.0(1.02)
12	1/4	-CM-ML12-RP4	42.6(1.68)	11.2(0.44)	22.8(0.90)	5.9(0.23)	22.0(0.87)	22.0(0.87)	18.0(0.71)
12	3/8	-CM-ML12-RP6	43.1(1.70)	11.2(0.44)	22.8(0.90)	7.9(0.31)	22.0(0.87)	22.0(0.87)	21.8(0.86)
12	1/2	-CM-ML12-RP8	52.1(2.05)	14.2(0.56)	22.8(0.90)	9.5(0.37)	22.0(0.87)	27.0(1.06)	26.0(1.02)
12	3/4	-CM-ML12-RP12	52.8(2.08)	15.7(0.62)	22.8(0.90)	9.5(0.37)	22.0(0.87)	35.0(1.38)	32.0(1.26)
15	1/2	-CM-ML15-RP8	47.5(1.87)	14.2(0.56)	24.4(0.96)	11.9(0.47)	25.0(0.98)	27.0(1.06)	26.0(1.02)
16	3/8	-CM-ML16-RP6	43.9(1.73)	11.2(0.44)	24.4(0.96)	7.9(0.31)	25.0(0.98)	24.0(0.94)	21.8(0.86)
16	1/2	-CM-ML16-RP8	49.0(1.93)	14.2(0.56)	24.4(0.96)	11.9(0.47)	25.0(0.98)	27.0(1.06)	26.0(1.02)
18	1/2	-CM-ML18-RP8	49.0(1.93)	14.2(0.56)	24.4(0.96)	11.9(0.47)	30.0(1.18)	27.0(1.06)	26.0(1.02)
18	3/4	-CM-ML18-RP12	52.8(2.08)	15.7(0.62)	24.4(0.96)	15.1(0.59)	30.0(1.18)	35.0(1.38)	32.0(1.26)
20	1/2	-CM-ML20-RP8	50.5(1.99)	14.2(0.56)	26.0(1.02)	11.9(0.47)	32.0(1.26)	30.0(1.18)	26.0(1.02)
20	3/4	-CM-ML20-RP12	52.8(2.08)	15.7(0.62)	26.0(1.02)	15.9(0.63)	32.0(1.26)	35.0(1.38)	32.0(1.26)
22	3/4	-CM-ML22-RP12	52.8(2.08)	15.7(0.62)	26.0(1.02)	15.9(0.63)	32.0(1.26)	35.0(1.38)	32.0(1.26)
22	1	-CM-ML22-RP16	55.3(2.18)	18.3(0.72)	26.0(1.02)	18.3(0.72)	32.0(1.26)	41.0(1.61)	39.0(1.54)
25	3/4	-CM-ML25-RP12	57.5(2.26)	15.7(0.62)	31.3(1.23)	15.9(0.63)	38.0(1.50)	35.0(1.38)	32.0(1.26)
25	1	-CM-ML25-RP16	60.1(2.37)	18.3(0.72)	31.3(1.23)	19.8(0.78)	38.0(1.50)	41.0(1.61)	39.0(1.54)
28	1	-CM-ML28-RP16	70.1(2.76)	18.3(0.72)	36.6(1.44)	19.8(0.78)	46.0(1.81)	41.0(1.61)	39.0(1.54)
28	1 1/4	-CM-ML28-RP20	73.9(2.91)	19.8(0.78)	36.6(1.44)	21.8(0.86)	46.0(1.81)	50.0(1.97)	49.0(1.93)
30	1 1/4	-CM-ML30-RP20	76.5(3.01)	19.8(0.78)	39.6(1.56)	26.2(1.03)	50.0(1.97)	50.0(1.97)	49.0(1.93)
32	1 1/4	-CM-ML32-RP20	78.9(3.11)	19.8(0.78)	42.0(1.65)	28.6(1.13)	50.0(1.97)	50.0(1.97)	49.0(1.93)
38	1 1/2	-CM-ML38-RP24	89.3(3.52)	20.6(0.81)	49.4(1.94)	31.8(1.25)	60.0(2.36)	55.0(2.17)	54.7(2.15)



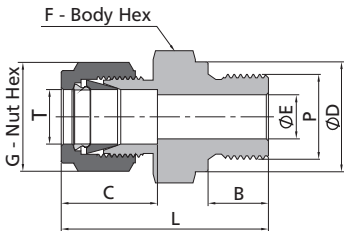
Metric Tube			ISO Parallel Thread (BP)					
T-Tube O.D. (mm)	P-BP Size	Basic Ordering Number	Dimensions, mm (in.)					
			L	B	C	E	G	F
6	1/4	-CM-ML6-BP4	36.9(1.45)	12.9(0.51)	15.3(0.60)	4.8(0.19)	14.0(0.55)	14.0(0.55)
6	3/8	-CM-ML6-BP6	39.5(1.56)	14.2(0.56)	15.3(0.60)	4.8(0.19)	14.0(0.55)	18.0(0.71)
8	1/8	-CM-ML8-BP2	33.9(1.33)	9.8(0.39)	16.2(0.64)	4.0(0.16)	16.0(0.63)	14.0(0.55)
8	1/4	-CM-ML8-BP4	37.0(1.46)	12.9(0.51)	16.2(0.64)	6.4(0.25)	16.0(0.63)	14.0(0.55)
8	3/8	-CM-ML8-BP6	39.3(1.55)	14.2(0.56)	16.2(0.64)	6.4(0.25)	16.0(0.63)	18.0(0.71)
8	1/2	-CM-ML8-BP8	45.4(1.79)	18.8(0.74)	16.2(0.64)	6.4(0.25)	16.0(0.63)	22.0(0.87)
10	1/4	-CM-ML10-BP4	39.5(1.56)	12.9(0.51)	17.2(0.68)	5.9(0.23)	19.0(0.75)	18.0(0.71)
10	1/2	-CM-ML10-BP8	46.3(1.82)	18.8(0.74)	17.2(0.68)	7.9(0.31)	19.0(0.75)	22.0(0.87)
12	3/8	-CM-ML12-BP6	44.2(1.74)	14.2(0.56)	22.8(0.90)	7.9(0.31)	22.0(0.87)	22.0(0.87)
12	1/2	-CM-ML12-BP8	52.1(2.05)	18.8(0.74)	22.8(0.90)	9.5(0.37)	22.0(0.87)	22.0(0.87)
14	1/4	-CM-ML14-BP4	42.9(1.69)	12.9(0.51)	24.4(0.96)	5.9(0.23)	25.0(0.98)	24.0(0.94)
16	3/8	-CM-ML16-BP6	43.4(1.71)	14.2(0.56)	24.4(0.96)	7.9(0.31)	25.0(0.98)	24.0(0.94)
16	1/2	-CM-ML16-BP8	47.9(1.89)	18.8(0.74)	24.4(0.96)	9.5(0.37)	25.0(0.98)	24.0(0.94)
18	1/2	-CM-ML18-BP8	49.8(1.96)	18.8(0.74)	24.4(0.96)	9.5(0.37)	30.0(1.18)	27.0(1.06)

Male Connectors

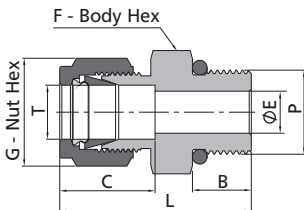


Metric Tube			SAE/MS Straight Thread					
T-Tube O.D. (mm)	P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, mm (in.)					
			L	B	C	E	G	F
6	9/16-18	-CM-ML6-ST9	35.6(1.40)	9.9(0.39)	15.3(0.60)	4.8(0.19)	14.0(0.55)	18.0(0.71)
10	9/16-18	-CM-ML10-ST9	37.3(1.47)	9.9(0.39)	17.2(0.68)	7.1(0.28)	19.0(0.75)	18.0(0.71)
10	3/4-16	-CM-ML10-ST12	39.4(1.55)	11.2(0.44)	17.2(0.68)	7.9(0.31)	19.0(0.75)	22.0(0.87)
12	7/16-20	-CM-ML12-ST7	40.6(1.60)	9.1(0.36)	22.8(0.90)	5.2(0.20)	22.0(0.87)	22.0(0.87)
12	9/16-18	-CM-ML12-ST9	39.9(1.57)	9.9(0.39)	22.8(0.90)	7.1(0.28)	22.0(0.87)	22.0(0.87)

Adapt to straight thread boss of SAE J1926-1, ISO 11926-1 and MS 16142.



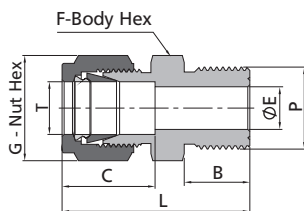
Metric Tube			Metric Thread (MRS)						
T-Tube O.D. (mm)	P-Metric Thread Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	B	C	E	G	F	D
6	M8 x 1	-CM-ML6-MRS8	33.3(1.31)	8.0(0.31)	15.3(0.60)	3.0(0.12)	14.0(0.55)	14.0(0.55)	12.0(0.47)
6	M10 x 1	-CM-ML6-MRS10	33.3(1.31)	8.0(0.31)	15.3(0.60)	4.0(0.16)	14.0(0.55)	14.0(0.55)	14.0(0.55)
6	M12 x 1.5	-CM-ML6-MRS12	38.2(1.50)	12.0(0.47)	15.3(0.60)	4.8(0.19)	14.0(0.55)	18.0(0.71)	17.0(0.67)
6	M14 x 1.5	-CM-ML6-MRS14	39.7(1.56)	12.0(0.47)	15.3(0.60)	4.8(0.19)	14.0(0.55)	22.0(0.87)	19.0(0.75)
8	M8 x 1	-CM-ML8-MRS8	34.1(1.34)	8.0(0.31)	16.2(0.64)	3.0(0.12)	16.0(0.63)	14.0(0.55)	12.0(0.47)
8	M10 x 1	-CM-ML8-MRS10	34.1(1.34)	8.0(0.31)	16.2(0.64)	5.0(0.20)	16.0(0.63)	14.0(0.55)	14.0(0.55)
8	M12 x 1.5	-CM-ML8-MRS12	40.4(1.59)	12.0(0.47)	16.2(0.64)	6.0(0.24)	16.0(0.63)	18.0(0.71)	17.0(0.67)
8	M14 x 1.5	-CM-ML8-MRS14	40.4(1.59)	12.0(0.47)	16.2(0.64)	6.4(0.25)	16.0(0.63)	19.0(0.75)	19.0(0.75)
10	M12 x 1.5	-CM-ML10-MRS12	40.7(1.60)	12.0(0.47)	17.2(0.68)	6.0(0.24)	19.0(0.75)	18.0(0.71)	17.0(0.67)
10	M14 x 1.5	-CM-ML10-MRS14	39.5(1.56)	12.0(0.47)	17.2(0.68)	7.9(0.31)	19.0(0.75)	19.0(0.75)	19.0(0.75)
12	M16 x 1.5	-CM-ML12-MRS16	45.5(1.79)	12.0(0.47)	22.8(0.90)	9.0(0.35)	22.0(0.87)	22.0(0.87)	21.0(0.83)
12	M20 x 1.5	-CM-ML12-MRS20	47.2(1.86)	14.0(0.55)	22.8(0.90)	9.5(0.37)	22.0(0.87)	25.0(0.98)	25.0(0.98)
12	M22 x 1.5	-CM-ML12-MRS22	47.5(1.87)	14.0(0.55)	22.8(0.90)	9.5(0.37)	22.0(0.87)	27.0(1.06)	27.0(1.06)
14	M14 x 1.5	-CM-ML14-MRS14	44.9(1.77)	12.0(0.47)	24.4(0.96)	8.0(0.31)	25.0(0.98)	24.0(0.94)	19.0(0.75)
14	M20 x 1.5	-CM-ML14-MRS20	48.0(1.89)	14.0(0.55)	24.4(0.96)	11.1(0.44)	25.0(0.98)	27.0(1.06)	25.0(0.98)
16	M20 x 1.5	-CM-ML16-MRS20	48.0(1.89)	14.0(0.55)	24.4(0.96)	12.0(0.47)	25.0(0.98)	25.0(0.98)	25.0(0.98)
18	M20 x 1.5	-CM-ML18-MRS20	48.5(1.91)	14.0(0.55)	24.4(0.96)	12.0(0.47)	30.0(1.18)	27.0(1.06)	25.0(0.98)
20	M20 x 1.5	-CM-ML20-MRS20	50.0(1.97)	14.0(0.55)	26.0(1.02)	12.0(0.47)	32.0(1.26)	30.0(1.18)	25.0(0.98)
22	M24 x 1.5	-CM-ML22-MRS24	50.5(1.99)	14.0(0.55)	26.0(1.02)	15.0(0.59)	32.0(1.26)	30.0(1.18)	28.8(1.13)
25	M27 x 2	-CM-ML25-MRS27	57.5(2.26)	16.0(0.63)	31.3(1.23)	16.8(0.66)	38.0(1.50)	35.0(1.38)	32.0(1.26)



Metric Tube			Metric Thread (MST)					
T-Tube O.D. (mm)	P-Metric Thread Size	Basic Ordering Number	Dimensions, mm (in.)					
			L	B	C	E	G	F
6	M14 x 1.5	-CM-ML6-MST14	38.7(1.52)	11.0(0.43)	15.3(0.60)	4.8(0.19)	14.0(0.55)	19.0(0.75)
10	M14 x 1.5	-CM-ML10-MST14	40.0(1.57)	11.0(0.43)	17.2(0.68)	7.5(0.30)	19.0(0.75)	19.0(0.75)
10	M20 x 1.5	-CM-ML10-MST20	47.2(1.86)	14.0(0.55)	17.2(0.68)	7.9(0.31)	19.0(0.75)	27.0(1.06)
12	M14 x 1.5	-CM-ML12-MST14	40.2(1.58)	11.0(0.43)	22.8(0.90)	7.5(0.30)	22.0(0.87)	22.0(0.87)
12	M20 x 1.5	-CM-ML12-MST20	47.2(1.86)	14.0(0.55)	22.8(0.90)	9.5(0.37)	22.0(0.87)	27.0(1.06)

Adapt to straight thread boss of ISO 6149-1.

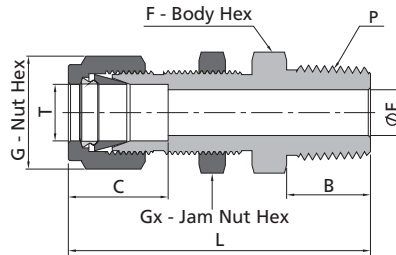
## Male Connectors



Metric Tube			Metric Thread (MS)					
T-Tube O.D. (mm)	P-Metric Thread Size	Basic Ordering Number	Dimensions, mm (in.)					
			L	B	C	E	G	F
6	M6 x 1	-CM-ML6-MS6	32.4(1.28)	8.0(0.31)	15.3(0.60)	2.0(0.08)	14.0(0.55)	14.0(0.55)
6	M8 x 1	-CM-ML6-MS8	35.3(1.39)	9.0(0.35)	15.3(0.60)	3.0(0.12)	14.0(0.55)	14.0(0.55)
6	M10 x 1	-CM-ML6-MS10	34.7(1.37)	11.0(0.43)	15.3(0.60)	4.7(0.19)	14.0(0.55)	14.0(0.55)
6	M12 x 1.5	-CM-ML6-MS12	36.4(1.43)	12.0(0.47)	15.3(0.60)	4.8(0.19)	14.0(0.55)	14.0(0.55)
6	M14 x 1.5	-CM-ML6-MS14	36.5(1.44)	13.0(0.51)	15.3(0.60)	4.8(0.19)	14.0(0.55)	16.0(0.63)
6	M16 x 1.5	-CM-ML6-MS16	38.4(1.51)	14.0(0.55)	15.3(0.60)	4.8(0.19)	14.0(0.55)	18.0(0.71)
6	M18 x 1.5	-CM-ML6-MS18	40.0(1.57)	15.0(0.59)	15.3(0.60)	4.8(0.19)	14.0(0.55)	19.0(0.75)
6	M20 x 1.5	-CM-ML6-MS20	41.7(1.64)	16.0(0.63)	15.3(0.60)	4.8(0.19)	14.0(0.55)	22.0(0.87)
8	M8 x 1	-CM-ML8-MS8	34.5(1.36)	9.0(0.35)	16.2(0.64)	3.0(0.12)	16.0(0.63)	14.0(0.55)
8	M10 x 1	-CM-ML8-MS10	36.6(1.44)	11.0(0.43)	16.2(0.64)	4.7(0.19)	16.0(0.63)	14.0(0.55)
8	M12 x 1.5	-CM-ML8-MS12	36.6(1.44)	12.0(0.47)	16.2(0.64)	6.0(0.24)	16.0(0.63)	14.0(0.55)
8	M14 x 1.5	-CM-ML8-MS14	37.7(1.48)	13.0(0.51)	16.2(0.64)	6.4(0.25)	16.0(0.63)	16.0(0.63)
8	M20 x 1.5	-CM-ML8-MS20	42.5(1.67)	16.0(0.63)	16.2(0.64)	6.4(0.25)	16.0(0.63)	22.0(0.87)
10	M12 x 1.5	-CM-ML10-MS12	38.7(1.52)	12.0(0.47)	17.2(0.68)	6.0(0.24)	19.0(0.75)	18.0(0.71)
10	M14 x 1.5	-CM-ML10-MS14	39.7(1.56)	13.0(0.51)	17.2(0.68)	7.2(0.28)	19.0(0.75)	18.0(0.71)
10	M20 x 1.5	-CM-ML10-MS20	43.5(1.71)	16.0(0.63)	17.2(0.68)	7.9(0.31)	19.0(0.75)	22.0(0.87)
12	M12 x 1.5	-CM-ML12-MS12	41.2(1.62)	12.0(0.47)	22.8(0.90)	6.0(0.24)	22.0(0.87)	22.0(0.87)
12	M16 x 1.5	-CM-ML12-MS16	43.2(1.70)	14.0(0.55)	22.8(0.90)	8.4(0.33)	22.0(0.87)	22.0(0.87)
12	M18 x 1.5	-CM-ML12-MS18	44.2(1.74)	15.0(0.59)	22.8(0.90)	9.5(0.37)	22.0(0.87)	22.0(0.87)
12	M20 x 1.5	-CM-ML12-MS20	45.2(1.78)	16.0(0.63)	22.8(0.90)	9.5(0.37)	22.0(0.87)	22.0(0.87)
14	M14 x 1.5	-CM-ML14-MS14	42.5(1.67)	13.0(0.51)	24.4(0.96)	7.2(0.28)	25.0(0.98)	24.0(0.94)
14	M16 x 1.5	-CM-ML14-MS16	43.9(1.73)	14.0(0.55)	24.4(0.96)	8.4(0.33)	25.0(0.98)	24.0(0.94)
14	M20 x 1.5	-CM-ML14-MS20	45.1(1.78)	16.0(0.63)	24.4(0.96)	10.8(0.43)	25.0(0.98)	24.0(0.94)
16	M20 x 1.5	-CM-ML16-MS20	46.1(1.81)	16.0(0.63)	24.4(0.96)	10.8(0.43)	25.0(0.98)	24.0(0.94)
18	M20 x 1.5	-CM-ML18-MS20	47.5(1.87)	16.0(0.63)	24.4(0.96)	10.8(0.43)	30.0(1.18)	27.0(1.06)
18	M22 x 1.5	-CM-ML18-MS22	48.5(1.91)	17.0(0.67)	24.4(0.96)	12.0(0.47)	30.0(1.18)	27.0(1.06)
20	M20 x 1.5	-CM-ML20-MS20	49.5(1.95)	16.0(0.63)	26.0(1.02)	10.8(0.43)	32.0(1.26)	30.0(1.18)
22	M24 x 1.5	-CM-ML22-MS24	50.5(1.99)	17.0(0.67)	26.0(1.02)	14.4(0.57)	32.0(1.26)	30.0(1.18)
25	M27 x 2	-CM-ML25-MS27	57.0(2.24)	18.0(0.71)	31.3(1.23)	16.1(0.63)	38.0(1.50)	35.0(1.38)

Bulkhead Male Connectors

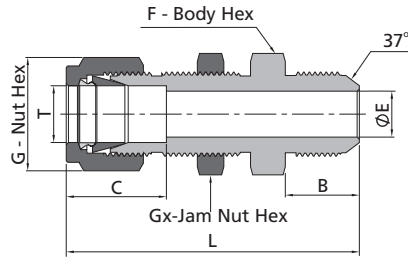
Tube Fittings



Fractional Tube			NPT Thread								
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)							Panel Hole Size in. (mm)	Max. Panel Thickness in. (mm)
			L	B	C	E	G	F	Gx		
1/16	1/16	-BCM-FL1-NS1	1.19(30.2)	0.38(9.7)	0.34(8.6)	0.05(1.3)	0.31(7.9)	0.31(7.9)	0.31(7.9)	0.20(5.2)	0.25(6.4)
1/16	1/8	-BCM-FL1-NS2	1.27(32.3)	0.38(9.7)	0.34(8.6)	0.05(1.3)	0.31(7.9)	0.44(11.1)	0.31(7.9)	0.20(5.2)	0.25(6.4)
1/8	1/8	-BCM-FL2-NS2	1.83(46.5)	0.38(9.7)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.50(12.7)	0.50(12.7)	0.33(8.3)	0.50(12.7)
3/16	1/8	-BCM-FL3-NS2	1.89(48.0)	0.38(9.7)	0.54(13.7)	0.12(3.0)	0.50(12.7)	0.56(14.3)	0.56(14.3)	0.39(9.9)	0.50(12.7)
1/4	1/8	-BCM-FL4-NS2	1.95(49.5)	0.38(9.7)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.63(15.9)	0.63(15.9)	0.45(11.5)	0.40(10.2)
1/4	1/4	-BCM-FL4-NS4	2.13(54.1)	0.56(14.2)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.63(15.9)	0.63(15.9)	0.45(11.5)	0.40(10.2)
1/4	3/8	-BCM-FL4-NS6	2.16(54.9)	0.56(14.2)	0.60(15.2)	0.19(4.8)	0.63(15.9)	0.69(17.5)	0.63(15.9)	0.45(11.5)	0.40(10.2)
1/4	1/2	-BCM-FL4-NS8	2.37(60.3)	0.75(19.1)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.87(22.2)	0.63(15.9)	0.45(11.5)	0.40(10.2)
5/16	1/8	-BCM-FL5-NS2	2.08(52.8)	0.38(9.7)	0.64(16.3)	0.19(4.8)	0.63(15.9)	0.69(17.5)	0.69(17.5)	0.52(13.1)	0.44(11.2)
5/16	1/4	-BCM-FL5-NS4	2.27(57.7)	0.56(14.2)	0.64(16.3)	0.25(6.4)	0.63(15.9)	0.69(17.5)	0.69(17.5)	0.52(13.1)	0.44(11.2)
3/8	1/8	-BCM-FL6-NS2	2.08(52.9)	0.38(9.7)	0.66(16.8)	0.19(4.8)	0.69(17.5)	0.75(19.1)	0.75(19.1)	0.58(14.7)	0.44(11.2)
3/8	1/4	-BCM-FL6-NS4	2.26(57.4)	0.56(14.2)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.75(19.1)	0.75(19.1)	0.58(14.7)	0.44(11.2)
3/8	3/8	-BCM-FL6-NS6	2.26(57.4)	0.56(14.2)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.75(19.1)	0.75(19.1)	0.58(14.7)	0.44(11.2)
3/8	1/2	-BCM-FL6-NS8	2.51(63.8)	0.75(19.1)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.87(22.2)	0.87(22.2)	0.58(14.7)	0.44(11.2)
1/2	1/8	-BCM-FL8-NS2	2.31(58.7)	0.38(9.7)	0.90(22.9)	0.19(4.8)	0.87(22.2)	0.94(23.8)	0.94(23.8)	0.76(19.4)	0.50(12.7)
1/2	1/4	-BCM-FL8-NS4	2.49(63.2)	0.56(14.2)	0.90(22.9)	0.28(7.1)	0.87(22.2)	0.94(23.8)	0.94(23.8)	0.76(19.4)	0.50(12.7)
1/2	3/8	-BCM-FL8-NS6	2.49(63.2)	0.56(14.2)	0.90(22.9)	0.38(9.7)	0.87(22.2)	0.94(23.8)	0.87(22.2)	0.76(19.4)	0.50(12.7)
1/2	1/2	-BCM-FL8-NS8	2.71(68.8)	0.75(19.1)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.94(23.8)	0.94(23.8)	0.76(19.4)	0.50(12.7)
5/8	3/8	-BCM-FL10-NS6	2.63(66.7)	0.56(14.2)	0.96(24.4)	0.38(9.7)	1.00(25.4)	1.06(27.0)	1.06(27.0)	0.89(22.6)	0.59(15.1)
5/8	1/2	-BCM-FL10-NS8	2.81(71.5)	0.75(19.1)	0.96(24.4)	0.47(11.9)	1.00(25.4)	1.06(27.0)	1.06(27.0)	0.89(22.6)	0.59(15.1)
3/4	1/2	-BCM-FL12-NS8	3.00(76.2)	0.75(19.1)	0.96(24.4)	0.47(11.9)	1.13(28.6)	1.19(30.2)	1.19(30.2)	1.02(25.8)	0.66(16.8)
3/4	3/4	-BCM-FL12-NS12	3.00(76.2)	0.75(19.1)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.19(30.2)	1.19(30.2)	1.02(25.8)	0.66(16.8)
7/8	3/4	-BCM-FL14-NS12	3.31(84.1)	0.75(19.1)	1.02(25.9)	0.62(15.7)	1.25(31.8)	1.31(33.3)	1.31(33.3)	1.14(29.0)	0.75(19.1)
1	3/4	-BCM-FL16-NS12	3.48(88.4)	0.75(19.1)	1.23(31.2)	0.62(15.7)	1.50(38.1)	1.63(41.3)	1.63(41.3)	1.33(33.7)	0.75(19.1)
1	1	-BCM-FL16-NS16	3.67(93.2)	0.94(23.9)	1.23(31.2)	0.88(22.4)	1.50(38.1)	1.63(41.3)	1.63(41.3)	1.33(33.7)	0.75(19.1)

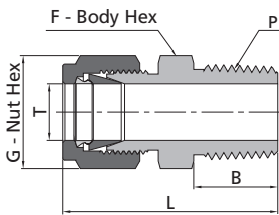
Metric Tube			NPT Thread								
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)							Panel Hole Size mm (in.)	Max. Panel Thickness mm (in.)
			L	B	C	E	G	F	Gx		
6	1/8	-BCM-ML6-NS2	49.6(1.95)	9.7(0.38)	15.3(0.60)	4.8(0.19)	14.0(0.55)	16.0(0.63)	16.0(0.63)	11.5(0.45)	10.2(0.40)
6	1/4	-BCM-ML6-NS4	53.6(2.11)	14.2(0.56)	15.3(0.60)	4.8(0.19)	14.0(0.55)	16.0(0.63)	16.0(0.63)	11.5(0.45)	10.2(0.40)
8	1/8	-BCM-ML8-NS2	52.3(2.06)	9.7(0.38)	16.2(0.64)	4.8(0.19)	16.0(0.63)	18.0(0.71)	18.0(0.71)	13.1(0.52)	11.2(0.44)
8	1/4	-BCM-ML8-NS4	56.6(2.23)	14.2(0.56)	16.2(0.64)	6.4(0.25)	16.0(0.63)	18.0(0.71)	18.0(0.71)	13.1(0.52)	11.2(0.44)
10	1/4	-BCM-ML10-NS4	58.4(2.30)	14.2(0.56)	17.2(0.68)	7.1(0.28)	19.0(0.75)	22.0(0.87)	22.0(0.87)	16.3(0.64)	11.2(0.44)
10	3/8	-BCM-ML10-NS6	58.4(2.30)	14.2(0.56)	17.2(0.68)	7.9(0.31)	19.0(0.75)	22.0(0.87)	22.0(0.87)	16.3(0.64)	11.2(0.44)
10	1/2	-BCM-ML10-NS8	63.1(2.48)	19.1(0.75)	17.2(0.68)	7.9(0.31)	19.0(0.75)	22.0(0.87)	22.0(0.87)	16.3(0.64)	11.2(0.44)
12	1/4	-BCM-ML12-NS4	63.9(2.52)	14.2(0.56)	22.8(0.90)	7.1(0.28)	22.0(0.87)	24.0(0.94)	24.0(0.94)	19.5(0.77)	12.7(0.50)
12	3/8	-BCM-ML12-NS6	63.9(2.52)	14.2(0.56)	22.8(0.90)	9.5(0.37)	22.0(0.87)	24.0(0.94)	24.0(0.94)	19.5(0.77)	12.7(0.50)
12	1/2	-BCM-ML12-NS8	68.8(2.71)	19.1(0.75)	22.8(0.90)	9.5(0.37)	22.0(0.87)	24.0(0.94)	24.0(0.94)	19.5(0.77)	12.7(0.50)

Bulkhead Male Connectors



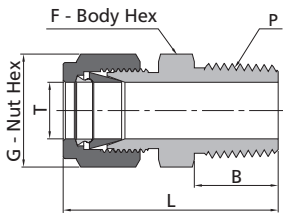
Fractional Tube			37° Flare (AN)								
T-Tube O.D. (in.)	AN Tube Flare Size	Basic Ordering Number	Dimensions, in. (mm)							Panel Hole Size in. (mm)	Max. Panel Thickness in. (mm)
			L	B	C	E	G	F	Gx		
1/8	1/8	-BCM-FL2-AN2	1.91(48.5)	0.45(11.4)	0.50(12.7)	0.06(1.5)	0.44(11.1)	0.50(12.7)	0.50(12.7)	0.33(8.3)	0.50(12.7)
1/8	1/4	-BCM-FL2-AN4	2.04(51.8)	0.55(14.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.63(15.9)	0.50(12.7)	0.33(8.3)	0.51(12.7)
3/16	3/16	-BCM-FL3-AN3	1.98(50.3)	0.48(12.2)	0.54(13.7)	0.12(3.0)	0.50(12.7)	0.56(14.3)	0.56(14.3)	0.39(9.9)	0.50(12.7)
1/4	1/4	-BCM-FL4-AN4	2.12(53.8)	0.55(14.0)	0.60(15.2)	0.17(4.3)	0.56(14.3)	0.63(15.9)	0.63(15.9)	0.45(11.5)	0.40(10.2)
5/16	5/16	-BCM-FL5-AN5	2.21(56.1)	0.55(14.0)	0.64(16.2)	0.23(5.8)	0.63(15.9)	0.69(17.5)	0.69(17.5)	0.52(13.1)	0.56(14.3)
3/8	1/4	-BCM-FL6-AN4	2.25(57.2)	0.55(14.0)	0.66(16.8)	0.17(4.3)	0.69(17.5)	0.75(19.1)	0.75(19.1)	0.58(14.7)	0.44(11.2)
3/8	3/8	-BCM-FL6-AN6	2.25(57.2)	0.56(14.2)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.75(19.1)	0.75(19.1)	0.58(14.7)	0.44(11.2)
1/2	1/2	-BCM-FL8-AN8	2.59(65.8)	0.66(16.8)	0.90(22.8)	0.39(9.9)	0.87(22.2)	0.94(23.8)	0.94(23.8)	0.76(19.4)	0.50(12.7)
5/8	5/8	-BCM-FL10-AN10	2.74(69.6)	0.76(19.3)	0.96(24.4)	0.48(12.3)	1.00(25.4)	1.06(27.0)	1.06(27.0)	0.89(22.6)	0.59(15.1)
3/4	3/4	-BCM-FL12-AN12	3.11(79.0)	0.86(21.8)	0.96(24.4)	0.61(15.5)	1.13(28.6)	1.19(30.2)	1.19(30.2)	1.02(25.8)	0.66(16.8)
1	1	-BCM-FL16-AN16	3.64(92.5)	0.91(23.1)	1.23(31.2)	0.84(21.3)	1.50(38.1)	1.63(41.3)	1.63(41.3)	1.33(33.7)	0.75(19.1)

Thermocouple Connectors



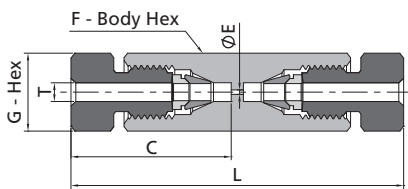
Fractional Tube			NPT Thread			
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			
			L	B	G	F
1/16	1/16	-TCM-FL1-NS1	0.94(23.9)	0.38(9.7)	0.31(7.9)	0.31(7.9)
1/16	1/8	-TCM-FL1-NS2	1.03(26.2)	0.38(9.7)	0.31(7.9)	0.44(11.1)
1/16	1/4	-TCM-FL1-NS4	1.22(31.0)	0.56(14.2)	0.31(7.9)	0.56(14.3)
1/8	1/16	-TCM-FL2-NS1	1.17(29.7)	0.38(9.7)	0.44(11.1)	0.44(11.1)
1/8	1/8	-TCM-FL2-NS2	1.20(30.5)	0.38(9.7)	0.44(11.1)	0.44(11.1)
1/8	1/4	-TCM-FL2-NS4	1.40(35.6)	0.56(14.2)	0.44(11.1)	0.56(14.3)
3/16	1/8	-TCM-FL3-NS2	1.23(31.2)	0.38(9.7)	0.50(12.7)	0.44(11.1)
3/16	1/4	-TCM-FL3-NS4	1.43(36.3)	0.56(14.2)	0.50(12.7)	0.56(14.3)
1/4	1/8	-TCM-FL4-NS2	1.29(32.8)	0.38(9.7)	0.56(14.3)	0.50(12.7)
1/4	1/4	-TCM-FL4-NS4	1.49(37.8)	0.56(14.2)	0.56(14.3)	0.56(14.3)
1/4	3/8	-TCM-FL4-NS6	1.51(38.4)	0.56(14.2)	0.56(14.3)	0.69(17.5)
1/4	1/2	-TCM-FL4-NS8	1.76(44.7)	0.75(19.1)	0.56(14.3)	0.87(22.2)
5/16	1/4	-TCM-FL5-NS4	1.52(38.6)	0.56(14.2)	0.63(15.9)	0.56(14.3)
3/8	1/4	-TCM-FL6-NS4	1.57(39.9)	0.56(14.2)	0.69(17.5)	0.63(15.9)
3/8	3/8	-TCM-FL6-NS6	1.57(39.9)	0.56(14.2)	0.69(17.5)	0.69(17.5)
3/8	1/2	-TCM-FL6-NS8	1.82(46.2)	0.75(19.1)	0.69(17.5)	0.87(22.2)
3/8	3/4	-TCM-FL6-NS12	1.88(47.8)	0.75(19.1)	0.69(17.5)	1.06(27.0)
1/2	1/2	-TCM-FL8-NS8	1.93(49.0)	0.75(19.1)	0.87(22.2)	0.87(22.2)
1/2	3/4	-TCM-FL8-NS12	1.99(50.5)	0.75(19.1)	0.87(22.2)	1.06(27.0)
5/8	3/4	-TCM-FL10-NS12	1.99(50.5)	0.75(19.1)	1.00(25.4)	1.06(27.0)
3/4	3/4	-TCM-FL12-NS12	1.99(50.5)	0.75(19.1)	1.13(28.6)	1.06(27.0)
1	1	-TCM-FL16-NS16	2.45(62.2)	0.94(23.9)	1.50(38.1)	1.37(34.9)

Thermocouple Connectors

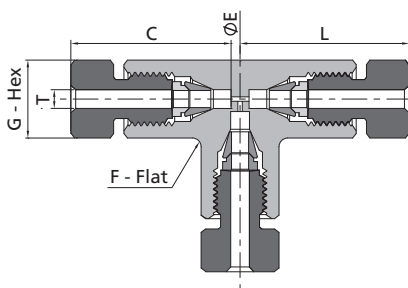


Metric Tube			NPT Thread			
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)			
			L	B	G	F
2	1/8	-TCM-ML2-NS2	30.5(1.20)	9.7(0.38)	12.0(0.47)	12.0(0.47)
3	1/8	-TCM-ML3-NS2	30.5(1.20)	9.7(0.38)	12.0(0.47)	12.0(0.47)
3	1/4	-TCM-ML3-NS4	35.6(1.40)	14.2(0.56)	12.0(0.47)	14.0(0.55)
4	1/8	-TCM-ML4-NS2	31.2(1.23)	9.7(0.38)	12.0(0.47)	12.0(0.47)
4	1/4	-TCM-ML4-NS4	36.3(1.43)	14.2(0.56)	12.0(0.47)	14.0(0.55)
6	1/8	-TCM-ML6-NS2	32.8(1.29)	9.7(0.38)	14.0(0.55)	14.0(0.55)
6	1/4	-TCM-ML6-NS4	37.9(1.49)	14.2(0.56)	14.0(0.55)	14.0(0.55)
6	3/8	-TCM-ML6-NS6	38.4(1.51)	14.2(0.56)	14.0(0.55)	18.0(0.71)
6	1/2	-TCM-ML6-NS8	44.7(1.76)	19.1(0.75)	14.0(0.55)	22.0(0.87)
8	1/4	-TCM-ML8-NS4	38.7(1.52)	14.2(0.56)	16.0(0.63)	15.0(0.59)
8	3/8	-TCM-ML8-NS6	39.3(1.55)	14.2(0.56)	16.0(0.63)	18.0(0.71)
8	1/2	-TCM-ML8-NS8	45.6(1.80)	19.1(0.75)	16.0(0.63)	22.0(0.87)
10	3/8	-TCM-ML10-NS6	40.9(1.61)	14.2(0.56)	19.0(0.75)	18.0(0.71)
10	1/2	-TCM-ML10-NS8	46.5(1.83)	19.1(0.75)	19.0(0.75)	22.0(0.87)
10	3/4	-TCM-ML10-NS12	48.0(1.89)	19.1(0.75)	19.0(0.75)	27.0(1.06)
10	1	-TCM-ML10-NS16	54.6(2.15)	23.9(0.94)	19.0(0.75)	35.0(1.38)
12	3/8	-TCM-ML12-NS6	43.4(1.71)	14.2(0.56)	22.0(0.87)	22.0(0.87)
12	1/2	-TCM-ML12-NS8	49.0(1.93)	19.1(0.75)	22.0(0.87)	22.0(0.87)
12	3/4	-TCM-ML12-NS12	50.5(1.99)	19.1(0.75)	22.0(0.87)	27.0(1.06)
14	1/2	-TCM-ML14-NS8	49.0(1.93)	19.1(0.75)	25.0(0.98)	24.0(0.94)
14	3/4	-TCM-ML14-NS12	50.5(1.99)	19.1(0.75)	25.0(0.98)	27.0(1.06)
15	3/4	-TCM-ML15-NS12	50.5(1.99)	19.1(0.75)	25.0(0.98)	27.0(1.06)
15	1	-TCM-ML15-NS16	57.1(2.25)	23.9(0.94)	25.0(0.98)	35.0(1.38)
18	3/4	-TCM-ML18-NS12	50.5(1.99)	19.1(0.75)	30.0(1.18)	27.0(1.06)
20	1	-TCM-ML20-NS16	57.1(2.25)	23.9(0.94)	32.0(1.26)	35.0(1.38)
22	1	-TCM-ML22-NS16	57.1(2.25)	23.9(0.94)	32.0(1.26)	35.0(1.38)

Chromatograph Fittings



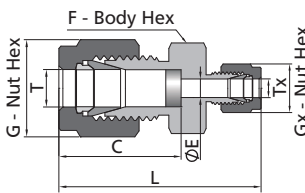
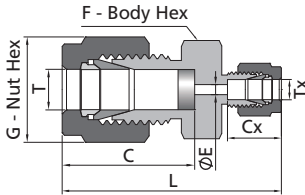
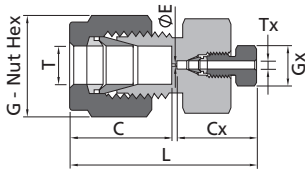
Fractional Tube							
T-Tube O.D (in.)	Basic Ordering Number	Dimensions, in. (mm)					Dead Volume
		L	C	E	G	F	
1/16	-U-NFL1	1.26(32.0)	0.61(15.5)	0.01(0.3)	0.25(6.4)	0.25(6.4)	6.6 × 10 <sup>-5</sup> cm <sup>3</sup>



Fractional Tube							
T-Tube O.D (in.)	Basic Ordering Number	Dimensions, in. (mm)					Dead Volume
		L	C	E	G	F	
1/16	-TTT-NFL1	0.66(16.8)	0.61(15.5)	0.01(0.3)	0.25(6.4)	0.37(9.5)	2.8 × 10 <sup>-4</sup> cm <sup>3</sup>



Column End Fittings



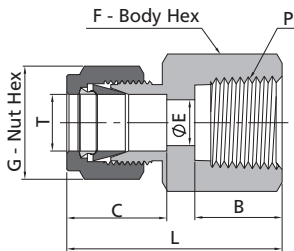
Fractional Tube										
T-Tube O.D. (in.)	Tx-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)						Dead Volume	
			L	C	Cx	E	G	Gx		
1/4	1/16	-U-FL4-NFL1	1.24(31.5)	0.60(15.2)	0.61(15.5)	0.01(0.3)	0.56(14.3)	0.25(6.4)	6.8 × 10 <sup>-5</sup> cm <sup>3</sup>	
3/8	1/16	-U-FL6-NFL1	1.30(33.0)	0.66(16.8)	0.61(15.5)	0.01(0.3)	0.69(17.5)	0.25(6.4)	6.8 × 10 <sup>-5</sup> cm <sup>3</sup>	

Fractional Tube										
T-Tube O.D. (in.)	Tx-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)						Dead Volume	
			L	C	Cx	G	F	E		
1/8	1/16	-U-TFL2SN7-FL1	1.22(31.0)	0.72(18.3)	0.34(8.6)	0.44(11.1)	0.44(11.1)	0.05(1.3)	5.4 × 10 <sup>-3</sup> cm <sup>3</sup>	
1/4	1/16	-U-TFL4SN7-FL1	1.35(34.3)	0.82(20.8)	0.34(8.6)	0.56(14.3)	0.50(12.7)	0.05(1.3)	6.7 × 10 <sup>-3</sup> cm <sup>3</sup>	
3/8	1/16	-U-TFL6SN7-FL1	1.44(36.6)	0.91(23.1)	0.34(8.6)	0.69(17.5)	0.63(15.9)	0.05(1.3)	6.5 × 10 <sup>-3</sup> cm <sup>3</sup>	

Fractional Tube										
T-Tube O.D. (in.)	Tx-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)						Dead Volume	
			L	C	G	Gx	F	E		
1/8	1/16	-U-TFL2SN7-TFL1	1.22(31.0)	0.72(18.3)	0.44(11.1)	0.31(7.9)	0.44(11.1)	0.07(1.7)	0	
1/4	1/16	-U-TFL4SN7-TFL1	1.35(34.3)	0.82(20.8)	0.56(14.3)	0.31(7.9)	0.50(12.7)	0.07(1.7)	0	
3/8	1/16	-U-TFL6SN7-TFL1	1.44(36.6)	0.91(23.1)	0.69(17.5)	0.31(7.9)	0.63(15.9)	0.07(1.7)	0	
1/2	1/16	-U-TFL8SN7-TFL1	1.58(40.1)	1.04(26.4)	0.87(22.2)	0.31(7.9)	0.81(20.6)	0.07(1.7)	0	

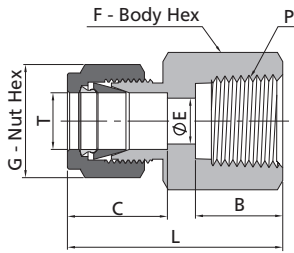
Nominal pore size of SN7 Stainless steel sinter is 7 um, and other nominal pore sizes are available. Stainless steel sinters are loosely installed to facilitate removal and replacement.

Female Connectors



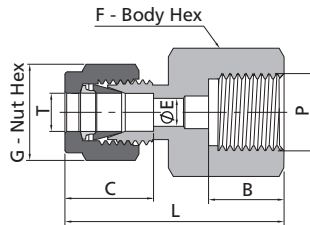
Fractional Tube			NPT Thread					
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)					
			L	B	C	E	G	F
1/16	1/16	-CF-FL1-NS1	0.93(23.6)	0.39(9.9)	0.34(8.6)	0.05(1.3)	0.31(7.9)	0.44(11.1)
1/16	1/8	-CF-FL1-NS2	0.96(24.4)	0.41(10.4)	0.34(8.6)	0.05(1.3)	0.31(7.9)	0.56(14.3)
1/8	1/8	-CF-FL2-NS2	1.13(28.7)	0.41(10.4)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.56(14.3)
1/8	1/4	-CF-FL2-NS4	1.32(33.5)	0.59(15.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.75(19.1)
3/16	1/8	-CF-FL3-NS2	1.17(29.7)	0.41(10.4)	0.54(13.7)	0.12(3.0)	0.50(12.7)	0.56(14.3)
1/4	1/8	-CF-FL4-NS2	1.23(31.2)	0.41(10.4)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.56(14.3)
1/4	1/4	-CF-FL4-NS4	1.41(35.8)	0.59(15.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.75(19.1)
1/4	3/8	-CF-FL4-NS6	1.48(37.6)	0.59(15.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.87(22.2)
1/4	1/2	-CF-FL4-NS8	1.67(42.4)	0.78(19.8)	0.60(15.2)	16.3(4.8)	0.56(14.3)	1.06(27.0)
5/16	1/8	-CF-FL5-NS2	1.26(32.0)	0.41(10.4)	0.64(16.3)	16.3(6.4)	0.63(15.9)	0.56(14.3)
5/16	1/4	-CF-FL5-NS4	1.45(36.8)	0.59(15.0)	0.64(16.3)	0.25(6.4)	0.63(15.9)	0.75(19.1)
3/8	1/8	-CF-FL6-NS2	1.29(32.8)	0.41(10.4)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.63(15.9)
3/8	1/4	-CF-FL6-NS4	1.48(37.6)	0.59(15.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.75(19.1)
3/8	3/8	-CF-FL6-NS6	1.54(39.1)	0.59(15.0)	0.66(16.8)	1.34(7.1)	0.69(17.5)	0.88(22.2)
3/8	1/2	-CF-FL6-NS8	1.73(43.9)	0.78(19.8)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.06(27.0)
3/8	3/4	-CF-FL6-NS12	1.88(47.8)	0.81(20.6)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.31(33.3)
1/2	1/4	-CF-FL8-NS4	1.59(40.4)	0.59(15.0)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.81(20.6)
1/2	3/8	-CF-FL8-NS6	1.65(41.9)	0.59(15.0)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.87(22.2)
1/2	1/2	-CF-FL8-NS8	1.84(46.7)	0.78(19.8)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.06(27.0)
1/2	3/4	-CF-FL8-NS12	1.90(48.3)	0.81(20.6)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.31(33.3)
5/8	3/8	-CF-FL10-NS6	1.65(41.9)	0.59(15.0)	0.96(24.4)	0.50(12.7)	1.00(25.4)	0.94(23.8)
5/8	1/2	-CF-FL10-NS8	1.84(46.7)	0.78(19.8)	0.96(24.4)	0.50(12.7)	1.00(25.4)	1.06(27.0)

Female Connectors

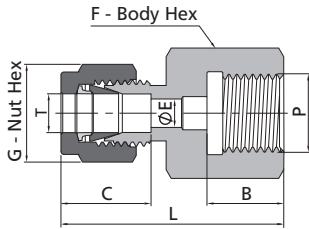


Fractional Tube			NPT Thread						
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	B	C	E	G	F	
3/4	1/2	-CF-FL12-NS8	1.84(46.7)	0.78(19.8)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.06(27.0)	
3/4	3/4	-CF-FL12-NS12	1.90(48.3)	0.81(20.6)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.31(33.3)	
7/8	3/4	-CF-FL14-NS12	1.96(49.8)	0.81(20.6)	1.02(25.9)	0.72(18.3)	1.25(31.8)	1.31(33.3)	
1	3/4	-CF-FL16-NS12	2.10(53.3)	0.81(20.6)	1.23(31.2)	0.88(22.4)	1.50(38.1)	1.37(34.9)	
1	1	-CF-FL16-NS16	2.45(62.2)	1.00(25.4)	1.23(31.2)	0.88(22.4)	1.50(38.1)	1.63(41.3)	
1 1/4	1 1/4	-CF-FL20-NS20	2.94(74.7)	1.00(25.4)	1.62(41.1)	1.09(27.7)	1.87(47.6)	2.13(54.0)	
1 1/2	1 1/2	-CF-FL24-NS24	3.30(83.8)	1.09(27.7)	1.97(50.0)	1.34(34.0)	2.25(57.2)	2.37(60.3)	

Fractional Tube			ISO Tapered Thread (RT)						
T-Tube O.D. (in.)	P-RT Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	B	C	E	G	F	
1/4	1/8	-CF-FL4-RT2	1.23(31.2)	0.41(10.4)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.56(14.3)	
1/4	1/4	-CF-FL4-RT4	1.41(35.8)	0.59(15.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.75(19.1)	
1/4	3/8	-CF-FL4-RT6	1.48(37.6)	0.59(15.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.87(22.2)	
1/4	1/2	-CF-FL4-RT8	1.67(42.4)	0.78(19.8)	0.60(15.2)	0.19(4.8)	0.56(14.3)	1.06(27.0)	
3/8	1/4	-CF-FL6-RT4	1.48(37.6)	0.59(15.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.75(19.1)	
3/8	3/8	-CF-FL6-RT6	1.54(39.1)	0.59(15.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.87(22.2)	
3/8	1/2	-CF-FL6-RT8	1.73(43.9)	0.78(19.8)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.06(27.0)	
1/2	1/4	-CF-FL8-RT4	1.59(40.4)	0.59(15.0)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.81(20.6)	
1/2	3/8	-CF-FL8-RT6	1.65(41.9)	0.59(15.0)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.87(22.2)	
1/2	1/2	-CF-FL8-RT8	1.84(46.7)	0.78(19.8)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.06(27.0)	

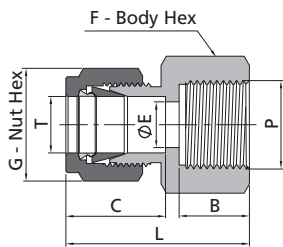


Fractional Tube			ISO Parallel Thread (RG)						
T-Tube O.D. (in.)	P-RG Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	B	C	E	G	F	
1/8	1/4	-CF-FL2-RG4	1.39(35.3)	0.51(12.9)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.75(19.1)	
1/8	3/8	-CF-FL2-RG6	1.52(38.7)	0.56(14.2)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.94(23.8)	
1/4	1/4	-CF-FL4-RG4	1.48(37.6)	0.51(12.9)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.75(19.1)	
1/4	3/8	-CF-FL4-RG6	1.48(37.6)	0.56(14.2)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.94(23.8)	
1/4	1/2	-CF-FL4-RG8	1.71(43.4)	0.74(18.8)	0.60(15.2)	0.19(4.8)	0.56(14.3)	1.06(27.0)	
5/16	1/4	-CF-FL5-RG4	1.51(38.4)	0.51(12.9)	0.64(16.3)	0.22(5.6)	0.63(15.9)	0.75(19.1)	
5/16	3/8	-CF-FL5-RG6	1.45(36.9)	0.56(14.2)	0.64(16.3)	0.25(6.4)	0.63(15.9)	0.94(23.8)	
5/16	1/2	-CF-FL5-RG8	1.61(40.9)	0.74(18.8)	0.64(16.3)	0.28(7.1)	0.63(15.9)	1.06(27.0)	
3/8	1/4	-CF-FL6-RG4	1.54(39.1)	0.51(12.9)	0.66(16.8)	0.22(5.6)	0.69(17.5)	0.75(19.1)	
3/8	3/8	-CF-FL6-RG6	1.52(38.6)	0.56(14.2)	0.66(16.8)	0.25(6.4)	0.69(17.5)	0.94(23.8)	
3/8	1/2	-CF-FL6-RG8	1.65(41.9)	0.74(18.8)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.06(27.0)	
1/2	1/4	-CF-FL8-RG4	1.65(41.9)	0.51(12.9)	0.90(22.9)	0.22(5.6)	0.87(22.2)	0.87(22.2)	
1/2	3/8	-CF-FL8-RG6	1.75(44.5)	0.56(14.2)	0.90(22.9)	0.25(6.4)	0.87(22.2)	0.94(23.8)	
1/2	1/2	-CF-FL8-RG8	1.90(48.3)	0.74(18.8)	0.90(22.9)	0.28(7.1)	0.87(22.2)	1.06(27.0)	



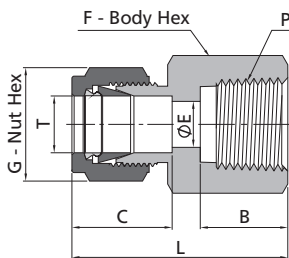
Adapt to Japanese gauge stud (JIS B7505)

Fractional Tube			ISO Parallel Thread (RJ)					
T-Tube O.D. (in.)	P-RJ Size	Basic Ordering Number	Dimensions, in. (mm)					
			L	B	C	E	G	F
1/4	1/4	-CF-FL4-RJ4	1.48(37.6)	0.51(12.9)	0.60(15.2)	0.18(4.6)	0.56(14.3)	0.75(19.1)
1/4	3/8	-CF-FL4-RJ6	1.48(37.6)	0.62(15.8)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.94(23.8)
1/4	1/2	-CF-FL4-RJ8	1.71(43.4)	0.74(18.8)	0.60(15.2)	0.19(4.8)	0.56(14.3)	1.06(27.0)
5/16	1/4	-CF-FL5-RJ4	1.51(38.4)	0.51(12.9)	0.64(16.3)	0.22(5.6)	0.63(15.9)	0.75(19.1)
5/16	1/2	-CF-FL5-RJ8	1.61(40.9)	0.74(18.8)	0.64(16.3)	0.28(7.1)	0.63(15.9)	1.06(27.0)
3/8	1/4	-CF-FL6-RJ4	1.54(39.1)	0.51(12.9)	0.66(16.8)	0.22(5.6)	0.69(17.5)	0.75(19.1)
3/8	3/8	-CF-FL6-RJ6	1.52(38.6)	0.62(15.8)	0.66(16.8)	0.25(6.4)	0.69(17.5)	0.94(23.8)
3/8	1/2	-CF-FL6-RJ8	1.65(41.9)	0.74(18.8)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.06(27.0)
1/2	1/4	-CF-FL8-RJ4	1.65(41.9)	0.51(12.9)	0.90(22.9)	0.22(5.6)	0.87(22.2)	0.81(20.6)
1/2	3/8	-CF-FL8-RJ6	1.75(44.5)	0.62(15.8)	0.90(22.9)	0.25(6.4)	0.87(22.2)	0.94(23.8)
1/2	1/2	-CF-FL8-RJ8	1.90(48.3)	0.74(18.8)	0.90(22.9)	0.28(7.1)	0.87(22.2)	1.06(27.0)



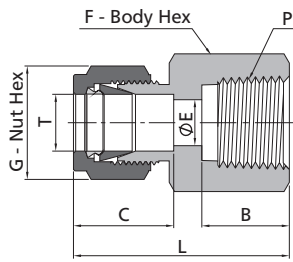
Fractional Tube			Metric Thread					
T-Tube O.D. (in.)	P-Metric Thread Size	Basic Ordering Number	Dimensions, in. (mm)					
			L	B	C	E	G	F
1/8	M14 x 1.5	-CF-FL2-MS14	1.22(31.0)	0.51(13.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.75(19.1)
1/8	M16 x 1.5	-CF-FL2-MS16	1.31(33.3)	0.55(14.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.87(22.2)
1/8	M18 x 1.5	-CF-FL2-MS18	1.35(34.3)	0.59(15.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	1.00(25.4)
1/8	M20 x 1.5	-CF-FL2-MS20	1.39(35.3)	0.63(16.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	1.06(27.0)
1/4	M16 x 1.5	-CF-FL4-MS16	1.41(35.8)	0.55(14.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.87(22.2)
1/4	M18 x 1.5	-CF-FL4-MS18	1.45(36.8)	0.59(15.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	1.00(25.4)
1/4	M20 x 1.5	-CF-FL4-MS20	1.49(37.8)	0.63(16.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	1.06(27.0)
3/8	M14 x 1.5	-CF-FL6-MS14	1.46(37.1)	0.51(13.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.75(19.1)
3/8	M16 x 1.5	-CF-FL6-MS16	1.48(37.5)	0.55(14.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.87(22.2)
3/8	M18 x 1.5	-CF-FL6-MS18	1.52(38.5)	0.59(15.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.00(25.4)
3/8	M20 x 1.5	-CF-FL6-MS20	1.56(39.5)	0.63(16.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.06(27.0)
1/2	M16 x 1.5	-CF-FL8-MS16	1.63(41.4)	0.55(14.0)	0.90(22.9)	0.33(8.4)	0.87(22.2)	0.87(22.2)
1/2	M18 x 1.5	-CF-FL8-MS18	1.67(42.4)	0.59(15.0)	0.90(22.9)	0.38(9.6)	0.87(22.2)	1.00(25.4)
1/2	M20 x 1.5	-CF-FL8-MS20	1.71(43.4)	0.63(16.0)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.06(27.0)
1/2	M22 x 1.5	-CF-FL8-MS22	1.65(41.9)	0.63(16.0)	0.90(22.9)	0.38(9.7)	0.87(22.2)	1.06(27.0)

Female Connectors



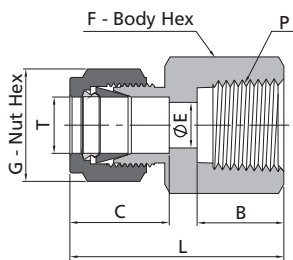
Metric Tube			NPT Thread					
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)					
			L	B	C	E	G	F
3	1/8	-CF-ML3-NS2	28.7(1.13)	10.4(0.41)	12.9(0.51)	2.4(0.09)	12.0(0.47)	14.0(0.55)
3	1/4	-CF-ML3-NS4	33.5(1.32)	15.0(0.59)	12.9(0.51)	2.4(0.09)	12.0(0.47)	19.0(0.75)
4	1/8	-CF-ML4-NS2	29.7(1.17)	10.4(0.41)	13.7(0.54)	2.4(0.09)	12.0(0.47)	14.0(0.55)
6	1/8	-CF-ML6-NS2	31.3(1.23)	10.4(0.41)	15.3(0.60)	4.8(0.19)	14.0(0.55)	14.0(0.55)
6	1/4	-CF-ML6-NS4	35.8(1.41)	15.0(0.59)	15.3(0.60)	4.8(0.19)	14.0(0.55)	19.0(0.75)
6	3/8	-CF-ML6-NS6	37.7(1.48)	15.0(0.59)	15.3(0.60)	4.8(0.19)	14.0(0.55)	22.0(0.87)
6	1/2	-CF-ML6-NS8	42.5(1.67)	19.8(0.78)	15.3(0.60)	4.8(0.19)	14.0(0.55)	27.0(1.06)
8	1/8	-CF-ML8-NS2	32.1(1.26)	10.4(0.41)	16.2(0.64)	6.4(0.25)	16.0(0.63)	15.0(0.59)
8	1/4	-CF-ML8-NS4	37.0(1.46)	15.0(0.59)	16.2(0.64)	6.4(0.25)	16.0(0.63)	19.0(0.75)
8	3/8	-CF-ML8-NS6	38.5(1.52)	15.0(0.59)	16.2(0.64)	6.4(0.25)	16.0(0.63)	22.0(0.87)
8	1/2	-CF-ML8-NS8	43.3(1.70)	19.8(0.78)	16.2(0.64)	6.4(0.25)	16.0(0.63)	27.0(1.06)
10	1/8	-CF-ML10-NS2	33.0(1.30)	10.4(0.41)	17.2(0.68)	7.9(0.31)	19.0(0.75)	18.0(0.71)
10	1/4	-CF-ML10-NS4	37.8(1.49)	15.0(0.59)	17.2(0.68)	7.9(0.31)	19.0(0.75)	19.0(0.75)
10	3/8	-CF-ML10-NS6	39.4(1.55)	15.0(0.59)	17.2(0.68)	7.9(0.31)	19.0(0.75)	22.0(0.87)
10	1/2	-CF-ML10-NS8	44.2(1.74)	19.8(0.78)	17.2(0.68)	7.9(0.31)	19.0(0.75)	27.0(1.06)

Female Connectors



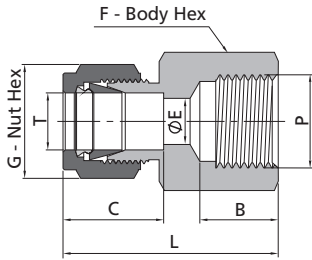
Metric Tube			NPT Thread						
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	B	C	E	G	F	
12	1/4	-CF-ML12-NS4	40.3(1.59)	15.0(0.59)	22.8(0.90)	9.5(0.37)	22.0(0.87)	22.0(0.87)	
12	3/8	-CF-ML12-NS6	41.9(1.65)	15.0(0.59)	22.8(0.90)	9.5(0.37)	22.0(0.87)	22.0(0.87)	
12	1/2	-CF-ML12-NS8	46.7(1.84)	19.8(0.78)	22.8(0.90)	9.5(0.37)	22.0(0.87)	27.0(1.06)	
12	3/4	-CF-ML12-NS12	49.1(1.93)	20.6(0.81)	22.8(0.90)	9.5(0.37)	22.0(0.87)	35.0(1.38)	
14	3/4	-CF-ML14-NS12	49.7(1.96)	20.6(0.81)	24.4(0.96)	11.1(0.44)	25.0(0.98)	35.0(1.38)	
15	1/2	-CF-ML15-NS8	46.7(1.84)	19.8(0.78)	24.4(0.96)	11.9(0.47)	25.0(0.98)	27.0(1.06)	
16	3/8	-CF-ML16-NS6	41.9(1.65)	15.0(0.59)	24.4(0.96)	12.7(0.50)	25.0(0.98)	27.0(1.06)	
16	1/2	-CF-ML16-NS8	46.9(1.85)	19.8(0.78)	24.4(0.96)	12.7(0.50)	25.0(0.98)	27.0(1.06)	
20	1/2	-CF-ML20-NS8	47.9(1.89)	19.8(0.78)	26.0(1.02)	15.9(0.63)	32.0(1.26)	30.0(1.18)	
20	3/4	-CF-ML20-NS12	49.7(1.96)	20.6(0.81)	26.0(1.02)	15.9(0.63)	32.0(1.26)	35.0(1.38)	
22	3/4	-CF-ML22-NS12	49.7(1.96)	20.6(0.81)	26.0(1.02)	18.3(0.72)	32.0(1.26)	35.0(1.38)	
22	1	-CF-ML22-NS16	57.9(2.28)	25.4(1.00)	26.0(1.02)	18.3(0.72)	32.0(1.26)	41.0(1.61)	
25	3/4	-CF-ML25-NS12	53.4(2.10)	20.6(0.81)	31.3(1.23)	21.8(0.86)	38.0(1.50)	35.0(1.38)	
25	1	-CF-ML25-NS16	62.3(2.45)	25.4(1.00)	31.3(1.23)	21.8(0.86)	38.0(1.50)	41.0(1.61)	

Female Connectors

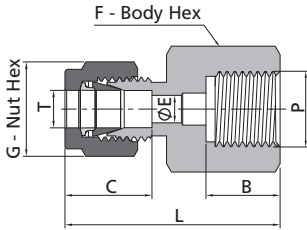


Metric Tube			ISO Tapered Thread (RT)						
T-Tube O.D. (mm)	P-RT Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	B	C	E	G	F	
3	1/8	-CF-ML3-RT2	28.7(1.13)	10.4(0.41)	12.9(0.51)	2.4(0.09)	12.0(0.47)	14.0(0.55)	
6	1/8	-CF-ML6-RT2	31.3(1.23)	10.4(0.41)	15.3(0.60)	4.8(0.19)	14.0(0.55)	14.0(0.55)	
6	1/4	-CF-ML6-RT4	35.8(1.41)	15.0(0.59)	15.3(0.60)	4.8(0.19)	14.0(0.55)	19.0(0.75)	
6	3/8	-CF-ML6-RT6	37.9(1.49)	15.0(0.59)	15.3(0.60)	4.8(0.19)	14.0(0.55)	22.0(0.87)	
6	1/2	-CF-ML6-RT8	42.5(1.67)	19.8(0.78)	15.3(0.60)	4.8(0.19)	14.0(0.55)	27.0(1.06)	
8	1/8	-CF-ML8-RT2	32.1(1.26)	10.4(0.41)	16.2(0.64)	6.4(0.25)	16.0(0.63)	15.0(0.59)	
8	1/4	-CF-ML8-RT4	37.0(1.46)	15.0(0.59)	16.2(0.64)	6.4(0.25)	16.0(0.63)	19.0(0.75)	
8	3/8	-CF-ML8-RT6	38.5(1.52)	15.0(0.59)	16.2(0.64)	6.4(0.25)	16.0(0.63)	22.0(0.87)	
8	1/2	-CF-ML8-RT8	43.3(1.70)	19.8(0.78)	16.2(0.64)	6.4(0.25)	16.0(0.63)	27.0(1.06)	
10	1/8	-CF-ML10-RT2	33.0(1.30)	10.4(0.41)	17.2(0.68)	7.9(0.31)	19.0(0.75)	18.0(0.71)	
10	1/4	-CF-ML10-RT4	37.8(1.49)	15.0(0.59)	17.2(0.68)	7.9(0.31)	19.0(0.75)	19.0(0.75)	
10	3/8	-CF-ML10-RT6	39.4(1.55)	15.0(0.59)	17.2(0.68)	7.9(0.31)	19.0(0.75)	22.0(0.87)	
10	1/2	-CF-ML10-RT8	44.2(1.74)	19.8(0.78)	17.2(0.68)	7.9(0.31)	19.0(0.75)	27.0(1.06)	
12	1/8	-CF-ML12-RT2	35.5(1.40)	10.4(0.41)	22.8(0.90)	8.3(0.33)	22.0(0.87)	22.0(0.87)	
12	1/4	-CF-ML12-RT4	40.3(1.59)	15.0(0.59)	22.8(0.90)	9.5(0.37)	22.0(0.87)	22.0(0.87)	
12	3/8	-CF-ML12-RT6	41.9(1.65)	15.0(0.59)	22.8(0.90)	9.5(0.37)	22.0(0.87)	22.0(0.87)	
12	1/2	-CF-ML12-RT8	46.7(1.84)	19.8(0.78)	22.8(0.90)	9.5(0.37)	22.0(0.87)	27.0(1.06)	
12	3/4	-CF-ML12-RT12	49.0(1.93)	20.6(0.81)	22.8(0.90)	9.5(0.37)	22.0(0.87)	35.0(1.38)	
15	1/2	-CF-ML15-RT8	46.7(1.84)	19.8(0.78)	24.4(0.96)	11.9(0.47)	25.0(0.98)	27.0(1.06)	
16	1/2	-CF-ML16-RT8	48.4(1.91)	19.8(0.78)	24.4(0.96)	12.7(0.50)	25.0(0.98)	27.0(1.06)	
16	3/4	-CF-ML16-RT12	49.7(1.96)	20.6(0.81)	24.4(0.96)	12.7(0.50)	25.0(0.98)	35.0(1.38)	
20	1/2	-CF-ML20-RT8	47.9(1.89)	19.8(0.78)	26.0(1.02)	15.9(0.63)	32.0(1.26)	30.0(1.18)	
20	3/4	-CF-ML20-RT12	49.7(1.96)	20.6(0.81)	26.0(1.02)	15.9(0.63)	32.0(1.26)	35.0(1.38)	
22	3/4	-CF-ML22-RT12	49.7(1.96)	20.6(0.81)	26.0(1.02)	18.3(0.72)	32.0(1.26)	35.0(1.38)	
22	1	-CF-ML22-RT16	57.9(2.28)	25.4(1.00)	26.0(1.02)	18.3(0.72)	32.0(1.26)	41.0(1.61)	
25	3/4	-CF-ML25-RT12	53.4(2.10)	20.6(0.81)	31.3(1.23)	21.8(0.86)	38.0(1.50)	35.0(1.38)	
25	1	-CF-ML25-RT16	62.3(2.45)	25.4(1.00)	31.3(1.23)	21.8(0.86)	38.0(1.50)	41.0(1.61)	

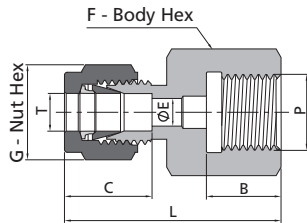
Female Connectors



Metric Tube			ISO Parallel Thread (RP)						
T-Tube O.D. (mm)	P-RP Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	B	C	E	G	F	
6	1/8	-CF-ML6-RP2	33.5(1.32)	15.5(0.61)	15.3(0.60)	4.8(0.19)	14.0(0.55)	14.0(0.55)	
6	1/4	-CF-ML6-RP4	39.4(1.55)	15.5(0.61)	15.3(0.60)	4.8(0.19)	14.0(0.55)	19.0(0.75)	
22	3/4	-CF-ML22-RP12	53.3(2.10)	20.5(0.81)	26.0(1.02)	18.3(0.72)	32.0(1.26)	35.0(1.38)	
25	1	-CF-ML25-RP16	63.9(2.52)	23.5(0.93)	31.3(1.23)	21.8(0.86)	38.0(1.50)	40.0(1.57)	



Metric Tube			ISO Parallel Thread (RG)						
T-Tube O.D. (mm)	P-RG Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	B	C	E	G	F	
3	1/4	-CF-ML3-RG4	35.3(1.39)	12.9(0.51)	12.9(0.51)	2.4(0.09)	12.0(0.47)	19.0(0.75)	
6	1/4	-CF-ML6-RG4	37.6(1.48)	12.9(0.51)	15.3(0.60)	4.8(0.19)	14.0(0.55)	19.0(0.75)	
6	3/8	-CF-ML6-RG6	37.6(1.48)	14.2(0.56)	15.3(0.60)	4.8(0.19)	14.0(0.55)	24.0(0.94)	
6	1/2	-CF-ML6-RG8	43.5(1.71)	18.8(0.74)	15.3(0.60)	4.8(0.19)	14.0(0.55)	27.0(1.06)	
8	1/4	-CF-ML8-RG4	38.5(1.52)	12.9(0.51)	16.2(0.64)	5.5(0.22)	16.0(0.63)	19.0(0.75)	
8	3/8	-CF-ML8-RG6	36.2(1.43)	14.2(0.56)	16.2(0.64)	6.4(0.25)	16.0(0.63)	24.0(0.94)	
8	1/2	-CF-ML8-RG8	41.0(1.61)	18.8(0.74)	16.2(0.64)	6.4(0.25)	16.0(0.63)	27.0(1.06)	
10	1/4	-CF-ML10-RG4	39.4(1.55)	12.9(0.51)	17.2(0.68)	5.5(0.22)	19.0(0.75)	19.0(0.75)	
10	3/8	-CF-ML10-RG6	38.8(1.53)	14.2(0.56)	17.2(0.68)	6.4(0.25)	19.0(0.75)	24.0(0.94)	
10	1/2	-CF-ML10-RG8	42.1(1.66)	18.8(0.74)	17.2(0.68)	7.9(0.31)	19.0(0.75)	27.0(1.06)	
12	1/4	-CF-ML12-RG4	41.9(1.65)	12.9(0.51)	22.8(0.90)	5.5(0.22)	22.0(0.87)	22.0(0.87)	
12	3/8	-CF-ML12-RG6	44.4(1.75)	14.2(0.56)	22.8(0.90)	6.4(0.25)	22.0(0.87)	24.0(0.94)	
12	1/2	-CF-ML12-RG8	48.2(1.90)	18.8(0.74)	22.8(0.90)	7.1(0.28)	22.0(0.87)	27.0(1.06)	
20	1/2	-CF-ML20-RG8	54.3(2.14)	18.8(0.74)	26.0(1.02)	7.1(0.28)	32.0(1.26)	30.0(1.18)	
22	1/2	-CF-ML22-RG8	54.3(2.14)	18.8(0.74)	26.0(1.02)	7.1(0.28)	32.0(1.26)	30.0(1.18)	

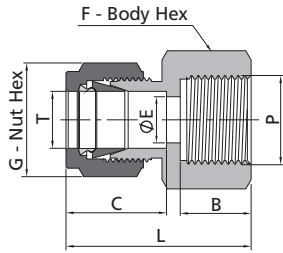


Adapt to Japanese Gauge stud (JIS B7505)

Metric Tube			ISO Parallel Thread (RJ)						
T-Tube O.D. (mm)	P-RJ Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	B	C	E	G	F	
6	1/4	-CF-ML6-RJ4	37.6(1.48)	12.9(0.51)	15.3(0.60)	4.8(0.19)	14.0(0.55)	19.0(0.75)	
6	3/8	-CF-ML6-RJ6	37.6(1.48)	15.8(0.62)	15.3(0.60)	4.8(0.19)	14.0(0.55)	24.0(0.94)	
6	1/2	-CF-ML6-RJ8	43.5(1.71)	18.8(0.74)	15.3(0.60)	4.8(0.19)	14.0(0.55)	27.0(1.06)	
8	1/4	-CF-ML8-RJ4	38.5(1.52)	12.9(0.51)	16.2(0.64)	5.5(0.22)	16.0(0.63)	19.0(0.75)	
8	3/8	-CF-ML8-RJ6	36.2(1.43)	15.8(0.62)	16.2(0.64)	6.5(0.26)	16.0(0.63)	24.0(0.94)	
8	1/2	-CF-ML8-RJ8	41.0(1.61)	18.8(0.74)	16.2(0.64)	7.0(0.28)	16.0(0.63)	27.0(1.06)	
10	1/4	-CF-ML10-RJ4	39.4(1.55)	12.9(0.51)	17.2(0.68)	5.5(0.22)	19.0(0.75)	19.0(0.75)	
10	3/8	-CF-ML10-RJ6	38.8(1.53)	15.8(0.62)	17.2(0.68)	6.5(0.26)	19.0(0.75)	24.0(0.94)	
10	1/2	-CF-ML10-RJ8	42.1(1.66)	18.8(0.74)	17.2(0.68)	7.0(0.28)	19.0(0.75)	27.0(1.06)	
12	1/4	-CF-ML12-RJ4	41.9(1.65)	12.9(0.51)	22.8(0.90)	5.5(0.22)	22.0(0.87)	22.0(0.87)	
12	3/8	-CF-ML12-RJ6	44.4(1.75)	15.8(0.62)	22.8(0.90)	6.5(0.26)	22.0(0.87)	24.0(0.94)	
12	1/2	-CF-ML12-RJ8	48.2(1.90)	18.8(0.74)	22.8(0.90)	7.0(0.28)	22.0(0.87)	27.0(1.06)	

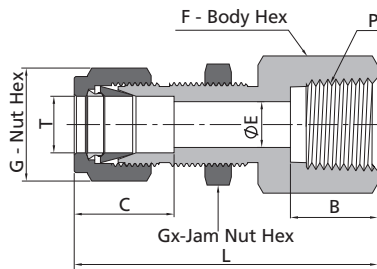
# A-32 6 Series Tube Fittings

Tube Fittings



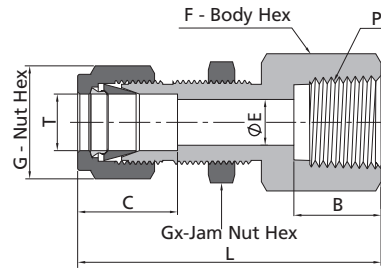
Metric Tube			Metric Thread						
T-Tube O.D. (mm)	P-Metric Thread Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	B	C	E	G	F	
6	M10 x 1	-CF-ML6-MS10	32.7(1.29)	11.0(0.43)	15.3(0.60)	4.7(0.19)	14.0(0.55)	16.0(0.63)	
6	M14 x 1.5	-CF-ML6-MS14	36.1(1.42)	13.0(0.51)	15.3(0.60)	4.8(0.19)	14.0(0.55)	19.0(0.75)	
6	M20 x 1.5	-CF-ML6-MS20	37.7(1.48)	16.0(0.63)	15.3(0.60)	4.8(0.19)	14.0(0.55)	27.0(1.06)	
8	M8 x 1	-CF-ML8-MS8	31.6(1.24)	9.0(0.35)	16.2(0.64)	3.0(0.12)	16.0(0.63)	14.0(0.55)	
8	M10 x 1	-CF-ML8-MS10	33.6(1.32)	11.0(0.43)	16.2(0.64)	4.0(0.16)	16.0(0.63)	16.0(0.63)	
8	M14 x 1.5	-CF-ML8-MS14	35.6(1.40)	13.0(0.51)	16.2(0.64)	6.4(0.25)	16.0(0.63)	19.0(0.75)	
8	M20 x 1.5	-CF-ML8-MS20	38.6(1.52)	16.0(0.63)	16.2(0.64)	6.4(0.25)	16.0(0.63)	27.0(1.06)	
10	M16 x 1.5	-CF-ML10-MS16	38.1(1.50)	14.0(0.55)	17.2(0.68)	7.9(0.31)	19.0(0.75)	22.0(0.87)	
12	M20 x 1.5	-CF-ML12-MS20	44.9(1.77)	16.0(0.63)	22.8(0.90)	9.5(0.37)	22.0(0.87)	27.0(1.06)	
14	M10 x 1	-CF-ML14-MS10	42.5(1.67)	11.0(0.43)	24.4(0.96)	4.0(0.16)	25.0(0.98)	24.0(0.94)	
14	M20 x 1.5	-CF-ML14-MS20	44.9(1.77)	16.0(0.63)	24.4(0.96)	10.8(0.43)	25.0(0.98)	27.0(1.06)	
14	M22 x 1.5	-CF-ML14-MS22	45.9(1.81)	17.0(0.67)	24.4(0.96)	11.1(0.44)	25.0(0.98)	27.0(1.06)	
16	M20 x 1.5	-CF-ML16-MS20	44.9(1.77)	16.0(0.63)	24.4(0.96)	10.8(0.43)	25.0(0.98)	27.0(1.06)	
20	M20 x 1.5	-CF-ML20-MS20	46.5(1.83)	16.0(0.63)	26.0(1.02)	10.8(0.43)	32.0(1.26)	30.0(1.18)	
25	M27 x 2	-CF-ML25-MS27	54.4(2.14)	18.0(0.71)	31.3(1.23)	16.1(0.63)	38.0(1.50)	35.0(1.38)	

## Bulkhead Female Connectors



Fractional Tube			NPT Thread								
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)							Panel Hole Size in. (mm)	Max. Panel Thickness in. (mm)
			L	B	C	E	G	F	Gx		
1/16	1/16	-BCF-FL1-NS1	1.19(30.2)	0.39(9.9)	0.34(8.6)	0.05(1.3)	0.31(7.9)	0.44(11.1)	0.31(7.9)	0.20(5.2)	0.13(3.2)
1/16	1/8	-BCF-FL1-NS2	1.20(30.7)	0.41(10.4)	0.34(8.6)	0.05(1.3)	0.31(7.9)	0.56(14.3)	0.31(7.9)	0.20(5.2)	0.13(3.2)
1/8	1/8	-BCF-FL2-NS2	1.76(44.7)	0.41(10.4)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.56(14.3)	0.50(12.7)	0.33(8.3)	0.50(12.7)
1/8	1/4	-BCF-FL2-NS4	1.95(49.6)	0.59(15.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.75(19.1)	0.50(12.7)	0.33(8.3)	0.50(12.7)
3/16	1/8	-BCF-FL3-NS2	1.79(45.5)	0.41(10.4)	0.54(13.7)	0.12(3.0)	0.50(12.7)	0.56(14.3)	0.56(14.3)	0.39(9.9)	0.50(12.7)
1/4	1/8	-BCF-FL4-NS2	1.85(47.0)	0.41(10.4)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.63(15.9)	0.63(15.9)	0.45(11.5)	0.40(10.2)
1/4	1/4	-BCF-FL4-NS4	2.04(51.8)	0.59(15.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.75(19.1)	0.63(15.9)	0.45(11.5)	0.40(10.2)
1/4	3/8	-BCF-FL4-NS6	2.10(53.3)	0.59(15.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.87(22.2)	0.63(15.9)	0.45(11.5)	0.40(10.2)
1/4	1/2	-BCF-FL4-NS8	2.29(58.2)	0.78(19.8)	0.60(15.2)	0.19(4.8)	0.56(14.3)	1.06(27.0)	0.63(15.9)	0.45(11.5)	0.40(10.2)
5/16	1/8	-BCF-FL5-NS2	1.96(49.8)	0.41(10.4)	0.64(16.3)	0.25(6.4)	0.63(15.9)	0.69(17.5)	0.69(17.5)	0.52(13.1)	0.44(11.2)
5/16	1/4	-BCF-FL5-NS4	2.38(60.5)	0.59(15.0)	0.64(16.3)	0.25(6.4)	0.63(15.9)	0.75(19.1)	0.69(17.5)	0.52(13.1)	0.44(11.2)
3/8	1/8	-BCF-FL6-NS2	1.98(50.3)	0.41(10.4)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.75(19.1)	0.75(19.1)	0.58(14.7)	0.44(11.2)
3/8	1/4	-BCF-FL6-NS4	2.17(55.1)	0.59(15.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.75(19.1)	0.75(19.1)	0.58(14.7)	0.44(11.2)
3/8	3/8	-BCF-FL6-NS6	2.23(56.6)	0.59(15.0)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.87(22.2)	0.75(19.1)	0.58(14.7)	0.44(11.2)
3/8	1/2	-BCF-FL6-NS8	2.42(61.5)	0.78(19.8)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.06(27.0)	0.75(19.1)	0.58(14.7)	0.44(11.2)
3/8	3/4	-BCF-FL6-NS12	2.57(65.3)	0.81(20.6)	0.66(16.8)	0.28(7.1)	0.69(17.5)	1.31(33.3)	0.75(19.1)	0.58(14.7)	0.44(11.2)
1/2	1/4	-BCF-FL8-NS4	2.37(60.2)	0.59(15.0)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.94(23.8)	0.94(23.8)	0.76(19.4)	0.50(12.7)
1/2	3/8	-BCF-FL8-NS6	2.43(61.7)	0.59(15.0)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.94(23.8)	0.94(23.8)	0.76(19.4)	0.50(12.7)
1/2	1/2	-BCF-FL8-NS8	2.62(66.5)	0.78(19.8)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.06(27.0)	0.94(23.8)	0.76(19.4)	0.50(12.7)
1/2	3/4	-BCF-FL8-NS12	2.68(68.1)	0.81(20.6)	0.90(22.9)	0.41(10.4)	0.87(22.2)	1.31(33.3)	0.94(23.8)	0.76(19.4)	0.50(12.7)

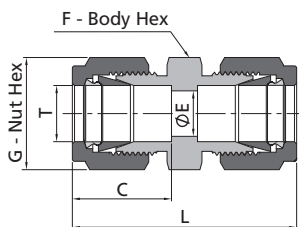
## Bulkhead Female Connectors



Fractional Tube			NPT Thread								
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)							Panel Hole Size in. (mm)	Max. Panel Thickness in. (mm)
			L	B	C	E	G	F	Gx		
5/8	3/8	-BCF-FL10-NS6	2.46(62.5)	0.59(15.0)	0.96(24.4)	0.50(12.7)	1.00(25.4)	1.06(27.0)	1.06(27.0)	0.89(22.6)	0.59(15.1)
5/8	1/2	-BCF-FL10-NS8	2.65(67.3)	0.78(19.8)	0.96(24.4)	0.50(12.7)	1.00(25.4)	1.06(27.0)	1.06(27.0)	0.89(22.6)	0.59(15.1)
3/4	1/2	-BCF-FL12-NS8	2.84(72.2)	0.78(19.8)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.19(30.2)	1.19(30.2)	1.02(25.8)	0.78(19.8)
3/4	3/4	-BCF-FL12-NS12	2.90(73.7)	0.81(20.6)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.31(33.3)	1.19(30.2)	1.02(25.8)	0.78(19.8)
7/8	3/4	-BCF-FL14-NS12	3.18(80.8)	0.81(20.6)	1.02(25.9)	0.72(18.3)	1.25(31.8)	1.31(33.3)	1.31(33.3)	1.14(29.0)	0.94(23.8)
1	3/4	-BCF-FL16-NS12	3.33(84.7)	0.81(20.6)	1.23(31.2)	0.88(22.4)	1.50(38.1)	1.63(41.3)	1.63(41.3)	1.33(33.7)	0.94(23.8)
1	1	-BCF-FL16-NS16	3.68(93.5)	1.00(25.4)	1.23(31.2)	0.88(22.4)	1.50(38.1)	1.63(41.3)	1.63(41.3)	1.33(33.7)	0.94(23.8)

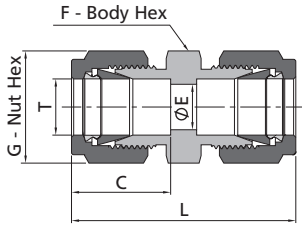
Metric Tube			NPT Thread								
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)							Panel Hole Size mm (in.)	Max. Panel Thickness mm (in.)
			L	B	C	E	G	F	Gx		
6	1/8	-BCF-ML6-NS2	47.2(1.86)	10.4(0.41)	15.3(0.60)	4.8(0.19)	14.0(0.55)	16.0(0.63)	16.0(0.63)	11.5(0.45)	10.2(0.40)
6	1/4	-BCF-ML6-NS4	51.8(2.04)	15.0(0.59)	15.3(0.60)	4.8(0.19)	14.0(0.55)	19.0(0.75)	16.0(0.63)	11.5(0.45)	10.2(0.40)
8	1/8	-BCF-ML8-NS2	49.6(1.95)	10.4(0.41)	16.2(0.64)	6.4(0.25)	16.0(0.63)	18.0(0.71)	18.0(0.71)	13.1(0.52)	11.2(0.44)
10	1/4	-BCF-ML10-NS4	55.2(2.17)	15.0(0.59)	17.2(0.68)	7.9(0.31)	19.0(0.75)	22.0(0.87)	22.0(0.87)	16.3(0.64)	11.2(0.44)
12	3/8	-BCF-ML12-NS6	62.9(2.48)	15.0(0.59)	22.8(0.90)	9.5(0.37)	22.0(0.87)	24.0(0.94)	24.0(0.94)	19.5(0.77)	12.7(0.50)
12	1/2	-BCF-ML12-NS8	66.5(2.62)	19.8(0.78)	22.8(0.90)	9.5(0.37)	22.0(0.87)	27.0(1.06)	24.0(0.94)	19.5(0.77)	12.7(0.50)

## Unions



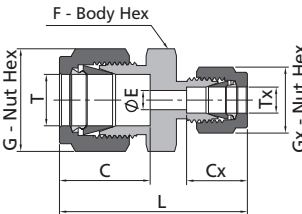
Fractional Tube		Dimensions, in. (mm)				
T-Tube O.D. (in.)	Basic Ordering Number	L	C	G	F	E
		1/16	-U-FL1	0.99(25.1)	0.34(8.6)	0.31(7.9)
1/8	-U-FL2	1.40(35.6)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.09(2.3)
3/16	-U-FL3	1.47(37.3)	0.54(13.7)	0.50(12.7)	0.50(12.7)	0.12(3.0)
1/4	-U-FL4	1.61(40.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)
5/16	-U-FL5	1.69(42.9)	0.64(16.2)	0.63(15.9)	0.56(14.3)	0.25(6.4)
3/8	-U-FL6	1.77(45.0)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.28(7.1)
1/2	-U-FL8	2.02(51.3)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)
5/8	-U-FL10	2.05(52.1)	0.96(24.4)	1.00(25.4)	0.94(23.9)	0.50(12.7)
3/4	-U-FL12	2.11(53.6)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.62(15.7)
7/8	-U-FL14	2.19(55.7)	1.02(25.9)	1.25(31.8)	1.19(30.2)	0.72(18.3)
1	-U-FL16	2.55(64.8)	1.23(31.2)	1.5(38.1)	1.37(34.9)	0.88(22.4)
1 1/8	-U-FL18	3.47(88.2)	1.44(36.7)	1.75(44.5)	1.63(41.3)	0.97(24.6)
1 1/4	-U-FL20	3.63(92.2)	1.62(41.1)	1.87(47.6)	1.75(44.5)	1.09(27.7)
1 1/2	-U-FL24	4.25(108.0)	1.97(50.0)	2.25(57.2)	2.13(54.0)	1.34(34.0)

Unions



Metric Tube		Dimensions, mm (in.)				
T-Tube O.D. (mm)	Basic Ordering Number	L	C	G	F	E
2	-U-ML2	35.6(1.40)	12.9(0.51)	12.0(0.47)	12.0(0.47)	1.7(0.07)
3	-U-ML3	35.3(1.39)	12.9(0.51)	12.0(0.47)	12.0(0.47)	2.4(0.09)
4	-U-ML4	37.3(1.47)	13.7(0.54)	12.0(0.47)	12.0(0.47)	2.4(0.09)
6	-U-ML6	41.0(1.61)	15.3(0.60)	14.0(0.55)	14.0(0.55)	4.8(0.19)
8	-U-ML8	43.2(1.70)	16.2(0.64)	16.0(0.63)	15.0(0.59)	6.4(0.25)
10	-U-ML10	46.2(1.82)	17.2(0.68)	19.0(0.75)	18.0(0.71)	7.9(0.31)
12	-U-ML12	51.2(2.02)	22.8(0.90)	22.0(0.87)	22.0(0.87)	9.5(0.37)
14	-U-ML14	52.0(2.05)	24.4(0.96)	25.0(0.98)	24.0(0.94)	11.1(0.44)
15	-U-ML15	52.0(2.05)	24.4(0.96)	25.0(0.98)	24.0(0.94)	11.9(0.47)
16	-U-ML16	52.0(2.05)	24.4(0.96)	25.0(0.98)	24.0(0.94)	12.7(0.50)
18	-U-ML18	53.5(2.11)	24.4(0.96)	30.0(1.18)	27.0(1.06)	15.1(0.59)
20	-U-ML20	55.0(2.17)	26.0(1.02)	32.0(1.26)	30.0(1.18)	15.9(0.63)
22	-U-ML22	55.0(2.17)	26.0(1.02)	32.0(1.26)	30.0(1.18)	18.3(0.72)
25	-U-ML25	65.0(2.56)	31.3(1.23)	38.0(1.50)	35.0(1.38)	21.8(0.86)
28	-U-ML28	85.0(3.35)	36.6(1.44)	46.0(1.81)	41.0(1.61)	21.8(0.86)
30	-U-ML30	92.7(3.65)	39.6(1.56)	50.0(1.97)	46.0(1.81)	26.2(1.03)
32	-U-ML32	97.3(3.83)	42.0(1.65)	50.0(1.97)	46.0(1.81)	28.6(1.13)
38	-U-ML38	113.6(4.47)	49.4(1.94)	60.0(2.36)	55.0(2.17)	33.7(1.33)

Conversion Unions

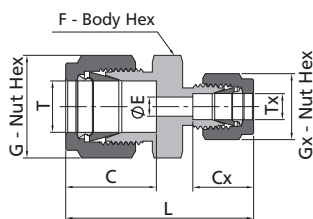


Fractional Tube		Dimensions, in. (mm)							
T-Tube O.D. (in.)	Tx-Tube O.D. (mm)	Basic Ordering Number	L	C	G	F	E	Cx	Gx
1/8	3	-U-FL2-ML3	1.39(35.2)	0.50(12.7)	0.44(11.1)	0.47(12.0)	0.09(2.3)	0.51(12.9)	0.47(12.0)
1/4	4	-U-FL4-ML4	1.55(39.4)	0.60(15.2)	0.56(14.3)	0.55(14.0)	0.09(2.4)	0.54(13.7)	0.47(12.0)
1/4	6	-U-FL4-ML6	1.62(41.2)	0.60(15.2)	0.56(14.3)	0.55(14.0)	0.19(4.8)	0.60(15.3)	0.55(14.0)
3/8	6	-U-FL6-ML6	1.72(43.7)	0.66(16.8)	0.69(17.5)	0.63(16.0)	0.19(4.8)	0.60(15.3)	0.55(14.0)
3/8	8	-U-FL6-ML8	1.75(44.5)	0.66(16.8)	0.69(17.5)	0.63(16.0)	0.25(6.4)	0.64(16.2)	0.63(16.0)
1/2	6	-U-FL8-ML6	1.88(47.7)	0.90(22.9)	0.87(22.2)	0.87(22.0)	0.19(4.8)	0.60(15.3)	0.55(14.0)
1/2	10	-U-FL8-ML10	1.93(48.9)	0.90(22.9)	0.87(22.2)	0.87(22.0)	0.31(7.9)	0.68(17.2)	0.75(19.0)
1/2	12	-U-FL8-ML12	2.02(51.4)	0.90(22.9)	0.87(22.2)	0.87(22.0)	0.37(9.5)	0.90(22.8)	0.87(22.0)
3/4	12	-U-FL12-ML12	2.13(54.2)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.37(9.5)	0.90(22.8)	0.87(22.0)
3/4	16	-U-FL12-ML16	2.12(53.9)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.50(12.7)	0.96(24.4)	0.98(25.0)
3/4	18	-U-FL12-ML18	2.11(53.6)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.59(15.1)	0.96(24.4)	1.18(30.0)
1	25	-U-FL16-ML25	2.65(67.4)	1.23(31.2)	1.50(38.1)	1.38(35.0)	0.86(21.8)	1.23(31.3)	1.50(38.0)

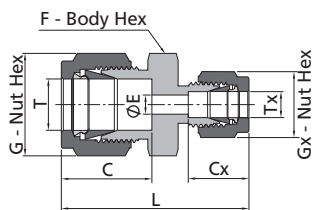
Metric Tube			Fractional Tube							
T-Tube O.D. (mm)	Tx-Tube O.D. (in.)	Basic Ordering Number	Dimensions, mm (in.)							
			L	C	G	F	E	Cx	Gx	
4	1/8	-U-ML4-FL2	36.5(1.44)	13.7(0.54)	12.0(0.47)	12.0(0.47)	2.4(0.09)	12.7(0.50)	11.1(0.44)	
6	1/8	-U-ML6-FL2	38.5(1.52)	15.3(0.60)	14.0(0.55)	14.0(0.55)	2.4(0.09)	12.7(0.50)	11.1(0.44)	
8	1/4	-U-ML8-FL4	42.3(1.67)	16.2(0.64)	16.0(0.63)	15.0(0.59)	4.8(0.19)	15.2(0.60)	14.3(0.56)	
10	1/8	-U-ML10-FL2	41.8(1.65)	17.2(0.68)	19.0(0.75)	18.0(0.71)	2.4(0.09)	12.7(0.50)	11.1(0.44)	
10	1/4	-U-ML10-FL4	44.5(1.75)	17.2(0.68)	19.0(0.75)	18.0(0.71)	4.8(0.19)	15.2(0.60)	14.3(0.56)	
10	5/16	-U-ML10-FL5	45.1(1.78)	17.2(0.68)	19.0(0.75)	18.0(0.71)	6.4(0.25)	16.2(0.64)	15.9(0.63)	
10	3/8	-U-ML10-FL6	45.9(1.81)	17.2(0.68)	19.0(0.75)	18.0(0.71)	7.1(0.28)	16.8(0.66)	17.5(0.69)	
12	5/16	-U-ML12-FL5	47.8(1.88)	22.8(0.90)	22.0(0.87)	22.0(0.87)	6.4(0.25)	16.2(0.64)	15.9(0.63)	
12	3/8	-U-ML12-FL6	48.4(1.91)	22.8(0.90)	22.0(0.87)	22.0(0.87)	7.1(0.28)	16.8(0.66)	17.5(0.69)	
15	1/2	-U-ML15-FL8	52.0(2.05)	24.4(0.96)	25.0(0.98)	24.0(0.94)	10.4(0.41)	22.9(0.90)	22.2(0.87)	
16	5/8	-U-ML16-FL10	52.0(2.05)	24.4(0.96)	25.0(0.98)	24.0(0.94)	12.7(0.50)	24.4(0.96)	25.4(1.00)	
20	1/2	-U-ML20-FL8	55.0(2.17)	26.0(1.02)	32.0(1.26)	30.0(1.18)	10.4(0.41)	22.9(0.90)	22.2(0.87)	



## Reducing Unions

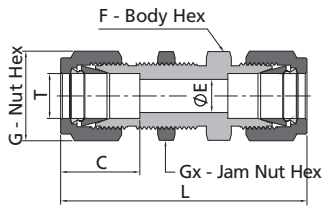


Fractional Tube			Dimensions, in. (mm)							
T-Tube O.D. (in.)	Tx-Tube O.D. (in.)	Basic Ordering Number	L	C	G	F	E	Cx	Gx	
1/8	1/16	-U-FL2-FL1	1.22(31.0)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.05(1.3)	0.34(8.6)	0.31(7.9)	
3/16	1/16	-U-FL3-FL1	1.27(32.3)	0.54(13.7)	0.50(12.7)	0.44(11.1)	0.05(1.3)	0.34(8.6)	0.31(7.9)	
3/16	1/8	-U-FL3-FL2	1.44(36.6)	0.54(13.7)	0.50(12.7)	0.44(11.1)	0.09(2.3)	0.50(12.7)	0.44(11.1)	
1/4	1/16	-U-FL4-FL1	1.35(34.3)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.05(1.3)	0.34(8.6)	0.31(7.9)	
1/4	1/8	-U-FL4-FL2	1.52(38.6)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.09(2.3)	0.50(12.7)	0.44(11.1)	
1/4	3/16	-U-FL4-FL3	1.55(39.4)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.12(3.0)	0.54(13.7)	0.50(12.7)	
5/16	1/8	-U-FL5-FL2	1.56(39.6)	0.64(16.2)	0.63(15.9)	0.56(14.3)	0.09(2.3)	0.50(12.7)	0.44(11.1)	
5/16	1/4	-U-FL5-FL4	1.66(42.2)	0.64(16.2)	0.63(15.9)	0.56(14.3)	0.19(4.8)	0.60(15.2)	0.56(14.3)	
3/8	1/16	-U-FL6-FL1	1.44(36.6)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.05(1.3)	0.34(8.6)	0.31(7.9)	
3/8	1/8	-U-FL6-FL2	1.61(40.9)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.09(2.3)	0.50(12.7)	0.44(11.1)	
3/8	1/4	-U-FL6-FL4	1.70(43.2)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.19(4.8)	0.60(15.2)	0.56(14.3)	
3/8	5/16	-U-FL6-FL5	1.74(44.2)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.25(6.4)	0.64(16.2)	0.63(15.9)	
1/2	1/8	-U-FL8-FL2	1.78(45.2)	0.90(22.8)	0.87(22.2)	0.81(20.6)	0.09(2.3)	0.50(12.7)	0.44(11.1)	
1/2	1/4	-U-FL8-FL4	1.85(47.0)	0.90(22.8)	0.87(22.2)	0.81(20.6)	0.19(4.8)	0.60(15.2)	0.56(14.3)	
1/2	3/8	-U-FL8-FL6	1.91(48.5)	0.90(22.8)	0.87(22.2)	0.81(20.6)	0.28(7.1)	0.66(16.8)	0.69(17.5)	
5/8	3/8	-U-FL10-FL6	1.94(49.3)	0.96(24.4)	1.00(25.4)	0.94(23.9)	0.28(7.1)	0.66(16.8)	0.69(17.5)	
5/8	1/2	-U-FL10-FL8	2.05(52.1)	0.96(24.4)	1.00(25.4)	0.94(23.9)	0.41(10.4)	0.90(22.8)	0.87(22.2)	
3/4	1/4	-U-FL12-FL4	1.94(49.3)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.19(4.8)	0.60(15.2)	0.56(14.3)	
3/4	3/8	-U-FL12-FL6	2.00(50.8)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.28(7.1)	0.66(16.8)	0.69(17.5)	
3/4	1/2	-U-FL12-FL8	2.11(53.6)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.41(10.4)	0.90(22.8)	0.87(22.2)	
3/4	5/8	-U-FL12-FL10	2.11(53.6)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.50(12.7)	0.96(24.4)	1.00(25.4)	
1	1/2	-U-FL16-FL8	2.38(60.5)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.41(10.4)	0.90(22.8)	0.87(22.2)	
1	3/4	-U-FL16-FL12	2.38(60.5)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.62(15.7)	0.96(24.4)	1.13(28.6)	



Metric Tube			Dimensions, mm (in.)							
T-Tube O.D. (mm)	Tx-Tube O.D. (mm)	Basic Ordering Number	L	C	G	F	E	Cx	Gx	
3	2	-U-ML3-ML2	35.3(1.39)	12.9(0.51)	12.0(0.47)	12.0(0.47)	1.7(0.07)	12.9(0.51)	12.0(0.47)	
6	2	-U-ML6-ML2	38.6(1.52)	15.3(0.60)	14.0(0.55)	14.0(0.55)	1.7(0.07)	12.9(0.51)	12.0(0.47)	
6	3	-U-ML6-ML3	38.6(1.52)	15.3(0.60)	14.0(0.55)	14.0(0.55)	2.4(0.09)	12.9(0.51)	12.0(0.47)	
6	4	-U-ML6-ML4	39.4(1.55)	15.3(0.60)	14.0(0.55)	14.0(0.55)	2.4(0.09)	13.7(0.54)	12.0(0.47)	
8	6	-U-ML8-ML6	42.3(1.67)	16.3(0.64)	16.0(0.63)	15.0(0.59)	4.8(0.19)	15.3(0.60)	14.0(0.55)	
10	6	-U-ML10-ML6	44.5(1.75)	17.2(0.68)	19.0(0.75)	18.0(0.71)	4.8(0.19)	15.3(0.60)	14.0(0.55)	
10	8	-U-ML10-ML8	45.1(1.78)	17.2(0.68)	19.0(0.75)	18.0(0.71)	6.4(0.25)	16.3(0.64)	16.0(0.63)	
12	6	-U-ML12-ML6	47.0(1.85)	22.8(0.90)	22.0(0.87)	22.0(0.87)	4.8(0.19)	15.3(0.60)	14.0(0.55)	
12	8	-U-ML12-ML8	47.8(1.88)	22.8(0.90)	22.0(0.87)	22.0(0.87)	6.4(0.25)	16.3(0.64)	16.0(0.63)	
12	10	-U-ML12-ML10	48.7(1.92)	22.8(0.90)	22.0(0.87)	22.0(0.87)	7.9(0.31)	17.2(0.68)	19.0(0.75)	
16	10	-U-ML16-ML10	49.5(1.95)	24.4(0.96)	25.0(0.98)	24.0(0.94)	7.9(0.31)	17.2(0.68)	19.0(0.75)	
16	12	-U-ML16-ML12	52.0(2.05)	24.4(0.96)	25.0(0.98)	24.0(0.94)	9.5(0.37)	22.8(0.90)	22.0(0.87)	
18	12	-U-ML18-ML12	53.5(2.11)	24.4(0.96)	30.0(1.18)	27.0(1.06)	9.5(0.37)	22.8(0.90)	22.0(0.87)	
25	18	-U-ML25-ML18	61.0(2.40)	31.3(1.23)	38.0(1.50)	35.0(1.38)	15.1(0.59)	24.4(0.96)	30.0(1.18)	
25	20	-U-ML25-ML20	62.3(2.45)	31.3(1.23)	38.0(1.50)	35.0(1.38)	15.9(0.63)	26.0(1.02)	32.0(1.26)	
30	18	-U-ML30-ML18	75.4(2.97)	39.6(1.56)	50.0(1.97)	46.0(1.81)	15.1(0.59)	24.4(0.96)	30.0(1.18)	
30	20	-U-ML30-ML20	75.4(2.97)	39.6(1.56)	50.0(1.97)	46.0(1.81)	15.9(0.63)	26.0(1.02)	32.0(1.26)	
30	25	-U-ML30-ML25	80.1(3.15)	39.6(1.56)	50.0(1.97)	46.0(1.81)	21.8(0.86)	31.3(1.23)	38.0(1.50)	
32	18	-U-ML32-ML18	77.8(3.06)	42.0(1.65)	50.0(1.97)	46.0(1.81)	15.1(0.59)	24.4(0.96)	30.0(1.18)	
32	20	-U-ML32-ML20	77.8(3.06)	42.0(1.65)	50.0(1.97)	46.0(1.81)	15.9(0.63)	26.0(1.02)	32.0(1.26)	
32	25	-U-ML32-ML25	82.3(3.24)	42.0(1.65)	50.0(1.97)	46.0(1.81)	21.8(0.86)	31.3(1.23)	38.0(1.50)	
38	20	-U-ML38-ML20	87.5(3.44)	49.4(1.94)	60.0(2.36)	55.0(2.17)	15.9(0.63)	26.0(1.02)	32.0(1.26)	
38	25	-U-ML38-ML25	92.0(3.62)	49.4(1.94)	60.0(2.36)	55.0(2.17)	21.8(0.86)	31.3(1.23)	38.0(1.50)	
38	30	-U-ML38-ML30	104.6(4.12)	49.4(1.94)	60.0(2.36)	55.0(2.17)	26.2(1.03)	39.6(1.56)	50.0(1.97)	

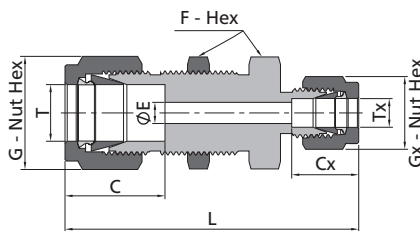
**Bulkhead Unions**



		Fractional Tube							Panel Hole Size in. (mm)	Max. Panel Thickness in. (mm)
Tx-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)								
		L	C	E	G	F	Gx			
1/16	-BU-FL1	1.24(31.5)	0.34(8.6)	0.05(1.3)	0.31(7.9)	0.31(7.9)	0.31(7.9)	0.20(5.2)	0.12(3.0)	
1/8	-BU-FL2	2.02(51.3)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.50(12.7)	0.50(12.7)	0.33(8.3)	0.50(12.7)	
3/16	-BU-FL3	2.11(53.6)	0.54(13.7)	0.12(3.0)	0.50(12.7)	0.56(14.3)	0.56(14.3)	0.39(9.9)	0.50(12.7)	
1/4	-BU-FL4	2.27(57.7)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.63(15.9)	0.63(15.9)	0.45(11.5)	0.40(10.2)	
5/16	-BU-FL5	2.39(60.7)	0.64(16.3)	0.25(6.4)	0.63(15.9)	0.69(17.5)	0.69(17.5)	0.52(13.1)	0.44(11.2)	
3/8	-BU-FL6	2.45(62.2)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.75(19.1)	0.75(19.1)	0.58(14.7)	0.44(11.2)	
1/2	-BU-FL8	2.80(71.1)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.94(23.8)	0.94(23.8)	0.76(19.4)	0.50(12.7)	
5/8	-BU-FL10	2.86(72.6)	0.96(24.4)	0.50(12.7)	1.00(25.4)	1.06(27.0)	1.06(27.0)	0.89(22.6)	0.50(12.7)	
3/4	-BU-FL12	3.11(79.0)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.19(30.2)	1.19(30.2)	1.02(25.8)	0.66(16.8)	
7/8	-BU-FL14	3.35(85.2)	1.02(25.9)	0.72(18.3)	1.25(31.8)	1.38(34.9)	1.37(34.9)	1.14(29.0)	0.75(19.1)	
1	-BU-FL16	3.77(95.8)	1.23(31.2)	0.88(22.4)	1.50(38.1)	1.63(41.3)	1.63(41.3)	1.33(33.7)	0.75(19.1)	
1 1/4	-BU-FL20	4.85(123.2)	1.62(41.1)	1.09(27.8)	1.87(47.6)	1.87(47.6)	1.87(47.6)	1.64(41.7)	0.75(19.1)	
1 1/2	-BU-FL24	5.48(139.2)	1.97(50.0)	1.34(34.0)	2.25(57.2)	2.25(57.2)	2.25(57.2)	1.95(49.6)	0.75(19.1)	

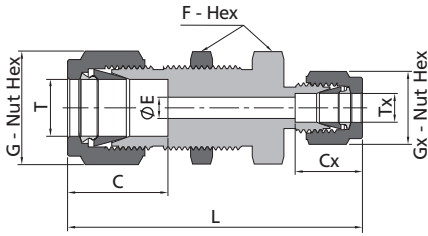
		Metric Tube							Panel Hole Size mm (in.)	Max. Panel Thickness mm (in.)
Tx-Tube O.D. (mm)	Basic Ordering Number	Dimensions, mm (in.)								
		L	C	E	G	F	Gx			
3	-BU-ML3	51.3(2.02)	12.9(0.51)	2.4(0.09)	12.0(0.47)	14.0(0.55)	14.0(0.55)	8.3(0.33)	12.7(0.50)	
4	-BU-ML4	53.6(2.11)	13.7(0.54)	2.4(0.09)	12.0(0.47)	14.0(0.55)	14.0(0.55)	9.9(0.39)	12.7(0.50)	
6	-BU-ML6	57.7(2.27)	15.3(0.60)	4.8(0.19)	14.0(0.55)	16.0(0.63)	16.0(0.63)	11.5(0.45)	10.2(0.40)	
8	-BU-ML8	61.0(2.40)	16.2(0.64)	6.4(0.25)	16.0(0.63)	18.0(0.71)	18.0(0.71)	13.1(0.52)	11.2(0.44)	
10	-BU-ML10	63.7(2.51)	17.2(0.68)	7.9(0.31)	19.0(0.75)	22.0(0.87)	22.0(0.87)	16.3(0.64)	11.2(0.44)	
12	-BU-ML12	71.0(2.80)	22.8(0.90)	9.5(0.37)	22.0(0.87)	24.0(0.94)	24.0(0.94)	19.5(0.77)	12.7(0.50)	
14	-BU-ML14	72.5(2.85)	24.4(0.96)	11.1(0.44)	25.0(0.98)	27.0(1.06)	27.0(1.06)	22.5(0.89)	12.7(0.50)	
15	-BU-ML15	72.5(2.85)	24.4(0.96)	11.9(0.47)	25.0(0.98)	27.0(1.06)	27.0(1.06)	22.8(0.90)	12.7(0.50)	
16	-BU-ML16	72.5(2.85)	24.4(0.96)	12.7(0.50)	25.0(0.98)	27.0(1.06)	27.0(1.06)	22.8(0.90)	12.7(0.50)	
18	-BU-ML18	78.9(3.11)	24.4(0.96)	15.1(0.59)	30.0(1.18)	30.0(1.18)	30.0(1.18)	26.0(1.02)	16.8(0.66)	
20	-BU-ML20	84.5(3.33)	26.0(1.02)	15.9(0.63)	32.0(1.26)	35.0(1.38)	35.0(1.38)	29.0(1.14)	19.0(0.75)	
25	-BU-ML25	96.0(3.78)	31.3(1.23)	21.8(0.86)	38.0(1.5)	41.0(1.61)	41.0(1.61)	34.0(1.34)	19.0(0.75)	
30	-BU-ML30	124.0(4.88)	39.6(1.56)	26.2(1.03)	50.0(1.97)	50.0(1.97)	50.0(1.97)	40.5(1.59)	19.0(0.75)	
32	-BU-ML32	128.0(5.04)	42.0(1.65)	28.6(1.13)	50.0(1.97)	50.0(1.97)	50.0(1.97)	42.5(1.67)	19.0(0.75)	
38	-BU-ML38	145.0(5.71)	49.4(1.94)	33.7(1.33)	60.0(2.36)	60.0(2.36)	60.0(2.36)	50.5(1.99)	19.0(0.75)	

**Bulkhead Reducing Unions**



			Fractional Tube							Panel Hole Size in. (mm)	Max. Panel Thickness in. (mm)
T-Tube O.D. (in.)	Tx-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)								
			L	C	E	G	F	Cx	Gx		
1/4	1/8	-BU-FL4-FL2	2.17(55.1)	0.60(15.2)	0.09(2.3)	0.56(14.3)	0.63(15.9)	0.50(12.7)	0.44(11.1)	0.45(11.5)	0.40(10.2)
3/8	1/4	-BU-FL6-FL4	2.39(60.7)	0.66(16.8)	0.19(4.8)	0.69(17.5)	0.75(19.1)	0.60(15.2)	0.56(14.3)	0.58(14.7)	0.44(11.2)
1/2	1/4	-BU-FL8-FL4	2.63(66.8)	0.90(22.9)	0.19(4.8)	0.87(22.2)	0.94(23.8)	0.60(15.2)	0.56(14.3)	0.76(19.4)	0.50(12.7)

### Bulkhead Reducing Unions



Metric Tube											
T-Tube O.D. (mm)	Tx-Tube O.D. (mm)	Basic Ordering Number	Dimensions, mm (in.)							Panel Hole Size mm (in.)	Max. Panel Thickness mm (in.)
			L	C	E	G	F	Cx	Gx		
6	3	-BU-ML6-ML3	55.1(2.17)	15.3(0.60)	2.4(0.09)	14.0(0.55)	16.0(0.63)	12.9(0.51)	12.0(0.47)	11.5(0.45)	10.2(0.40)
8	6	-BU-ML8-ML6	60.1(2.37)	16.2(0.64)	4.8(0.19)	16.0(0.63)	18.0(0.71)	15.3(0.60)	14.0(0.55)	13.1(0.52)	11.2(0.44)
12	8	-BU-ML12-ML8	67.6(2.66)	22.8(0.90)	6.4(0.25)	22.0(0.87)	24.0(0.94)	16.2(0.64)	16.0(0.63)	19.5(0.77)	12.7(0.50)

### Bulkhead Conversion Unions

Fractional Tube										Metric Tube	
T-Tube O.D. (in.)	Tx-Tube O.D. (mm)	Basic Ordering Number	Dimensions, in. (mm)							Panel Hole Size in. (mm)	Max. Panel Thickness in. (mm)
			L	C	E	G	F	Cx	Gx		
1/4	6	-BU-FL4-ML6	2.27(57.7)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.63(15.9)	0.60(15.3)	0.55(14.0)	0.45(11.5)	0.40(10.2)

Metric Tube										Fractional Tube	
T-Tube O.D. (mm)	Tx-Tube O.D. (in.)	Basic Ordering Number	Dimensions, mm (in.)							Panel Hole Size mm (in.)	Max. Panel Thickness mm (in.)
			L	C	E	G	F	Cx	Gx		
6	1/8	-BU-ML6-FL2	55.1(2.17)	15.3(0.60)	2.3(0.09)	14.0(0.55)	16.0(0.63)	12.7(0.5)	11.0(0.43)	11.5(0.45)	10.2(0.40)
6	1/4	-BU-ML6-FL4	57.7(2.27)	15.3(0.60)	4.8(0.19)	14.0(0.55)	16.0(0.63)	15.2(0.6)	14.3(0.56)	11.5(0.45)	10.2(0.40)

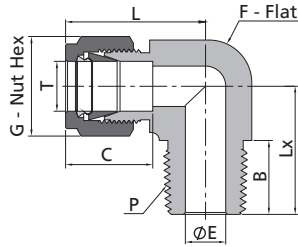
### Bulkhead Locknuts



Fractional Tube	
T-Tube O.D. (in.)	Basic Ordering Number
1/16	-BN-FL1
1/8	-BN-FL2
3/16	-BN-FL3
1/4	-BN-FL4
5/16	-BN-FL5
3/8	-BN-FL6
1/2	-BN-FL8
5/8	-BN-FL10
3/4	-BN-FL12
7/8	-BN-FL14
1	-BN-FL16
1 1/4	-BN-FL20
1 1/2	-BN-FL24

Metric Tube	
T-Tube O.D. (mm)	Basic Ordering Number
3	-BN-ML3
4	-BN-ML4
6	-BN-ML6
8	-BN-ML8
10	-BN-ML10
12	-BN-ML12
14	-BN-ML14
18	-BN-ML18
20	-BN-ML20
22	-BN-ML22
25	-BN-ML25
28	-BN-ML28
30	-BN-ML30
32	-BN-ML32
38	-BN-ML38

Male Elbows

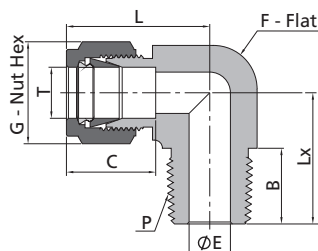


Tube Fittings

Fractional Tube			NPT Thread							
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)							
			L	C	G	F	E	B	Lx	
1/16	1/16	-LM-FL1-NS1	0.75(19.1)	0.34(8.6)	0.31(7.9)	0.44(11.1)	0.05(1.3)	0.38(9.7)	0.70(17.8)	
1/16	1/8	-LM-FL1-NS2	0.75(19.1)	0.34(8.6)	0.31(7.9)	0.44(11.1)	0.05(1.3)	0.38(9.7)	0.70(17.8)	
1/8	1/16	-LM-FL2-NS1	0.93(23.6)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.09(2.4)	0.38(9.7)	0.70(17.8)	
1/8	1/8	-LM-FL2-NS2	0.93(23.6)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.09(2.4)	0.38(9.7)	0.70(17.8)	
1/8	1/4	-LM-FL2-NS4	0.97(24.6)	0.50(12.7)	0.44(11.1)	0.50(12.7)	0.09(2.4)	0.56(14.2)	0.92(23.4)	
3/16	1/8	-LM-FL3-NS2	1.00(25.4)	0.54(13.7)	0.50(12.7)	0.50(12.7)	0.12(3.0)	0.38(9.7)	0.74(18.8)	
3/16	1/4	-LM-FL3-NS4	1.00(25.4)	0.54(13.7)	0.50(12.7)	0.50(12.7)	0.12(3.0)	0.56(14.2)	0.92(23.4)	
1/4	1/16	-LM-FL4-NS1	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.12(3.0)	0.38(9.7)	0.74(18.8)	
1/4	1/8	-LM-FL4-NS2	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)	0.38(9.7)	0.74(18.8)	
1/4	1/4	-LM-FL4-NS4	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)	0.56(14.2)	0.92(23.4)	
1/4	3/8	-LM-FL4-NS6	1.17(29.7)	0.60(15.2)	0.56(14.3)	0.69(17.5)	0.19(4.8)	0.56(14.2)	1.03(26.2)	
1/4	1/2	-LM-FL4-NS8	1.25(31.8)	0.60(15.2)	0.56(14.3)	0.81(20.6)	0.19(4.8)	0.75(19.1)	1.30(33.0)	
5/16	1/8	-LM-FL5-NS2	1.13(28.7)	0.64(16.3)	0.63(15.9)	0.56(14.3)	0.19(4.8)	0.38(9.7)	0.78(19.8)	
5/16	1/4	-LM-FL5-NS4	1.13(28.7)	0.64(16.3)	0.63(15.9)	0.56(14.3)	0.25(6.4)	0.56(14.2)	0.96(24.4)	
5/16	3/8	-LM-FL5-NS6	1.20(30.5)	0.64(16.3)	0.63(15.9)	0.69(17.5)	0.25(6.4)	0.56(14.2)	1.03(26.2)	
3/8	1/8	-LM-FL6-NS2	1.20(30.5)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.19(4.8)	0.38(9.7)	0.82(20.8)	
3/8	1/4	-LM-FL6-NS4	1.20(30.5)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.28(7.1)	0.56(14.2)	1.00(25.4)	
3/8	3/8	-LM-FL6-NS6	1.23(31.2)	0.66(16.8)	0.69(17.5)	0.69(17.5)	0.28(7.1)	0.56(14.2)	1.03(26.2)	
3/8	1/2	-LM-FL6-NS8	1.31(33.3)	0.66(16.8)	0.69(17.5)	0.81(20.6)	0.28(7.1)	0.75(19.1)	1.30(33.0)	
3/8	3/4	-LM-FL6-NS12	1.46(37.1)	0.66(16.8)	0.69(17.5)	1.06(27.0)	0.28(7.1)	0.75(19.1)	1.45(36.8)	
1/2	1/4	-LM-FL8-NS4	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.28(7.1)	0.56(14.2)	1.11(28.2)	
1/2	3/8	-LM-FL8-NS6	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.38(9.7)	0.56(14.2)	1.11(28.2)	
1/2	1/2	-LM-FL8-NS8	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)	0.75(19.1)	1.30(33.0)	
1/2	3/4	-LM-FL8-NS12	1.57(39.9)	0.90(22.9)	0.87(22.2)	1.06(27.0)	0.41(10.4)	0.75(19.1)	1.45(36.8)	
5/8	3/8	-LM-FL10-NS6	1.50(38.1)	0.96(24.4)	1.00(25.4)	0.94(23.8)	0.38(9.7)	0.56(14.2)	1.19(30.2)	
5/8	1/2	-LM-FL10-NS8	1.50(38.1)	0.96(24.4)	1.00(25.4)	0.94(23.8)	0.47(11.9)	0.75(19.1)	1.38(35.1)	
5/8	3/4	-LM-FL10-NS12	1.57(39.9)	0.96(24.4)	1.00(25.4)	1.06(27.0)	0.50(12.7)	0.75(19.1)	1.45(36.8)	
3/4	1/2	-LM-FL12-NS8	1.57(39.9)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.47(11.9)	0.75(19.1)	1.45(36.8)	
3/4	3/4	-LM-FL12-NS12	1.57(39.9)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.62(15.7)	0.75(19.1)	1.45(36.8)	
7/8	3/4	-LM-FL14-NS12	1.76(44.7)	1.02(25.9)	1.25(31.8)	1.37(34.9)	0.62(15.7)	0.75(19.1)	1.64(41.7)	
1	3/4	-LM-FL16-NS12	1.93(49.0)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.62(15.7)	0.75(19.1)	1.64(41.7)	
1	1	-LM-FL16-NS16	1.93(49.0)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.88(22.4)	0.94(23.9)	1.83(46.5)	
1 1/4	1 1/4	-LM-FL20-NS20	2.62(66.5)	1.62(41.1)	1.87(47.6)	1.69(42.9)	1.09(27.7)	0.94(23.9)	2.06(52.4)	
1 1/2	1 1/2	-LM-FL24-NS24	3.07(78.0)	1.97(50.0)	2.25(57.2)	2.00(50.8)	1.34(34.0)	1.03(26.2)	2.38(60.5)	

Fractional Tube			ISO Tapered Thread (RT)							
T-Tube O.D. (in.)	P-RT Size	Basic Ordering Number	Dimensions, in. (mm)							
			L	C	G	F	E	B	Lx	
1/8	1/8	-LM-FL2-RT2	0.93(23.6)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.09(2.4)	0.38(9.7)	0.87(22.2)	
1/8	1/4	-LM-FL2-RT4	0.97(24.6)	0.50(12.7)	0.44(11.1)	0.50(12.7)	0.09(2.4)	0.56(14.2)	0.92(23.4)	
1/4	1/8	-LM-FL4-RT2	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)	0.38(9.7)	0.74(18.8)	
1/4	1/4	-LM-FL4-RT4	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)	0.56(14.2)	0.92(23.4)	
1/4	3/8	-LM-FL4-RT6	1.17(29.7)	0.60(15.2)	0.56(14.3)	0.69(17.5)	0.19(4.8)	0.56(14.2)	1.03(26.2)	
1/4	1/2	-LM-FL4-RT8	1.25(31.8)	0.60(15.2)	0.56(14.3)	0.81(20.6)	0.19(4.8)	0.75(19.1)	1.30(33.0)	
5/16	1/4	-LM-FL5-RT4	1.13(28.7)	0.64(16.3)	0.63(15.9)	0.56(14.3)	0.25(6.4)	0.56(14.2)	0.96(24.4)	
3/8	1/8	-LM-FL6-RT2	1.20(30.5)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.19(4.8)	0.38(9.7)	0.82(20.8)	
3/8	1/4	-LM-FL6-RT4	1.20(30.5)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.28(7.1)	0.56(14.2)	1.00(25.4)	
3/8	3/8	-LM-FL6-RT6	1.23(31.2)	0.66(16.8)	0.69(17.5)	0.69(17.5)	0.28(7.1)	0.56(14.2)	1.03(26.2)	
1/2	3/8	-LM-FL8-RT6	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.38(9.7)	0.56(14.2)	1.11(28.2)	
1/2	1/2	-LM-FL8-RT8	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)	0.75(19.1)	1.30(33.0)	
3/4	1/2	-LM-FL12-RT8	1.57(39.9)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.37(9.5)	0.75(19.1)	1.45(36.8)	
1	1	-LM-FL16-RT16	1.93(49.0)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.88(22.4)	0.94(23.9)	1.83(46.5)	

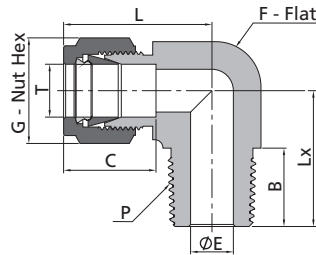
## Male Elbows



Metric Tube			NPT Thread							
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)							
			L	C	G	F	E	B	Lx	
3	1/8	-LM-ML3-NS2	23.6(0.93)	12.9(0.51)	12.0(0.47)	11.1(0.44)	2.4(0.09)	9.7(0.38)	17.8(0.70)	
3	1/4	-LM-ML3-NS4	24.6(0.97)	12.9(0.51)	12.0(0.47)	12.7(0.50)	2.4(0.09)	14.2(0.56)	23.4(0.92)	
4	1/8	-LM-ML4-NS2	25.4(1.00)	13.7(0.54)	12.0(0.47)	12.7(0.50)	2.4(0.09)	9.7(0.38)	18.8(0.74)	
4	1/4	-LM-ML4-NS4	25.4(1.00)	13.7(0.54)	12.0(0.47)	12.7(0.50)	2.4(0.09)	14.2(0.56)	23.4(0.92)	
6	1/8	-LM-ML6-NS2	27.0(1.06)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.8(0.19)	9.7(0.38)	18.8(0.74)	
6	1/4	-LM-ML6-NS4	27.0(1.06)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.8(0.19)	14.2(0.56)	23.4(0.92)	
6	3/8	-LM-ML6-NS6	29.8(1.17)	15.3(0.60)	14.0(0.55)	17.5(0.69)	4.8(0.19)	14.2(0.56)	26.2(1.03)	
6	1/2	-LM-ML6-NS8	31.8(1.25)	15.3(0.60)	14.0(0.55)	20.6(0.81)	4.8(0.19)	19.1(0.75)	33.0(1.30)	
8	1/8	-LM-ML8-NS2	28.8(1.13)	16.2(0.64)	16.0(0.63)	14.3(0.56)	4.8(0.19)	9.7(0.38)	19.8(0.78)	
8	1/4	-LM-ML8-NS4	28.8(1.13)	16.2(0.64)	16.0(0.63)	14.3(0.56)	6.4(0.25)	14.2(0.56)	24.4(0.96)	
8	3/8	-LM-ML8-NS6	30.6(1.20)	16.2(0.64)	16.0(0.63)	17.5(0.69)	6.4(0.25)	14.2(0.56)	26.2(1.03)	
8	1/2	-LM-ML8-NS8	32.6(1.28)	16.2(0.64)	16.0(0.63)	20.6(0.81)	6.4(0.25)	19.1(0.75)	33.0(1.30)	
10	1/8	-LM-ML10-NS2	31.5(1.24)	17.2(0.68)	19.0(0.75)	17.5(0.69)	4.8(0.19)	9.7(0.38)	21.6(0.85)	
10	1/4	-LM-ML10-NS4	31.5(1.24)	17.2(0.68)	19.0(0.75)	17.5(0.69)	7.1(0.28)	14.2(0.56)	26.2(1.03)	
10	3/8	-LM-ML10-NS6	31.5(1.24)	17.2(0.68)	19.0(0.75)	17.5(0.69)	7.9(0.31)	14.2(0.56)	26.2(1.03)	
10	1/2	-LM-ML10-NS8	33.5(1.32)	17.2(0.68)	19.0(0.75)	20.6(0.81)	7.9(0.31)	19.1(0.75)	33.0(1.30)	
12	1/8	-LM-ML12-NS2	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	4.8(0.19)	9.7(0.38)	23.6(0.93)	
12	1/4	-LM-ML12-NS4	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	7.1(0.28)	14.2(0.56)	28.2(1.11)	
12	3/8	-LM-ML12-NS6	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)	14.2(0.56)	28.2(1.11)	
12	1/2	-LM-ML12-NS8	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)	19.1(0.75)	33.0(1.30)	
12	3/4	-LM-ML12-NS12	39.8(1.57)	22.8(0.90)	22.0(0.87)	27.0(1.06)	9.5(0.37)	19.1(0.75)	36.8(1.45)	
15	1/2	-LM-ML15-NS8	38.0(1.50)	24.4(0.96)	25.0(0.98)	23.8(0.94)	11.9(0.47)	19.1(0.75)	35.1(1.38)	
16	1/4	-LM-ML16-NS4	38.0(1.50)	24.4(0.96)	25.0(0.98)	23.8(0.94)	7.1(0.28)	14.2(0.56)	30.2(1.19)	
16	3/8	-LM-ML16-NS6	38.0(1.50)	24.4(0.96)	25.0(0.98)	23.8(0.94)	9.5(0.37)	14.2(0.56)	30.2(1.19)	
16	1/2	-LM-ML16-NS8	38.0(1.50)	24.4(0.96)	25.0(0.98)	23.8(0.94)	11.9(0.47)	19.1(0.75)	35.1(1.38)	
16	3/4	-LM-ML16-NS12	39.8(1.57)	24.4(0.96)	25.0(0.98)	27.0(1.06)	12.7(0.50)	19.1(0.75)	36.8(1.45)	
18	1/2	-LM-ML18-NS8	39.8(1.57)	24.4(0.96)	30.0(1.18)	27.0(1.06)	11.9(0.47)	19.1(0.75)	36.8(1.45)	
18	3/4	-LM-ML18-NS12	39.8(1.57)	24.4(0.96)	30.0(1.18)	27.0(1.06)	15.1(0.59)	19.1(0.75)	36.8(1.45)	
20	1/2	-LM-ML20-NS8	44.6(1.76)	26.0(1.02)	32.0(1.26)	34.9(1.37)	11.9(0.47)	19.1(0.75)	41.7(1.64)	
20	3/4	-LM-ML20-NS12	44.6(1.76)	26.0(1.02)	32.0(1.26)	34.9(1.37)	15.9(0.63)	19.1(0.75)	41.7(1.64)	
22	3/4	-LM-ML22-NS12	44.6(1.76)	26.0(1.02)	32.0(1.26)	34.9(1.37)	15.9(0.63)	19.1(0.75)	41.7(1.64)	
22	1	-LM-ML22-NS16	44.6(1.76)	26.0(1.02)	32.0(1.26)	34.9(1.37)	18.3(0.72)	23.9(0.94)	46.5(1.83)	
25	3/4	-LM-ML25-NS12	49.1(1.93)	31.3(1.23)	38.0(1.50)	34.9(1.37)	15.9(0.63)	19.1(0.75)	41.7(1.64)	
25	1	-LM-ML25-NS16	49.1(1.93)	31.3(1.23)	38.0(1.50)	34.9(1.37)	21.8(0.86)	23.9(0.94)	46.5(1.83)	
30	1 1/4	-LM-ML30-NS20	69.9(2.75)	39.6(1.56)	50.0(1.97)	42.9(1.69)	26.2(1.03)	23.9(0.94)	53.1(2.09)	
32	1 1/4	-LM-ML32-NS20	72.3(2.85)	42.0(1.65)	50.0(1.97)	42.9(1.69)	27.8(1.09)	23.9(0.94)	53.1(2.09)	
38	1 1/2	-LM-ML38-NS24	84.0(3.31)	49.4(1.94)	60.0(2.36)	50.8(2.00)	33.7(1.33)	26.2(1.03)	60.4(2.38)	

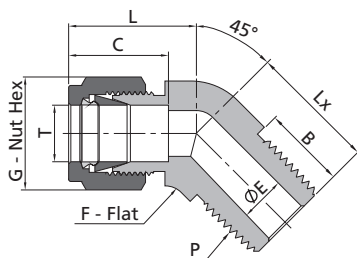
Male Elbows

Tube Fittings



Metric Tube			ISO Tapered Thread (RT)						
T-Tube O.D. (mm)	P-RT Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	C	G	F	E	B	Lx
3	1/8	-LM-ML3-RT2	23.6(0.93)	12.9(0.51)	12.0(0.47)	11.1(0.44)	2.4(0.09)	9.7(0.38)	17.8(0.70)
3	1/4	-LM-ML3-RT4	24.6(0.97)	12.9(0.51)	12.0(0.47)	12.7(0.50)	2.4(0.09)	14.2(0.56)	23.4(0.92)
4	1/8	-LM-ML4-RT2	25.4(1.00)	13.7(0.54)	12.0(0.47)	12.7(0.50)	2.4(0.09)	9.7(0.38)	18.8(0.74)
4	1/4	-LM-ML4-RT4	25.4(1.00)	13.7(0.54)	12.0(0.47)	12.7(0.50)	2.4(0.09)	14.2(0.56)	23.4(0.92)
6	1/8	-LM-ML6-RT2	27.0(1.06)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.8(0.19)	9.7(0.38)	18.8(0.74)
6	1/4	-LM-ML6-RT4	27.0(1.06)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.8(0.19)	14.2(0.56)	23.4(0.92)
6	3/8	-LM-ML6-RT6	29.8(1.17)	15.3(0.60)	14.0(0.55)	17.5(0.69)	4.8(0.19)	14.2(0.56)	26.2(1.03)
6	1/2	-LM-ML6-RT8	31.8(1.25)	15.3(0.60)	14.0(0.55)	20.6(0.81)	4.8(0.19)	19.1(0.75)	33.0(1.30)
8	1/8	-LM-ML8-RT2	28.8(1.13)	16.2(0.64)	16.0(0.63)	14.3(0.56)	4.8(0.19)	9.7(0.38)	19.8(0.78)
8	1/4	-LM-ML8-RT4	28.8(1.13)	16.2(0.64)	16.0(0.63)	14.3(0.56)	6.4(0.25)	14.2(0.56)	24.4(0.96)
8	3/8	-LM-ML8-RT6	30.6(1.20)	16.2(0.64)	16.0(0.63)	17.5(0.69)	6.4(0.25)	14.2(0.56)	26.2(1.03)
8	1/2	-LM-ML8-RT8	32.6(1.28)	16.2(0.64)	16.0(0.63)	20.6(0.81)	6.4(0.25)	19.1(0.75)	33.0(1.30)
10	1/8	-LM-ML10-RT2	31.5(1.24)	17.2(0.68)	19.0(0.75)	17.5(0.69)	4.8(0.19)	9.7(0.38)	21.6(0.85)
10	1/4	-LM-ML10-RT4	31.5(1.24)	17.2(0.68)	19.0(0.75)	17.5(0.69)	7.1(0.28)	14.2(0.56)	26.2(1.03)
10	3/8	-LM-ML10-RT6	31.5(1.24)	17.2(0.68)	19.0(0.75)	17.5(0.69)	7.9(0.31)	14.2(0.56)	26.2(1.03)
10	1/2	-LM-ML10-RT8	33.5(1.32)	17.2(0.68)	19.0(0.75)	20.6(0.81)	7.9(0.31)	19.1(0.75)	33.0(1.30)
12	1/8	-LM-ML12-RT2	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	4.8(0.19)	9.7(0.38)	23.6(0.93)
12	1/4	-LM-ML12-RT4	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	7.1(0.28)	14.2(0.56)	28.2(1.11)
12	3/8	-LM-ML12-RT6	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)	14.2(0.56)	28.2(1.11)
12	1/2	-LM-ML12-RT8	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)	19.1(0.75)	33.0(1.30)
12	3/4	-LM-ML12-RT12	39.8(1.57)	22.8(0.90)	22.0(0.87)	27.0(1.06)	9.5(0.37)	19.1(0.75)	36.8(1.45)
14	1/2	-LM-ML14-RT8	38.1(1.50)	24.4(0.96)	25.0(0.98)	23.8(0.94)	11.1(0.44)	19.1(0.75)	35.1(1.38)
15	1/2	-LM-ML15-RT8	38.1(1.50)	24.4(0.96)	25.0(0.98)	23.8(0.94)	11.9(0.47)	19.1(0.75)	35.1(1.38)
16	1/4	-LM-ML16-RT4	38.0(1.50)	24.4(0.96)	25.0(0.98)	23.8(0.94)	7.1(0.28)	14.2(0.56)	30.2(1.19)
16	3/8	-LM-ML16-RT6	38.0(1.50)	24.4(0.96)	25.0(0.98)	23.8(0.94)	9.5(0.37)	14.2(0.56)	30.2(1.19)
16	1/2	-LM-ML16-RT8	38.0(1.50)	24.4(0.96)	25.0(0.98)	23.8(0.94)	11.9(0.47)	19.1(0.75)	35.1(1.38)
16	3/4	-LM-ML16-RT12	39.8(1.57)	24.4(0.96)	25.0(0.98)	27.0(1.06)	12.7(0.50)	19.1(0.75)	36.8(1.45)
18	1/2	-LM-ML18-RT8	39.8(1.57)	24.4(0.96)	30.0(1.18)	27.0(1.06)	11.9(0.47)	19.1(0.75)	36.8(1.45)
18	3/4	-LM-ML18-RT12	39.8(1.57)	24.4(0.96)	30.0(1.18)	27.0(1.06)	15.1(0.59)	19.1(0.75)	36.8(1.45)
20	1/2	-LM-ML20-RT8	44.6(1.76)	26.0(1.02)	32.0(1.26)	34.9(1.37)	11.9(0.47)	19.1(0.75)	41.7(1.64)
20	3/4	-LM-ML20-RT12	44.6(1.76)	26.0(1.02)	32.0(1.26)	34.9(1.37)	15.9(0.63)	19.1(0.75)	41.7(1.64)
22	3/4	-LM-ML22-RT12	44.6(1.76)	26.0(1.02)	32.0(1.26)	34.9(1.37)	15.9(0.63)	19.1(0.75)	41.7(1.64)
22	1	-LM-ML22-RT16	44.6(1.76)	26.0(1.02)	32.0(1.26)	34.9(1.37)	18.3(0.72)	23.9(0.94)	46.5(1.83)
25	3/4	-LM-ML25-RT12	49.1(1.93)	31.3(0.90)	38.0(1.50)	34.9(1.37)	15.9(0.63)	19.1(0.75)	41.7(1.64)
25	1	-LM-ML25-RT16	49.1(1.93)	31.3(0.90)	38.0(1.50)	34.9(1.37)	21.8(0.86)	23.9(0.94)	46.5(1.83)
28	1	-LM-ML28-RT16	64.0(2.52)	36.6(0.90)	46.0(1.81)	42.9(1.69)	21.8(0.86)	23.9(0.94)	53.1(2.09)

## 45° Male Elbows



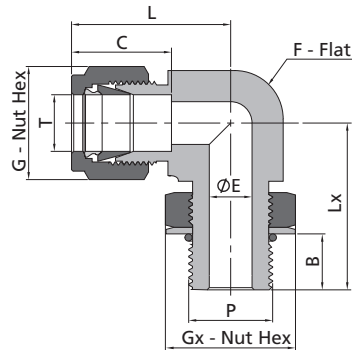
Fractional Tube			NPT Thread						
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	C	G	F	E	B	Lx
1/16	1/16	-VM-FL1-NS1	0.82(20.8)	0.34(8.6)	0.31(7.9)	0.44(11.1)	0.05(1.3)	0.38(9.7)	0.66(16.8)
1/8	1/8	-VM-FL2-NS2	0.82(20.8)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.09(2.3)	0.38(9.7)	0.66(16.8)
3/16	1/8	-VM-FL3-NS2	0.85(21.6)	0.54(13.7)	0.50(12.7)	0.44(11.1)	0.12(3.0)	0.38(9.7)	0.58(14.7)
1/4	1/8	-VM-FL4-NS2	0.97(24.6)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)	0.38(9.7)	0.65(16.5)
1/4	1/4	-VM-FL4-NS4	0.97(24.6)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)	0.56(14.2)	0.83(21.1)
5/16	1/8	-VM-FL5-NS2	0.94(24.0)	0.64(16.3)	0.63(15.9)	0.56(14.3)	0.19(4.8)	0.38(9.7)	0.66(16.8)
3/8	1/8	-VM-FL6-NS2	1.10(27.9)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.19(4.8)	0.38(9.7)	0.72(18.3)
3/8	1/4	-VM-FL6-NS4	1.10(27.9)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.28(7.1)	0.56(14.2)	0.90(22.9)
3/8	3/8	-VM-FL6-NS6	1.15(29.2)	0.66(16.8)	0.69(17.5)	0.81(20.6)	0.28(7.1)	0.56(14.2)	0.95(24.1)
1/2	3/8	-VM-FL8-NS6	1.26(32.0)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.38(9.7)	0.56(14.2)	0.95(24.1)
5/8	1/2	-VM-FL10-NS8	1.21(30.7)	0.96(24.4)	1.00(25.4)	0.94(23.8)	0.47(11.9)	0.56(14.2)	1.17(29.7)
3/4	3/4	-VM-FL12-NS12	1.34(34.0)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.62(15.7)	0.75(19.1)	1.22(31.0)
7/8	3/4	-VM-FL14-NS12	1.59(40.4)	1.02(25.9)	1.25(31.8)	1.25(31.8)	0.62(15.7)	0.75(19.1)	1.27(32.3)
1	1	-VM-FL16-NS16	1.59(40.4)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.88(22.4)	0.94(23.9)	1.49(37.8)

Metric Tube			NPT Thread						
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	C	G	F	E	B	Lx
6	1/8	-VM-ML6-NS2	23.4(0.92)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.8(0.19)	9.7(0.38)	16.8(0.66)
6	1/4	-VM-ML6-NS4	23.4(0.92)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.8(0.19)	14.2(0.56)	21.8(0.86)
8	1/8	-VM-ML8-NS2	24.3(0.96)	16.2(0.64)	16.0(0.63)	15.9(0.63)	4.8(0.19)	9.7(0.38)	16.8(0.66)
10	1/4	-VM-ML10-NS4	26.6(1.05)	17.2(0.68)	19.0(0.75)	17.5(0.69)	7.9(0.31)	14.2(0.56)	24.1(0.95)
12	3/8	-VM-ML12-NS6	29.1(1.15)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)	14.2(0.56)	24.1(0.95)
12	1/2	-VM-ML12-NS8	30.7(1.21)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)	19.1(0.75)	29.7(1.17)
16	1/2	-VM-ML16-NS8	30.7(1.21)	24.4(0.96)	25.0(0.98)	23.8(0.94)	11.9(0.47)	19.1(0.75)	29.7(1.17)

Adjustable Male Elbows

SAE/MS Straight Thread

Adapt to straight thread boss of SAE J1926-1, ISO 11926-1 and MS 16142.

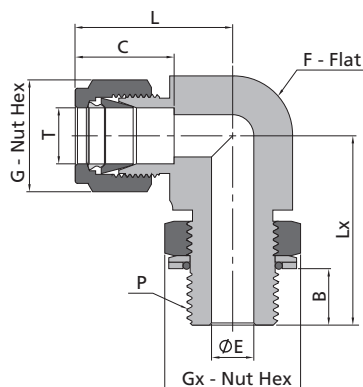


Fractional Tube			SAE/MS Straight Thread								
T-Tube O.D. (in.)	P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)								
			L	B	C	G	E	F	Lx	Gx	
1/4	7/16-20	-LP-FL4-ST7	1.12(28.4)	0.39(9.9)	0.60(15.2)	0.56(14.3)	0.19(4.8)	0.50(12.7)	1.06(27.0)	0.56(14.3)	
1/4	9/16-18	-LP-FL4-ST9	1.20(30.5)	0.44(11.2)	0.60(15.2)	0.56(14.3)	0.19(4.8)	0.63(15.9)	1.27(32.3)	0.69(17.5)	
5/16	1/2-20	-LP-FL5-ST8	1.19(30.2)	0.39(9.9)	0.64(16.3)	0.63(15.9)	0.23(5.8)	0.56(14.3)	1.16(29.5)	0.63(15.9)	
3/8	7/16-20	-LP-FL6-ST7	1.31(33.3)	0.39(9.9)	0.66(16.8)	0.69(17.5)	0.20(5.1)	0.63(15.9)	1.24(31.5)	0.56(14.3)	
3/8	9/16-18	-LP-FL6-ST9	1.26(32.0)	0.44(11.2)	0.66(16.8)	0.69(17.5)	0.28(7.1)	0.63(15.9)	1.27(32.3)	0.69(17.5)	
3/8	3/4-16	-LP-FL6-ST12	1.37(34.8)	0.50(12.7)	0.66(16.8)	0.69(17.5)	0.28(7.1)	0.81(20.6)	1.49(37.8)	0.87(22.2)	
1/2	9/16-18	-LP-FL8-ST9	1.48(37.6)	0.44(11.2)	0.90(22.9)	0.87(22.2)	0.28(7.1)	0.81(20.6)	1.48(37.5)	0.69(17.5)	
1/2	3/4-16	-LP-FL8-ST12	1.48(37.6)	0.50(12.7)	0.90(22.9)	0.87(22.2)	0.41(10.4)	0.81(20.6)	1.49(37.8)	0.87(22.2)	
5/8	7/8-14	-LP-FL10-ST14	1.56(39.6)	0.56(14.2)	0.96(24.4)	1.00(25.4)	0.50(12.7)	0.94(23.8)	1.71(43.4)	1.00(25.4)	
3/4	1 1/16-12	-LP-FL12-ST17	1.63(41.4)	0.66(16.8)	0.96(24.4)	1.13(28.6)	0.62(15.7)	1.06(27.0)	1.92(48.8)	1.25(31.8)	
7/8	1 3/16-12	-LP-FL14-ST19	1.70(43.2)	0.66(16.8)	1.02(25.9)	1.25(31.8)	0.72(18.3)	1.25(31.8)	1.99(50.5)	1.37(34.9)	
1	1 5/16-12	-LP-FL16-ST21	1.99(50.5)	0.66(16.8)	1.23(31.2)	1.50(38.1)	0.88(22.4)	1.37(34.9)	2.11(53.6)	1.50(38.1)	
1 1/4	1 5/8-12	-LP-FL20-ST26	2.67(67.8)	0.66(16.8)	1.62(41.1)	1.87(47.6)	1.09(27.7)	1.69(42.9)	2.29(58.2)	1.87(47.6)	
1 1/2	1 7/8-12	-LP-FL24-ST30	3.07(78.0)	0.66(16.8)	1.97(50.0)	2.25(57.2)	1.34(34.0)	2.00(50.8)	2.38(60.5)	2.13(54.0)	



## Adjustable Male Elbows

## ISO Parallel Thread



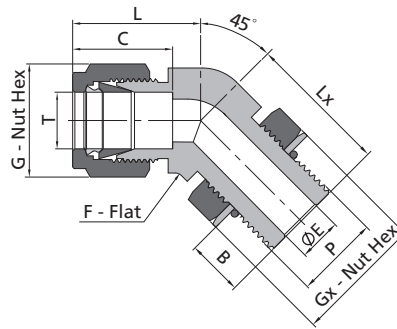
Fractional Tube			ISO Parallel Thread (PP)							
T-Tube O.D. (in.)	P-ISO Parallel Thread Size	Basic Ordering Number	Dimensions, in. (mm)							
			L	B	C	G	E	F	Lx	Gx
1/4	1/8	-LP-FL4-PP2	1.06(26.9)	0.26(6.6)	0.60(15.2)	0.56(14.3)	0.16(4.1)	0.50(12.7)	1.04(26.4)	0.56(14.3)
1/4	1/4	-LP-FL4-PP4	1.14(29.0)	0.35(9.0)	0.60(15.2)	0.56(14.3)	0.19(4.8)	0.63(15.9)	1.27(32.3)	0.75(19.1)
3/8	1/4	-LP-FL6-PP4	1.20(30.5)	0.35(9.0)	0.66(16.8)	0.69(17.5)	0.23(5.8)	0.63(15.9)	1.27(32.3)	0.75(19.1)
3/8	3/8	-LP-FL6-PP6	1.31(33.3)	0.37(9.4)	0.66(16.8)	0.69(17.5)	0.28(7.1)	0.81(20.6)	1.46(37.1)	0.87(22.2)
1/2	1/4	-LP-FL8-PP4	1.42(36.1)	0.35(9.0)	0.90(22.9)	0.87(22.2)	0.23(5.8)	0.81(20.6)	1.38(35.1)	0.75(19.1)
1/2	3/8	-LP-FL8-PP6	1.42(36.1)	0.37(9.4)	0.90(22.9)	0.87(22.2)	0.31(7.9)	0.81(20.6)	1.46(37.1)	0.87(22.2)
1/2	1/2	-LP-FL8-PP8	1.50(38.1)	0.51(13.0)	0.90(22.9)	0.87(22.2)	0.41(10.4)	0.94(23.8)	1.71(43.4)	1.06(27.0)
5/8	1/2	-LP-FL10-PP8	1.50(38.1)	0.51(13.0)	0.96(24.4)	1.00(25.4)	0.47(11.9)	0.94(23.8)	1.71(43.4)	1.06(27.0)
3/4	1/2	-LP-FL12-PP8	1.57(39.9)	0.51(13.0)	0.96(24.4)	1.13(28.6)	0.47(11.9)	1.06(27.0)	1.78(45.2)	1.06(27.0)
3/4	3/4	-LP-FL12-PP12	1.57(39.9)	0.51(13.0)	0.96(24.4)	1.13(28.6)	0.62(15.7)	1.06(27.0)	1.92(48.8)	1.37(34.9)
1	3/4	-LP-FL16-PP12	1.93(49.0)	0.51(13.0)	1.23(31.2)	1.50(38.1)	0.62(15.7)	1.37(34.9)	2.10(53.3)	1.37(34.9)
1	1	-LP-FL16-PP16	1.93(49.0)	0.52(13.2)	1.23(31.2)	1.50(38.1)	0.78(19.8)	1.37(34.9)	2.11(53.6)	1.63(41.3)

Metric Tube			ISO Parallel Thread (PP)							
T-Tube O.D. (mm)	P-ISO Parallel Thread Size	Basic Ordering Number	Dimensions, mm (in.)							
			L	B	C	G	E	F	Lx	Gx
6	1/8	-LP-ML6-PP2	27.0(1.06)	6.6(0.26)	15.3(0.60)	14.0(0.55)	4.0(0.16)	12.7(0.50)	26.4(1.04)	14.3(0.56)
6	1/4	-LP-ML6-PP4	29.0(1.14)	9.0(0.35)	15.3(0.60)	14.0(0.55)	4.8(0.19)	15.9(0.63)	32.3(1.27)	19.1(0.75)
8	1/8	-LP-ML8-PP2	28.8(1.13)	6.6(0.26)	16.2(0.64)	16.0(0.63)	4.0(0.16)	14.3(0.56)	27.4(1.08)	14.3(0.56)
8	1/4	-LP-ML8-PP4	29.9(1.18)	9.0(0.35)	16.2(0.64)	16.0(0.63)	5.9(0.23)	15.9(0.63)	32.2(1.27)	19.1(0.75)
10	1/4	-LP-ML10-PP4	33.5(1.32)	9.0(0.35)	17.2(0.68)	19.0(0.75)	5.9(0.23)	20.6(0.81)	35.0(1.38)	19.1(0.75)
10	3/8	-LP-ML10-PP6	33.5(1.32)	9.4(0.37)	17.2(0.68)	19.0(0.75)	7.9(0.31)	20.6(0.81)	37.1(1.46)	22.2(0.87)
12	1/4	-LP-ML12-PP4	36.0(1.42)	9.0(0.35)	22.8(0.90)	22.0(0.87)	5.9(0.23)	20.6(0.81)	35.0(1.38)	19.1(0.75)
12	3/8	-LP-ML12-PP6	36.0(1.42)	9.4(0.37)	22.8(0.90)	22.0(0.87)	7.9(0.31)	20.6(0.81)	37.1(1.46)	22.2(0.87)
12	1/2	-LP-ML12-PP8	38.0(1.50)	13.0(0.51)	22.8(0.90)	22.0(0.87)	9.5(0.37)	23.8(0.94)	43.4(1.71)	27.0(1.06)
12	3/4	-LP-ML12-PP12	39.8(1.57)	13.0(0.51)	22.8(0.90)	22.0(0.87)	9.5(0.37)	27.0(1.06)	48.8(1.92)	34.9(1.37)

45° Adjustable Male Elbows

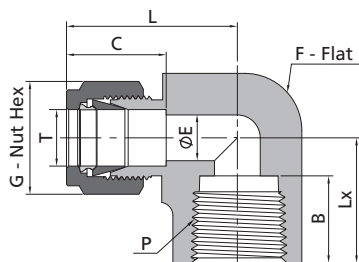
SAE/MS Straight Thread

Adapt to straight thread boss of SAE J1926-1, ISO 11926-1 and MS 16142.



Fractional Tube			SAE/MS Straight Thread							
T-Tube O.D. (in.)	P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)							
			L	B	C	G	E	F	Lx	Gx
1/4	7/16-20	-VP-FL4-ST7	1.01(25.7)	0.39(9.9)	0.60(15.2)	0.56(14.3)	0.19(4.8)	0.50(12.7)	1.01(25.7)	0.56(14.3)
3/8	9/16-18	-VP-FL6-ST9	1.10(27.9)	0.44(11.2)	0.66(16.8)	0.69(17.5)	0.28(7.1)	0.63(15.9)	1.11(28.2)	0.69(17.5)
1/2	3/4-16	-VP-FL8-ST12	1.26(32.0)	0.50(12.7)	0.90(22.9)	0.87(22.2)	0.41(10.4)	0.81(20.6)	1.27(32.3)	0.87(22.2)
3/4	1 1/16-12	-VP-FL12-ST17	1.57(39.9)	0.66(16.8)	0.96(24.4)	1.13(28.6)	0.62(15.7)	1.06(27.0)	1.86(47.2)	1.25(31.8)
1	1 5/16-12	-VP-FL16-ST21	1.87(47.5)	0.66(16.8)	1.23(31.2)	1.50(38.1)	0.88(22.4)	1.37(34.9)	1.99(50.5)	1.50(38.1)

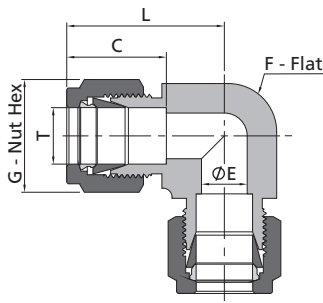
## Female Elbows



Fractional Tube			NPT Thread						
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	B	C	G	E	F	Lx
1/16	1/16	-LF-FL1-NS1	0.71(18.0)	0.39(9.9)	0.34(8.6)	0.31(7.9)	0.05(1.3)	0.44(11.1)	0.56(14.2)
1/16	1/8	-LF-FL1-NS2	0.81(20.6)	0.41(10.4)	0.34(8.6)	0.31(7.9)	0.05(1.3)	0.56(14.3)	0.75(19.1)
1/8	1/8	-LF-FL2-NS2	0.97(24.6)	0.41(10.4)	0.50(12.7)	0.44(11.1)	0.09(2.3)	0.50(12.7)	0.75(19.1)
1/8	1/4	-LF-FL2-NS4	1.08(27.4)	0.59(15.0)	0.50(12.7)	0.44(11.1)	0.09(2.3)	0.69(17.5)	0.88(22.4)
3/16	1/8	-LF-FL3-NS2	1.00(25.4)	0.41(10.4)	0.54(13.7)	0.50(12.7)	0.12(3.0)	0.5(12.7)	0.75(19.1)
1/4	1/8	-LF-FL4-NS2	1.06(26.9)	0.41(10.4)	0.60(15.2)	0.56(14.3)	0.19(4.8)	0.50(12.7)	0.75(19.1)
1/4	1/4	-LF-FL4-NS4	1.17(29.7)	0.59(15.0)	0.60(15.2)	0.56(14.3)	0.19(4.8)	0.69(17.5)	0.88(22.4)
1/4	3/8	-LF-FL4-NS6	1.25(31.8)	0.59(15.0)	0.60(15.2)	0.56(14.3)	0.19(4.8)	0.81(20.6)	0.88(22.4)
1/4	1/2	-LF-FL4-NS8	1.36(34.5)	0.78(19.8)	0.60(15.2)	0.56(14.3)	0.19(4.8)	1.00(25.4)	1.12(28.4)
5/16	1/8	-LF-FL5-NS2	1.13(28.7)	0.41(10.4)	0.64(16.3)	0.63(15.9)	0.25(6.4)	0.56(14.3)	0.75(19.1)
5/16	1/4	-LF-FL5-NS4	1.20(30.5)	0.59(15.0)	0.64(16.3)	0.63(15.9)	0.25(6.4)	0.69(17.5)	0.88(22.4)
3/8	1/8	-LF-FL6-NS2	1.20(30.5)	0.41(10.4)	0.66(16.8)	0.69(17.5)	0.28(7.1)	0.63(15.9)	0.75(19.1)
3/8	1/4	-LF-FL6-NS4	1.23(31.2)	0.59(15.0)	0.66(16.8)	0.69(17.5)	0.28(7.1)	0.69(17.5)	0.88(22.4)
3/8	3/8	-LF-FL6-NS6	1.31(33.3)	0.59(15.0)	0.66(16.8)	0.69(17.5)	0.28(7.1)	0.81(20.6)	0.88(22.4)
3/8	1/2	-LF-FL6-NS8	1.42(36.1)	0.78(19.8)	0.66(16.8)	0.69(17.5)	0.28(7.1)	1.00(25.4)	1.12(28.4)
1/2	1/4	-LF-FL8-NS4	1.42(36.1)	0.59(15.0)	0.90(22.9)	0.87(22.2)	0.41(10.4)	0.81(20.6)	0.88(22.4)
1/2	3/8	-LF-FL8-NS6	1.42(36.1)	0.59(15.0)	0.90(22.9)	0.87(22.2)	0.41(10.4)	0.81(20.6)	0.88(22.4)
1/2	1/2	-LF-FL8-NS8	1.53(38.9)	0.78(19.8)	0.90(22.9)	0.87(22.2)	0.41(10.4)	1.00(25.4)	1.12(28.4)
5/8	3/8	-LF-FL10-NS6	1.50(38.1)	0.59(15.0)	0.96(24.4)	1.00(25.4)	0.50(12.7)	0.94(23.8)	0.88(22.4)
5/8	1/2	-LF-FL10-NS8	1.57(39.9)	0.78(19.8)	0.96(24.4)	1.00(25.4)	0.50(12.7)	1.06(27.0)	1.12(28.4)
3/4	1/2	-LF-FL12-NS8	1.57(39.9)	0.78(19.8)	0.96(24.4)	1.13(28.6)	0.62(15.7)	1.06(27.0)	1.12(28.4)
3/4	3/4	-LF-FL12-NS12	1.76(44.7)	0.81(20.6)	0.96(24.4)	1.13(28.6)	0.62(15.7)	1.37(34.9)	1.25(31.8)
7/8	3/4	-LF-FL14-NS12	1.76(44.7)	0.81(20.6)	1.02(25.9)	1.25(31.8)	0.72(18.3)	1.37(34.9)	1.25(31.8)
1	3/4	-LF-FL16-NS12	1.93(49.0)	0.81(20.6)	1.23(31.2)	1.50(38.1)	0.88(22.4)	1.37(34.9)	1.25(31.8)
1	1	-LF-FL16-NS16	2.11(53.6)	1.06(26.9)	1.23(31.2)	1.50(38.1)	0.88(22.4)	1.69(42.9)	1.50(38.1)

Metric Tube			NPT Thread						
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	B	C	G	E	F	Lx
6	1/8	-LF-ML6-NS2	27.0(1.06)	10.4(0.41)	15.3(0.60)	14.0(0.55)	4.8(0.19)	12.7(0.50)	19.0(0.75)
6	1/4	-LF-ML6-NS4	29.8(1.17)	15.0(0.59)	15.3(0.60)	14.0(0.55)	4.8(0.19)	17.5(0.69)	22.4(0.88)
8	1/8	-LF-ML8-NS2	28.8(1.13)	10.4(0.41)	16.2(0.64)	16.0(0.63)	6.4(0.25)	14.3(0.56)	19.1(0.75)
8	1/4	-LF-ML8-NS4	30.6(1.20)	15.0(0.59)	16.2(0.64)	16.0(0.63)	6.4(0.25)	17.5(0.69)	22.4(0.88)
10	1/4	-LF-ML10-NS4	33.5(1.32)	15.0(0.59)	17.2(0.68)	19.0(0.75)	7.9(0.31)	20.6(0.81)	22.4(0.88)
10	3/8	-LF-ML10-NS6	33.5(1.32)	15.0(0.59)	17.2(0.68)	19.0(0.75)	7.9(0.31)	20.6(0.81)	22.4(0.88)
10	1/2	-LF-ML10-NS8	36.6(1.44)	19.8(0.78)	17.2(0.68)	19.0(0.75)	7.9(0.31)	25.4(1.00)	28.5(1.12)
12	1/4	-LF-ML12-NS4	36.0(1.42)	15.0(0.59)	22.8(0.90)	22.0(0.87)	9.5(0.37)	20.6(0.81)	22.4(0.88)
12	3/8	-LF-ML12-NS6	36.0(1.42)	15.0(0.59)	22.8(0.90)	22.0(0.87)	9.5(0.37)	20.6(0.81)	22.4(0.88)
12	1/2	-LF-ML12-NS8	38.8(1.53)	19.8(0.78)	22.8(0.90)	22.0(0.87)	9.5(0.37)	25.4(1.00)	28.4(1.12)
16	3/8	-LF-ML16-NS6	39.5(1.56)	15.0(0.59)	24.4(0.96)	25.0(0.98)	12.7(0.50)	27.0(1.06)	23.6(0.93)
16	1/2	-LF-ML16-NS8	39.5(1.56)	19.8(0.78)	24.4(0.96)	25.0(0.98)	12.7(0.50)	27.0(1.06)	28.5(1.12)

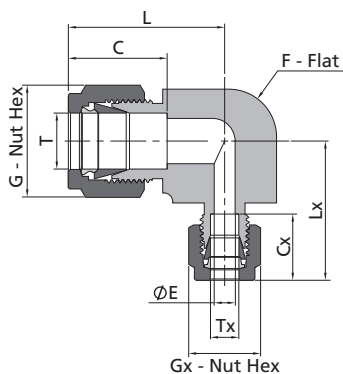
Union Elbows



Fractional Tube						
T-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)				
		L	C	G	F	E
1/16	-LU-FL1	0.70(17.8)	0.34(8.6)	0.31(7.9)	0.37(9.5)	0.05(1.3)
1/8	-LU-FL2	0.88(22.4)	0.50(12.7)	0.44(11.1)	0.37(9.5)	0.09(2.3)
3/16	-LU-FL3	1.00(25.4)	0.54(13.7)	0.50(12.7)	0.50(12.7)	0.12(3.0)
1/4	-LU-FL4	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)
5/16	-LU-FL5	1.13(28.7)	0.64(16.3)	0.63(15.9)	0.56(14.3)	0.25(6.4)
3/8	-LU-FL6	1.20(30.5)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.28(7.1)
1/2	-LU-FL8	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)
5/8	-LU-FL10	1.50(38.1)	0.96(24.4)	1.00(25.4)	0.94(23.8)	0.5(12.7)
3/4	-LU-FL12	1.57(39.9)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.62(15.7)
7/8	-LU-FL14	1.76(44.7)	1.02(25.9)	1.25(31.8)	1.37(34.9)	0.72(18.3)
1	-LU-FL16	1.93(49.0)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.88(22.4)
1 1/8	-LU-FL18	2.63(66.9)	1.44(36.7)	1.75(44.5)	1.69(42.9)	0.97(24.6)
1 1/4	-LU-FL20	2.62(66.5)	1.62(41.1)	1.87(47.6)	1.69(42.9)	1.09(27.7)
1 1/2	-LU-FL24	3.07(78.0)	1.97(50.0)	2.25(57.2)	2.00(50.8)	1.34(34.0)

Metric Tube						
T-Tube O.D. (mm)	Basic Ordering Number	Dimensions, mm (in.)				
		L	C	G	F	E
3	-LU-ML3	22.3(0.88)	12.9(0.51)	12.0(0.47)	9.5(0.37)	2.4(0.09)
4	-LU-ML4	25.4(1.00)	13.7(0.54)	12.0(0.47)	12.7(0.50)	2.4(0.09)
6	-LU-ML6	27.0(1.06)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.8(0.19)
8	-LU-ML8	28.8(1.13)	16.2(0.64)	16.0(0.63)	14.3(0.56)	6.4(0.25)
10	-LU-ML10	31.5(1.24)	17.2(0.68)	19.0(0.75)	17.5(0.69)	7.9(0.31)
12	-LU-ML12	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)
14	-LU-ML14	38.0(1.50)	24.4(0.96)	25.0(0.98)	23.8(0.94)	11.0(0.43)
15	-LU-ML15	38.0(1.50)	24.4(0.96)	25.0(0.98)	23.8(0.94)	11.9(0.47)
16	-LU-ML16	38.0(1.50)	24.4(0.96)	25.0(0.98)	23.8(0.94)	12.7(0.50)
18	-LU-ML18	39.8(1.57)	24.4(0.96)	30.0(1.18)	27.0(1.06)	15.1(0.59)
20	-LU-ML20	44.6(1.76)	26.0(1.02)	32.0(1.26)	34.9(1.37)	15.9(0.63)
22	-LU-ML22	44.6(1.76)	26.0(1.02)	32.0(1.26)	34.9(1.37)	18.3(0.72)
25	-LU-ML25	49.1(1.93)	31.3(1.23)	38.0(1.5)	34.9(1.37)	21.8(0.86)
28	-LU-ML28	64.0(2.52)	36.6(1.44)	46.0(1.81)	42.9(1.69)	21.8(0.86)
30	-LU-ML30	69.9(2.75)	39.6(1.56)	50.0(1.97)	42.9(1.69)	26.2(1.03)
32	-LU-ML32	72.3(2.85)	42.0(1.65)	50.0(1.97)	42.9(1.69)	28.6(1.13)
38	-LU-ML38	84.0(3.31)	49.4(1.94)	60.0(2.36)	50.8(2.00)	33.7(1.33)

## Union Reducing Elbows

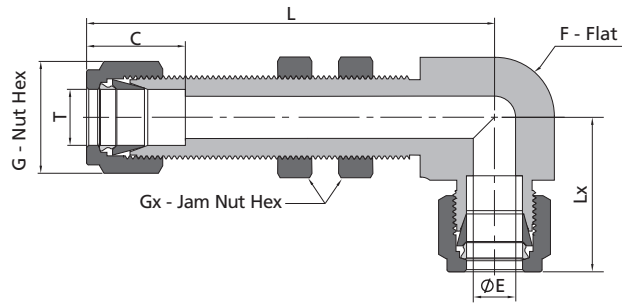


Fractional Tube			Dimensions, in. (mm)								
T-Tube O.D. (in.)	Tx-Tube O.D. (in.)	Basic Ordering Number	L	C	G	F	E	Cx	Gx	Lx	
3/16	1/8	-LU-FL3-FL2	1.00(25.4)	0.54(13.7)	0.50(12.7)	0.50(12.7)	0.09(2.3)	0.50(12.7)	0.44(11.1)	0.97(24.7)	
1/4	1/8	-LU-FL4-FL2	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.09(2.3)	0.50(12.7)	0.44(11.1)	1.00(25.4)	
5/16	1/8	-LU-FL5-FL2	1.17(29.7)	0.64(16.3)	0.63(15.9)	0.56(14.3)	0.09(2.3)	0.50(12.7)	0.44(11.1)	1.04(26.4)	
5/16	1/4	-LU-FL5-FL4	1.17(29.7)	0.64(16.3)	0.63(15.9)	0.56(14.3)	0.19(4.8)	0.60(15.2)	0.56(14.3)	1.14(29.0)	
3/8	1/8	-LU-FL6-FL2	1.20(30.5)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.09(2.3)	0.50(12.7)	0.44(11.1)	1.04(26.4)	
3/8	1/4	-LU-FL6-FL4	1.20(30.5)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.19(4.8)	0.60(15.2)	0.56(14.3)	1.14(29.0)	
3/8	5/16	-LU-FL6-FL5	1.20(30.5)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.25(6.4)	0.64(16.3)	0.63(15.9)	1.17(29.7)	
1/2	1/4	-LU-FL8-FL4	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.19(4.8)	0.60(15.2)	0.56(14.3)	1.27(32.2)	
1/2	5/16	-LU-FL8-FL5	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.25(6.4)	0.64(16.3)	0.63(15.9)	1.28(32.5)	
1/2	3/8	-LU-FL8-FL6	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.28(7.1)	0.66(16.8)	0.69(17.5)	1.32(33.6)	
5/8	3/8	-LU-FL10-FL6	1.50(38.1)	0.96(24.4)	1.00(25.4)	0.94(23.8)	0.28(7.1)	0.66(16.8)	0.69(17.5)	1.40(35.6)	
5/8	1/2	-LU-FL10-FL8	1.50(38.1)	0.96(24.4)	1.00(25.4)	0.94(23.8)	0.41(10.4)	0.90(22.9)	0.87(22.2)	1.50(38.1)	
3/4	1/4	-LU-FL12-FL4	1.57(39.9)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.19(4.8)	0.60(15.2)	0.56(14.3)	1.41(35.9)	
3/4	3/8	-LU-FL12-FL6	1.57(39.9)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.28(7.1)	0.66(16.8)	0.69(17.5)	1.47(37.4)	
3/4	1/2	-LU-FL12-FL8	1.57(39.9)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.41(10.4)	0.90(22.9)	0.87(22.2)	1.57(39.9)	
7/8	1/4	-LU-FL14-FL4	1.76(44.7)	1.02(25.9)	1.25(31.8)	1.37(34.9)	0.19(4.8)	0.60(15.2)	0.56(14.3)	1.60(40.7)	
1	1/2	-LU-FL16-FL8	1.93(49.0)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.41(10.4)	0.90(22.9)	0.87(22.2)	1.75(44.4)	
1	3/4	-LU-FL16-FL12	1.93(49.0)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.62(15.7)	0.96(24.4)	1.13(28.6)	1.85(47.1)	

Metric Tube			Dimensions, mm (in.)								
T-Tube O.D. (mm)	Tx-Tube O.D. (mm)	Basic Ordering Number	L	C	G	F	E	Cx	Gx	Lx	
8	6	-LU-ML8-ML6	28.8(1.13)	16.2(0.64)	16.0(0.63)	14.3(0.56)	4.8(0.19)	15.3(0.60)	14.0(0.55)	27.9(1.10)	
10	8	-LU-ML10-ML8	31.5(1.24)	17.2(0.68)	19.0(0.75)	17.5(0.69)	6.4(0.25)	16.2(0.64)	16.0(0.63)	30.5(1.20)	
12	8	-LU-ML12-ML8	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	6.4(0.25)	16.2(0.64)	16.0(0.63)	32.6(1.28)	
14	8	-LU-ML14-ML8	38.8(1.53)	24.4(0.96)	25.0(0.98)	23.8(0.94)	6.4(0.25)	16.2(0.64)	16.0(0.63)	34.7(1.37)	
14	10	-LU-ML14-ML10	38.8(1.53)	24.4(0.96)	25.0(0.98)	23.8(0.94)	7.9(0.31)	17.2(0.68)	19.0(0.75)	35.5(1.40)	

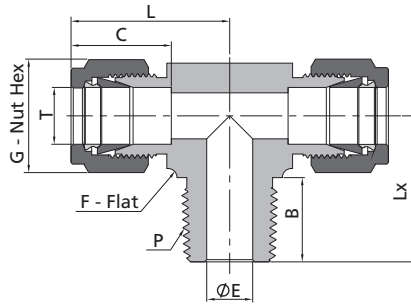
Bulkhead Union Elbows

Tube Fittings



Fractional Tube		Dimensions, in. (mm)							Panel Hole Size	Max. Panel Thickness
T-Tube O.D. (in.)	Basic Ordering Number	L	C	E	G	F	LX	Gx	in. (mm)	in. (mm)
1/8	-BBLU-FL2	1.93(49.0)	0.50(12.7)	0.09(2.3)	0.44(11.1)	0.37(9.5)	0.88(22.4)	0.50(12.7)	0.33(8.3)	0.60(15.2)
3/16	-BBLU-FL3	2.03(51.6)	0.54(13.7)	0.12(3.0)	0.50(12.7)	0.50(12.7)	1.00(25.4)	0.56(14.3)	0.39(9.9)	0.61(15.5)
1/4	-BBLU-FL4	2.10(53.3)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.50(12.7)	1.06(26.9)	0.63(15.9)	0.45(11.5)	0.61(15.5)
5/6	-BBLU-FL5	2.30(58.4)	0.64(16.3)	0.25(6.4)	0.63(15.9)	0.63(15.9)	1.13(28.7)	0.69(17.5)	0.52(13.1)	0.74(18.8)
3/8	-BBLU-FL6	2.36(59.9)	0.66(16.8)	0.28(7.1)	0.69(15.7)	0.63(15.9)	1.20(30.5)	0.75(19.1)	0.58(14.7)	0.74(18.8)
1/2	-BBLU-FL8	2.67(67.8)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.81(20.6)	1.42(36.1)	0.94(23.8)	0.76(19.4)	0.74(18.8)
5/8	-BBLU-FL10	2.82(71.6)	0.96(24.4)	0.50(12.7)	1.00(25.4)	0.94(23.8)	1.50(38.1)	1.06(27.0)	0.89(22.6)	0.50(12.7)
3/4	-BBLU-FL12	3.08(78.2)	0.96(24.4)	0.62(12.7)	1.13(28.6)	1.06(27.0)	1.57(39.9)	1.19(30.2)	1.02(25.0)	0.66(16.8)

## Male Branch Tees

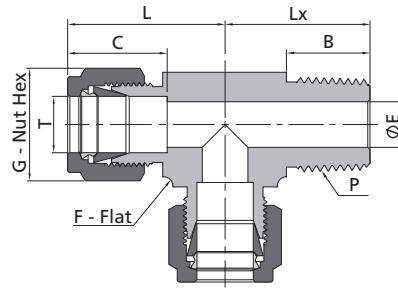


Fractional Tube			NPT Thread						
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	C	G	F	E	B	Lx
1/8	1/8	-TTM-FL2-NS2	0.93(23.6)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.09(2.3)	0.38(9.7)	0.70(17.8)
1/8	1/4	-TTM-FL2-NS4	0.97(24.6)	0.50(12.7)	0.44(11.1)	0.50(12.7)	0.09(2.3)	0.56(14.2)	0.92(23.4)
3/16	1/8	-TTM-FL3-NS2	0.96(24.4)	0.54(13.7)	0.50(12.7)	0.44(11.1)	0.12(3.0)	0.38(9.7)	0.70(17.8)
1/4	1/8	-TTM-FL4-NS2	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)	0.38(9.7)	0.74(18.8)
1/4	1/4	-TTM-FL4-NS4	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)	0.56(14.2)	0.92(23.4)
5/16	1/8	-TTM-FL5-NS2	1.17(29.7)	0.64(16.3)	0.63(15.9)	0.63(15.9)	0.19(4.8)	0.38(9.7)	0.82(20.8)
5/16	1/4	-TTM-FL5-NS4	1.17(29.7)	0.64(16.3)	0.63(15.9)	0.63(15.9)	0.25(6.4)	0.56(14.2)	1.01(25.7)
3/8	1/4	-TTM-FL6-NS4	1.20(30.5)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.28(7.1)	0.56(14.2)	1.00(25.4)
3/8	3/8	-TTM-FL6-NS6	1.31(33.3)	0.66(16.8)	0.69(17.5)	0.81(20.6)	0.28(7.1)	0.56(14.2)	1.11(28.2)
1/2	3/8	-TTM-FL8-NS6	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.38(9.7)	0.56(14.2)	1.11(28.2)
1/2	1/2	-TTM-FL8-NS8	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)	0.75(19.1)	1.30(33.0)
5/8	1/2	-TTM-FL10-NS8	1.53(38.9)	0.96(24.4)	1.00(25.4)	1.00(25.4)	0.47(11.9)	0.75(19.1)	1.41(35.8)
3/4	3/4	-TTM-FL12-NS12	1.57(39.9)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.62(15.7)	0.75(19.1)	1.45(36.8)
7/8	3/4	-TTM-FL14-NS12	1.88(47.8)	1.02(25.9)	1.25(31.8)	1.37(34.9)	0.62(15.7)	0.75(19.1)	1.87(47.5)
1	3/4	-TTM-FL16-NS12	1.94(49.3)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.62(15.7)	0.75(19.1)	1.87(47.5)
1	1	-TTM-FL16-NS16	1.94(49.3)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.88(22.4)	0.94(23.9)	1.84(46.7)

Metric Tube			NPT Thread						
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	C	G	F	E	B	Lx
6	1/8	-TTM-ML6-NS2	27.0(1.06)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.8(0.19)	9.7(0.38)	18.8(0.74)
6	1/4	-TTM-ML6-NS4	27.0(1.06)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.8(0.19)	14.2(0.56)	23.4(0.92)
8	1/8	-TTM-ML8-NS2	29.9(1.18)	16.2(0.64)	16.0(0.63)	15.9(0.63)	4.8(0.19)	9.7(0.38)	20.8(0.82)
8	1/4	-TTM-ML8-NS4	29.9(1.18)	16.2(0.64)	16.0(0.63)	15.9(0.63)	6.4(0.25)	14.2(0.56)	25.4(1.00)
10	1/4	-TTM-ML10-NS4	33.5(1.32)	17.2(0.68)	19.0(0.75)	20.6(0.81)	7.1(0.28)	14.2(0.56)	28.2(1.11)
10	3/8	-TTM-ML10-NS6	33.5(1.32)	17.2(0.68)	19.0(0.75)	20.6(0.81)	7.9(0.31)	14.2(0.56)	28.2(1.11)
12	1/4	-TTM-ML12-NS4	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	7.1(0.28)	14.2(0.56)	28.2(1.11)
12	3/8	-TTM-ML12-NS6	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)	14.2(0.56)	28.2(1.11)
12	1/2	-TTM-ML12-NS8	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)	19.1(0.75)	33.0(1.30)
16	1/2	-TTM-ML16-NS8	38.8(1.53)	24.4(0.96)	25.0(0.98)	25.4(1.00)	11.9(0.47)	19.1(0.75)	35.8(1.41)

Male Run Tees

Tube Fittings



Fractional Tube			NPT Thread						
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	C	G	F	E	B	Lx
1/8	1/8	-TMT-FL2-NS2	0.93(23.6)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.09(2.3)	0.38(9.7)	0.70(17.8)
1/8	1/4	-TMT-FL2-NS4	0.97(24.6)	0.50(12.7)	0.44(11.1)	0.50(12.7)	0.09(2.3)	0.56(14.2)	0.92(23.4)
3/16	1/8	-TMT-FL3-NS2	0.96(24.4)	0.54(13.7)	0.50(12.7)	0.44(11.1)	0.12(3.0)	0.38(9.7)	0.70(17.8)
1/4	1/8	-TMT-FL4-NS2	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)	0.38(9.7)	0.74(18.8)
1/4	1/4	-TMT-FL4-NS4	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)	0.56(14.2)	0.92(23.4)
5/16	1/8	-TMT-FL5-NS2	1.17(29.7)	0.64(16.3)	0.63(15.9)	0.63(15.9)	0.19(4.8)	0.38(9.7)	0.82(20.8)
5/16	1/4	-TMT-FL5-NS4	1.17(29.7)	0.64(16.3)	0.63(15.9)	0.63(15.9)	0.25(6.4)	0.56(14.2)	1.01(25.7)
3/8	1/4	-TMT-FL6-NS4	1.20(30.5)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.28(7.1)	0.56(14.2)	1.00(25.4)
3/8	3/8	-TMT-FL6-NS6	1.31(33.3)	0.66(16.8)	0.69(17.5)	0.81(20.6)	0.28(7.1)	0.56(14.2)	1.11(28.2)
1/2	3/8	-TMT-FL8-NS6	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.38(9.7)	0.56(14.2)	1.11(28.2)
1/2	1/2	-TMT-FL8-NS8	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)	0.75(19.1)	1.3(33.0)
5/8	1/2	-TMT-FL10-NS8	1.50(38.1)	0.96(24.4)	1.00(25.4)	0.94(23.8)	0.47(11.9)	0.75(19.1)	1.41(35.8)
3/4	3/4	-TMT-FL12-NS12	1.57(39.9)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.62(15.7)	0.75(19.1)	1.45(36.8)
7/8	3/4	-TMT-FL14-NS12	1.88(47.8)	1.02(25.9)	1.25(31.8)	1.37(34.9)	0.62(15.7)	0.75(19.1)	1.87(47.5)
1	3/4	-TMT-FL16-NS12	1.94(49.3)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.62(15.7)	0.75(19.1)	1.87(47.5)
1	1	-TMT-FL16-NS16	1.94(49.3)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.88(22.4)	0.94(23.9)	1.84(46.7)

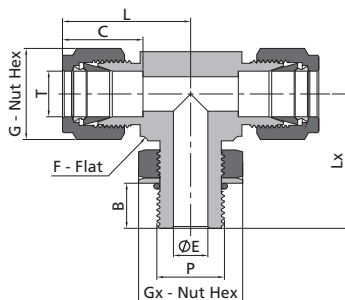
Metric Tube			NPT Thread						
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	C	G	F	E	B	Lx
6	1/8	-TMT-ML6-NS2	27.0(1.06)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.8(0.19)	9.7(0.38)	18.0(0.71)
6	1/4	-TMT-ML6-NS4	27.0(1.06)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.8(0.19)	14.2(0.56)	23.4(0.92)
8	1/8	-TMT-ML8-NS2	29.9(1.18)	16.2(0.64)	16.0(0.63)	15.9(0.63)	4.8(0.19)	9.7(0.38)	20.8(0.82)
8	1/4	-TMT-ML8-NS4	29.9(1.18)	16.2(0.64)	16.0(0.63)	15.9(0.63)	6.4(0.25)	14.2(0.56)	25.4(1.00)
10	1/4	-TMT-ML10-NS4	33.5(1.32)	17.2(0.68)	19.0(0.75)	20.6(0.81)	7.1(0.28)	14.2(0.56)	28.2(1.11)
10	1/2	-TMT-ML10-NS8	33.5(1.32)	17.2(0.68)	19.0(0.75)	20.6(0.81)	7.9(0.31)	19.1(0.75)	33.0(1.3)
12	1/4	-TMT-ML12-NS4	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	7.1(0.28)	14.2(0.56)	28.2(1.11)
12	3/8	-TMT-ML12-NS6	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)	14.2(0.56)	28.2(1.11)
12	1/2	-TMT-ML12-NS8	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)	19.1(0.75)	33.0(1.30)
16	1/2	-TMT-ML16-NS8	38.0(1.50)	24.4(0.96)	25.0(0.98)	23.8(0.94)	11.9(0.47)	19.1(0.75)	35.0(1.38)



## Adjustable Male Branch Tees

## SAE/MS Straight Thread

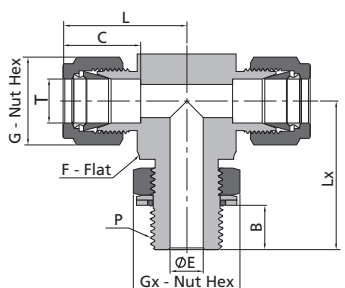
Adapt to straight thread boss of  
SAE J1926-1, ISO 11926-1 and MS 16142.



Fractional Tube			SAE/MS Straight Thread								
T-Tube O.D. (in.)	P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)								
			L	B	C	E	G	F	Lx	Gx	
1/4	7/16-20	-TTP-FL4-ST7	1.12(28.5)	0.39(9.9)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.50(12.7)	1.06(27.0)	0.56(14.3)	
3/8	9/16-18	-TTP-FL6-ST9	1.26(32.0)	0.44(11.2)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.63(15.9)	1.27(32.3)	0.69(17.5)	
1/2	3/4-16	-TTP-FL8-ST12	1.48(37.6)	0.50(12.7)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.81(20.6)	1.49(37.8)	0.87(22.2)	
3/4	1 1/16-12	-TTP-FL12-ST17	1.63(41.4)	0.66(16.8)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.06(27.0)	1.92(48.8)	1.25(31.8)	
1	1 5/16-12	-TTP-FL16-ST21	1.99(50.5)	0.66(16.8)	1.23(31.2)	0.88(22.4)	1.50(38.1)	1.37(34.9)	2.11(53.6)	1.50(38.1)	
1 1/4	1 5/8-12	-TTP-FL20-ST26	2.67(67.8)	0.66(16.8)	1.62(41.1)	1.09(27.7)	1.87(47.6)	1.69(42.9)	2.29(58.2)	1.87(47.6)	
1 1/2	1 7/8-12	-TTP-FL24-ST30	3.07(78.0)	0.66(16.8)	1.97(50.0)	1.34(34.0)	2.25(57.2)	2.00(50.8)	2.38(60.5)	2.13(54.0)	

## Adjustable Male Branch Tees

## ISO Parallel Thread



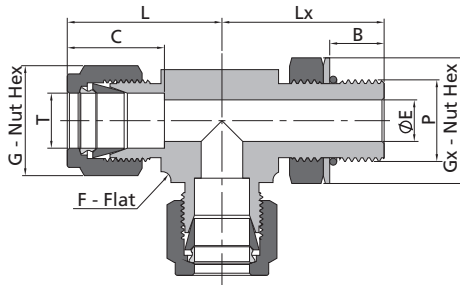
Fractional Tube			ISO Parallel Thread (PP)								
T-Tube O.D. (in.)	P-ISO Parallel Thread Size	Basic Ordering Number	Dimensions, in. (mm)								
			L	B	C	E	G	F	Lx	Gx	
1/4	1/8	-TTP-FL4-PP2	1.06(26.9)	0.26(6.6)	0.60(15.2)	0.16(4.1)	0.56(14.3)	0.50(12.7)	1.04(26.4)	0.56(14.3)	
1/4	1/4	-TTP-FL4-PP4	1.14(29.0)	0.35(9.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.63(15.9)	1.27(32.3)	0.75(19.1)	
3/8	1/4	-TTP-FL6-PP4	1.20(30.5)	0.35(9.0)	0.66(16.8)	0.23(5.8)	0.69(17.5)	0.63(15.9)	1.27(32.3)	0.75(19.1)	
1/2	3/8	-TTP-FL8-PP6	1.42(36.1)	0.37(9.4)	0.90(22.9)	0.31(7.9)	0.87(22.2)	0.81(20.6)	1.46(37.1)	0.87(22.2)	
1/2	1/2	-TTP-FL8-PP8	1.50(38.1)	0.51(13.0)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.94(23.8)	1.71(43.4)	1.06(27.0)	
5/8	1/2	-TTP-FL10-PP8	1.50(38.1)	0.51(13.0)	0.96(24.4)	0.47(11.9)	1.00(25.4)	0.94(23.8)	1.71(43.4)	1.06(27.0)	
3/4	1/2	-TTP-FL12-PP8	1.57(39.9)	0.51(13.0)	0.96(24.4)	0.47(11.9)	1.13(28.6)	1.06(27.0)	1.78(45.2)	1.06(27.0)	
3/4	3/4	-TTP-FL12-PP12	1.57(39.9)	0.51(13.0)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.06(27.0)	1.92(48.8)	1.37(34.9)	
1	1	-TTP-FL16-PP16	1.93(49.0)	0.52(13.2)	1.23(31.2)	0.78(19.8)	1.50(38.1)	1.37(34.9)	2.11(53.6)	1.63(41.3)	

Metric Tube			ISO Parallel Thread (PP)								
T-Tube O.D. (mm)	P-ISO Parallel Thread Size	Basic Ordering Number	Dimensions, mm (in.)								
			L	B	C	E	G	F	Lx	Gx	
6	1/8	-TTP-ML6-PP2	27.0(1.06)	6.6(0.26)	15.3(0.60)	4.0(0.16)	14.0(0.55)	12.7(0.50)	26.4(1.04)	14.3(0.56)	
6	1/4	-TTP-ML6-PP4	29.0(1.14)	9.0(0.35)	15.3(0.60)	4.8(0.19)	14.0(0.55)	15.9(0.63)	32.2(1.27)	19.1(0.75)	
8	1/8	-TTP-ML8-PP2	28.8(1.13)	6.6(0.26)	16.2(0.64)	4.0(0.16)	16.0(0.63)	14.3(0.56)	27.5(1.08)	14.3(0.56)	
8	1/4	-TTP-ML8-PP4	29.9(1.18)	9.0(0.35)	16.2(0.64)	5.9(0.23)	16.0(0.63)	15.9(0.63)	32.2(1.27)	19.1(0.75)	
10	1/4	-TTP-ML10-PP4	33.5(1.32)	9.0(0.35)	17.2(0.68)	5.9(0.23)	19.0(0.75)	20.6(0.81)	35.1(1.38)	19.1(0.75)	
12	3/8	-TTP-ML12-PP6	36.0(1.42)	9.4(0.37)	22.8(0.90)	7.9(0.31)	22.0(0.87)	20.6(0.81)	37.1(1.46)	22.2(0.87)	
12	1/2	-TTP-ML12-PP8	38.0(1.50)	13.0(0.51)	22.8(0.90)	9.5(0.37)	22.0(0.87)	23.8(0.94)	43.5(1.71)	27.0(1.06)	

Adjustable Male Run Tees

SAE/MS Straight Thread

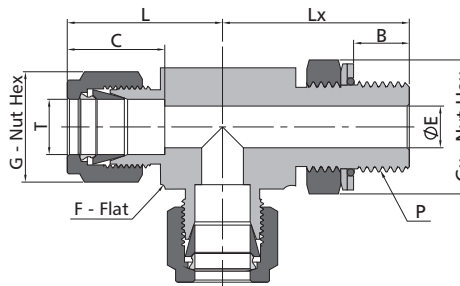
Adapt to straight thread boss of SAE J1926-1, ISO 11926-1 and MS 16142.



Fractional Tube			SAE/MS Straight Thread								
T-Tube O.D. (in.)	P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)								
			L	B	C	E	G	F	Lx	Gx	
1/4	7/16-20	-TPT-FL4-ST7	1.12(28.5)	0.39(9.9)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.50(12.7)	1.06(27.0)	0.56(14.3)	
3/8	9/16-18	-TPT-FL6-ST9	1.26(32.0)	0.44(11.2)	0.66(16.8)	0.28(7.1)	0.69(17.5)	0.63(15.9)	1.27(32.3)	0.69(17.5)	
1/2	3/4-16	-TPT-FL8-ST12	1.48(37.6)	0.50(12.7)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.81(20.6)	1.49(37.8)	0.87(22.2)	
3/4	1 1/16-12	-TPT-FL12-ST17	1.63(41.4)	0.66(16.8)	0.96(24.4)	0.62(15.7)	1.25(31.75)	1.06(27.0)	1.92(48.8)	1.25(31.8)	
1	1 5/16-12	-TPT-FL16-ST21	1.99(50.5)	0.66(16.8)	1.23(31.2)	0.88(22.4)	1.50(38.1)	1.37(34.9)	2.11(53.6)	1.50(38.1)	
1 1/4	1 5/8-12	-TPT-FL20-ST26	2.67(67.8)	0.66(16.8)	1.62(41.1)	1.09(27.7)	1.87(47.6)	1.69(42.9)	2.29(58.2)	1.87(47.6)	
1 1/2	1 7/8-12	-TPT-FL24-ST30	3.07(78.0)	0.66(16.8)	1.97(50.0)	1.34(34.0)	2.25(57.2)	2.00(50.8)	2.38(60.5)	2.13(54.0)	

Adjustable Male Run Tees

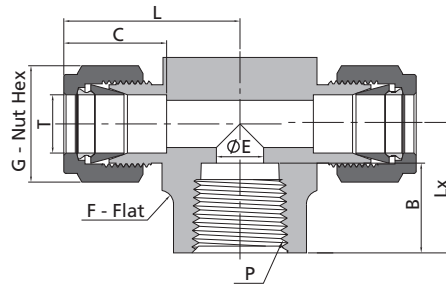
ISO Parallel Thread



Fractional Tube			ISO Parallel Thread (PP)								
T-Tube O.D. (in.)	P-ISO Parallel Thread Size	Basic Ordering Number	Dimensions, in. (mm)								
			L	B	C	E	G	F	Lx	Gx	
1/4	1/8	-TPT-FL4-PP2	1.06(26.9)	0.26(6.6)	0.60(15.2)	0.16(4.1)	0.56(14.3)	0.50(12.7)	1.04(26.4)	0.56(14.3)	
1/4	1/4	-TPT-FL4-PP4	1.14(29.0)	0.35(9.0)	0.60(15.2)	0.19(4.8)	0.56(14.3)	0.63(15.9)	1.27(32.3)	0.75(19.1)	
3/8	1/4	-TPT-FL6-PP4	1.20(30.5)	0.35(9.0)	0.66(16.8)	0.23(5.8)	0.69(17.5)	0.63(15.9)	1.27(32.3)	0.75(19.1)	
1/2	3/8	-TPT-FL8-PP6	1.42(36.1)	0.37(9.4)	0.90(22.9)	0.31(7.9)	0.87(22.2)	0.81(20.6)	1.46(37.1)	0.87(22.2)	
1/2	1/2	-TPT-FL8-PP8	1.50(38.1)	0.51(13.0)	0.90(22.9)	0.41(10.4)	0.87(22.2)	0.94(23.8)	1.71(43.4)	1.06(27.0)	
5/8	1/2	-TPT-FL10-PP8	1.50(38.1)	0.51(13.0)	0.96(24.4)	0.47(11.9)	1.00(25.4)	0.94(23.8)	1.71(43.4)	1.06(27.0)	
3/4	1/2	-TPT-FL12-PP8	1.57(39.9)	0.51(13.0)	0.96(24.4)	0.47(11.9)	1.13(28.6)	1.06(27.0)	1.78(45.2)	1.06(27.0)	
3/4	3/4	-TPT-FL12-PP12	1.57(39.9)	0.51(13.0)	0.96(24.4)	0.62(15.7)	1.13(28.6)	1.06(27.0)	1.92(48.8)	1.37(34.9)	
1	1	-TPT-FL16-PP16	1.93(49.0)	0.52(13.2)	1.23(31.2)	0.78(19.8)	1.50(38.1)	1.37(34.9)	2.11(53.6)	1.63(41.3)	

Metric Tube			ISO Parallel Thread (PP)								
T-Tube O.D. (mm)	P-ISO Parallel Thread Size	Basic Ordering Number	Dimensions, mm (in.)								
			L	B	C	E	G	F	Lx	Gx	
6	1/8	-TPT-ML6-PP2	27.0(1.06)	6.6(0.26)	15.3(0.60)	4.0(0.16)	14.0(0.55)	12.7(0.50)	26.4(1.04)	14.3(0.56)	
6	1/4	-TPT-ML6-PP4	29.0(1.14)	9.0(0.35)	15.3(0.60)	4.8(0.19)	14.0(0.55)	15.9(0.63)	32.2(1.27)	19.1(0.75)	
8	1/8	-TPT-ML8-PP2	28.8(1.13)	6.6(0.26)	16.2(0.64)	4.0(0.16)	16.0(0.63)	14.3(0.56)	27.5(1.08)	14.3(0.56)	
8	1/4	-TPT-ML8-PP4	29.9(1.18)	9.0(0.35)	16.2(0.64)	5.9(0.23)	16.0(0.63)	15.9(0.63)	32.2(1.27)	19.1(0.75)	
10	1/4	-TPT-ML10-PP4	33.5(1.32)	9.0(0.35)	17.2(0.68)	5.9(0.23)	19.0(0.75)	20.6(0.81)	35.1(1.38)	19.1(0.75)	
12	3/8	-TPT-ML12-PP6	36.0(1.42)	9.4(0.37)	22.8(0.90)	7.9(0.31)	22.0(0.87)	20.6(0.81)	37.1(1.46)	22.2(0.87)	
12	1/2	-TPT-ML12-PP8	38.0(1.50)	13.0(0.51)	22.8(0.90)	9.5(0.37)	22.0(0.87)	23.8(0.94)	43.5(1.71)	27.0(1.06)	

## Female Branch Tees

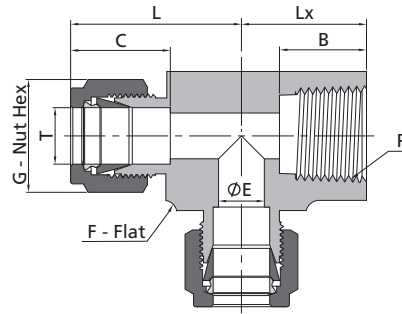


Fractional Tube			NPT Thread						
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	C	G	F	E	B	Lx
1/8	1/8	-TTF-FL2-NS2	0.97(24.6)	0.50(12.7)	0.44(11.1)	0.50(12.7)	0.09(2.3)	0.41(10.4)	0.75(19.1)
3/16	1/8	-TTF-FL3-NS2	1.01(25.7)	0.54(13.7)	0.50(12.7)	0.50(12.7)	0.12(3.0)	0.41(10.4)	0.75(19.1)
1/4	1/8	-TTF-FL4-NS2	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)	0.41(10.4)	0.75(19.1)
1/4	1/4	-TTF-FL4-NS4	1.17(29.7)	0.60(15.2)	0.56(14.3)	0.69(17.5)	0.19(4.8)	0.59(15.0)	0.88(22.4)
5/16	1/8	-TTF-FL5-NS2	1.17(29.7)	0.64(16.2)	0.63(15.9)	0.63(15.9)	0.25(6.4)	0.41(10.4)	0.75(19.1)
3/8	1/4	-TTF-FL6-NS4	1.23(31.2)	0.66(16.8)	0.69(17.5)	0.69(17.5)	0.28(7.1)	0.59(15.0)	0.88(22.4)
3/8	3/8	-TTF-FL6-NS6	1.31(33.3)	0.66(16.8)	0.69(17.5)	0.81(20.6)	0.28(7.1)	0.59(15.0)	0.88(22.4)
3/8	1/2	-TTF-FL6-NS8	1.42(36.1)	0.66(16.8)	0.69(17.5)	1.00(25.4)	0.28(7.1)	0.78(19.8)	1.12(28.4)
1/2	1/4	-TTF-FL8-NS4	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)	0.59(15.0)	0.88(22.4)
1/2	3/8	-TTF-FL8-NS6	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)	0.59(15.0)	0.88(22.4)
1/2	1/2	-TTF-FL8-NS8	1.53(38.9)	0.90(22.9)	0.87(22.2)	1.00(25.4)	0.41(10.4)	0.78(19.8)	1.12(28.4)
5/8	1/2	-TTF-FL10-NS8	1.53(38.9)	0.96(24.4)	1.00(25.4)	1.00(25.4)	0.50(12.7)	0.78(19.8)	1.12(28.4)
3/4	3/4	-TTF-FL12-NS12	1.76(44.7)	0.96(24.4)	1.13(28.6)	1.37(34.9)	0.62(15.7)	0.81(20.6)	1.25(31.8)
7/8	3/4	-TTF-FL14-NS12	1.76(44.7)	1.02(25.9)	1.25(31.8)	1.37(34.9)	0.72(18.3)	0.81(20.6)	1.25(31.8)
1	3/4	-TTF-FL16-NS12	1.93(49.0)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.88(22.4)	0.81(20.6)	1.25(31.8)
1	1	-TTF-FL16-NS16	2.11(53.6)	1.23(31.2)	1.50(38.1)	1.69(42.9)	0.88(22.4)	1.00(25.4)	1.50(38.1)

Metric Tube			NPT Thread						
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	C	G	F	E	B	Lx
6	1/8	-TTF-ML6-NS2	27.0(1.06)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.8(0.19)	10.4(0.41)	19.0(0.75)
6	1/4	-TTF-ML6-NS4	29.8(1.17)	15.3(0.60)	14.0(0.55)	17.5(0.69)	4.8(0.19)	15.0(0.59)	22.4(0.88)
8	1/8	-TTF-ML8-NS2	29.9(1.18)	16.2(0.64)	16.0(0.63)	15.9(0.63)	6.4(0.25)	10.4(0.41)	19.0(0.75)
8	1/4	-TTF-ML8-NS4	30.6(1.2)	16.2(0.64)	16.0(0.63)	17.5(0.69)	6.4(0.25)	15.0(0.59)	22.4(0.88)
10	1/4	-TTF-ML10-NS4	33.5(1.32)	17.2(0.68)	19.0(0.75)	20.6(0.81)	7.9(0.31)	15.0(0.59)	22.4(0.88)
12	1/8	-TTF-ML12-NS2	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	6.4(0.25)	10.4(0.41)	22.3(0.88)
12	1/4	-TTF-ML12-NS4	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)	15.0(0.59)	22.4(0.88)
12	3/8	-TTF-ML12-NS6	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)	15.0(0.59)	22.4(0.88)
12	1/2	-TTF-ML12-NS8	38.8(1.53)	22.8(0.90)	22.0(0.87)	25.4(1.00)	9.5(0.37)	19.8(0.78)	28.5(1.12)
16	1/2	-TTF-ML16-NS8	38.8(1.53)	24.4(0.96)	25.0(0.98)	25.4(1.00)	12.7(0.50)	19.8(0.78)	28.4(1.12)

Female Run Tees

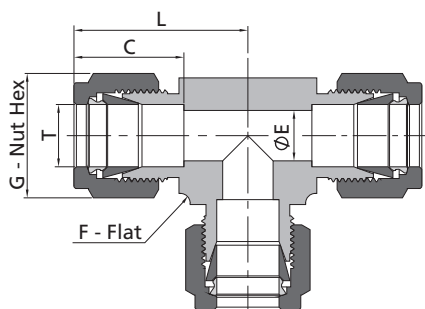
Tube Fittings



Fractional Tube			NPT Thread						
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	C	G	F	E	B	Lx
1/8	1/8	-TFT-FL2-NS2	0.97(24.6)	0.50(12.7)	0.44(11.1)	0.50(12.7)	0.09(2.3)	0.41(10.4)	0.75(19.1)
3/16	1/8	-TFT-FL3-NS2	1.01(25.7)	0.54(13.7)	0.50(12.7)	0.50(12.7)	0.12(3.0)	0.41(10.4)	0.75(19.1)
1/4	1/8	-TFT-FL4-NS2	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)	0.41(10.4)	0.75(19.1)
1/4	1/4	-TFT-FL4-NS4	1.17(29.7)	0.60(15.2)	0.56(14.3)	0.69(17.5)	0.19(4.8)	0.59(15.0)	0.88(22.4)
5/16	1/8	-TFT-FL5-NS2	1.17(29.7)	0.64(16.2)	0.63(15.9)	0.63(15.9)	0.25(6.4)	0.41(10.4)	0.75(19.1)
3/8	1/4	-TFT-FL6-NS4	1.23(31.2)	0.66(16.8)	0.69(17.5)	0.69(17.5)	0.28(7.1)	0.59(15.0)	0.88(22.4)
1/2	1/4	-TFT-FL8-NS4	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)	0.59(15.0)	0.88(22.4)
1/2	3/8	-TFT-FL8-NS6	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)	0.59(15.0)	0.88(22.4)
1/2	1/2	-TFT-FL8-NS8	1.57(39.9)	0.90(22.9)	0.87(22.2)	1.06(27.0)	0.41(10.4)	0.78(19.8)	1.12(28.4)
5/8	1/2	-TFT-FL10-NS8	1.57(39.9)	0.96(24.4)	1.00(25.4)	1.06(27.0)	0.50(12.7)	0.78(19.8)	1.12(28.4)
3/4	3/4	-TFT-FL12-NS12	1.76(44.7)	0.96(24.4)	1.13(28.6)	1.37(34.9)	0.62(15.7)	0.81(20.6)	1.25(31.8)
7/8	1/2	-TFT-FL14-NS8	1.76(44.7)	1.02(25.9)	1.25(31.8)	1.37(34.9)	0.62(15.7)	0.78(19.8)	1.12(28.4)
7/8	3/4	-TFT-FL14-NS12	1.76(44.7)	1.02(25.9)	1.25(31.8)	1.37(34.9)	0.72(18.3)	0.81(20.6)	1.25(31.8)
1	3/4	-TFT-FL16-NS12	1.93(49.0)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.88(22.4)	0.81(20.6)	1.25(31.8)
1	1	-TFT-FL16-NS16	2.11(53.6)	1.23(31.2)	1.50(38.1)	1.69(42.9)	0.88(22.4)	1.00(25.4)	1.50(38.1)

Metric Tube			NPT Thread						
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	C	G	F	E	B	Lx
6	1/8	-TFT-ML6-NS2	27.0(1.06)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.8(0.19)	10.4(0.41)	19.0(0.75)
6	1/4	-TFT-ML6-NS4	29.8(1.17)	15.3(0.60)	14.0(0.55)	17.5(0.69)	4.8(0.19)	15.0(0.59)	22.4(0.88)
8	1/8	-TFT-ML8-NS2	29.9(1.18)	16.2(0.64)	16.0(0.63)	15.9(0.63)	6.4(0.25)	10.4(0.41)	19.0(0.75)
8	1/4	-TFT-ML8-NS4	30.6(1.20)	16.2(0.64)	16.0(0.63)	17.5(0.69)	6.4(0.25)	15.0(0.59)	22.4(0.88)
10	1/4	-TFT-ML10-NS4	33.5(1.32)	17.2(0.68)	19.0(0.75)	20.6(0.81)	7.9(0.31)	15.0(0.59)	22.4(0.88)
12	1/4	-TFT-ML12-NS4	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)	15.0(0.59)	22.4(0.88)
12	3/8	-TFT-ML12-NS6	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)	15.0(0.59)	23.1(0.91)
12	1/2	-TFT-ML12-NS8	38.8(1.53)	22.8(0.90)	22.0(0.87)	25.4(1.00)	9.5(0.37)	19.8(0.78)	28.5(1.12)
16	1/2	-TFT-ML16-NS8	39.8(1.57)	24.4(0.96)	25.0(0.98)	27.0(1.06)	12.7(0.50)	19.8(0.78)	28.4(1.12)

## Union Tees

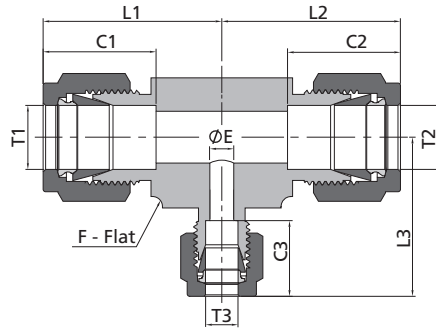


Fractional Tube						
T-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)				
		L	C	G	F	E
1/16	-TTT-FL1	0.70(17.8)	0.34(8.6)	0.31(7.9)	0.37(9.5)	0.05(1.3)
1/8	-TTT-FL2	0.87(22.2)	0.50(12.7)	0.44(11.1)	0.37(9.5)	0.09(2.3)
3/16	-TTT-FL3	0.96(24.4)	0.54(13.7)	0.50(12.7)	0.44(11.1)	0.12(3.0)
1/4	-TTT-FL4	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)
5/16	-TTT-FL5	1.17(29.7)	0.64(16.2)	0.63(15.9)	0.63(15.9)	0.25(6.4)
3/8	-TTT-FL6	1.20(30.5)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.28(7.1)
1/2	-TTT-FL8	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)
5/8	-TTT-FL10	1.53(38.9)	0.96(24.4)	1.00(25.4)	1.00(25.4)	0.50(12.7)
3/4	-TTT-FL12	1.57(39.9)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.62(15.7)
7/8	-TTT-FL14	1.76(44.7)	1.02(25.9)	1.25(31.8)	1.37(34.9)	0.72(18.3)
1	-TTT-FL16	1.93(49.0)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.88(22.4)
1 1/8	-TTT-FL18	2.17(55.1)	1.44(36.7)	1.75(44.5)	1.69(42.9)	0.97(24.6)
1 1/4	-TTT-FL20	2.62(66.5)	1.62(41.1)	1.87(47.6)	1.69(42.9)	1.09(27.7)
1 1/2	-TTT-FL24	3.07(78.0)	1.97(50.0)	2.25(57.2)	2.00(50.8)	1.34(34.0)

Metric Tube						
T-Tube O.D. (mm)	Basic Ordering Number	Dimensions, mm (in.)				
		L	C	G	F	E
2	-TTT-ML2	22.3(0.88)	12.9(0.51)	12.0(0.47)	9.5(0.37)	1.7(0.07)
3	-TTT-ML3	22.3(0.88)	12.9(0.51)	12.0(0.47)	9.5(0.37)	2.4(0.09)
4	-TTT-ML4	25.4(1.00)	13.7(0.54)	12.0(0.47)	12.7(0.50)	2.4(0.09)
6	-TTT-ML6	27.0(1.06)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.8(0.19)
8	-TTT-ML8	29.9(1.18)	16.2(0.64)	16.0(0.63)	15.9(0.63)	6.4(0.25)
10	-TTT-ML10	31.5(1.24)	17.2(0.68)	19.0(0.75)	17.5(0.69)	7.9(0.31)
12	-TTT-ML12	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)
14	-TTT-ML14	38.8(1.53)	24.4(0.96)	25.0(0.98)	25.4(1.00)	11.1(0.44)
15	-TTT-ML15	38.8(1.53)	24.4(0.96)	25.0(0.98)	25.4(1.00)	11.9(0.47)
16	-TTT-ML16	38.8(1.53)	24.4(0.96)	25.0(0.98)	25.4(1.00)	12.7(0.50)
18	-TTT-ML18	39.8(1.57)	24.4(0.96)	30.0(1.18)	27.0(1.06)	15.1(0.59)
20	-TTT-ML20	44.6(1.76)	26.0(1.02)	32.0(1.26)	34.9(1.37)	15.9(0.63)
22	-TTT-ML22	44.6(1.76)	26.0(1.02)	32.0(1.26)	34.9(1.37)	18.3(0.72)
25	-TTT-ML25	49.1(1.93)	31.3(1.23)	38.0(1.50)	34.9(1.37)	21.8(0.86)
28	-TTT-ML28	64.0(2.52)	36.6(1.44)	46.0(1.81)	42.9(1.69)	21.8(0.86)
30	-TTT-ML30	69.9(2.75)	39.6(1.56)	50.0(1.97)	42.9(1.69)	26.2(1.03)
32	-TTT-ML32	72.3(2.85)	42.0(1.65)	50.0(1.97)	42.9(1.69)	28.6(1.13)
38	-TTT-ML38	84.0(3.31)	49.4(1.94)	60.0(2.36)	50.8(2.00)	33.7(1.33)

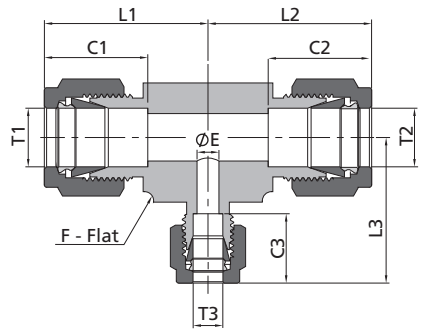
Reducing Union Tees

Tube Fittings



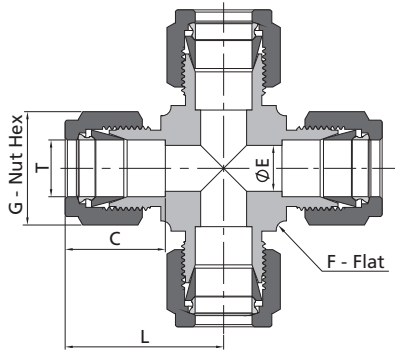
Fractional Tube				Dimensions, in. (mm)								
T1-Tube O.D. (in.)	T2-Tube O.D. (in.)	T3-Tube O.D. (in.)	Basic Ordering Number	L1	L2	L3	C1	C2	C3	F	E	
1/4	1/4	1/8	-TTT-FL4-FL4-FL2	1.05(26.7)	1.05(26.7)	0.96(24.4)	0.60(15.2)	0.60(15.2)	0.50(12.7)	0.50(12.7)	0.09(2.3)	
3/8	1/4	1/4	-TTT-FL6-FL4-FL4	1.20(30.5)	1.14(29.0)	1.14(29.0)	0.66(16.8)	0.60(15.2)	0.60(15.2)	0.63(15.9)	0.19(4.8)	
3/8	1/4	3/8	-TTT-FL6-FL4-FL6	1.20(30.5)	1.14(29.0)	1.20(30.5)	0.66(16.8)	0.60(15.2)	0.66(16.8)	0.63(15.9)	0.19(4.8)	
3/8	3/8	1/4	-TTT-FL6-FL6-FL4	1.20(30.5)	1.20(30.5)	1.14(29.0)	0.66(16.8)	0.66(16.8)	0.60(15.2)	0.63(15.9)	0.19(4.8)	
1/2	1/4	1/4	-TTT-FL8-FL4-FL4	1.42(36.1)	1.22(30.9)	1.22(30.9)	0.90(22.9)	0.60(15.2)	0.60(15.2)	0.81(20.6)	0.19(4.8)	
1/2	1/4	1/2	-TTT-FL8-FL4-FL8	1.42(36.1)	1.25(31.8)	1.42(36.1)	0.90(22.9)	0.60(15.2)	0.90(22.9)	0.81(20.6)	0.19(4.8)	
1/2	3/8	3/8	-TTT-FL8-FL6-FL6	1.42(36.1)	1.31(33.3)	1.31(33.3)	0.90(22.9)	0.66(16.8)	0.66(16.8)	0.81(20.6)	0.28(7.1)	
1/2	3/8	1/2	-TTT-FL8-FL6-FL8	1.42(36.1)	1.31(33.3)	1.42(36.1)	0.90(22.9)	0.66(16.8)	0.90(22.9)	0.81(20.6)	0.28(7.1)	
1/2	1/2	1/4	-TTT-FL8-FL8-FL4	1.42(36.1)	1.42(36.1)	1.25(31.8)	0.90(22.9)	0.90(22.9)	0.60(15.2)	0.81(20.6)	0.19(4.8)	
1/2	1/2	3/8	-TTT-FL8-FL8-FL6	1.42(36.1)	1.42(36.1)	1.31(33.3)	0.90(22.9)	0.90(22.9)	0.66(16.8)	0.81(20.6)	0.28(7.1)	
5/8	3/8	3/8	-TTT-FL10-FL6-FL6	1.53(38.9)	1.42(36.1)	1.42(36.1)	0.96(24.4)	0.66(16.8)	0.66(16.8)	1.00(25.4)	0.28(7.1)	
5/8	3/8	1/2	-TTT-FL10-FL6-FL8	1.53(38.9)	1.42(36.1)	1.53(38.9)	0.96(24.4)	0.66(16.8)	0.90(22.9)	1.00(25.4)	0.28(7.1)	
5/8	1/2	3/8	-TTT-FL10-FL8-FL6	1.53(38.9)	1.53(38.9)	1.42(36.1)	0.96(24.4)	0.90(22.9)	0.66(16.8)	1.00(25.4)	0.28(7.1)	
5/8	1/2	1/2	-TTT-FL10-FL8-FL8	1.53(38.9)	1.53(38.9)	1.53(38.9)	0.96(24.4)	0.90(22.9)	0.90(22.9)	1.00(25.4)	0.41(10.4)	
5/8	5/8	3/8	-TTT-FL10-FL10-FL6	1.53(38.9)	1.53(38.9)	1.42(36.1)	0.96(24.4)	0.96(24.4)	0.66(16.8)	1.00(25.4)	0.28(7.1)	
5/8	5/8	1/2	-TTT-FL10-FL10-FL8	1.53(38.9)	1.53(38.9)	1.53(38.9)	0.96(24.4)	0.96(24.4)	0.90(22.9)	1.00(25.4)	0.41(10.4)	
3/4	3/8	3/8	-TTT-FL12-FL6-FL6	1.56(39.6)	1.45(36.9)	1.45(36.9)	0.96(24.4)	0.66(16.8)	0.66(16.8)	1.06(27.0)	0.28(7.1)	
3/4	1/2	3/8	-TTT-FL12-FL8-FL6	1.56(39.6)	1.56(39.6)	1.45(36.9)	0.96(24.4)	0.90(22.9)	0.66(16.8)	1.06(27.0)	0.28(7.1)	
3/4	1/2	1/2	-TTT-FL12-FL8-FL8	1.56(39.6)	1.56(39.6)	1.56(39.6)	0.96(24.4)	0.90(22.9)	0.90(22.9)	1.06(27.0)	0.41(10.4)	
3/4	5/8	3/8	-TTT-FL12-FL10-FL6	1.56(39.6)	1.56(39.6)	1.45(36.9)	0.96(24.4)	0.96(24.4)	0.66(16.8)	1.06(27.0)	0.28(7.1)	
3/4	5/8	1/2	-TTT-FL12-FL10-FL8	1.56(39.6)	1.56(39.6)	1.56(39.6)	0.96(24.4)	0.96(24.4)	0.90(22.9)	1.06(27.0)	0.41(10.4)	
3/4	5/8	5/8	-TTT-FL12-FL10-FL10	1.56(39.6)	1.56(39.6)	1.56(39.6)	0.96(24.4)	0.96(24.4)	0.96(24.4)	1.06(27.0)	0.50(12.7)	
3/4	3/4	1/4	-TTT-FL12-FL12-FL4	1.56(39.6)	1.56(39.6)	1.43(36.3)	0.96(24.4)	0.96(24.4)	0.60(15.2)	1.06(27.0)	0.19(4.8)	
3/4	3/4	3/8	-TTT-FL12-FL12-FL6	1.56(39.6)	1.56(39.6)	1.45(36.9)	0.96(24.4)	0.96(24.4)	0.66(16.8)	1.06(27.0)	0.28(7.1)	
3/4	3/4	1/2	-TTT-FL12-FL12-FL8	1.56(39.6)	1.56(39.6)	1.56(39.6)	0.96(24.4)	0.96(24.4)	0.90(22.9)	1.06(27.0)	0.41(10.4)	
3/4	3/4	5/8	-TTT-FL12-FL12-FL10	1.56(39.6)	1.56(39.6)	1.56(39.6)	0.96(24.4)	0.96(24.4)	0.96(24.4)	1.06(27.0)	0.50(12.7)	
7/8	1/2	3/4	-TTT-FL14-FL8-FL12	1.76(44.7)	1.76(44.7)	1.76(44.7)	1.02(25.9)	0.90(22.9)	0.96(24.4)	1.37(34.9)	0.41(10.4)	
7/8	5/8	3/8	-TTT-FL14-FL10-FL6	1.76(44.7)	1.76(44.7)	1.65(41.9)	1.02(25.9)	0.96(24.4)	0.66(16.8)	1.37(34.9)	0.28(7.1)	
7/8	3/4	3/8	-TTT-FL14-FL12-FL6	1.76(44.7)	1.76(44.7)	1.65(41.9)	1.02(25.9)	0.96(24.4)	0.66(16.8)	1.37(34.9)	0.28(7.1)	
7/8	3/4	1/2	-TTT-FL14-FL12-FL8	1.76(44.7)	1.76(44.7)	1.76(44.7)	1.02(25.9)	0.96(24.4)	0.90(22.9)	1.37(34.9)	0.41(10.4)	
7/8	3/4	3/4	-TTT-FL14-FL12-FL12	1.76(44.7)	1.76(44.7)	1.76(44.7)	1.02(25.9)	0.96(24.4)	0.96(24.4)	1.37(34.9)	0.62(15.7)	
7/8	7/8	1/4	-TTT-FL14-FL14-FL4	1.76(44.7)	1.76(44.7)	1.59(40.4)	1.02(25.9)	1.02(25.9)	0.60(15.2)	1.37(34.9)	0.19(4.8)	
7/8	7/8	3/8	-TTT-FL14-FL14-FL6	1.76(44.7)	1.76(44.7)	1.65(41.9)	1.02(25.9)	1.02(25.9)	0.66(16.8)	1.37(34.9)	0.28(7.1)	
1	3/8	3/8	-TTT-FL16-FL6-FL6	1.94(49.3)	1.65(41.9)	1.65(41.9)	1.23(31.2)	0.66(16.8)	0.66(16.8)	1.37(34.9)	0.28(7.1)	
1	1/2	1/4	-TTT-FL16-FL8-FL4	1.94(49.3)	1.76(44.7)	1.59(40.4)	1.23(31.2)	0.90(22.9)	0.60(15.2)	1.37(34.9)	0.19(4.8)	
1	1/2	3/8	-TTT-FL16-FL8-FL6	1.94(49.3)	1.76(44.7)	1.65(41.9)	1.23(31.2)	0.90(22.9)	0.66(16.8)	1.37(34.9)	0.28(7.1)	
1	1/2	1/2	-TTT-FL16-FL8-FL8	1.94(49.3)	1.76(44.7)	1.76(44.7)	1.23(31.2)	0.90(22.9)	0.90(22.9)	1.37(34.9)	0.41(10.4)	
1	1/2	1	-TTT-FL16-FL8-FL16	1.94(49.3)	1.76(44.7)	1.94(49.3)	1.23(31.2)	0.90(22.9)	1.23(31.2)	1.37(34.9)	0.41(10.4)	
1	5/8	3/8	-TTT-FL16-FL10-FL6	1.94(49.3)	1.76(44.7)	1.65(41.9)	1.23(31.2)	0.96(24.4)	0.66(16.8)	1.37(34.9)	0.28(7.1)	
1	3/4	3/8	-TTT-FL16-FL12-FL6	1.94(49.3)	1.76(44.7)	1.65(41.9)	1.23(31.2)	0.96(24.4)	0.66(16.8)	1.37(34.9)	0.28(7.1)	
1	3/4	1/2	-TTT-FL16-FL12-FL8	1.94(49.3)	1.76(44.7)	1.76(44.7)	1.23(31.2)	0.96(24.4)	0.90(22.9)	1.37(34.9)	0.41(10.4)	
1	3/4	5/8	-TTT-FL16-FL12-FL10	1.94(49.3)	1.76(44.7)	1.76(44.7)	1.23(31.2)	0.96(24.4)	0.96(24.4)	1.37(34.9)	0.50(12.7)	
1	3/4	1	-TTT-FL16-FL12-FL16	1.94(49.3)	1.76(44.7)	1.94(49.3)	1.23(31.2)	0.96(24.4)	1.23(31.2)	1.37(34.9)	0.62(15.7)	
1	7/8	1/4	-TTT-FL16-FL14-FL4	1.94(49.3)	1.76(44.7)	1.59(40.4)	1.23(31.2)	1.02(25.9)	0.60(15.2)	1.37(34.9)	0.19(4.8)	
1	7/8	3/8	-TTT-FL16-FL14-FL6	1.94(49.3)	1.76(44.7)	1.65(41.9)	1.23(31.2)	1.02(25.9)	0.66(16.8)	1.37(34.9)	0.28(7.1)	
1	7/8	1/2	-TTT-FL16-FL14-FL8	1.94(49.3)	1.76(44.7)	1.76(44.7)	1.23(31.2)	1.02(25.9)	0.90(22.9)	1.37(34.9)	0.41(10.4)	
1	7/8	3/4	-TTT-FL16-FL14-FL12	1.94(49.3)	1.76(44.7)	1.76(44.7)	1.23(31.2)	1.02(25.9)	0.96(24.4)	1.37(34.9)	0.62(15.7)	
1	7/8	7/8	-TTT-FL16-FL14-FL14	1.94(49.3)	1.76(44.7)	1.76(44.7)	1.23(31.2)	1.02(25.9)	1.02(25.9)	1.37(34.9)	0.72(18.3)	
1	1	1/4	-TTT-FL16-FL16-FL4	1.94(49.3)	1.94(49.3)	1.59(40.4)	1.23(31.2)	1.23(31.2)	0.60(15.2)	1.37(34.9)	0.19(4.8)	
1	1	3/8	-TTT-FL16-FL16-FL6	1.94(49.3)	1.94(49.3)	1.65(41.9)	1.23(31.2)	1.23(31.2)	0.66(16.8)	1.37(34.9)	0.28(7.1)	
1	1	1/2	-TTT-FL16-FL16-FL8	1.94(49.3)	1.94(49.3)	1.76(44.7)	1.23(31.2)	1.23(31.2)	0.90(22.9)	1.37(34.9)	0.41(10.4)	
1	1	5/8	-TTT-FL16-FL16-FL10	1.94(49.3)	1.94(49.3)	1.76(44.7)	1.23(31.2)	1.23(31.2)	0.96(24.4)	1.37(34.9)	0.50(12.7)	
1	1	3/4	-TTT-FL16-FL16-FL12	1.94(49.3)	1.94(49.3)	1.76(44.7)	1.23(31.2)	1.23(31.2)	0.96(24.4)	1.37(34.9)	0.62(15.7)	
1	1	7/8	-TTT-FL16-FL16-FL14	1.94(49.3)	1.94(49.3)	1.76(44.7)	1.23(31.2)	1.23(31.2)	1.02(25.9)	1.37(34.9)	0.72(18.3)	
1 1/4	1 1/4	1	-TTT-FL20-FL20-FL16	2.67(67.8)	2.67(67.8)	2.17(55.1)	1.62(41.2)	1.62(41.2)	1.23(31.3)	1.69(42.9)	0.88(22.4)	
1 1/2	1 1/2	1	-TTT-FL24-FL24-FL16	3.10(78.7)	3.10(78.7)	2.36(60.0)	1.97(50.0)	1.97(50.0)	1.23(31.3)	2.00(50.8)	0.88(22.4)	

Reducing Union Tees



Metric Tube				Dimensions, mm (in.)							
T1-Tube O.D. (mm)	T2-Tube O.D. (mm)	T3-Tube O.D. (mm)	Basic Ordering Number	L1	L2	L3	C1	C2	C3	F	E
3	3	6	-TTT-ML3-ML3-ML6	24.7(0.97)	24.7(0.97)	27.0(1.06)	12.9(0.51)	12.9(0.51)	15.3(0.60)	12.7(0.50)	2.4(0.09)
6	6	3	-TTT-ML6-ML6-ML3	27.0(1.06)	27.0(1.06)	24.7(0.97)	15.3(0.60)	15.3(0.60)	12.9(0.51)	12.7(0.50)	2.4(0.09)
6	6	8	-TTT-ML6-ML6-ML8	28.0(1.10)	28.0(1.10)	28.8(1.13)	15.3(0.60)	15.3(0.60)	16.2(0.64)	14.3(0.56)	4.8(0.19)
8	8	6	-TTT-ML8-ML8-ML6	30.0(1.18)	30.0(1.18)	29.0(1.14)	16.2(0.64)	16.2(0.64)	15.3(0.60)	15.9(0.63)	4.8(0.19)
8	8	12	-TTT-ML8-ML8-ML12	35.2(1.39)	35.2(1.39)	36.0(1.42)	16.2(0.64)	16.2(0.64)	22.8(0.90)	20.6(0.81)	6.4(0.25)
10	10	6	-TTT-ML10-ML10-ML6	31.5(1.24)	31.5(1.24)	29.9(1.18)	17.2(0.68)	17.2(0.68)	15.3(0.60)	17.5(0.69)	4.8(0.19)
10	10	8	-TTT-ML10-ML10-ML8	31.5(1.24)	31.5(1.24)	30.7(1.21)	17.2(0.68)	17.2(0.68)	16.2(0.64)	17.5(0.69)	6.4(0.25)
12	12	6	-TTT-ML12-ML12-ML6	36.0(1.42)	36.0(1.42)	31.8(1.25)	22.8(0.90)	22.8(0.90)	15.3(0.60)	20.6(0.81)	4.8(0.19)
12	12	8	-TTT-ML12-ML12-ML8	36.0(1.42)	36.0(1.42)	32.0(1.26)	22.8(0.90)	22.8(0.90)	16.2(0.64)	20.6(0.81)	6.4(0.25)
12	12	14	-TTT-ML12-ML12-ML14	38.0(1.50)	38.0(1.50)	38.0(1.50)	22.8(0.90)	22.8(0.90)	24.4(0.96)	25.4(1.00)	9.5(0.37)
12	12	18	-TTT-ML12-ML12-ML18	39.8(1.57)	39.8(1.57)	39.8(1.57)	22.8(0.90)	22.8(0.90)	24.4(0.96)	27.0(1.06)	9.5(0.37)
14	14	8	-TTT-ML14-ML14-ML8	38.0(1.50)	38.0(1.50)	35.5(1.40)	24.4(0.96)	24.4(0.96)	16.2(0.64)	25.4(1.00)	6.4(0.25)
14	14	10	-TTT-ML14-ML14-ML10	38.0(1.50)	38.0(1.50)	36.7(1.44)	24.4(0.96)	24.4(0.96)	17.2(0.68)	25.4(1.00)	7.9(0.31)
15	15	12	-TTT-ML15-ML15-ML12	38.8(1.53)	38.8(1.53)	38.8(1.53)	24.4(0.96)	24.4(0.96)	22.8(0.90)	25.4(1.00)	9.5(0.37)
16	8	16	-TTT-ML16-ML8-ML16	38.8(1.53)	35.5(1.40)	38.8(1.53)	24.4(0.96)	16.2(0.64)	24.4(0.96)	25.4(1.00)	6.4(0.25)
16	16	12	-TTT-ML16-ML16-ML12	38.8(1.53)	38.8(1.53)	38.9(1.53)	24.4(0.96)	24.4(0.96)	22.8(0.90)	25.4(1.00)	9.5(0.37)
18	18	8	-TTT-ML18-ML18-ML8	39.8(1.57)	39.8(1.57)	39.0(1.54)	24.4(0.96)	24.4(0.96)	16.2(0.64)	27.0(1.06)	6.4(0.25)
18	18	10	-TTT-ML18-ML18-ML10	39.8(1.57)	39.8(1.57)	37.4(1.47)	24.4(0.96)	24.4(0.96)	17.2(0.68)	27.0(1.06)	7.9(0.31)
18	18	12	-TTT-ML18-ML18-ML12	39.8(1.57)	39.8(1.57)	39.8(1.57)	24.4(0.96)	24.4(0.96)	22.8(0.90)	27.0(1.06)	9.5(0.37)
18	18	14	-TTT-ML18-ML18-ML14	39.8(1.57)	39.8(1.57)	39.8(1.57)	24.4(0.96)	24.4(0.96)	24.4(0.96)	27.0(1.06)	11.1(0.44)
20	20	14	-TTT-ML20-ML20-ML14	44.6(1.76)	44.6(1.76)	44.6(1.76)	26.0(1.02)	26.0(1.02)	24.4(0.96)	34.9(1.37)	11.1(0.44)
22	22	12	-TTT-ML22-ML22-ML12	44.6(1.76)	44.6(1.76)	44.6(1.76)	26.0(1.02)	26.0(1.02)	22.8(0.90)	34.9(1.37)	9.5(0.37)
25	25	12	-TTT-ML25-ML25-ML12	49.1(1.93)	49.1(1.93)	44.7(1.76)	31.3(1.23)	31.3(1.23)	22.8(0.90)	34.9(1.37)	9.5(0.37)

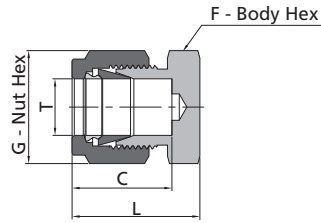
Union Crosses



Fractional Tube						
T-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)				
		L	C	G	F	E
1/8	-C-FL2	0.88(22.4)	0.50(12.7)	0.44(11.1)	0.37(9.5)	0.09(2.3)
3/16	-C-FL3	0.96(24.4)	0.54(13.7)	0.50(12.7)	0.44(11.1)	0.12(3.0)
1/4	-C-FL4	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)
5/16	-C-FL5	1.17(29.7)	0.64(16.2)	0.63(15.9)	0.63(15.9)	0.25(6.4)
3/8	-C-FL6	1.20(30.5)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.28(7.1)
1/2	-C-FL8	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)
5/8	-C-FL10	1.53(38.8)	0.96(24.4)	1.00(25.4)	1.0(25.4)	0.50(12.7)
3/4	-C-FL12	1.57(39.9)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.62(15.7)
7/8	-C-FL14	1.76(44.7)	1.02(25.9)	1.25(31.8)	1.37(34.9)	0.72(18.3)
1	-C-FL16	1.93(49.0)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.88(22.4)

Metric Tube						
T-Tube O.D. (mm)	Basic Ordering Number	Dimensions, mm (in.)				
		L	C	G	F	E
3	-C-ML3	22.3(0.88)	12.9(0.51)	12.0(0.47)	9.5(0.37)	2.4(0.09)
4	-C-ML4	25.4(1.00)	13.7(0.54)	12.0(0.47)	12.7(0.50)	2.4(0.09)
6	-C-ML6	27.0(1.06)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.8(0.19)
8	-C-ML8	29.9(1.18)	16.2(0.64)	16.0(0.63)	15.9(0.63)	6.4(0.25)
10	-C-ML10	33.5(1.32)	17.2(0.68)	19.0(0.75)	20.6(0.81)	7.9(0.31)
12	-C-ML12	36.0(1.42)	22.8(0.90)	22.0(0.87)	20.6(0.81)	9.5(0.37)
16	-C-ML16	37.0(1.46)	24.4(0.96)	25.0(0.98)	23.8(0.94)	12.7(0.50)
18	-C-ML18	38.3(1.51)	24.4(0.96)	30.0(1.18)	27.0(1.06)	15.1(0.59)
20	-C-ML20	44.6(1.76)	26.0(1.02)	32.0(1.26)	34.9(1.37)	15.9(0.63)
22	-C-ML22	44.7(1.76)	26.0(1.02)	32.0(1.26)	34.9(1.37)	18.3(0.72)
25	-C-ML25	49.2(1.94)	31.3(1.23)	38.0(1.50)	34.9(1.37)	21.8(0.86)

Caps

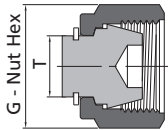


Fractional Tube					
T-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)			
		L	C	G	F
1/16	-TC-FL1	0.59(15.0)	0.34(8.6)	0.31(7.9)	0.31(7.9)
1/8	-TC-FL2	0.79(20.1)	0.50(12.7)	0.44(11.1)	0.44(11.1)
3/16	-TC-FL3	0.84(21.3)	0.54(13.7)	0.50(12.7)	0.44(11.1)
1/4	-TC-FL4	0.92(23.4)	0.60(15.2)	0.56(14.3)	0.50(12.7)
5/16	-TC-FL5	0.96(24.4)	0.64(16.3)	0.63(15.9)	0.56(14.3)
3/8	-TC-FL6	1.01(25.7)	0.66(16.8)	0.69(17.5)	0.63(15.9)
1/2	-TC-FL8	1.15(29.2)	0.90(22.9)	0.87(22.2)	0.81(20.6)
5/8	-TC-FL10	1.18(30.0)	0.96(24.4)	1.00(25.4)	0.94(23.8)
3/4	-TC-FL12	1.24(31.5)	0.96(24.4)	1.13(28.6)	1.06(27.0)
7/8	-TC-FL14	1.34(34.0)	1.02(25.9)	1.25(31.8)	1.19(30.2)
1	-TC-FL16	1.51(38.4)	1.23(31.2)	1.50(38.1)	1.37(34.9)
1 1/8	-TC-FL18	1.51(38.4)	1.44(36.7)	1.75(44.5)	1.63(41.3)
1 1/4	-TC-FL20	2.10(53.3)	1.62(41.1)	1.87(47.6)	1.75(44.5)
1 1/2	-TC-FL24	2.54(64.5)	1.97(50.0)	2.25(57.2)	2.13(54.0)

Metric Tube					
T-Tube O.D. (mm)	Basic Ordering Number	Dimensions, mm (in.)			
		L	C	G	F
2	-TC-ML2	20.1(0.79)	12.9(0.51)	12.0(0.47)	12.0(0.47)
3	-TC-ML3	20.1(0.79)	12.9(0.51)	12.0(0.47)	12.0(0.47)
4	-TC-ML4	21.3(0.84)	13.7(0.54)	12.0(0.47)	12.0(0.47)
6	-TC-ML6	23.1(0.91)	15.3(0.60)	14.0(0.55)	14.0(0.55)
8	-TC-ML8	24.5(0.96)	16.2(0.64)	16.0(0.63)	15.0(0.59)
10	-TC-ML10	26.6(1.05)	17.2(0.68)	19.0(0.75)	18.0(0.71)
12	-TC-ML12	29.1(1.15)	22.8(0.90)	22.0(0.87)	22.0(0.87)
14	-TC-ML14	29.9(1.18)	24.4(0.96)	25.0(0.98)	24.0(0.94)
15	-TC-ML15	29.9(1.18)	24.4(0.96)	25.0(0.98)	24.0(0.94)
16	-TC-ML16	29.9(1.18)	24.4(0.96)	25.0(0.98)	24.0(0.94)
18	-TC-ML18	31.4(1.24)	24.4(0.96)	30.0(1.18)	27.0(1.06)
20	-TC-ML20	34.0(1.34)	26.0(1.02)	32.0(1.26)	30.0(1.18)
22	-TC-ML22	34.0(1.34)	26.0(1.02)	32.0(1.26)	30.0(1.18)
25	-TC-ML25	38.5(1.52)	31.3(1.23)	38.0(1.50)	35.0(1.38)
28	-TC-ML28	48.5(1.91)	36.6(1.44)	46.0(1.81)	41.0(1.61)
30	-TC-ML30	53.4(2.10)	39.6(1.56)	50.0(1.97)	46.0(1.81)
32	-TC-ML32	55.8(2.20)	42.0(1.65)	50.0(1.97)	46.0(1.81)
38	-TC-ML38	65.4(2.57)	49.4(1.94)	60.0(2.36)	55.0(2.17)



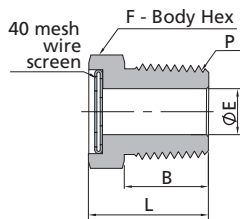
## Plugs



Fractional Tube		
T-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)
		G
1/16	-TP-FL1	0.31(7.9)
1/8	-TP-FL2	0.44(11.1)
3/16	-TP-FL3	0.50(12.7)
1/4	-TP-FL4	0.56(14.3)
5/16	-TP-FL5	0.63(15.9)
3/8	-TP-FL6	0.69(17.5)
1/2	-TP-FL8	0.87(22.2)
5/8	-TP-FL10	1.00(25.4)
3/4	-TP-FL12	1.13(28.6)
7/8	-TP-FL14	1.25(31.8)
1	-TP-FL16	1.50(38.1)
1 1/4	-TP-FL20	1.87(47.6)
1 1/2	-TP-FL24	2.25(57.2)

Metric Tube		
T-Tube O.D. (mm)	Basic Ordering Number	Dimensions, mm (in.)
		G
2	-TP-ML2	12.0(0.47)
3	-TP-ML3	12.0(0.47)
4	-TP-ML4	12.0(0.47)
6	-TP-ML6	14.0(0.55)
8	-TP-ML8	16.0(0.63)
10	-TP-ML10	19.0(0.75)
12	-TP-ML12	22.0(0.87)
14	-TP-ML14	25.0(0.98)
15	-TP-ML15	25.0(0.98)
16	-TP-ML16	25.0(0.98)
18	-TP-ML18	30.0(1.18)
20	-TP-ML20	32.0(1.26)
22	-TP-ML22	32.0(1.26)
25	-TP-ML25	38.0(1.50)
28	-TP-ML28	46.0(1.81)
30	-TP-ML30	50.0(1.97)
32	-TP-ML32	50.0(1.97)
38	-TP-ML38	60.0(2.36)

## Vent Protectors



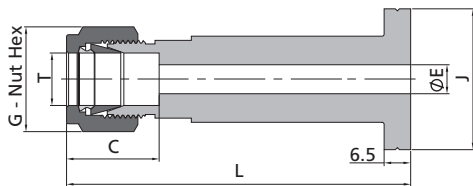
40 mesh 300 series stainless steel wire screen assembly

NPT Thread					
P-NPT Size	Ordering Number	Dimensions, in. (mm)			
		L	F	B	E
1/8	-VPF-NS2	0.56(14.2)	0.50(12.7)	0.38(9.7)	0.19(4.8)
1/4	-VPF-NS4	0.78(19.8)	0.56(14.3)	0.56(14.2)	0.28(7.1)
3/8	-VPF-NS6	0.81(20.6)	0.69(17.5)	0.56(14.2)	0.41(10.4)
1/2	-VPF-NS8	1.03(26.2)	0.87(22.2)	0.75(19.1)	0.50(12.7)
3/4	-VPF-NS12	1.06(26.9)	1.06(27.0)	0.76(19.2)	0.72(18.3)
1	-VPF-NS16	1.37(34.8)	1.37(34.9)	0.94(23.9)	0.88(22.4)

To order brass, replace SS in the ordering number with B

Example: B-VPF-NS2

## Lapped Flange Connectors

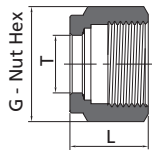


- Standard material is 316 or Monel.
- The flange ends are used with NPS 1/2 lap joint pipe flanges.
- The flange ends are dimensioned to meet "ANSI B16.5 Class 2500" flange specifications.
- The Flange Seal A means surface finish Ra 3.2-6.3 µm, the flange Seal B means Ra 6.3-12.5 µm.

Fractional Tube							
T-Tube O.D. (in.)	Flange Seal	Basic Ordering Number	Dimensions, in. (mm)				
			L	G	C	E	J
1/4	A	-LFC-FL4A	3.18(80.8)	0.56(14.3)	0.60(15.2)	0.19(4.8)	1.36(34.5)
1/4	B	-LFC-FL4B	3.18(80.8)	0.56(14.3)	0.60(15.2)	0.19(4.8)	1.36(34.5)
3/8	A	-LFC-FL6A	3.24(82.3)	0.69(17.5)	0.66(16.8)	0.28(7.1)	1.36(34.5)
3/8	B	-LFC-FL6B	3.24(82.3)	0.69(17.5)	0.66(16.8)	0.28(7.1)	1.36(34.5)
1/2	A	-LFC-FL8A	3.35(85.1)	0.87(22.2)	0.90(22.9)	0.31(7.9)	1.36(34.5)
1/2	B	-LFC-FL8B	3.35(85.1)	0.87(22.2)	0.90(22.9)	0.31(7.9)	1.36(34.5)

Metric Tube							
T-Tube O.D. (mm)	Flange Seal	Basic Ordering Number	Dimensions, mm (in.)				
			L	G	C	E	J
10	A	-LFC-ML10A	82.6(3.25)	19.0(0.75)	17.2(0.68)	7.9(0.31)	34.5(1.36)
10	B	-LFC-ML10B	82.6(3.25)	19.0(0.75)	17.2(0.68)	7.9(0.31)	34.5(1.36)

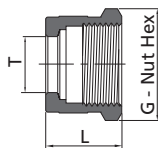
Nuts



Fractional Tube			
T-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)	
		L	G
1/16	-N-FL1	0.31(7.9)	0.31(7.9)
1/8	-N-FL2	0.47(11.9)	0.44(11.1)
3/16	-N-FL3	0.47(11.9)	0.50(12.7)
1/4	-N-FL4	0.50(12.7)	0.56(14.3)
5/16	-N-FL5	0.53(13.5)	0.63(15.9)
3/8	-N-FL6	0.56(14.2)	0.69(17.5)
1/2	-N-FL8	0.69(17.5)	0.87(22.2)
5/8	-N-FL10	0.69(17.5)	1.00(25.4)
3/4	-N-FL12	0.69(17.5)	1.13(28.6)
7/8	-N-FL14	0.69(17.5)	1.25(31.8)
1	-N-FL16	0.81(20.6)	1.50(38.1)
1 1/8	-N-FL18	1.21(30.8)	1.75(44.5)
1 1/4	-N-FL20	1.25(31.8)	1.87(47.6)
1 1/2	-N-FL24	1.50(38.1)	2.25(57.2)

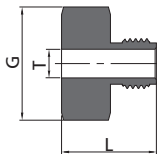
Metric Tube			
T-Tube O.D. (mm)	Basic Ordering Number	Dimensions, mm (in.)	
		L	G
2	-N-ML2	11.9(0.47)	12.0(0.47)
3	-N-ML3	11.9(0.47)	12.0(0.47)
4	-N-ML4	11.9(0.47)	12.0(0.47)
6	-N-ML6	12.7(0.50)	14.0(0.55)
8	-N-ML8	13.5(0.53)	16.0(0.63)
10	-N-ML10	15.1(0.59)	19.0(0.75)
12	-N-ML12	17.4(0.69)	22.0(0.87)
14	-N-ML14	17.4(0.69)	25.0(0.98)
15	-N-ML15	17.4(0.69)	25.0(0.98)
16	-N-ML16	17.4(0.69)	25.0(0.98)
18	-N-ML18	17.4(0.69)	30.0(1.18)
20	-N-ML20	17.4(0.69)	32.0(1.26)
22	-N-ML22	17.4(0.69)	32.0(1.26)
25	-N-ML25	20.6(0.81)	38.0(1.50)
28	-N-ML28	30.6(1.20)	46.0(1.81)
30	-N-ML30	32.7(1.29)	50.0(1.97)
32	-N-ML32	34.4(1.35)	50.0(1.97)
38	-N-ML38	40.6(1.60)	60.0(2.36)

Knurled Nuts



To order a knurled nut add K to the nut ordering number.  
Example: B-KN-FL4

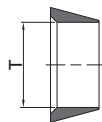
Male Nuts



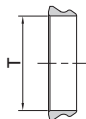
Fractional Tube			
T-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)	
		L	G
1/16	-MN-FL1	0.38(9.7)	0.25(6.4)
1/8	-MN-FL2	0.53(13.5)	0.37(9.5)
1/4	-MN-FL4	0.62(15.7)	0.50(12.7)
1/2	-MN-FL8	0.87(22.1)	0.94(23.8)

Metric Tube			
T-Tube O.D. (mm)	Basic Ordering Number	Dimensions, mm (in.)	
		L	G
3	-MN-ML3	13.5(0.53)	10.0(0.39)
6	-MN-ML6	15.7(0.62)	14.0(0.55)
10	-MN-ML10	22.1(0.87)	22.0(0.87)
12	-MN-ML12	22.1(0.87)	24.0(0.94)

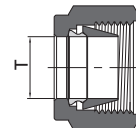
## Front Ferrules



## Rear Ferrules



## Nuts + Ferrules



Fractional Tube	
T-Tube O.D. (in.)	Basic Ordering Number
1/16	-FF-FL1
1/8	-FF-FL2
3/16	-FF-FL3
1/4	-FF-FL4
5/16	-FF-FL5
3/8	-FF-FL6
1/2	-FF-FL8
5/8	-FF-FL10
3/4	-FF-FL12
7/8	-FF-FL14
1	-FF-FL16
1 1/8	-FF-FL18*
1 1/4	-FF-FL20*
1 1/2	-FF-FL24*

Metric Tube	
T-Tube O.D. (mm)	Basic Ordering Number
2	-FF-ML2
3	-FF-ML3
4	-FF-ML4
6	-FF-ML6
8	-FF-ML8
10	-FF-ML10
12	-FF-ML12
14	-FF-ML14
15	-FF-ML15
16	-FF-ML16
18	-FF-ML18
20	-FF-ML20
22	-FF-ML22
25	-FF-ML25
28	-FF-ML28*
30	-FF-ML30*
32	-FF-ML32*
38	-FF-ML38*

\* Stainless steel front ferrules over 1 in. or 25 mm are PFA coated.

Fractional Tube	
T-Tube O.D. (in.)	Basic Ordering Number
1/16	-RF-FL1
1/8	-RF-FL2
3/16	-RF-FL3
1/4	-RF-FL4
5/16	-RF-FL5
3/8	-RF-FL6
1/2	-RF-FL8
5/8	-RF-FL10
3/4	-RF-FL12
7/8	-RF-FL14
1	-RF-FL16
1 1/8	-RF-FL18*
1 1/4	-RF-FL20*
1 1/2	-RF-FL24*

Metric Tube	
T-Tube O.D. (mm)	Basic Ordering Number
2	-RF-ML2
3	-RF-ML3
4	-RF-ML4
6	-RF-ML6
8	-RF-ML8
10	-RF-ML10
12	-RF-ML12
14	-RF-ML14
15	-RF-ML15
16	-RF-ML16
18	-RF-ML18
20	-RF-ML20
22	-RF-ML22
25	-RF-ML25
28	-RF-ML28*
30	-RF-ML30*
32	-RF-ML32*
38	-RF-ML38*

\* Stainless steel rear ferrules over 1 in. or 25 mm are PFA coated.

Fractional Tube	
T-Tube O.D. (in.)	Basic Ordering Number
1/16	-NFR-FL1
1/8	-NFR-FL2
3/16	-NFR-FL3
1/4	-NFR-FL4
5/16	-NFR-FL5
3/8	-NFR-FL6
1/2	-NFR-FL8
5/8	-NFR-FL10
3/4	-NFR-FL12
7/8	-NFR-FL14
1	-NFR-FL16
1 1/8	-NFR-FL18
1 1/4	-NFR-FL20
1 1/2	-NFR-FL24

Metric Tube	
T-Tube O.D. (mm)	Basic Ordering Number
2	-NFR-ML2
3	-NFR-ML3
4	-NFR-ML4
6	-NFR-ML6
8	-NFR-ML8
10	-NFR-ML10
12	-NFR-ML12
14	-NFR-ML14
15	-NFR-ML15
16	-NFR-ML16
18	-NFR-ML18
20	-NFR-ML20
22	-NFR-ML22
25	-NFR-ML25
28	-NFR-ML28
30	-NFR-ML30
32	-NFR-ML32
38	-NFR-ML38

Nuts - Ferrule Sets



Each Nut-Ferrule Set contains 5 nuts, 5 front ferrules and 5 rear ferrules.

Fractional Tube	
T-Tube O.D. (in.)	Basic Ordering Number
1/16	-NFS-FL1
1/8	-NFS-FL2
3/16	-NFS-FL3
1/4	-NFS-FL4
5/16	-NFS-FL5
3/8	-NFS-FL6
1/2	-NFS-FL8
5/8	-NFS-FL10
3/4	-NFS-FL12

Metric Tube	
T-Tube O.D. (mm)	Basic Ordering Number
2	-NFS-ML2
3	-NFS-ML3
4	-NFS-ML4
6	-NFS-ML6
8	-NFS-ML8
10	-NFS-ML10
12	-NFS-ML12
14	-NFS-ML14
15	-NFS-ML15
16	-NFS-ML16
18	-NFS-ML18

Ferrule Sets

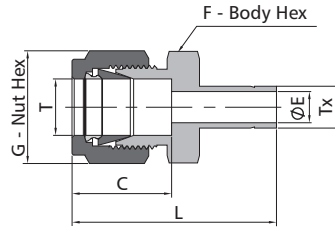


Each Ferrule Set contains 10 front ferrules and 10 rear ferrules.

Fractional Tube	
T-Tube O.D. (in.)	Basic Ordering Number
1/16	-FRS-FL1
1/8	-FRS-FL2
3/16	-FRS-FL3
1/4	-FRS-FL4
5/16	-FRS-FL5
3/8	-FRS-FL6
1/2	-FRS-FL8
5/8	-FRS-FL10
3/4	-FRS-FL12

Metric Tube	
T-Tube O.D. (mm)	Basic Ordering Number
2	-FRS-ML2
3	-FRS-ML3
4	-FRS-ML4
6	-FRS-ML6
8	-FRS-ML8
10	-FRS-ML10
12	-FRS-ML12
14	-FRS-ML14
15	-FRS-ML15
16	-FRS-ML16
18	-FRS-ML18

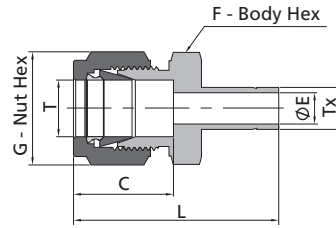
Reducers



Fractional Tube			Dimensions, in. (mm)				
T-Tube O.D. (in.)	Tx-Tube O.D. (in.)	Basic Ordering Number	L	C	G	F	E
1/16	1/8	-R-FL1-FT2	1.15(29.2)	0.34(8.6)	0.31(7.9)	0.31(7.9)	0.05(1.3)
1/16	3/16	-R-FL1-FT3	1.18(30.0)	0.34(8.6)	0.31(7.9)	0.31(7.9)	0.05(1.3)
1/16	1/4	-R-FL1-FT4	1.24(31.5)	0.34(8.6)	0.31(7.9)	0.31(7.9)	0.05(1.3)
1/8	1/16	-R-FL2-FT1	1.14(29.0)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.03(0.8)
1/8	1/8	-R-FL2-FT2	1.32(33.5)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.08(2.0)
1/8	3/16	-R-FL2-FT3	1.35(34.3)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.09(2.3)
1/8	1/4	-R-FL2-FT4	1.42(36.1)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.09(2.3)
1/8	3/8	-R-FL2-FT6	1.48(37.6)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.09(2.3)
1/8	1/2	-R-FL2-FT8	1.74(44.2)	0.50(12.7)	0.44(11.1)	0.56(14.3)	0.09(2.3)
3/16	1/8	-R-FL3-FT2	1.37(34.8)	0.54(13.7)	0.50(12.7)	0.44(11.1)	0.08(2.0)
3/16	1/4	-R-FL3-FT4	1.46(37.1)	0.54(13.7)	0.50(12.7)	0.44(11.1)	0.12(3.0)
1/4	1/8	-R-FL4-FT2	1.45(36.8)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.08(2.0)
1/4	3/16	-R-FL4-FT3	1.48(37.6)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.12(3.0)
1/4	1/4	-R-FL4-FT4	1.54(39.1)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.17(4.3)
1/4	5/16	-R-FL4-FT5	1.57(39.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)
1/4	3/8	-R-FL4-FT6	1.60(40.6)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)
1/4	1/2	-R-FL4-FT8	1.82(46.2)	0.60(15.2)	0.56(14.3)	0.56(14.3)	0.19(4.8)
1/4	5/8	-R-FL4-FT10	1.89(48.0)	0.60(15.2)	0.56(14.3)	0.69(17.5)	0.19(4.8)
1/4	3/4	-R-FL4-FT12	1.88(47.8)	0.60(15.2)	0.56(14.3)	0.81(20.6)	0.19(4.8)
5/16	3/8	-R-FL5-FT6	1.65(41.9)	0.64(16.3)	0.63(15.9)	0.56(14.3)	0.25(6.4)
5/16	1/2	-R-FL5-FT8	1.87(47.5)	0.64(16.3)	0.63(15.9)	0.56(14.3)	0.25(6.4)
3/8	1/4	-R-FL6-FT4	1.63(41.4)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.17(4.3)
3/8	3/8	-R-FL6-FT6	1.70(43.2)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.27(6.9)
3/8	1/2	-R-FL6-FT8	1.91(48.5)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.28(7.1)
3/8	5/8	-R-FL6-FT10	1.98(50.3)	0.66(16.8)	0.69(17.5)	0.69(17.5)	0.28(7.1)
3/8	3/4	-R-FL6-FT12	1.98(50.3)	0.66(16.8)	0.69(17.5)	0.81(20.6)	0.28(7.1)
1/2	1/4	-R-FL8-FT4	1.77(45.0)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.17(4.3)
1/2	3/8	-R-FL8-FT6	1.84(46.7)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.27(6.9)
1/2	1/2	-R-FL8-FT8	2.06(52.3)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.37(9.4)
1/2	5/8	-R-FL8-FT10	2.12(53.8)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)
1/2	3/4	-R-FL8-FT12	2.12(53.8)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)
1/2	1	-R-FL8-FT16	2.37(60.2)	0.90(22.9)	0.87(22.2)	1.06(27.0)	0.41(10.4)
5/8	3/4	-R-FL10-FT12	2.15(54.6)	0.96(24.4)	1.00(25.4)	0.94(23.8)	0.50(12.7)
5/8	7/8	-R-FL10-FT14	2.21(56.1)	0.96(24.4)	1.00(25.4)	0.94(23.8)	0.50(12.7)
5/8	1	-R-FL10-FT16	2.40(61.0)	0.96(24.4)	1.00(25.4)	1.06(27.0)	0.50(12.7)
3/4	1/2	-R-FL12-FT8	2.15(54.6)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.37(9.4)
3/4	1	-R-FL12-FT16	2.46(62.5)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.62(15.7)
1	1 1/4	-R-FL16-FT20	3.17(80.5)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.88(22.4)
1	1 1/2	-R-FL16-FT24	3.51(89.2)	1.23(31.2)	1.50(38.1)	1.63(41.3)	0.88(22.4)
1	2	-R-FL16-FT32	4.43(112.5)	1.23(31.2)	1.50(38.1)	2.13(54.0)	0.88(22.4)
1 1/4	1 1/2	-R-FL20-FT24	4.10(104.1)	1.62(41.1)	1.87(47.6)	1.87(47.6)	1.09(27.7)

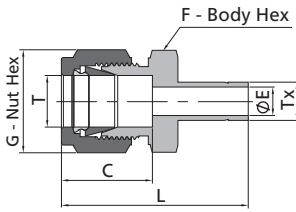
Reducers

Tube Fittings



Metric Tube			Dimensions, mm (in.)					
T-Tube O.D. (mm)	Tx-Tube O.D. (mm)	Basic Ordering Number	L	C	G	F	E	
2	3	-R-ML2-MT3	33.5(1.32)	12.9(0.51)	12.0(0.47)	12.0(0.47)	1.7(0.07)	
3	4	-R-ML3-MT4	35.0(1.38)	12.9(0.51)	12.0(0.47)	12.0(0.47)	2.4(0.09)	
3	6	-R-ML3-MT6	36.1(1.42)	12.9(0.51)	12.0(0.47)	12.0(0.47)	2.4(0.09)	
3	10	-R-ML3-MT10	38.4(1.51)	12.9(0.51)	12.0(0.47)	14.0(0.55)	2.4(0.09)	
4	6	-R-ML4-MT6	37.1(1.46)	13.7(0.54)	12.0(0.47)	12.0(0.47)	2.4(0.09)	
6	3	-R-ML6-MT3	36.9(1.45)	15.3(0.60)	14.0(0.55)	14.0(0.55)	1.9(0.07)	
6	8	-R-ML6-MT8	39.9(1.57)	15.3(0.60)	14.0(0.55)	14.0(0.55)	4.8(0.19)	
6	10	-R-ML6-MT10	40.7(1.60)	15.3(0.60)	14.0(0.55)	14.0(0.55)	4.8(0.19)	
6	12	-R-ML6-MT12	46.3(1.82)	15.3(0.60)	14.0(0.55)	14.0(0.55)	4.8(0.19)	
6	18	-R-ML6-MT18	49.6(1.95)	15.3(0.60)	14.0(0.55)	22.0(0.87)	4.8(0.19)	
8	6	-R-ML8-MT6	40.3(1.59)	16.2(0.64)	16.0(0.63)	15.0(0.59)	4.1(0.16)	
8	10	-R-ML8-MT10	42.0(1.65)	16.2(0.64)	16.0(0.63)	15.0(0.59)	6.4(0.25)	
8	12	-R-ML8-MT12	47.6(1.87)	16.2(0.64)	16.0(0.63)	15.0(0.59)	6.4(0.25)	
10	6	-R-ML10-MT6	42.4(1.67)	17.2(0.68)	19.0(0.75)	18.0(0.71)	4.1(0.16)	
10	8	-R-ML10-MT8	43.4(1.71)	17.2(0.68)	19.0(0.75)	18.0(0.71)	5.6(0.22)	
10	12	-R-ML10-MT12	49.8(1.96)	17.2(0.68)	19.0(0.75)	18.0(0.71)	7.9(0.31)	
10	15	-R-ML10-MT15	51.3(2.02)	17.2(0.68)	19.0(0.75)	18.0(0.71)	7.9(0.31)	
10	18	-R-ML10-MT18	51.3(2.02)	17.2(0.68)	19.0(0.75)	22.0(0.87)	7.9(0.31)	
12	6	-R-ML12-MT6	44.9(1.77)	22.8(0.90)	22.0(0.87)	22.0(0.87)	4.1(0.16)	
12	8	-R-ML12-MT8	45.9(1.81)	22.8(0.90)	22.0(0.87)	22.0(0.87)	5.6(0.22)	
12	10	-R-ML12-MT10	46.7(1.84)	22.8(0.90)	22.0(0.87)	22.0(0.87)	7.1(0.28)	
12	16	-R-ML12-MT16	53.8(2.12)	22.8(0.90)	22.0(0.87)	22.0(0.87)	9.5(0.37)	
12	18	-R-ML12-MT18	53.8(2.12)	22.8(0.90)	22.0(0.87)	22.0(0.87)	9.5(0.37)	
12	20	-R-ML12-MT20	56.1(2.21)	22.8(0.90)	22.0(0.87)	22.0(0.87)	9.5(0.37)	
12	22	-R-ML12-MT22	56.1(2.21)	22.8(0.90)	22.0(0.87)	24.0(0.94)	9.5(0.37)	
12	25	-R-ML12-MT25	62.4(2.46)	22.8(0.90)	22.0(0.87)	27.0(1.06)	9.5(0.37)	
16	12	-R-ML16-MT12	53.0(2.09)	24.4(0.96)	25.0(0.98)	24.0(0.94)	8.8(0.35)	
18	12	-R-ML18-MT12	54.6(2.15)	24.4(0.96)	30.0(1.18)	27.0(1.06)	8.8(0.35)	
18	16	-R-ML18-MT16	56.1(2.21)	24.4(0.96)	30.0(1.18)	27.0(1.06)	12.0(0.47)	
18	20	-R-ML18-MT20	57.6(2.27)	24.4(0.96)	30.0(1.18)	27.0(1.06)	15.1(0.59)	
18	22	-R-ML18-MT22	57.6(2.27)	24.4(0.96)	30.0(1.18)	27.0(1.06)	15.1(0.59)	
18	25	-R-ML18-MT25	62.4(2.46)	24.4(0.96)	30.0(1.18)	27.0(1.06)	15.1(0.59)	
20	16	-R-ML20-MT16	57.9(2.28)	26.0(1.02)	32.0(1.26)	30.0(1.18)	12.0(0.47)	
20	18	-R-ML20-MT18	57.9(2.28)	26.0(1.02)	32.0(1.26)	30.0(1.18)	13.9(0.55)	
20	22	-R-ML20-MT22	59.4(2.34)	26.0(1.02)	32.0(1.26)	30.0(1.18)	15.9(0.63)	
20	25	-R-ML20-MT25	64.2(2.53)	26.0(1.02)	32.0(1.26)	30.0(1.18)	15.8(0.62)	
22	18	-R-ML22-MT18	57.9(2.28)	26.0(1.02)	32.0(1.26)	30.0(1.18)	13.9(0.55)	
22	20	-R-ML22-MT20	59.4(2.34)	26.0(1.02)	32.0(1.26)	30.0(1.18)	15.5(0.61)	
22	25	-R-ML22-MT25	64.2(2.53)	26.0(1.02)	32.0(1.26)	30.0(1.18)	18.3(0.72)	
25	18	-R-ML25-MT18	63.1(2.48)	31.3(1.23)	38.0(1.50)	35.0(1.38)	13.9(0.55)	
25	20	-R-ML25-MT20	64.6(2.54)	31.3(1.23)	38.0(1.50)	35.0(1.38)	15.5(0.61)	

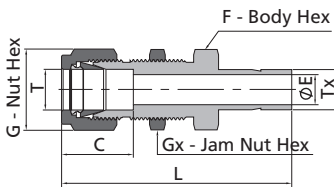
Reducers



Metric Tube			Fractional Tube				
T-Tube O.D. (mm)	Tx-Tube O.D. (in.)	Basic Ordering Number	Dimensions, mm (in.)				
			L	C	G	F	E
2	1/8	-R-ML2-FT2	33.5(1.32)	12.9(0.51)	12.0(0.47)	12.0(0.47)	1.7(0.07)
3	1/8	-R-ML3-FT2	33.5(1.32)	12.9(0.51)	12.0(0.47)	12.0(0.47)	2.0(0.08)
3	1/4	-R-ML3-FT4	36.1(1.42)	12.9(0.51)	12.0(0.47)	12.0(0.47)	2.4(0.09)
4	1/4	-R-ML4-FT4	37.1(1.46)	13.7(0.54)	12.0(0.47)	12.0(0.47)	2.4(0.09)
6	1/8	-R-ML6-FT2	36.9(1.45)	15.3(0.60)	14.0(0.55)	14.0(0.55)	2.0(0.08)
6	1/4	-R-ML6-FT4	39.2(1.54)	15.3(0.60)	14.0(0.55)	14.0(0.55)	4.4(0.17)
6	5/16	-R-ML6-FT5	39.9(1.57)	15.3(0.60)	14.0(0.55)	14.0(0.55)	4.8(0.19)
6	3/8	-R-ML6-FT6	40.7(1.60)	15.3(0.60)	14.0(0.55)	14.0(0.55)	4.8(0.19)
6	1/2	-R-ML6-FT8	46.3(1.82)	15.3(0.60)	14.0(0.55)	14.0(0.55)	4.8(0.19)
8	1/4	-R-ML8-FT4	40.3(1.59)	16.2(0.64)	16.0(0.63)	15.0(0.59)	4.4(0.17)
8	3/8	-R-ML8-FT6	42.0(1.65)	16.2(0.64)	16.0(0.63)	15.0(0.59)	6.4(0.25)
8	1/2	-R-ML8-FT8	47.6(1.87)	16.2(0.64)	16.0(0.63)	15.0(0.59)	6.4(0.25)
10	3/8	-R-ML10-FT6	44.4(1.75)	17.2(0.68)	19.0(0.75)	18.0(0.71)	6.8(0.27)
10	1/2	-R-ML10-FT8	49.8(1.96)	17.2(0.68)	19.0(0.75)	18.0(0.71)	7.9(0.31)
12	1/2	-R-ML12-FT8	52.3(2.06)	22.8(0.90)	22.0(0.87)	22.0(0.87)	9.3(0.37)
12	3/4	-R-ML12-FT12	53.8(2.12)	22.8(0.90)	22.0(0.87)	22.0(0.87)	9.5(0.37)
18	3/4	-R-ML18-FT12	56.1(2.21)	24.4(0.96)	30.0(1.18)	27.0(1.06)	14.7(0.58)
18	1	-R-ML18-FT16	62.4(2.46)	24.4(0.96)	30.0(1.18)	27.0(1.06)	15.1(0.59)
25	1	-R-ML25-FT16	69.5(2.74)	31.3(1.23)	38.0(1.50)	35.0(1.38)	20.2(0.80)

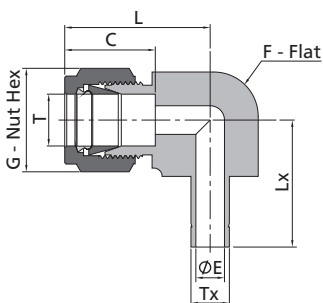
Fractional Tube			Metric Tube				
T-Tube O.D. (in.)	Tx-Tube O.D. (mm)	Basic Ordering Number	Dimensions, in. (mm)				
			L	C	G	F	E
1/8	6	-R-FL2-MT6	1.42(36.1)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.09(2.3)

Bulkhead Reducers



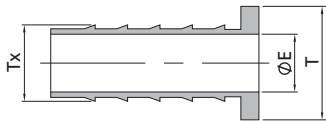
Fractional Tube			Metric Tube					
T-Tube O.D. (in.)	Tx-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)					
			L	C	G	F	Gx	E
1/8	1/8	-BR-FL2-FT2	1.95(49.5)	0.50(12.7)	0.44(11.1)	0.50(12.7)	0.50(12.7)	0.08(2.0)
1/4	1/4	-BR-FL4-FT4	2.20(55.9)	0.60(15.2)	0.56(14.3)	0.63(15.9)	0.63(15.9)	0.17(4.3)
3/8	3/8	-BR-FL6-FT6	2.41(61.2)	0.66(16.8)	0.69(17.5)	0.75(19.1)	0.75(19.1)	0.27(6.9)
1/2	1/2	-BR-FL8-FT8	2.87(72.9)	0.90(22.9)	0.87(22.2)	0.94(23.8)	0.94(23.8)	0.37(9.4)
5/8	5/8	-BR-FL10-FT10	2.96(75.2)	0.96(24.4)	1.00(25.4)	1.06(27.0)	1.06(27.0)	0.47(11.9)
3/4	3/4	-BR-FL12-FT12	3.21(81.5)	0.96(24.4)	1.13(28.6)	1.19(30.2)	1.19(30.2)	0.58(14.7)
1	1	-BR-FL16-FT16	3.95(100.3)	1.23(31.2)	1.50(38.1)	1.63(41.3)	1.63(41.3)	0.80(20.3)

Reducer Elbows



Metric Tube			Fractional Tube					
T-Tube O.D. (mm)	Tx-Tube O.D. (mm)	Basic Ordering Number	Dimensions, mm (in.)					
			L	C	G	F	E	Lx
6	6	-LR-ML6-MT6	27.0(1.06)	15.3(0.60)	14.0(0.55)	12.7(0.50)	4.6(0.18)	25.0(0.98)
12	12	-LR-ML12-MT12	38.1(1.50)	22.8(0.90)	22.0(0.87)	23.8(0.94)	8.8(0.35)	39.2(1.54)

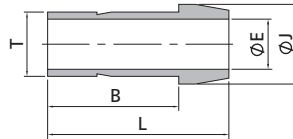
Insert for Soft Plastic Tubings



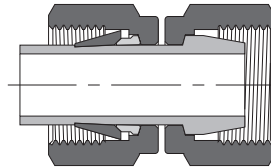
Fractional Tube			
T-Tube O.D. (in.)	Tx-Tube I.D. (in.)	Basic Ordering Number	E in. (mm)
3/16	1/8	-IN-3-2	0.09(2.3)
1/4	1/8	-IN-4-2	0.09(2.3)
1/4	0.17	-IN-4-017	0.11(2.8)
1/4	3/16	-IN-4-3	0.14(3.5)
5/16	1/8	-IN-5-2	0.09(2.3)
5/16	3/16	-IN-5-3	0.12(3.0)
5/16	1/4	-IN-5-4	0.19(4.8)
3/8	3/16	-IN-6-3	0.12(3.0)
3/8	1/4	-IN-6-4	0.19(4.8)
1/2	1/4	-IN-8-4	0.19(4.8)
1/2	3/8	-IN-8-6	0.31(7.9)
5/8	3/8	-IN-10-6	0.31(7.9)
5/8	1/2	-IN-10-8	0.44(11.1)
3/4	1/2	-IN-12-8	0.44(11.1)
3/4	5/8	-IN-12-10	0.56(14.2)
1	3/4	-IN-16-12	0.69(17.5)

Metric Tube			
T-Tube O.D. (mm)	Tx-Tube I.D. (mm)	Basic Ordering Number	E mm (in.)
6	4	-IN-6M-4M	2.8(0.11)
8	6	-IN-8M-6M	4.4(0.17)
10	8	-IN-10M-8M	6.4(0.25)
12	8	-IN-12M-8M	6.4(0.25)
12	10	-IN-12M-10M	8.3(0.33)

Port Connectors



1" / 25 mm and below



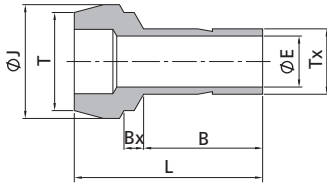
1 1/4" / 28 mm and above

Fractional Tube					
T-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)			
		L	B	E	J
1/16	-P-FL1	0.54(13.7)	0.42(10.7)	0.03(0.8)	0.13(3.3)
1/8	-P-FL2	0.88(22.4)	0.62(15.7)	0.08(2.0)	0.24(6.1)
1/4	-P-FL4	0.97(24.6)	0.74(18.8)	0.17(4.3)	0.37(9.4)
5/16	-P-FL5	1.02(25.9)	0.79(20.1)	0.22(5.6)	0.43(10.9)
3/8	-P-FL6	1.03(26.2)	0.80(20.3)	0.27(6.9)	0.50(12.7)
1/2	-P-FL8	1.41(35.8)	1.02(25.9)	0.37(9.4)	0.62(15.7)
5/8	-P-FL10	1.64(41.7)	1.11(28.1)	0.47(11.9)	0.81(20.5)
3/4	-P-FL12	1.65(41.9)	1.09(27.7)	0.58(14.7)	0.87(22.1)
1	-P-FL16	1.89(48.0)	1.36(34.5)	0.80(20.3)	1.12(28.4)
1 1/4	-P-FL20	2.72(69.1)	1.99(50.6)	1.02(25.9)	1.47(37.4)
1 1/2	-P-FL24	3.31(84.1)	2.34(59.4)	1.25(31.8)	1.80(45.8)

Metric Tube					
T-Tube O.D. (mm)	Basic Ordering Number	Dimensions, mm (in.)			
		L	B	E	J
3	-P-ML3	22.2(0.87)	15.7(0.62)	1.9(0.07)	6.0(0.24)
6	-P-ML6	24.6(0.97)	18.7(0.74)	4.1(0.16)	9.0(0.35)
8	-P-ML8	25.9(1.02)	20.0(0.79)	5.6(0.22)	11.0(0.43)
10	-P-ML10	26.1(1.03)	20.2(0.80)	7.1(0.28)	13.1(0.52)
12	-P-ML12	35.8(1.41)	26.0(1.02)	8.8(0.35)	15.0(0.59)
15	-P-ML15	37.8(1.49)	27.6(1.09)	11.2(0.44)	19.6(0.77)
16	-P-ML16	37.8(1.49)	27.6(1.09)	12.0(0.47)	20.6(0.81)
18	-P-ML18	37.8(1.49)	27.7(1.09)	13.9(0.55)	21.0(0.83)
20	-P-ML20	39.4(1.55)	29.2(1.15)	15.5(0.61)	24.6(0.97)
25	-P-ML25	49.3(1.94)	34.5(1.36)	19.9(0.78)	31.2(1.23)
28	-P-ML28	63.5(2.5)	48.3(1.90)	22.5(0.89)	34.4(1.35)
30	-P-ML30	67.6(2.66)	52.2(2.06)	24.3(0.96)	37.4(1.47)
32	-P-ML32	69.7(2.74)	52.4(2.06)	26.5(1.04)	39.4(1.55)
38	-P-ML38	81.9(3.22)	61.4(2.42)	31.6(1.24)	45.8(1.80)



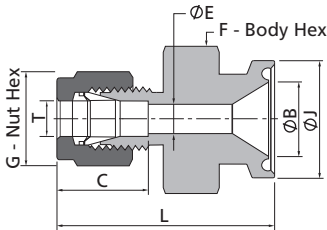
Reducing Port Connectors



Fractional Tube								
T-Tube O.D. (in.)	Tx-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)					
			L	B	E	Bx	J	
1/8	1/16	-P-FL2-FL1	0.68(17.3)	0.34(8.6)	0.03(0.8)	0.08(2.0)	0.24(6.1)	
1/4	1/16	-P-FL4-FL1	0.71(18.0)	0.34(8.6)	0.03(0.8)	0.14(3.6)	0.37(9.4)	
1/4	1/8	-P-FL4-FL2	0.89(22.6)	0.53(13.5)	0.08(2.0)	0.13(3.3)	0.37(9.4)	
3/8	1/8	-P-FL6-FL2	0.91(23.1)	0.53(13.5)	0.08(2.0)	0.15(3.8)	0.50(12.7)	
3/8	1/4	-P-FL6-FL4	0.98(24.9)	0.62(15.7)	0.17(4.3)	0.13(3.3)	0.50(12.7)	
1/2	1/4	-P-FL8-FL4	1.15(29.2)	0.62(15.7)	0.17(4.3)	0.15(3.8)	0.62(15.7)	
1/2	3/8	-P-FL8-FL6	1.20(30.5)	0.69(17.5)	0.27(6.9)	0.13(3.3)	0.62(15.7)	
3/4	1/2	-P-FL12-FL8	1.49(37.8)	0.91(23.1)	0.37(9.4)	0.15(3.8)	0.87(22.1)	
1	1/2	-P-FL16-FL8	1.69(42.9)	0.96(24.4)	0.37(9.4)	0.19(4.8)	1.12(28.5)	
1	3/4	-P-FL16-FL12	1.72(43.7)	1.02(25.9)	0.58(14.7)	0.16(4.1)	1.12(28.5)	

Metric Tube								
T-Tube O.D. (mm)	Tx-Tube O.D. (mm)	Basic Ordering Number	Dimensions, mm (in.)					
			L	B	E	Bx	J	
6	3	-P-ML6-ML3	22.6(0.89)	13.5(0.53)	1.9(0.07)	3.2(0.13)	9.0(0.35)	
8	6	-P-ML8-ML6	24.7(0.97)	15.7(0.62)	4.1(0.16)	3.1(0.12)	11.0(0.43)	
10	6	-P-ML10-ML6	25.0(0.98)	15.7(0.62)	4.1(0.16)	3.4(0.13)	13.1(0.52)	
10	8	-P-ML10-ML8	26.3(1.04)	17.0(0.67)	5.6(0.22)	3.1(0.12)	13.1(0.52)	
12	6	-P-ML12-ML6	29.6(1.17)	15.7(0.62)	4.1(0.16)	3.6(0.14)	15.0(0.59)	
12	8	-P-ML12-ML8	29.8(1.17)	16.8(0.66)	5.6(0.22)	3.4(0.13)	15.0(0.59)	
12	10	-P-ML12-ML10	30.4(1.20)	17.5(0.69)	7.1(0.28)	3.1(0.12)	15.0(0.59)	
16	12	-P-ML16-ML12	36.2(1.43)	23.1(0.91)	8.8(0.35)	3.4(0.13)	19.0(0.75)	
28	25	-P-ML28-ML25	56.5(2.22)	33.0(1.30)	19.8(0.78)	8.2(0.32)	34.3(1.35)	
32	25	-P-ML32-ML25	60.3(2.37)	33.0(1.30)	19.8(0.78)	9.9(0.39)	39.5(1.56)	
38	25	-P-ML38-ML25	65.8(2.59)	33.0(1.30)	19.8(0.78)	12.3(0.48)	47.1(1.85)	

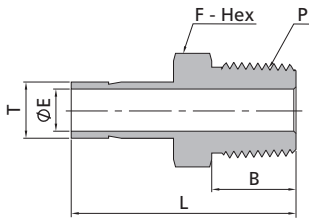
Sanitary Flange Fittings



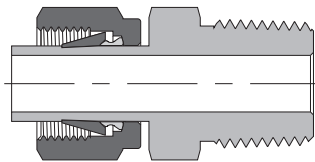
Fractional Tube									
T-Tube O.D. (in.)	Flange Size (in.)	Basic Ordering Number	Dimensions, in. (mm)						
			L	B	C	E	F	J	G
1/4	1/2	-SFF-FL4-SC8	1.57(39.9)	0.37(9.4)	0.60(15.2)	0.19(4.8)	1.00(25.4)	0.98(24.9)	0.56(14.3)
1/4	3/4	-SFF-FL4-SC12	1.57(39.9)	0.62(15.7)	0.60(15.2)	0.19(4.8)	1.00(25.4)	0.98(24.9)	0.56(14.3)
1/4	1	-SFF-FL4-SC16	1.57(39.9)	0.87(22.1)	0.60(15.2)	0.19(4.8)	1.37(34.9)	1.98(50.3)	0.56(14.3)
1/4	1 1/2	-SFF-FL4-SC24	1.57(39.9)	1.37(34.8)	0.60(15.2)	0.19(4.8)	1.37(34.9)	1.98(50.3)	0.56(14.3)
3/8	1/2	-SFF-FL6-SC8	1.63(41.4)	0.37(9.4)	0.66(16.8)	0.28(7.1)	1.00(25.4)	0.98(24.9)	0.69(17.5)
3/8	3/4	-SFF-FL6-SC12	1.63(41.4)	0.62(15.7)	0.66(16.8)	0.28(7.1)	1.00(25.4)	0.98(24.9)	0.69(17.5)
3/8	1	-SFF-FL6-SC16	1.63(41.4)	0.87(22.1)	0.66(16.8)	0.28(7.1)	1.37(34.9)	1.98(50.3)	0.69(17.5)
3/8	1 1/2	-SFF-FL6-SC24	1.63(41.4)	1.37(34.8)	0.66(16.8)	0.28(7.1)	1.37(34.9)	1.98(50.3)	0.69(17.5)
1/2	1/2	-SFF-FL8-SC8	1.74(44.2)	0.37(9.4)	0.90(22.9)	0.37(9.4)	1.00(25.4)	0.98(24.9)	0.87(22.2)
1/2	3/4	-SFF-FL8-SC12	1.74(44.2)	0.62(15.7)	0.90(22.9)	0.41(10.4)	1.00(25.4)	0.98(24.9)	0.87(22.2)
1/2	1	-SFF-FL8-SC16	1.74(44.2)	0.87(22.1)	0.90(22.9)	0.41(10.4)	1.37(34.9)	1.98(50.3)	0.87(22.2)
1/2	1 1/2	-SFF-FL8-SC24	1.74(44.2)	1.37(34.8)	0.90(22.9)	0.41(10.4)	1.37(34.9)	1.98(50.3)	0.87(22.2)
1	1	-SFF-FL16-SC16	1.91(48.5)	0.87(22.1)	1.23(31.2)	0.87(22.1)	1.37(34.9)	1.98(50.3)	1.50(38.1)
1	2	-SFF-FL16-SC32	2.49(63.2)	1.37(34.8)	1.23(31.2)	0.88(22.4)	2.75(69.9)	2.52(64.0)	1.50(38.1)

Male Adapters

Tube Fittings



1" and below

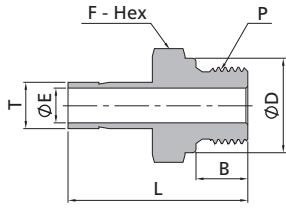


1 1/4" and above

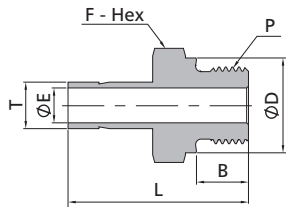
Fractional Tube			NPT Thread			
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			
			L	B	E	F
1/16	1/8	-AM-FT1-NS2	1.00(25.4)	0.38(9.7)	0.03(0.8)	0.44(11.1)
1/8	1/8	-AM-FT2-NS2	1.16(29.5)	0.38(9.7)	0.08(2.0)	0.44(11.1)
1/8	1/4	-AM-FT2-NS4	1.37(34.8)	0.56(14.2)	0.08(2.0)	0.56(14.3)
3/16	1/8	-AM-FT3-NS2	1.19(30.2)	0.38(9.7)	0.12(3.0)	0.44(11.1)
3/16	1/4	-AM-FT3-NS4	1.40(35.6)	0.56(14.2)	0.12(3.0)	0.56(14.3)
1/4	1/8	-AM-FT4-NS2	1.25(31.8)	0.38(9.7)	0.17(4.3)	0.44(11.1)
1/4	1/4	-AM-FT4-NS4	1.46(37.1)	0.56(14.2)	0.17(4.3)	0.56(14.3)
1/4	3/8	-AM-FT4-NS6	1.49(37.8)	0.56(14.2)	0.17(4.3)	0.69(17.5)
1/4	1/2	-AM-FT4-NS8	1.71(43.4)	0.75(19.1)	0.17(4.3)	0.87(22.2)
5/16	1/8	-AM-FT5-NS2	1.29(32.8)	0.38(9.7)	0.19(4.8)	0.44(11.1)
5/16	1/4	-AM-FT5-NS4	1.50(38.1)	0.56(14.2)	0.22(5.6)	0.56(14.3)
5/16	3/8	-AM-FT5-NS6	1.53(38.9)	0.56(14.2)	0.22(5.6)	0.69(17.5)
5/16	1/2	-AM-FT5-NS8	1.74(44.2)	0.75(19.1)	0.22(5.6)	0.87(22.2)
3/8	1/8	-AM-FT6-NS2	1.32(33.5)	0.38(9.7)	0.19(4.8)	0.44(11.1)
3/8	1/4	-AM-FT6-NS4	1.53(38.9)	0.56(14.2)	0.27(6.9)	0.56(14.3)
3/8	3/8	-AM-FT6-NS6	1.56(39.6)	0.56(14.2)	0.27(6.9)	0.69(17.5)
3/8	1/2	-AM-FT6-NS8	1.78(45.2)	0.75(19.1)	0.27(6.9)	0.87(22.2)
1/2	1/4	-AM-FT8-NS4	1.75(44.5)	0.56(14.2)	0.28(7.1)	0.56(14.3)
1/2	3/8	-AM-FT8-NS6	1.78(45.2)	0.56(14.2)	0.37(9.4)	0.69(17.5)
1/2	1/2	-AM-FT8-NS8	2.00(50.8)	0.75(19.1)	0.37(9.4)	0.87(22.2)
5/8	1/2	-AM-FT10-NS8	2.06(52.3)	0.75(19.1)	0.47(11.9)	0.87(22.2)
3/4	1/2	-AM-FT12-NS8	2.06(52.3)	0.75(19.1)	0.47(11.9)	0.87(22.2)
3/4	3/4	-AM-FT12-NS12	2.06(52.3)	0.75(19.1)	0.58(14.7)	1.06(27.0)
3/4	1	-AM-FT12-NS16	2.41(61.2)	0.94(23.9)	0.58(14.7)	1.37(34.9)
1	3/4	-AM-FT16-NS12	2.31(58.7)	0.75(19.1)	0.62(15.7)	1.06(27.0)
1	1	-AM-FT16-NS16	2.60(66.0)	0.94(23.9)	0.80(20.3)	1.37(34.9)
1 1/4	1 1/4	-AM-FT20-NS20	3.16(80.3)	0.94(23.9)	1.02(25.9)	1.75(44.5)
1 1/2	1 1/2	-AM-FT24-NS24	3.72(94.5)	1.03(26.2)	1.25(31.8)	2.13(54.0)

Fractional Tube			ISO Tapered Thread (RT)			
T-Tube O.D. (in.)	P-RT Size	Basic Ordering Number	Dimensions, in. (mm)			
			L	B	E	F
1/8	1/8	-AM-FT2-RT2	1.16(29.5)	0.38(9.7)	0.08(2.0)	0.44(11.1)
1/8	1/4	-AM-FT2-RT4	1.37(34.8)	0.56(14.2)	0.08(2.0)	0.56(14.3)
1/4	1/8	-AM-FT4-RT2	1.25(31.8)	0.38(9.7)	0.17(4.3)	0.44(11.1)
1/4	1/4	-AM-FT4-RT4	1.46(37.1)	0.56(14.2)	0.17(4.3)	0.56(14.3)
1/4	3/8	-AM-FT4-RT6	1.49(37.8)	0.56(14.2)	0.17(4.3)	0.69(17.5)
1/4	1/2	-AM-FT4-RT8	1.71(43.4)	0.75(19.1)	0.17(4.3)	0.87(22.2)
5/16	1/8	-AM-FT5-RT2	1.29(32.8)	0.38(9.7)	0.19(4.8)	0.44(11.1)
5/16	1/4	-AM-FT5-RT4	1.50(38.1)	0.56(14.2)	0.22(5.6)	0.56(14.3)
3/8	1/4	-AM-FT6-RT4	1.53(38.9)	0.56(14.2)	0.27(6.9)	0.56(14.3)
3/8	3/8	-AM-FT6-RT6	1.56(39.6)	0.56(14.2)	0.27(6.9)	0.69(17.5)
3/8	1/2	-AM-FT6-RT8	1.78(45.2)	0.75(19.1)	0.27(6.9)	0.87(22.2)
1/2	1/4	-AM-FT8-RT4	1.75(44.5)	0.56(14.2)	0.28(7.1)	0.56(14.3)
1/2	3/8	-AM-FT8-RT6	1.78(45.2)	0.56(14.2)	0.37(9.4)	0.69(17.5)
1/2	1/2	-AM-FT8-RT8	2.00(50.8)	0.75(19.1)	0.37(9.4)	0.87(22.2)
5/8	3/8	-AM-FT10-RT6	1.91(48.5)	0.56(14.2)	0.37(9.5)	0.69(17.5)
5/8	1/2	-AM-FT10-RT8	2.06(52.3)	0.75(19.1)	0.47(11.9)	0.87(22.2)
3/4	3/4	-AM-FT12-RT12	2.06(52.3)	0.75(19.1)	0.58(14.7)	1.06(27.0)
1	1	-AM-FT16-RT16	2.60(66.0)	0.94(23.9)	0.80(20.3)	1.37(34.9)

Male Adapters



Fractional Tube			ISO Parallel Thread (RS)				
T-Tube O.D. (in.)	P-RS Size	Basic Ordering Number	Dimensions, in. (mm)				
			L	B	E	F	D
1/8	1/8	-AM-FT2-RS2	1.22(31.0)	0.28(7.1)	0.08(2.0)	0.56(14.3)	0.54(13.7)
1/8	1/4	-AM-FT2-RS4	1.41(35.8)	0.44(11.2)	0.08(2.0)	0.75(19.1)	0.70(17.8)
1/4	1/8	-AM-FT4-RS2	1.31(33.3)	0.28(7.1)	0.16(4.1)	0.56(14.3)	0.54(13.7)
1/4	1/4	-AM-FT4-RS4	1.50(38.1)	0.44(11.2)	0.17(4.3)	0.75(19.1)	0.70(17.8)
3/8	1/8	-AM-FT6-RS2	1.29(32.8)	0.28(7.1)	0.16(4.1)	0.56(14.3)	0.54(13.7)
3/8	1/4	-AM-FT6-RS4	1.57(39.9)	0.44(11.2)	0.23(5.8)	0.75(19.1)	0.70(17.8)
3/8	3/8	-AM-FT6-RS6	1.60(40.6)	0.44(11.2)	0.27(6.9)	0.87(22.2)	0.85(21.6)
3/8	1/2	-AM-FT6-RS8	1.69(42.9)	0.56(14.2)	0.28(7.1)	1.06(27.0)	1.02(25.9)
1/2	1/4	-AM-FT8-RS4	1.79(45.5)	0.44(11.2)	0.23(5.8)	0.75(19.1)	0.70(17.8)
1/2	3/8	-AM-FT8-RS6	1.82(46.2)	0.44(11.2)	0.31(7.9)	0.87(22.2)	0.85(21.6)
1/2	1/2	-AM-FT8-RS8	1.94(49.2)	0.56(14.2)	0.37(9.4)	1.06(27.0)	1.02(25.9)
5/8	1/2	-AM-FT10-RS8	1.97(50.0)	0.56(14.2)	0.47(11.9)	1.06(27.0)	1.02(25.9)
3/4	3/4	-AM-FT12-RS12	2.16(54.9)	0.63(16.0)	0.58(14.7)	1.31(33.3)	1.26(32.0)
1	1	-AM-FT16-RS16	2.54(64.5)	0.72(18.3)	0.80(20.3)	1.63(41.3)	1.53(38.9)

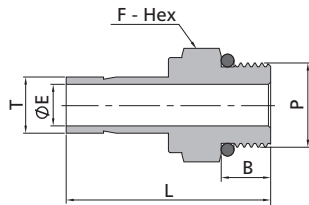


Fractional Tube			ISO Parallel Thread (RP)				
T-Tube O.D. (in.)	P-RP Size	Basic Ordering Number	Dimensions, in. (mm)				
			L	B	E	F	D
1/8	1/8	-AM-FT2-RP2	1.09(27.7)	0.28(7.1)	0.08(2.0)	0.56(14.3)	0.54(13.7)
1/8	1/4	-AM-FT2-RP4	1.31(33.3)	0.44(11.2)	0.08(2.0)	0.75(19.1)	0.70(17.8)
1/4	1/8	-AM-FT4-RP2	1.19(30.2)	0.28(7.1)	0.16(4.1)	0.56(14.3)	0.54(13.7)
1/4	1/4	-AM-FT4-RP4	1.50(38.1)	0.44(11.2)	0.18(4.6)	0.75(19.1)	0.70(17.8)
3/8	1/8	-AM-FT6-RP2	1.34(34.0)	0.28(7.1)	0.16(4.1)	0.75(19.1)	0.54(13.7)
3/8	1/4	-AM-FT6-RP4	1.47(37.3)	0.44(11.2)	0.25(6.4)	0.75(19.1)	0.70(17.8)
3/8	3/8	-AM-FT6-RP6	1.50(38.1)	0.44(11.2)	0.27(6.9)	0.87(22.2)	0.85(21.6)
3/8	1/2	-AM-FT6-RP8	1.69(42.9)	0.56(14.2)	0.27(6.9)	1.06(27.0)	1.02(25.9)
1/2	1/4	-AM-FT8-RP4	1.69(42.9)	0.44(11.2)	0.25(6.4)	0.75(19.1)	0.70(17.8)
1/2	3/8	-AM-FT8-RP6	1.72(43.7)	0.44(11.2)	0.31(7.9)	0.87(22.2)	0.85(21.6)
1/2	1/2	-AM-FT8-RP8	1.94(49.3)	0.56(14.2)	0.37(9.4)	1.06(27.0)	1.02(25.9)
5/8	1/2	-AM-FT10-RP8	1.97(50.0)	0.56(14.2)	0.47(11.9)	1.06(27.0)	1.02(25.9)
3/4	3/4	-AM-FT12-RP12	2.09(53.1)	0.63(16.0)	0.58(14.7)	1.32(33.5)	1.26(32.0)
1	1	-AM-FT16-RP16	2.49(63.3)	0.72(18.3)	0.78(19.8)	1.63(41.3)	1.53(38.9)

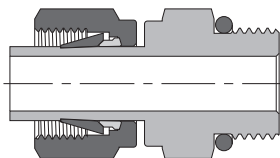
Tube Fittings

Male Adapters

Tube Fittings



1" and below

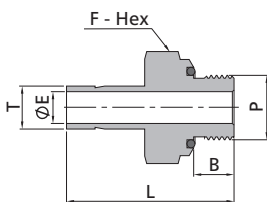
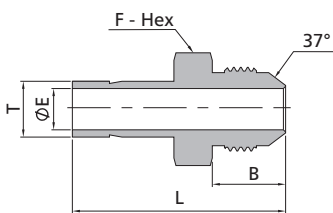


1 1/4" and above

Adapt to straight thread boss of SAE J1926-1, ISO 11926-1 and MS 16142.

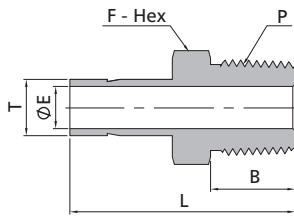
Fractional Tube			SAE/MS Straight Thread			
T-Tube O.D. (in.)	P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)			
			L	B	E	F
1/8	5/16-24	-AM-FT2-ST5	1.20(30.5)	0.30(7.6)	0.08(2.0)	0.44(11.1)
1/4	7/16-20	-AM-FT4-ST7	1.39(35.3)	0.36(9.1)	0.17(4.3)	0.56(14.3)
3/8	7/16-20	-AM-FT6-ST7	1.46(37.1)	0.36(9.1)	0.20(5.1)	0.56(14.3)
3/8	9/16-18	-AM-FT6-ST9	1.52(38.6)	0.39(9.9)	0.27(6.9)	0.69(17.5)
3/8	3/4-16	-AM-FT6-ST12	1.60(40.6)	0.44(11.2)	0.27(6.9)	0.87(22.2)
1/2	9/16-18	-AM-FT8-ST9	1.74(44.2)	0.39(9.9)	0.28(7.1)	0.69(17.5)
1/2	3/4-16	-AM-FT8-ST12	1.82(46.2)	0.44(11.2)	0.37(9.4)	0.87(22.2)
5/8	7/8-14	-AM-FT10-ST14	1.94(49.3)	0.50(12.7)	0.47(11.9)	1.00(25.4)
3/4	1 1/16-12	-AM-FT12-ST17	2.10(53.3)	0.59(15.0)	0.58(14.7)	1.25(31.8)
1	1 5/16-12	-AM-FT16-ST21	2.41(61.2)	0.59(15.0)	0.80(20.3)	1.50(38.1)
1 1/4	1 5/8-12	-AM-FT20-ST26	2.81(71.4)	0.59(15.0)	1.02(25.9)	1.87(47.6)
1 1/2	1 7/8-12	-AM-FT24-ST30	3.28(83.3)	0.59(15.0)	1.25(31.8)	2.13(54.0)

Fractional Tube			37° Flare (AN)			
T-Tube O.D. (in.)	AN Tube Flare Size	Basic Ordering Number	Dimensions, in. (mm)			
			L	B	E	F
1/4	1/4	-AM-FT4-AN4	1.46(37.1)	0.55(14.0)	0.17(4.3)	0.50(12.7)
3/8	1/4	-AM-FT6-AN4	1.53(38.9)	0.55(14.0)	0.17(4.3)	0.50(12.7)
3/8	3/8	-AM-FT6-AN6	1.56(39.6)	0.56(14.2)	0.27(6.9)	0.63(15.9)
1/2	1/2	-AM-FT8-AN8	1.91(48.5)	0.66(16.8)	0.37(9.4)	0.81(20.6)
3/4	3/4	-AM-FT12-AN12	2.21(56.1)	0.86(21.8)	0.58(14.7)	1.13(28.6)
1	1	-AM-FT16-AN16	2.58(65.5)	0.91(23.1)	0.80(20.3)	1.37(34.9)

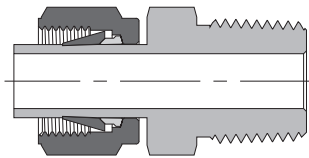


Fractional Tube			O-Seal with SAE/MS Straight Thread			
T-Tube O.D. (in.)	P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)			
			L	B	E	F
1/8	5/16-24	-AM-FT2-OST5	1.28(32.5)	0.34(8.6)	0.08(2.0)	0.56(14.3)
3/16	3/8-24	-AM-FT3-OST6	1.38(35.1)	0.38(9.7)	0.12(3.0)	0.63(15.9)
1/4	7/16-20	-AM-FT4-OST7	1.54(39.1)	0.41(10.4)	0.17(4.3)	0.75(19.1)
5/16	1/2-20	-AM-FT5-OST8	1.64(41.7)	0.44(11.2)	0.22(5.6)	0.87(22.2)
3/8	9/16-18	-AM-FT6-OST9	1.70(43.2)	0.47(11.9)	0.27(6.9)	0.94(23.8)
1/2	3/4-16	-AM-FT8-OST12	1.95(49.5)	0.47(11.9)	0.37(9.4)	1.13(28.6)

## Male Adapters



25 mm and below

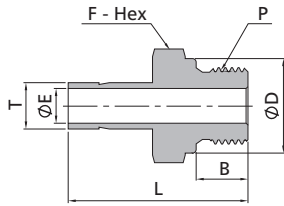


28 mm and above

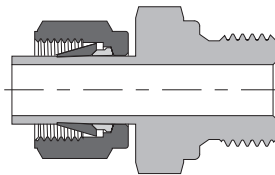
Metric Tube			NPT Thread			
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)			
			L	B	E	F
3	1/8	-AM-MT3-NS2	29.4(1.16)	9.7(0.38)	1.8(0.07)	12.0(0.47)
4	1/8	-AM-MT4-NS2	29.4(1.16)	9.7(0.38)	2.4(0.09)	12.0(0.47)
6	1/8	-AM-MT6-NS2	32.8(1.29)	9.7(0.38)	4.1(0.16)	12.0(0.47)
6	1/4	-AM-MT6-NS4	38.1(1.50)	14.2(0.56)	4.1(0.16)	14.0(0.55)
6	3/8	-AM-MT6-NS6	39.2(1.54)	14.2(0.56)	4.1(0.16)	18.0(0.71)
6	1/2	-AM-MT6-NS8	42.1(1.66)	19.1(0.75)	4.1(0.16)	22.0(0.87)
8	1/4	-AM-MT8-NS4	39.1(1.54)	14.2(0.56)	5.6(0.22)	14.0(0.55)
8	3/8	-AM-MT8-NS6	39.9(1.57)	14.2(0.56)	5.6(0.22)	19.0(0.75)
10	1/4	-AM-MT10-NS4	39.9(1.57)	14.2(0.56)	7.1(0.28)	14.0(0.55)
10	3/8	-AM-MT10-NS6	40.6(1.60)	14.2(0.56)	7.1(0.28)	18.0(0.71)
10	1/2	-AM-MT10-NS8	46.2(1.82)	19.1(0.75)	7.1(0.28)	22.0(0.87)
12	1/4	-AM-MT12-NS4	46.5(1.83)	14.2(0.56)	7.1(0.28)	14.0(0.55)
12	3/8	-AM-MT12-NS6	46.2(1.82)	14.2(0.56)	8.8(0.35)	18.0(0.71)
12	1/2	-AM-MT12-NS8	52.1(2.05)	19.1(0.75)	8.8(0.35)	22.0(0.87)
16	1/2	-AM-MT16-NS8	50.8(2.00)	19.1(0.75)	11.9(0.47)	22.0(0.87)
16	3/4	-AM-MT16-NS12	51.6(2.03)	19.1(0.75)	12.0(0.47)	27.0(1.06)
18	1/2	-AM-MT18-NS8	50.8(2.00)	19.1(0.75)	11.9(0.47)	27.0(1.06)
18	3/4	-AM-MT18-NS12	51.6(2.03)	19.1(0.75)	14.0(0.55)	27.0(1.06)
20	1/2	-AM-MT20-NS8	53.3(2.1)	19.1(0.75)	11.9(0.47)	22.0(0.87)
20	3/4	-AM-MT20-NS12	53.8(2.12)	19.1(0.75)	15.5(0.61)	27.0(1.06)
25	1	-AM-MT25-NS16	65.9(2.59)	23.9(0.94)	19.8(0.78)	35.0(1.38)
28	1	-AM-MT28-NS16	74.7(2.94)	23.9(0.94)	22.2(0.87)	35.0(1.38)
28	1 1/4	-AM-MT28-NS20	76.2(3.00)	23.9(0.94)	22.5(0.89)	46.0(1.81)
30	1	-AM-MT30-NS16	79.2(3.12)	23.9(0.94)	22.2(0.87)	41.0(1.61)
30	1 1/4	-AM-MT30-NS20	80.0(3.15)	23.9(0.94)	24.3(0.96)	46.0(1.81)
32	1 1/4	-AM-MT32-NS20	81.0(3.19)	23.9(0.94)	26.5(1.04)	46.0(1.81)
38	1 1/2	-AM-MT38-NS24	92.2(3.63)	26.2(1.03)	31.6(1.24)	55.0(2.17)

Metric Tube			ISO Tapered Thread (RT)			
T-Tube O.D. (mm)	P-RT Size	Basic Ordering Number	Dimensions, mm (in.)			
			L	B	E	F
3	1/8	-AM-MT3-RT2	29.4(1.16)	9.7(0.38)	2.4(0.09)	12.0(0.47)
4	1/8	-AM-MT4-RT2	29.4(1.16)	9.7(0.38)	2.0(0.08)	12.0(0.47)
6	1/8	-AM-MT6-RT2	32.8(1.29)	9.7(0.38)	4.1(0.16)	12.0(0.47)
6	1/4	-AM-MT6-RT4	38.1(1.50)	14.2(0.56)	4.1(0.16)	14.0(0.55)
8	1/4	-AM-MT8-RT4	39.1(1.54)	14.2(0.56)	5.6(0.22)	14.0(0.55)
8	3/8	-AM-MT8-RT6	39.9(1.57)	14.2(0.56)	5.6(0.22)	18.0(0.71)
10	1/4	-AM-MT10-RT4	39.9(1.57)	14.2(0.56)	7.1(0.28)	14.0(0.55)
10	3/8	-AM-MT10-RT6	40.6(1.60)	14.2(0.56)	7.1(0.28)	18.0(0.71)
10	1/2	-AM-MT10-RT8	44.5(1.75)	19.1(0.75)	7.1(0.28)	22.0(0.87)
12	1/4	-AM-MT12-RT4	46.5(1.83)	14.2(0.56)	7.1(0.28)	16.0(0.63)
12	3/8	-AM-MT12-RT6	46.2(1.82)	14.2(0.56)	8.8(0.35)	18.0(0.71)
12	1/2	-AM-MT12-RT8	51.8(2.04)	19.1(0.75)	8.8(0.35)	22.0(0.87)
16	1/2	-AM-MT16-RT8	50.8(2.00)	19.1(0.75)	11.9(0.47)	22.0(0.87)
18	3/4	-AM-MT18-RT12	51.6(2.03)	19.1(0.75)	14.0(0.55)	27.0(1.06)
20	3/4	-AM-MT20-RT12	52.4(2.06)	19.1(0.75)	15.5(0.61)	27.0(1.06)
25	1	-AM-MT25-RT16	65.9(2.59)	23.9(0.94)	19.8(0.78)	35.0(1.38)
28	1	-AM-MT28-RT16	74.7(2.94)	23.9(0.94)	22.2(0.87)	35.0(1.38)
28	1 1/4	-AM-MT28-RT20	76.2(3.00)	23.9(0.94)	22.5(0.89)	46.0(1.81)
30	1 1/4	-AM-MT30-RT20	80.0(3.15)	23.9(0.94)	24.3(0.96)	46.0(1.81)
32	1 1/4	-AM-MT32-RT20	81.0(3.19)	23.9(0.94)	26.5(1.04)	46.0(1.81)
38	1 1/2	-AM-MT38-RT24	92.2(3.63)	26.2(1.03)	31.6(1.24)	55.0(2.17)

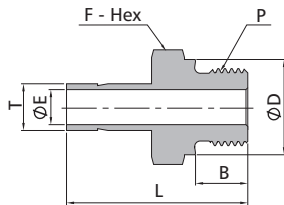
Male Adapters



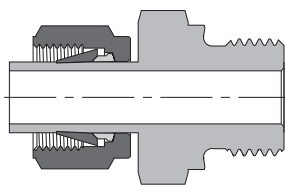
25 mm and below



28 mm and above



25 mm and below

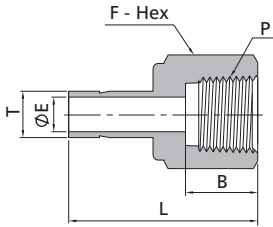


28 mm and above

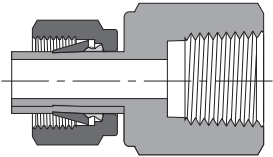
Metric Tube			ISO Parallel Thread (RS)				
T-Tube O.D. (mm)	P-RS Size	Basic Ordering Number	Dimensions, mm (in.)				
			L	B	E	F	D
3	1/8	-AM-MT3-RS2	31.0(1.22)	7.1(0.28)	1.8(0.07)	14.0(0.55)	13.7(0.54)
4	1/8	-AM-MT4-RS2	31.8(1.25)	7.1(0.28)	2.4(0.09)	14.0(0.55)	13.7(0.54)
6	1/8	-AM-MT6-RS2	34.3(1.35)	7.1(0.28)	4.0(0.16)	14.0(0.55)	13.7(0.54)
6	1/4	-AM-MT6-RS4	39.1(1.54)	11.2(0.44)	4.1(0.16)	19.0(0.75)	17.8(0.70)
8	1/4	-AM-MT8-RS4	39.6(1.56)	11.2(0.44)	5.6(0.22)	19.0(0.75)	17.8(0.70)
10	1/4	-AM-MT10-RS4	40.9(1.61)	11.2(0.44)	5.9(0.23)	19.0(0.75)	17.8(0.70)
10	3/8	-AM-MT10-RS6	41.7(1.64)	11.2(0.44)	7.1(0.28)	22.0(0.87)	21.6(0.85)
10	1/2	-AM-MT10-RS8	44.7(1.76)	14.2(0.56)	7.1(0.28)	27.0(1.06)	25.9(1.02)
12	1/4	-AM-MT12-RS4	46.7(1.84)	11.2(0.44)	5.9(0.23)	19.0(0.75)	17.8(0.70)
12	3/8	-AM-MT12-RS6	47.2(1.86)	11.2(0.44)	7.9(0.31)	22.0(0.87)	21.6(0.85)
12	1/2	-AM-MT12-RS8	50.5(1.99)	14.2(0.56)	8.8(0.35)	27.0(1.06)	25.9(1.02)
16	1/2	-AM-MT16-RS8	50.8(2.00)	14.2(0.56)	11.9(0.47)	27.0(1.06)	25.9(1.02)
18	3/4	-AM-MT18-RS12	55.9(2.20)	16.0(0.63)	13.9(0.55)	35.0(1.38)	32.0(1.26)
20	3/4	-AM-MT20-RS12	57.0(2.24)	16.0(0.63)	15.5(0.61)	35.0(1.38)	32.0(1.26)
25	1	-AM-MT25-RS16	65.1(2.56)	18.3(0.72)	19.8(0.78)	41.0(1.61)	38.9(1.53)
28	1	-AM-MT28-RS16	71.9(2.83)	18.3(0.72)	19.8(0.78)	41.0(1.61)	38.9(1.53)
28	1 1/4	-AM-MT28-RS20	77.0(3.03)	19.8(0.78)	22.5(0.89)	50.0(1.97)	49.0(1.93)
30	1 1/4	-AM-MT30-RS20	80.8(3.18)	19.8(0.78)	24.3(0.96)	50.0(1.97)	49.0(1.93)
32	1 1/4	-AM-MT32-RS20	81.8(3.22)	19.8(0.78)	26.5(1.04)	50.0(1.97)	49.0(1.93)
38	1 1/2	-AM-MT38-RS24	94.5(3.72)	20.6(0.81)	31.6(1.24)	55.0(2.17)	54.7(2.15)

Metric Tube			ISO Parallel Thread (RP)				
T-Tube O.D. (mm)	P-RP Size	Basic Ordering Number	Dimensions, mm (in.)				
			L	B	E	F	D
3	1/8	-AM-MT3-RP2	31.0(1.22)	7.1(0.28)	1.8(0.07)	14.0(0.55)	13.7(0.54)
4	1/8	-AM-MT4-RP2	31.8(1.25)	7.1(0.28)	2.0(0.08)	14.0(0.55)	13.7(0.54)
6	1/8	-AM-MT6-RP2	34.3(1.35)	7.1(0.28)	4.0(0.16)	14.0(0.55)	13.7(0.54)
6	1/4	-AM-MT6-RP4	38.1(1.50)	11.2(0.44)	4.0(0.16)	19.0(0.75)	17.8(0.70)
8	1/4	-AM-MT8-RP4	38.9(1.53)	11.2(0.44)	5.6(0.22)	19.0(0.75)	17.8(0.70)
10	1/4	-AM-MT10-RP4	38.9(1.53)	11.2(0.44)	6.4(0.25)	19.0(0.75)	17.8(0.70)
10	3/8	-AM-MT10-RP6	39.7(1.56)	11.2(0.44)	7.1(0.28)	22.0(0.87)	21.6(0.85)
10	1/2	-AM-MT10-RP8	42.9(1.69)	14.2(0.56)	7.1(0.28)	27.0(1.06)	25.9(1.02)
12	1/4	-AM-MT12-RP4	43.7(1.72)	11.2(0.44)	6.4(0.25)	19.0(0.75)	17.8(0.70)
12	3/8	-AM-MT12-RP6	44.5(1.75)	11.2(0.44)	7.9(0.31)	22.0(0.87)	21.6(0.85)
12	1/2	-AM-MT12-RP8	49.2(1.94)	14.2(0.56)	9.1(0.36)	27.0(1.06)	25.9(1.02)
16	1/2	-AM-MT16-RP8	50.8(2.00)	14.2(0.56)	11.9(0.47)	27.0(1.06)	25.9(1.02)
18	3/4	-AM-MT18-RP12	53.2(2.09)	16.0(0.63)	14.0(0.55)	33.0(1.30)	32.0(1.26)
20	3/4	-AM-MT20-RP12	54.0(2.13)	16.0(0.63)	15.5(0.61)	33.0(1.30)	32.0(1.26)
25	1	-AM-MT25-RP16	65.1(2.56)	18.3(0.72)	19.8(0.78)	41.0(1.61)	38.9(1.53)
28	1	-AM-MT28-RP16	72.7(2.86)	18.3(0.72)	19.8(0.78)	41.0(1.61)	38.9(1.53)
28	1 1/4	-AM-MT28-RP20	77.3(3.04)	19.8(0.78)	22.5(0.89)	50.0(1.97)	49.0(1.93)
30	1 1/4	-AM-MT30-RP20	80.8(3.18)	19.8(0.78)	24.3(0.96)	50.0(1.97)	49.0(1.93)
32	1 1/4	-AM-MT32-RP20	82.1(3.23)	19.8(0.78)	26.5(1.04)	50.0(1.97)	49.0(1.93)
38	1 1/2	-AM-MT38-RP24	94.5(3.72)	20.6(0.81)	31.6(1.24)	55.0(2.17)	54.7(2.15)

Female Adapters



1" and below



1 1/4" and above

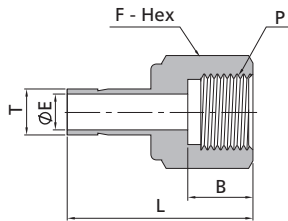
Fractional Tube			NPT Thread			
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			
			L	B	E	F
1/16	1/8	-AF-FT1-NS2	1.07(27.2)	0.41(10.4)	0.03(0.8)	0.56(14.3)
1/8	1/8	-AF-FT2-NS2	1.24(31.5)	0.41(10.4)	0.08(2.0)	0.56(14.3)
1/8	1/4	-AF-FT2-NS4	1.39(35.3)	0.59(15.0)	0.08(2.0)	0.75(19.1)
3/16	1/8	-AF-FT3-NS2	1.25(31.8)	0.41(10.4)	0.11(2.9)	0.56(14.3)
3/16	1/4	-AF-FT3-NS4	1.41(35.8)	0.59(15.0)	0.12(3.0)	0.75(19.1)
1/4	1/8	-AF-FT4-NS2	1.30(33.0)	0.41(10.4)	0.17(4.3)	0.56(14.3)
1/4	1/4	-AF-FT4-NS4	1.46(37.1)	0.59(15.0)	0.17(4.3)	0.75(19.1)
1/4	3/8	-AF-FT4-NS6	1.55(39.4)	0.59(15.0)	0.17(4.3)	0.87(22.2)
1/4	1/2	-AF-FT4-NS8	1.79(45.5)	0.78(19.8)	0.17(4.3)	1.06(27.0)
5/16	1/8	-AF-FT5-NS2	1.34(34.0)	0.41(10.4)	0.22(5.6)	0.56(14.3)
5/16	1/4	-AF-FT5-NS4	1.48(37.6)	0.59(15.0)	0.22(5.6)	0.75(19.1)
5/16	3/8	-AF-FT5-NS6	1.59(40.4)	0.59(15.0)	0.22(5.6)	0.87(22.2)
3/8	1/8	-AF-FT6-NS2	1.35(34.3)	0.41(10.4)	0.27(6.9)	0.56(14.3)
3/8	1/4	-AF-FT6-NS4	1.50(38.1)	0.59(15.0)	0.27(6.9)	0.75(19.1)
3/8	3/8	-AF-FT6-NS6	1.59(40.4)	0.59(15.0)	0.27(6.9)	0.87(22.2)
3/8	1/2	-AF-FT6-NS8	1.84(46.7)	0.78(19.8)	0.27(6.9)	1.06(27.0)
1/2	1/4	-AF-FT8-NS4	1.71(43.4)	0.59(15.0)	0.37(9.4)	0.75(19.1)
1/2	3/8	-AF-FT8-NS6	1.79(45.5)	0.59(15.0)	0.37(9.4)	0.87(22.2)
1/2	1/2	-AF-FT8-NS8	2.04(51.8)	0.78(19.8)	0.37(9.4)	1.06(27.0)
5/8	3/8	-AF-FT10-NS6	1.86(47.2)	0.59(15.0)	0.47(11.9)	0.87(22.2)
5/8	1/2	-AF-FT10-NS8	2.09(53.1)	0.78(19.8)	0.47(11.9)	1.06(27.0)
3/4	1/2	-AF-FT12-NS8	2.08(52.8)	0.78(19.8)	0.58(14.7)	1.06(27.0)
3/4	3/4	-AF-FT12-NS12	2.16(54.9)	0.81(20.6)	0.58(14.7)	1.31(33.3)
3/4	1	-AF-FT12-NS16	2.30(58.4)	1.00(25.4)	0.58(14.7)	1.63(41.3)
7/8	3/4	-AF-FT14-NS12	2.22(56.4)	0.81(20.6)	0.58(14.7)	1.31(33.3)
1	3/4	-AF-FT16-NS12	2.39(60.7)	0.81(20.6)	0.80(20.3)	1.31(33.3)
1	1	-AF-FT16-NS16	2.53(64.3)	1.00(25.4)	0.80(20.3)	1.63(41.3)
1 1/4	1 1/4	-AF-FT20-NS20	3.06(77.7)	1.00(25.4)	1.02(25.9)	2.13(54.0)
1 1/2	1 1/2	-AF-FT24-NS24	3.50(88.9)	1.09(27.7)	1.25(31.8)	2.37(60.3)

Fractional Tube			ISO Tapered Thread (RT)			
T-Tube O.D. (in.)	P-RT Size	Basic Ordering Number	Dimensions, in. (mm)			
			L	B	E	F
1/4	1/8	-AF-FT4-RT2	1.30(33.0)	0.41(10.4)	0.17(4.3)	0.56(14.3)
1/4	1/4	-AF-FT4-RT4	1.45(36.8)	0.59(15.0)	0.17(4.3)	0.75(19.1)
3/8	1/4	-AF-FT6-RT4	1.50(38.1)	0.59(15.0)	0.27(6.9)	0.75(19.1)
3/8	3/8	-AF-FT6-RT6	1.59(40.4)	0.59(15.0)	0.27(6.9)	0.87(22.2)
1/2	1/4	-AF-FT8-RT4	1.71(43.4)	0.59(15.0)	0.37(9.4)	0.75(19.1)
1/2	3/8	-AF-FT8-RT6	1.80(45.7)	0.59(15.0)	0.37(9.4)	0.87(22.2)
1/2	1/2	-AF-FT8-RT8	2.05(52.1)	0.78(19.8)	0.37(9.4)	1.06(27.0)

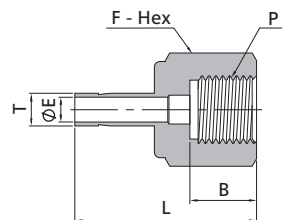
Tube Fittings

Female Adapters

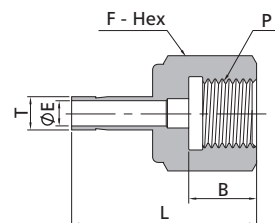
Tube Fittings



Fractional Tube			ISO Parallel Thread (RP)			
T-Tube O.D. (in.)	P-RP Size	Basic Ordering Number	Dimensions, in. (mm)			
			L	B	E	F
1/8	1/8	-AF-FT2-RP2	1.17(29.7)	0.40(10.2)	0.08(2.0)	0.56(14.3)
1/4	1/8	-AF-FT4-RP2	1.25(31.8)	0.40(10.2)	0.17(4.3)	0.56(14.3)
1/4	1/4	-AF-FT4-RP4	1.50(38.1)	0.61(15.5)	0.17(4.3)	0.75(19.1)
3/8	1/4	-AF-FT6-RP4	1.55(39.4)	0.61(15.5)	0.27(6.9)	0.75(19.1)
3/8	3/8	-AF-FT6-RP6	1.57(39.9)	0.60(15.2)	0.27(6.9)	0.94(23.8)
1/2	3/8	-AF-FT8-RP6	1.78(45.2)	0.60(15.2)	0.38(9.7)	0.94(23.8)
1/2	1/2	-AF-FT8-RP8	1.95(49.5)	0.73(18.5)	0.38(9.7)	1.06(27.0)

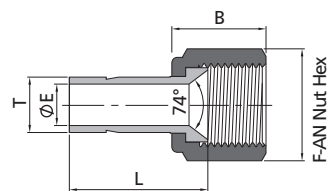


Fractional Tube			ISO Parallel Thread (RG)			
T-Tube O.D. (in.)	P-RG Size	Basic Ordering Number	Dimensions, in. (mm)			
			L	B	E	F
1/4	1/4	-AF-FT4-RG4	1.39(35.3)	0.51(12.9)	0.17(4.3)	0.75(19.1)
3/8	3/8	-AF-FT6-RG6	1.55(39.4)	0.56(14.2)	0.26(6.6)	0.94(23.8)
1/2	1/2	-AF-FT8-RG8	1.80(45.7)	0.74(18.8)	0.28(7.1)	1.06(27.0)



Adapt to Japanese gauge stud.

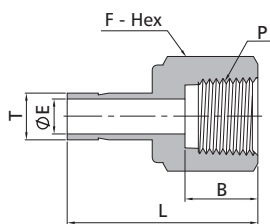
Fractional Tube			ISO Parallel Thread (RJ)			
T-Tube O.D. (in.)	P-RJ Size	Basic Ordering Number	Dimensions, in. (mm)			
			L	B	E	F
1/4	1/4	-AF-FT4-RJ4	1.39(35.3)	0.51(12.9)	0.17(4.3)	0.75(19.1)
3/8	3/8	-AF-FT6-RJ6	1.55(39.4)	0.62(15.8)	0.26(6.6)	0.94(23.8)
1/2	1/2	-AF-FT8-RJ8	1.94(49.3)	0.74(18.8)	0.28(7.1)	1.06(27.0)



Fractional Tube			AN Thread			
T-Tube O.D. (in.)	AN Tube Flare Size(in.)	Basic Ordering Number	Dimensions, in. (mm)			
			L	B	E	F
1/8	1/8	-AF-FT2-AN2	0.88(22.4)	0.55(14.0)	0.08(2.0)	0.37(9.5)
1/8	1/4	-AF-FT2-AN4	0.88(22.4)	0.62(15.8)	0.16(4.0)	0.56(14.3)
1/4	1/4	-AF-FT4-AN4	0.96(24.4)	0.62(15.8)	0.18(4.6)	0.56(14.3)
3/8	3/8	-AF-FT6-AN6	0.98(24.9)	0.73(18.5)	0.27(6.8)	0.75(19.05)
1/2	1/2	-AF-FT8-AN8	1.42(36.1)	0.85(21.6)	0.37(9.4)	0.87(22.2)
3/4	3/4	-AF-FT12-AN12	1.49(37.8)	1.03(26.2)	0.58(14.7)	1.25(31.8)

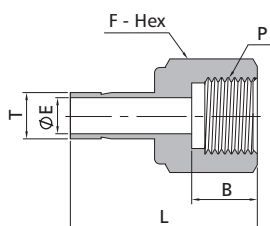


## Female Adapters



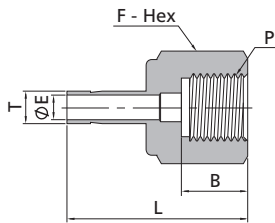
Metric Tube			NPT Thread			
T-Tube O.D. (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)			
			L	B	E	F
3	1/8	-AF-MT3-NS2	28.8(1.13)	10.4(0.41)	1.3(0.05)	14.0(0.55)
4	1/8	-AF-MT4-NS2	33.3(1.31)	10.4(0.41)	2.4(0.09)	14.0(0.55)
6	1/8	-AF-MT6-NS2	32.5(1.28)	10.4(0.41)	4.1(0.16)	14.0(0.55)
6	1/4	-AF-MT6-NS4	37.1(1.46)	15.0(0.59)	4.1(0.16)	19.0(0.75)
8	1/8	-AF-MT8-NS2	35.1(1.38)	10.4(0.41)	5.6(0.22)	14.0(0.55)
8	1/4	-AF-MT8-NS4	37.6(1.48)	15.0(0.59)	5.6(0.22)	19.0(0.75)
8	3/8	-AF-MT8-NS6	36.5(1.44)	15.0(0.59)	5.6(0.22)	22.0(0.87)
10	1/4	-AF-MT10-NS4	38.1(1.50)	15.0(0.59)	7.1(0.28)	19.0(0.75)
10	3/8	-AF-MT10-NS6	40.1(1.58)	15.0(0.59)	7.1(0.28)	22.0(0.87)
10	1/2	-AF-MT10-NS8	46.5(1.83)	19.8(0.78)	7.1(0.28)	27.0(1.06)
12	1/4	-AF-MT12-NS4	43.7(1.72)	15.0(0.59)	8.8(0.35)	19.0(0.75)
12	3/8	-AF-MT12-NS6	42.9(1.69)	15.0(0.59)	8.8(0.35)	22.0(0.87)
12	1/2	-AF-MT12-NS8	52.3(2.06)	19.8(0.78)	8.8(0.35)	27.0(1.06)
16	1/2	-AF-MT16-NS8	49.2(1.94)	19.8(0.78)	12.0(0.47)	27.0(1.06)
18	3/4	-AF-MT18-NS12	52.4(2.06)	20.6(0.81)	14.0(0.55)	32.0(1.26)
20	1/2	-AF-MT20-NS8	50.0(1.97)	19.8(0.78)	15.5(0.61)	27.0(1.06)
20	3/4	-AF-MT20-NS12	57.2(2.25)	20.6(0.81)	15.5(0.61)	35.0(1.38)
25	1	-AF-MT25-NS16	66.7(2.63)	25.4(1.00)	19.8(0.78)	41.0(1.61)

Metric Tube			ISO Tapered Thread (RT)			
T-Tube O.D. (mm)	P-RT Size	Basic Ordering Number	Dimensions, mm (in.)			
			L	B	E	F
3	1/8	-AF-MT3-RT2	28.8(1.13)	10.4(0.41)	1.8(0.07)	14.0(0.55)
4	1/8	-AF-MT4-RT2	28.6(1.13)	10.4(0.41)	2.4(0.09)	14.0(0.55)
6	1/8	-AF-MT6-RT2	33.0(1.30)	10.4(0.41)	4.1(0.16)	14.0(0.55)
8	1/4	-AF-MT8-RT4	37.6(1.48)	15.0(0.59)	5.6(0.22)	19.0(0.75)
10	1/4	-AF-MT10-RT4	38.1(1.50)	15.0(0.59)	7.1(0.28)	19.0(0.75)
10	3/8	-AF-MT10-RT6	36.5(1.44)	15.0(0.59)	7.1(0.28)	22.0(0.87)
10	1/2	-AF-MT10-RT8	41.3(1.63)	19.8(0.78)	7.1(0.28)	27.0(1.06)
12	1/4	-AF-MT12-RT4	43.7(1.72)	15.0(0.59)	8.8(0.35)	19.0(0.75)
12	3/8	-AF-MT12-RT6	43.7(1.72)	15.0(0.59)	8.8(0.35)	22.0(0.87)
12	1/2	-AF-MT12-RT8	46.8(1.84)	19.8(0.78)	8.8(0.35)	27.0(1.06)
16	1/2	-AF-MT16-RT8	48.4(1.91)	19.8(0.78)	12.0(0.47)	27.0(1.06)
18	3/4	-AF-MT18-RT12	52.4(2.06)	20.6(0.81)	14.0(0.55)	32.0(1.26)
20	3/4	-AF-MT20-RT12	52.4(2.06)	20.6(0.81)	15.5(0.61)	32.0(1.26)
25	1	-AF-MT25-RT16	66.7(2.63)	25.4(1.00)	19.8(0.78)	41.0(1.61)

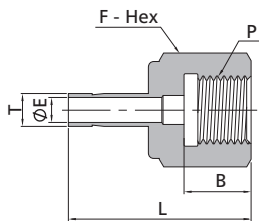


Metric Tube			ISO Parallel Thread (RP)			
T-Tube O.D. (mm)	P-RP Size	Basic Ordering Number	Dimensions, mm (in.)			
			L	B	E	F
6	1/8	-AF-MT6-RP2	32.0(1.26)	10.2(0.40)	4.1(0.16)	14.0(0.55)
6	1/4	-AF-MT6-RP4	37.8(1.49)	15.2(0.60)	4.1(0.16)	19.0(0.75)
12	1/2	-AF-MT12-RP8	49.8(1.96)	18.8(0.74)	8.8(0.35)	27.0(1.06)

Female Adapters



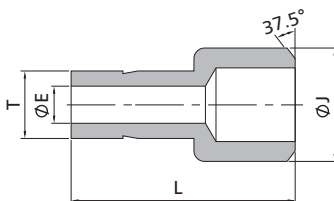
Metric Tube			ISO Parallel Thread (RG)			
T-Tube O.D. (mm)	P-RG Size	Basic Ordering Number	Dimensions, mm (in.)			
			L	B	E	F
3	1/8	-AF-MT3-RG2	28.6(1.13)	9.8(0.39)	1.9(0.07)	14.0(0.55)
3	1/4	-AF-MT3-RG4	33.5(1.32)	12.9(0.50)	1.9(0.07)	19.0(0.75)
4	1/8	-AF-MT4-RG2	29.4(1.16)	9.8(0.39)	2.4(0.09)	14.0(0.55)
6	1/8	-AF-MT6-RG2	29.1(1.15)	9.8(0.39)	4.1(0.16)	14.0(0.55)
6	1/4	-AF-MT6-RG4	35.3(1.39)	12.9(0.50)	4.1(0.16)	19.0(0.75)
6	3/8	-AF-MT6-RG6	38.4(1.51)	14.2(0.56)	4.1(0.16)	24.0(0.94)
6	1/2	-AF-MT6-RG8	42.9(1.69)	18.8(0.74)	4.1(0.16)	27.0(1.06)
8	1/4	-AF-MT8-RG4	33.0(1.30)	12.9(0.50)	5.5(0.22)	19.0(0.75)
8	3/8	-AF-MT8-RG6	38.9(1.53)	14.2(0.56)	5.6(0.22)	24.0(0.94)
8	1/2	-AF-MT8-RG8	43.7(1.72)	18.8(0.74)	5.6(0.22)	27.0(1.06)
10	1/4	-AF-MT10-RG4	34.5(1.36)	12.9(0.50)	5.5(0.22)	19.0(0.75)
10	3/8	-AF-MT10-RG6	36.1(1.42)	14.2(0.56)	6.5(0.26)	24.0(0.94)
10	1/2	-AF-MT10-RG8	41.1(1.62)	18.8(0.74)	7.1(0.28)	27.0(1.06)
12	1/4	-AF-MT12-RG4	40.1(1.58)	12.9(0.50)	5.5(0.22)	19.0(0.75)
12	3/8	-AF-MT12-RG6	44.7(1.76)	14.2(0.56)	6.5(0.26)	24.0(0.94)
12	1/2	-AF-MT12-RG8	48.8(1.92)	18.8(0.74)	7.0(0.28)	27.0(1.06)
16	1/2	-AF-MT16-RG8	49.0(1.93)	18.8(0.74)	7.0(0.28)	27.0(1.06)
18	1/2	-AF-MT18-RG8	49.3(1.94)	18.8(0.74)	7.0(0.28)	27.0(1.06)



Adapt to Japanese gauge stud.

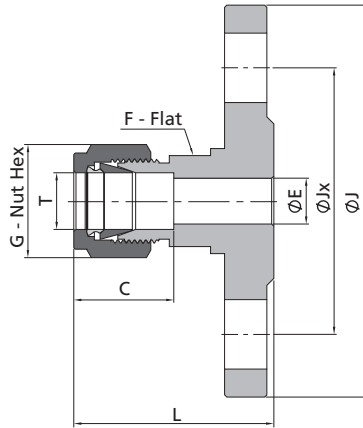
Metric Tube			ISO Parallel Thread (RJ)			
T-Tube O.D. (mm)	P-RJ Size	Basic Ordering Number	Dimensions, mm (in.)			
			L	B	E	F
6	1/4	-AF-MT6-RJ4	35.3(1.39)	12.9(0.50)	4.1(0.16)	19.0(0.75)
6	3/8	-AF-MT6-RJ6	38.6(1.52)	15.8(0.62)	4.1(0.16)	24.0(0.94)
6	1/2	-AF-MT6-RJ8	42.9(1.69)	18.8(0.74)	4.1(0.16)	27.0(1.06)
8	1/4	-AF-MT8-RJ4	33.0(1.30)	12.9(0.50)	5.5(0.22)	19.0(0.75)
8	3/8	-AF-MT8-RJ6	39.4(1.55)	15.8(0.62)	5.6(0.22)	24.0(0.94)
8	1/2	-AF-MT8-RJ8	43.7(1.72)	18.8(0.74)	5.6(0.22)	27.0(1.06)
10	1/4	-AF-MT10-RJ4	34.5(1.36)	12.9(0.50)	5.5(0.22)	19.0(0.75)
10	3/8	-AF-MT10-RJ6	36.1(1.42)	15.8(0.62)	6.5(0.26)	24.0(0.94)
10	1/2	-AF-MT10-RJ8	41.1(1.62)	18.8(0.74)	7.1(0.28)	27.0(1.06)
12	1/4	-AF-MT12-RJ4	40.1(1.58)	12.9(0.50)	5.5(0.22)	19.0(0.75)
12	3/8	-AF-MT12-RJ6	44.7(1.76)	15.8(0.62)	6.5(0.26)	24.0(0.94)
12	1/2	-AF-MT12-RJ8	48.8(1.92)	18.8(0.74)	7.0(0.28)	27.0(1.06)

Weld Adapters



Fractional Tube			Pipe Weld		
T-Tube O.D. (in.)	Pipe Weld Size	Basic Ordering Number	Dimensions, in. (mm)		
			L	J	E
1/4	1/4	-AW-FT4-PB4	1.14(29.0)	0.54(13.7)	0.17(4.3)
3/8	1/2	-AW-FT6-PB8	1.46(37.1)	0.84(21.3)	0.27(6.9)
1/2	1/2	-AW-FT8-PB8	1.66(42.2)	0.84(21.3)	0.37(9.4)
1/2	3/4	-AW-FT8-PB12	1.68(42.7)	1.05(26.7)	0.37(9.4)
3/4	3/4	-AW-FT12-PB12	1.87(47.5)	1.05(26.7)	0.58(14.7)

Flange Adapters



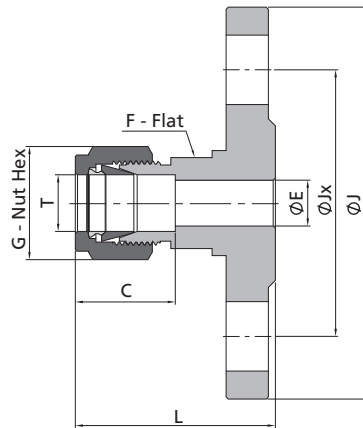
- ⊙ Integrally forged body.
- ⊙ ANSI flanges comply with ANSI B16.5.
- ⊙ DIN flanges comply with DIN 2501/2526.
- ⊙ GB flanges comply with GB/T 9123.1.
- ⊙ EN flanges comply with EN 1092-1.
- ⊙ JIS flanges comply with JIS B 2220.

ANSI Flanges				Dimensions, in. (mm)						
T-Tube O.D. (in.)	ANSI Flange NPS	Class	Basic Ordering Number Raised Face Flange	L	J	Jx	E	C	G	F
1/4	1/2	150	-FA-FL4-F8-150	1.61(40.9)	3.50(88.9)	2.38(60.5)	0.19(4.8)	0.60(15.2)	0.56(14.3)	0.81(20.6)
3/8	1/2	300	-FA-FL6-F8-300	1.79(45.5)	3.75(95.3)	2.62(66.5)	0.28(7.1)	0.66(16.8)	0.69(17.5)	0.81(20.6)
1/2	1/2	150	-FA-FL8-F8-150	1.78(45.2)	3.50(88.9)	2.38(60.5)	0.41(10.4)	0.90(22.9)	0.87(22.2)	0.81(20.6)
1/2	1	150	-FA-FL8-F16-150	1.90(48.3)	4.25(108.0)	3.12(79.2)	0.41(10.4)	0.90(22.9)	0.87(22.2)	0.81(20.6)
1/2	2	150	-FA-FL8-F32-150	2.09(53.1)	6.00(152.4)	4.76(121.0)	0.41(10.4)	0.90(22.9)	0.87(22.2)	0.81(20.6)
3/4	1	150	-FA-FL12-F16-150	1.98(50.3)	4.25(108.0)	3.12(79.2)	0.62(15.7)	0.96(24.4)	1.13(28.6)	1.25(31.8)
1	1	150	-FA-FL16-F16-150	2.38(60.5)	4.25(108.0)	3.12(79.2)	0.88(22.4)	1.23(31.2)	1.50(38.1)	1.37(34.9)

DIN/GB Flanges, Pressure Class PN 40				Dimensions, mm (in.)						
T-Tube O.D. (mm)	ANSI Flange Size DN	Basic Ordering Number Raised Face Flange		L	J	Jx	E	C	G	F
6	25	-FA-ML6-F25-40B1		47.5(1.87)	115.0(4.53)	85.0(3.35)	4.8(0.19)	15.3(0.60)	14.0(0.55)	20.0(0.79)
12	15	-FA-ML12-F15-40B1		48.5(1.91)	95.0(3.74)	65.0(2.56)	9.5(0.37)	22.8(0.90)	22.0(0.87)	20.0(0.79)
12	25	-FA-ML12-F25-40B1		50.5(1.99)	115.0(4.53)	85.0(3.35)	9.5(0.37)	22.8(0.90)	22.0(0.87)	20.0(0.79)
12	50	-FA-ML12-F50-40B1		55.3(2.18)	165.0(6.50)	125.0(4.92)	9.5(0.37)	22.8(0.90)	22.0(0.87)	20.0(0.79)
18	15	-FA-ML18-F15-40B1		51.8(2.04)	95.0(3.74)	65.0(2.56)	15.1(0.59)	24.4(0.96)	30.0(1.18)	32.0(1.26)
18	25	-FA-ML18-F25-40B1		53.8(2.12)	115.0(4.53)	85.0(3.35)	15.1(0.59)	24.4(0.96)	30.0(1.18)	32.0(1.26)
25	25	-FA-ML25-F25-40B1		64.0(2.52)	115.0(4.53)	85.0(3.35)	21.8(0.86)	31.3(1.23)	38.0(1.50)	35.0(1.38)

Flange Adapters

Tube Fittings



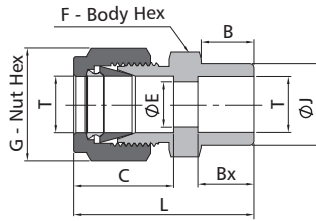
- ⊙ Integrally forged body.
- ⊙ ANSI flanges comply with ANSI B16.5.
- ⊙ DIN flanges comply with DIN 2501/2526.
- ⊙ GB flanges comply with GB/T 9123.1.
- ⊙ EN flanges comply with EN 1092-1.
- ⊙ JIS flanges comply with JIS B 2220.

EN Flanges, Pressure Class PN 40									
T-Tube O.D. (mm)	EN Flange Size DN	Basic Ordering Number Raised Face Flange	Dimensions, mm (in.)						
			L	J	Jx	E	C	G	F
6	25	-FA-ML6-F25E-40B1	47.5(1.87)	115.0(4.53)	85.0(3.35)	4.8(0.19)	15.3(0.60)	14.0(0.55)	20.0(0.79)
12	15	-FA-ML12-F15E-40B1	48.5(1.91)	95.0(3.74)	65.0(2.56)	9.5(0.37)	22.8(0.90)	22.0(0.87)	20.0(0.79)
12	25	-FA-ML12-F25E-40B1	50.5(1.99)	115.0(4.53)	85.0(3.35)	9.5(0.37)	22.8(0.90)	22.0(0.87)	20.0(0.79)
12	50	-FA-ML12-F50E-40B1	55.3(2.18)	165.0(6.50)	125.0(4.92)	9.5(0.37)	22.8(0.90)	22.0(0.87)	20.0(0.79)
18	15	-FA-ML18-F15E-40B1	51.8(2.04)	95.0(3.74)	65.0(2.56)	15.1(0.59)	24.4(0.96)	30.0(1.18)	32.0(1.26)
18	25	-FA-ML18-F25E-40B1	53.8(2.12)	115.0(4.53)	85.0(3.35)	15.1(0.59)	24.4(0.96)	30.0(1.18)	32.0(1.26)
25	25	-FA-ML25-F25E-40B1	64.0(2.52)	115.0(4.53)	85.0(3.35)	21.8(0.86)	31.3(1.23)	38.0(1.50)	35.0(1.38)

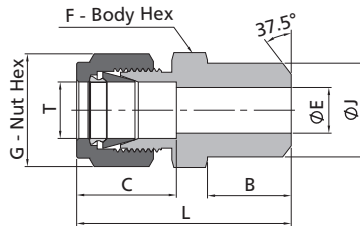
JIS Flanges, Pressure Class 10K									
T-Tube O.D.	JIS Flange Size DN	Basic Ordering Number Raised Face Flange	Dimensions, in. (mm)						
			L	J	Jx	E	C	G	F
1/4"	15	-FA-FL4-F15-10KRF	1.66(42.2)	3.74(95.0)	2.76(70.1)	0.19(4.8)	0.60(15.2)	0.56(14.3)	0.81(20.6)
3/8"	15	-FA-FL6-F15-10KRF	1.72(43.7)	3.74(95.0)	2.76(70.1)	0.28(7.1)	0.66(16.8)	0.69(17.5)	0.81(20.6)
1/2"	15	-FA-FL8-F15-10KRF	1.83(46.5)	3.74(95.0)	2.76(70.1)	0.41(10.4)	0.90(22.9)	0.87(22.2)	0.81(20.6)
3/4"	15	-FA-FL12-F15-10KRF	1.91(48.5)	3.74(95.0)	2.76(70.1)	0.62(15.7)	0.96(24.4)	1.13(28.6)	1.25(31.8)
1"	25	-FA-FL16-F25-10KRF	2.40(61.0)	4.92(125.0)	3.54(89.9)	0.88(22.4)	1.23(31.2)	1.50(38.1)	1.37(34.9)
12mm	15	-FA-ML12-F15-10KRF	1.83(46.5)	3.74(95.0)	2.76(70.0)	0.37(9.5)	0.90(22.8)	0.87(22.0)	0.79(20.0)
18mm	15	-FA-ML18-F15-10KRF	1.91(48.5)	3.74(95.0)	2.76(70.0)	0.59(15.1)	0.96(24.4)	1.18(30.0)	1.26(32.0)
25mm	25	-FA-ML25-F25-10KRF	2.40(61.0)	4.92(125.0)	3.54(90.0)	0.86(21.8)	1.23(31.3)	1.50(38.0)	1.38(35.0)

Weld Connectors

Tube Fittings

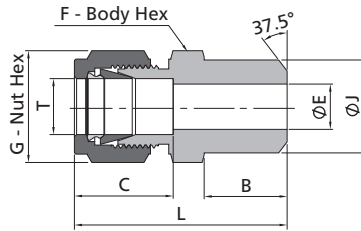


Fractional Tube			Tube Socket Weld						
T-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)							
		L	C	G	F	B	E	Bx	J
1/8	-CW-FL2-TS2	1.14(29.0)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.34(8.6)	0.09(2.3)	0.10(2.5)	0.31(7.9)
3/16	-CW-FL3-TS3	1.17(29.7)	0.54(13.7)	0.50(12.7)	0.44(11.1)	0.37(9.5)	0.13(3.3)	0.19(4.8)	0.42(10.7)
1/4	-CW-FL4-TS4	1.32(33.5)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.41(10.4)	0.19(4.8)	0.28(7.1)	0.48(12.2)
3/8	-CW-FL6-TS6	1.48(37.6)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.47(11.9)	0.28(7.1)	0.31(7.9)	0.62(15.7)
1/2	-CW-FL8-TS8	1.62(41.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.47(11.9)	0.41(10.4)	0.50(12.7)	0.75(19.1)
5/8	-CW-FL10-TS10	1.65(41.9)	0.96(24.4)	1.00(25.4)	0.94(23.8)	0.47(11.9)	0.50(12.7)	0.41(10.4)	0.92(23.4)
3/4	-CW-FL12-TS12	1.71(43.4)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.47(11.9)	0.62(15.7)	0.44(11.1)	1.05(26.7)
1	-CW-FL16-TS16	2.07(52.6)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.56(14.2)	0.88(22.4)	0.62(15.7)	1.36(34.5)



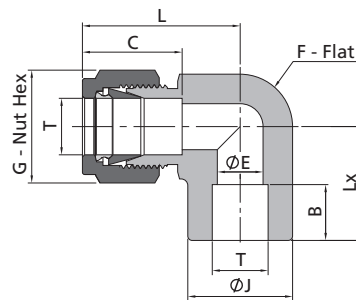
Fractional Tube			Pipe Butt Weld						
T-Tube O.D. (in.)	Pipe Weld Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	C	G	F	E	B	J
1/8	1/8	-CW-FL2-PB2	1.20(30.5)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.09(2.3)	0.38(9.7)	0.41(10.3)
3/16	1/8	-CW-FL3-PB2	1.23(31.2)	0.54(13.7)	0.50(12.7)	0.44(11.1)	0.12(3.0)	0.38(9.7)	0.41(10.3)
1/4	1/8	-CW-FL4-PB2	1.29(32.8)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.19(4.8)	0.38(9.7)	0.41(10.3)
1/4	1/4	-CW-FL4-PB4	1.49(37.8)	0.60(15.2)	0.56(14.3)	0.56(14.3)	0.19(4.8)	0.56(14.2)	0.54(13.7)
5/16	1/8	-CW-FL5-PB2	1.34(34.0)	0.64(16.3)	0.63(15.9)	0.56(14.3)	0.21(5.3)	0.38(9.7)	0.41(10.3)
5/16	1/4	-CW-FL5-PB4	1.52(38.6)	0.64(16.3)	0.63(15.9)	0.56(14.3)	0.25(6.4)	0.56(14.2)	0.54(13.7)
3/8	1/4	-CW-FL6-PB4	1.57(39.9)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.28(7.1)	0.56(14.2)	0.54(13.7)
3/8	3/8	-CW-FL6-PB6	1.57(39.9)	0.66(16.8)	0.69(17.5)	0.69(17.5)	0.28(7.1)	0.56(14.2)	0.67(17.1)
3/8	1/2	-CW-FL6-PB8	1.82(46.2)	0.66(16.8)	0.69(17.5)	0.87(22.2)	0.28(7.1)	0.75(19.1)	0.84(21.3)
3/8	3/4	-CW-FL6-PB12	1.88(47.8)	0.66(16.8)	0.69(17.5)	1.06(27.0)	0.28(7.1)	0.75(19.1)	1.05(26.7)
1/2	3/8	-CW-FL8-PB6	1.71(43.4)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.41(10.4)	0.56(14.2)	0.67(17.1)
1/2	1/2	-CW-FL8-PB8	1.93(49.0)	0.90(22.9)	0.87(22.2)	0.87(22.2)	0.41(10.4)	0.75(19.1)	0.84(21.3)
1/2	3/4	-CW-FL8-PB12	1.99(50.5)	0.90(22.9)	0.87(22.2)	1.06(27.0)	0.41(10.4)	0.75(19.1)	1.05(26.7)
5/8	1/2	-CW-FL10-PB8	1.93(49.0)	0.96(24.4)	1.00(25.4)	0.94(23.8)	0.50(12.7)	0.75(19.1)	0.84(21.3)
3/4	1/2	-CW-FL12-PB8	1.99(50.5)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.55(14.0)	0.75(19.1)	0.84(21.3)
3/4	3/4	-CW-FL12-PB12	1.99(50.5)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.62(15.7)	0.75(19.1)	1.05(26.7)
1	1	-CW-FL16-PB16	2.45(62.2)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.88(22.4)	0.94(23.9)	1.31(33.4)
1 1/4	1 1/4	-CW-FL20-PB20	3.04(77.2)	1.62(41.1)	1.87(47.6)	1.75(44.5)	1.09(27.7)	0.94(23.9)	1.66(42.2)
1 1/2	1 1/2	-CW-FL24-PB24	3.50(88.9)	1.97(50.0)	2.25(57.2)	2.13(54.0)	1.34(34.0)	1.03(26.2)	1.90(48.3)

Weld Connectors



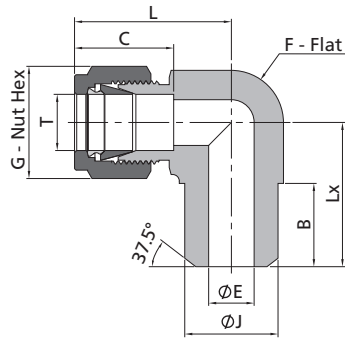
Metric Tube			Pipe Butt Weld						
T-Tube O.D. (mm)	Pipe Weld Size	Basic Ordering Number	Dimensions, mm (in.)						
			L	C	G	F	E	B	J
3	1/8	-CW-ML3-PB2	30.5(1.20)	12.9(0.51)	12.0(0.47)	12.0(0.47)	2.4(0.09)	9.7(0.38)	10.3(0.41)
4	1/8	-CW-ML4-PB2	31.5(1.24)	13.7(0.54)	12.0(0.47)	12.0(0.47)	2.4(0.09)	9.7(0.38)	10.3(0.41)
6	1/8	-CW-ML6-PB2	32.8(1.29)	15.3(0.60)	14.0(0.55)	14.0(0.55)	4.8(0.19)	9.7(0.38)	10.3(0.41)
6	1/4	-CW-ML6-PB4	37.9(1.49)	15.3(0.60)	14.0(0.55)	14.0(0.55)	4.8(0.19)	14.2(0.56)	13.7(0.54)
8	1/8	-CW-ML8-PB2	34.2(1.35)	16.2(0.64)	16.0(0.63)	15.0(0.59)	5.4(0.21)	9.7(0.38)	10.3(0.41)
8	1/4	-CW-ML8-PB4	38.7(1.52)	16.2(0.64)	16.0(0.63)	15.0(0.59)	6.4(0.25)	14.2(0.56)	13.7(0.54)
8	1/2	-CW-ML8-PB8	45.6(1.80)	16.2(0.64)	16.0(0.63)	22.0(0.87)	6.4(0.25)	19.1(0.75)	21.3(0.84)
10	1/4	-CW-ML10-PB4	40.9(1.60)	17.2(0.70)	19.0(0.75)	18.0(0.71)	7.5(0.30)	14.2(0.56)	13.7(0.54)
10	3/8	-CW-ML10-PB6	40.9(1.60)	17.2(0.70)	19.0(0.75)	18.0(0.71)	7.9(0.31)	14.2(0.56)	17.1(0.67)
10	1/2	-CW-ML10-PB8	46.5(1.80)	17.2(0.70)	19.0(0.75)	22.0(0.87)	7.9(0.31)	19.1(0.75)	21.3(0.84)
12	1/4	-CW-ML12-PB4	43.4(1.70)	22.8(0.90)	22.0(0.87)	22.0(0.87)	7.5(0.30)	14.2(0.56)	13.7(0.54)
12	3/8	-CW-ML12-PB6	43.4(1.70)	22.8(0.90)	22.0(0.87)	22.0(0.87)	9.5(0.37)	14.2(0.56)	17.1(0.67)
12	1/2	-CW-ML12-PB8	49.0(1.90)	22.8(0.90)	22.0(0.87)	22.0(0.87)	9.5(0.37)	19.1(0.75)	21.3(0.84)
14	3/8	-CW-ML14-PB6	44.1(1.70)	24.4(0.96)	25.0(0.98)	24.0(0.94)	10.7(0.42)	14.2(0.56)	17.1(0.67)
15	1/2	-CW-ML15-PB8	49.0(1.90)	24.4(0.96)	25.0(0.98)	24.0(0.94)	11.9(0.47)	19.1(0.75)	21.3(0.84)
16	1/2	-CW-ML16-PB8	49.0(1.90)	24.4(0.96)	25.0(0.98)	24.0(0.94)	12.7(0.50)	19.1(0.75)	21.3(0.84)
18	1/2	-CW-ML18-PB8	50.5(2.00)	24.4(0.96)	30.0(1.18)	27.0(1.06)	13.9(0.55)	19.1(0.75)	21.3(0.84)
30	1 1/4	-CW-ML30-PB20	77.2(3.00)	39.6(1.60)	50.0(1.97)	46.0(1.81)	26.2(1.03)	23.9(0.94)	42.2(1.66)
32	1 1/4	-CW-ML32-PB20	79.6(3.10)	42.0(1.70)	50.0(1.97)	46.0(1.81)	28.6(1.13)	23.9(0.94)	42.2(1.66)
38	1 1/2	-CW-ML38-PB24	91.6(3.60)	49.4(1.90)	60.0(2.36)	55.0(2.17)	33.7(1.33)	26.2(1.03)	48.3(1.9)

Weld Elbows



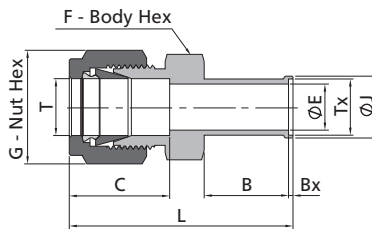
Fractional Tube		Tube Socket Weld							
T-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)							
		L	C	G	F	B	E	Lx	J
1/8	-LW-FL2-TS2	0.66(16.8)	0.50(12.7)	0.44(11.1)	0.37(9.5)	0.10(2.5)	0.09(2.3)	0.63(16.0)	0.38(9.7)
3/16	-LW-FL3-TS3	0.72(18.3)	0.54(13.7)	0.50(12.7)	0.44(11.1)	0.19(4.8)	0.13(3.3)	0.69(17.5)	0.44(11.2)
1/4	-LW-FL4-TS4	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.28(7.1)	0.19(4.8)	0.77(19.6)	0.50(12.7)
3/8	-LW-FL6-TS6	1.20(30.5)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.31(7.9)	0.28(7.1)	0.91(23.1)	0.62(15.7)
1/2	-LW-FL8-TS8	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.38(9.7)	0.41(10.4)	1.02(25.9)	0.81(20.6)
5/8	-LW-FL10-TS10	1.16(29.5)	0.96(24.4)	1.00(25.4)	1.06(27.0)	0.41(10.4)	0.50(12.7)	1.16(29.5)	0.94(23.9)
3/4	-LW-FL12-TS12	1.57(39.9)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.44(11.2)	0.62(15.7)	1.17(29.7)	1.06(26.9)
1	-LW-FL16-TS16	1.93(49.0)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.62(15.7)	0.88(22.4)	1.45(36.8)	1.38(35.1)

Weld Elbows



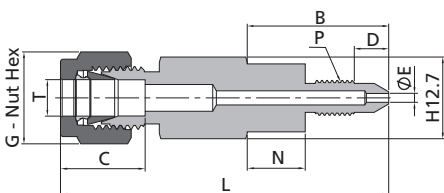
Fractional Tube			Pipe Butt Weld							
T-Tube O.D. (in.)	Pipe Weld Size	Basic Ordering Number	Dimensions, in. (mm)							
			L	C	G	F	B	E	Lx	J
1/8	1/8	-LW-FL2-PB2	0.92(23.4)	0.50(12.7)	0.44(11.1)	0.44(11.1)	0.38(9.7)	0.09(2.3)	0.72(18.3)	0.41(10.3)
3/16	1/8	-LW-FL3-PB2	1.01(25.7)	0.54(13.7)	0.50(12.7)	0.50(12.7)	0.38(9.7)	0.12(3.0)	0.74(18.8)	0.41(10.3)
1/4	1/8	-LW-FL4-PB2	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.38(9.7)	0.19(4.8)	0.74(18.8)	0.41(10.3)
1/4	1/4	-LW-FL4-PB4	1.06(26.9)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.56(14.2)	0.19(4.8)	0.92(23.4)	0.54(13.7)
3/8	1/4	-LW-FL6-PB4	1.20(30.5)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.56(14.2)	0.28(7.1)	1.00(25.4)	0.54(13.7)
1/2	3/8	-LW-FL8-PB6	1.37(34.8)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.56(14.2)	0.41(10.4)	1.13(28.8)	0.67(17.1)
1/2	1/2	-LW-FL8-PB8	1.42(36.1)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.75(19.1)	0.41(10.4)	1.30(33.0)	0.84(21.3)
5/8	1/2	-LW-FL10-PB8	1.43(36.3)	0.96(24.4)	1.00(25.4)	0.94(23.8)	0.75(19.1)	0.50(12.7)	1.38(35.1)	0.84(21.3)
3/4	3/4	-LW-FL12-PB12	1.57(39.9)	0.96(24.4)	1.13(28.6)	1.06(27.0)	0.75(19.1)	0.62(15.7)	1.45(36.8)	1.05(26.7)
1	3/4	-LW-FL16-PB12	1.94(49.3)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.75(19.1)	0.74(18.8)	1.65(41.9)	1.05(26.7)
1	1	-LW-FL16-PB16	1.94(49.3)	1.23(31.2)	1.50(38.1)	1.37(34.9)	0.94(23.9)	0.88(22.4)	1.84(46.7)	1.31(33.4)

Automatic Tube Weld Connectors



Fractional Tube			Automatic Tube Weld							
T-Tube O.D. (in.)	Tx-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)							
			L	C	G	F	B	E	Bx	J
1/4	1/4	-CW-FL4-TB4A	1.74(44.2)	0.60(15.2)	0.56(14.3)	0.50(12.7)	0.75(19.1)	0.18(4.5)	0.02(0.5)	0.29(7.4)
3/8	3/8	-CW-FL6-TB6A	1.84(46.7)	0.66(16.8)	0.69(17.5)	0.63(15.9)	0.75(19.1)	0.31(7.8)	0.03(0.8)	0.41(10.4)
1/2	1/2	-CW-FL8-TB8A	1.99(50.5)	0.90(22.9)	0.87(22.2)	0.81(20.6)	0.75(19.1)	0.41(10.4)	0.04(1.0)	0.55(14.0)

Calibration Fittings



- ⦿ The calibration fittings can be connected directly with the bleed port of the transmitter so that the calibration process can be simplified.
- ⦿ Two types are available to fit the bleed ports of the transmitters.

T-Tube O.D. (in.)	P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)						
			L	B	C	D	E	G	N
1/4	1/4-28	-FC-FL4-1428	1.69(42.9)	0.78(19.8)	0.60(15.2)	0.43(10.9)	0.06(1.5)	0.56(14.3)	—
1/4	5/16-24	-FC-FL4-51624	2.32(58.9)	1.41(35.8)	0.60(15.2)	0.40(10.2)	0.06(1.5)	0.56(14.3)	0.41(10.4)

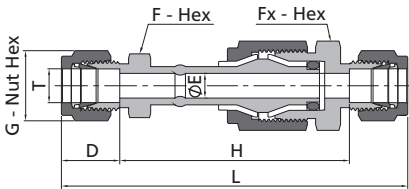
### Dielectric Fittings

#### Materials

Component	Material
Insulator	Polyamide-imide
O-Ring	70 Durometer FKM
Backup Ring	Virgin PTFE

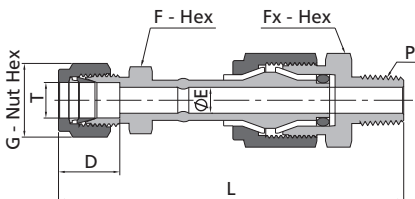
#### Technical Data

- ⊙ Electrical Resistance of Insulators at 70°F (20°C): 10×10<sup>6</sup>Ω at 10 V
- ⊙ Maximum working pressure: 5000 psig (344 bar) at 70°F (21°C)
- ⊙ Temperature range: -40°F (-40°C) to 200°F (93°C)



Fractional Tube								
T-Tube O.D. (in.)	Basic Ordering Number	Dimensions, in. (mm)						
		L	D	G	H	E	F	Fx
1/4	-DF-FL4	3.77(95.7)	0.60(15.2)	0.56(14.3)	2.57(65.3)	0.19(4.8)	0.50(12.7)	0.81(20.6)
3/8	-DF-FL6	3.92(99.6)	0.66(16.8)	0.69(17.5)	2.59(65.8)	0.28(7.1)	0.63(15.9)	0.81(20.6)
1/2	-DF-FL8	4.17(106.0)	0.90(22.9)	0.87(22.2)	2.37(60.2)	0.28(7.1)	0.81(20.6)	0.81(20.6)

Metric Tube								
T-Tube O.D. (mm)	Basic Ordering Number	Dimensions, mm (in.)						
		L	D	G	H	E	F	Fx
12	-DF-ML12	107.0(4.21)	22.8(0.90)	22.0(0.87)	61.7(2.43)	7.1(0.28)	22.0(0.87)	22.0(0.87)

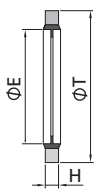


Fractional Tube						NPT Thread		
T-Tube O.D. (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)					
			L	D	G	E	F	Fx
3/8	1/4	-DF-FL6-NS4	3.73(94.7)	0.66(16.8)	0.69(17.5)	0.28(7.1)	0.63(15.9)	0.87(22.2)

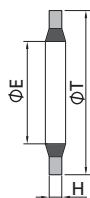


## RS, RSD Gaskets

RS



RSD



The RS and RSD gaskets provide a seal with male ISO parallel threads. The gasket consists of a fluorocarbon FKM or Buna inner ring bonded to a carbon steel or stainless steel outer ring.

ISO Parallel Thread Size	Basic Ordering Number	Dimensions, in. (mm)		
		T	E	H
1/8	-RS-2	0.63(16.0)	0.41(10.4)	0.08(2.0)
1/4	-RS-4	0.81(20.6)	0.54(13.7)	
3/8	-RS-6	0.94(23.9)	0.68(17.3)	
1/2	-RS-8	1.13(28.7)	0.85(21.6)	0.10(2.5)
3/4	-RS-12	1.38(35.1)	1.06(26.9)	
1	-RS-16	1.69(42.9)	1.33(33.8)	
1/8	-RSD-2	0.58(14.7)	0.47(12)	0.05(1.25)
1/4	-RSD-4	0.74(18.7)	0.62(15.75)	
3/8	-RSD-6	0.89(22.7)	0.76(19.25)	
1/2	-RSD-8	1.05(26.7)	0.93(23.55)	
3/4	-RSD-12	1.28(32.5)	1.15(29.2)	
1	-RSD-16	1.56(39.5)	1.42(36.1)	0.08(2)

## RS-M Gaskets

Metric Thread Size	Basic Ordering Number	Dimensions, mm (in.)		
		T	E	H
M8 x 1	-RS-M8	13.0(0.51)	8.7(0.34)	1.0(0.04)
M10 x 1	-RS-M10	16.0(0.63)	10.7(0.42)	1.5(0.06)
M12 x 1.5	-RS-M12	18.0(0.63)	12.7(0.42)	
M14 x 1.5	-RS-M14	22.0(0.71)	14.7(0.50)	
M16 x 1.5	-RS-M16	24.0(0.87)	16.7(0.66)	
M18 x 1.5	-RS-M18	26.0(0.94)	18.7(0.74)	
M20 x 1.5	-RS-M20	28.0(1.02)	20.7(0.81)	2.0(0.08)
M22 x 1.5	-RS-M22	30.0(1.10)	22.7(0.89)	
M24 x 1.5	-RS-M24	32.0(1.20)	24.7(1.00)	
M27 x 2	-RS-M27	36.0(1.30)	27.2(1.10)	
M30 x 2	-RS-M30	39.0(1.40)	30.7(1.20)	
M33 x 2	-RS-M33	42.0(1.50)	33.7(1.30)	2.5(0.10)
M36 x 2	-RS-M36	48.0(1.70)	37.0(1.50)	
M39 x 2	-RS-M39	51.0(1.90)	40.0(1.60)	
M42 x 2	-RS-M42	53.0(2.00)	42.7(1.70)	
M45 x 2	-RS-M45	57.0(2.10)	46.0(1.80)	
M48 x 2	-RS-M48	59.0(2.20)	48.7(1.90)	3.0(0.12)

## Ordering Information

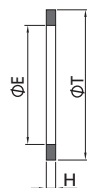
Add the material designator as a prefix to the basic ordering number to complete the ordering number.

Ring		Designator
Outer	Inner	
Stainless Steel	FKM	SSF
Carbon Steel	FKM	CSF
	Buna-N	CSB

## Example:

1. A RS gasket with a Buna inner ring bonded to carbon steel outer ring provides a seal with 1/8 male ISO parallel thread, the complete ordering number is CSB-RS-2.
  2. A RSD gasket with an FKM inner ring bonded to stainless steel outer ring provides a seal with 1/4 male ISO parallel thread, the complete ordering number is SSF-RSD-4.
- The RS and RSD gaskets can be used with RS fitting only.

## RP Gaskets



The RP gasket provides a seal with male ISO parallel threads. The RP gasket may be used with a RS fitting.

ISO Parallel Thread Size	Basic Ordering Number	Dimensions, in. (mm)		
		T	E	H
1/8	-RP-2	0.59(15.0)	0.39(9.9)	0.04(1.0)
1/4	-RP-4	0.75(19.1)	0.52(13.2)	0.06(1.5)
3/8	-RP-6	0.91(23.1)	0.66(16.8)	
1/2	-RP-8	1.06(26.9)	0.83(21.1)	
3/4	-RP-12	1.30(33.0)	1.05(26.7)	0.08(2.0)
1	-RP-16	1.58(40.1)	1.31(33.2)	

## RP-M Gaskets

Metric Thread Size	Basic Ordering Number	Dimensions, mm (in.)		
		T	E	H
M8 x 1	-RP-M8	13.2(0.52)	8.2(0.32)	1.5(0.06)
M10 x 1	-RP-M10	15.2(0.60)	10.2(0.40)	
M12 x 1.5	-RP-M12	18.2(0.60)	12.2(0.40)	
M14 x 1.5	-RP-M14	20.2(0.72)	14.2(0.48)	
M16 x 1.5	-RP-M16	22.2(0.80)	16.2(0.64)	
M18 x 1.5	-RP-M18	24.2(0.87)	18.2(0.72)	2.0(0.08)
M20 x 1.5	-RP-M20	26.2(0.95)	20.2(0.80)	
M22 x 1.5	-RP-M22	28.2(1.03)	22.2(0.87)	
M24 x 1.5	-RP-M24	30.2(1.10)	24.2(1.00)	
M27 x 2	-RP-M27	33.3(1.20)	27.2(1.10)	
M30 x 2	-RP-M30	37.3(1.30)	30.2(1.20)	2.5(0.10)
M33 x 2	-RP-M33	40.3(1.50)	33.2(1.30)	
M36 x 2	-RP-M36	43.3(1.60)	36.2(1.40)	
M39 x 2	-RP-M39	47.3(1.70)	39.2(1.50)	
M42 x 2	-RP-M42	50.3(1.90)	42.2(1.70)	
M45 x 2	-RP-M45	53.3(2.00)	45.2(1.80)	2.5(0.10)
M48 x 2	-RP-M48	56.3(2.10)	48.2(1.90)	

## RG Gaskets

The RG gasket provides a seal on pressure gauges equipped with male ISO parallel threads.

ISO Parallel Thread Size	Basic Ordering Number	Dimensions, in. (mm)		
		T	E	H
1/4	-RG-4	0.42(10.7)	0.30(7.6)	0.07(1.8)
3/8	-RG-6	0.56(14.2)	0.34(8.6)	0.09(2.3)
1/2	-RG-8	0.70(17.8)	0.36(9.1)	0.10(2.5)

## RG-M Gaskets

ISO Parallel Thread Size	Basic Ordering Number	Dimensions, in. (mm)		
		T	E	H
M10 x 1	-RG-M10	8.3(0.33)	3.3(0.13)	1.5(0.06)
M12 x 1.5	-RG-M12	9.7(0.38)	5.4(0.21)	2.0(0.08)
M14 x 1.5	-RG-M14	11.7(0.38)	6.4(0.21)	
M16 x 1.5	-RG-M16	13.7(0.46)	8.4(0.25)	
M18 x 1.5	-RG-M18	15.7(0.54)	10.0(0.39)	
M20 x 1.5	-RG-M20	17.6(0.62)	11.4(0.45)	
M22 x 1.5	-RG-M22	19.6(0.69)	13.4(0.53)	
M24 x 1.5	-RG-M24	21.6(0.77)	14.8(0.58)	2.5(0.10)
M27 x 2	-RG-M27	24.0(0.90)	13.9(0.50)	
M30 x 2	-RG-M30	27.0(0.90)	19.5(0.80)	
M33 x 2	-RG-M33	30.0(1.10)	21.5(0.80)	
M36 x 2	-RG-M36	33.0(1.20)	23.5(0.90)	
M39 x 2	-RG-M39	36.0(1.30)	24.5(1.00)	
M42 x 2	-RG-M42	38.9(1.40)	29.5(1.20)	
M45 x 2	-RG-M45	41.9(1.50)	30.0(1.20)	
M48 x 2	-RG-M48	44.9(1.60)	32.5(1.30)	

## RJ Gaskets

The RJ gasket provides a seal on Japanese pressure gauges equipped with male ISO parallel threads.

ISO Parallel Thread Size	Basic Ordering Number	Dimensions, in. (mm)		
		T	E	H
1/4	-RJ-4	0.43(10.9)	0.22(5.6)	0.04(1.0)
3/8	-RJ-6	0.55(13.9)	0.22(5.6)	0.04(1.0)
1/2	-RJ-8	0.70(17.8)	0.22(5.6)	0.04(1.0)

## Ordering Information

Add the material designator as a prefix to the basic ordering number to complete the ordering number.

Material	Designator
Copper	CU
316L SS	6L
Vulcanized Fibre	QB
PTFE	T

Vulcanized Fibre and PTFE cannot be used for RP gasket.

### Example:

CU-RP-2, 6L-RG-6, QB-RG-M20, T-RJ-8.

## O-rings



### O-rings for Fittings with SAE/MS Straight Threads

SAE/MS Thread Size	Ordering Number	Material
5/16-24	V19-902	90 Durometer Fluorocarbon FKM
3/8-24	V19-903	
7/16-20	V19-904	
1/2-20	V19-905	
9/16-18	V19-906	
3/4-16	V19-908	
7/8-14	V19-910	
1 1/16-12	V19-912	
1 3/16-12	V19-914	
1 5/16-12	V19-916	
1 5/8-12	V19-920	
1 7/8-12	V19-924	

### O-rings for Fittings with O-Seal Pipe Threads

NPT/ISO Thread Size	Ordering Number	Material
1/8	BN7-013	70 Durometer NBR
1/4	BN7-113	
3/8	BN7-116	
1/2	BN7-118	

## A-86 6 Series Tube Fittings

### O-rings for Adjustable Fittings with ISO Parallel Threads

ISO Parallel Thread Size	Ordering Number	Material
1/8	VI9-502	90 Durometer Fluorocarbon FKM
1/4	VI9-111	
3/8	VI9-113	
1/2	VI9-508	
3/4	VI9-119	
1	VI9-217	

### O-rings for Fittings with O-Seal Straight Threads

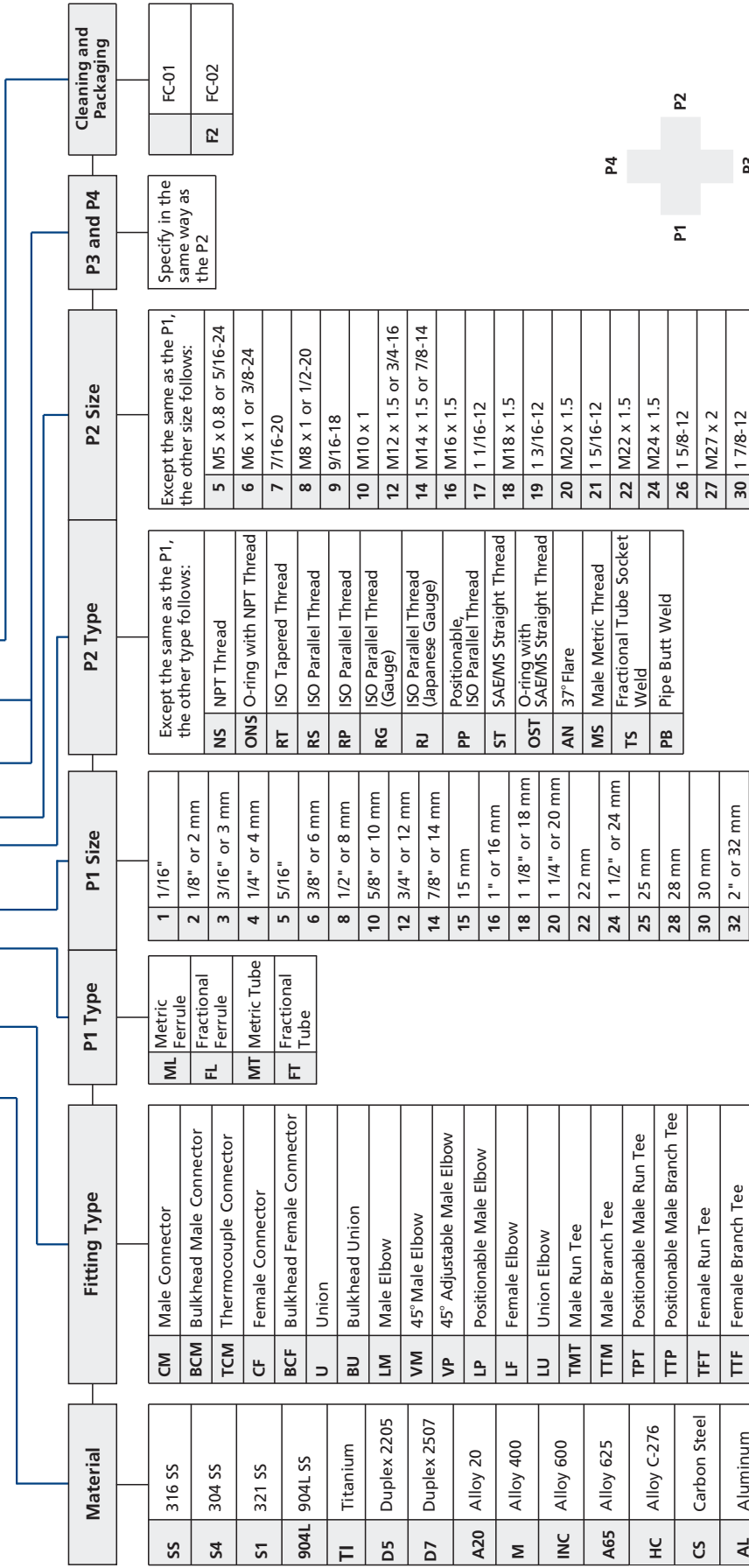
SAE/MS Thread Size	Ordering Number	Material
5/16-24	BN7-011	70 Durometer NBR
3/8-24	BN7-012	
7/16-20	BN7-013	
1/2-20	BN7-112	
9/16-18	BN7-113	
3/4-16	BN7-116	
1 1/16-12	BN7-121	
1 5/16-12	BN7-125	

### O-rings for Fittings with Metric Threads

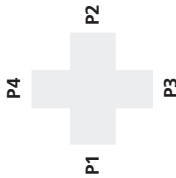
SAE/MS Thread Size	Ordering Number	Material
M14 x 1.5	BN9-M14	90 Durometer NBR
M20 x 1.5	BN9-M20	

# Ordering Number Description

SS – CM – ML12 – NS8 – □ – □ – □



Material	Fitting Type	P1 Type	P1 Size	P2 Type	P2 Size	P3 and P4	Cleaning and Packaging
SS	CM	ML	1 1/16"	Except the same as the P1, the other type follows: NS NPT Thread ONS O-ring with NPT Thread RT ISO Tapered Thread RS ISO Parallel Thread RP ISO Parallel Thread RG ISO Parallel Thread (Gauge) RJ ISO Parallel Thread (Japanese Gauge) PP Positionable, ISO Parallel Thread ST SAE/MS Straight Thread OST O-ring with SAE/MS Straight Thread AN 37° Flare MS Male Metric Thread TS Fractional Tube Socket Weld PB Pipe Butt Weld	Except the same as the P1, the other size follows: 5 M5 x 0.8 or 5/16-24 6 M6 x 1 or 3/8-24 7 7/16-20 8 M8 x 1 or 1/2-20 9 9/16-18 10 M10 x 1 12 M12 x 1.5 or 3/4-16 14 M14 x 1.5 or 7/8-14 16 M16 x 1.5 17 1 1/16-12 18 M18 x 1.5 19 1 3/16-12 20 M20 x 1.5 21 1 5/16-12 22 M22 x 1.5 24 M24 x 1.5 26 1 5/8-12 27 M27 x 2 30 1 7/8-12	Specify in the same way as the P2	FC-01 FC-02
S4	BCM	FL	2 1/8" or 2 mm				
S1	TCM	MT	3 3/16" or 3 mm				
904L	CF	FT	4 1/4" or 4 mm				
TI	BCF		5 5/16"				
D5	U		6 3/8" or 6 mm				
D7	BU		8 1/2" or 8 mm				
AZ0	LM		10 5/8" or 10 mm				
M	VM		12 3/4" or 12 mm				
INC	VP		14 7/8" or 14 mm				
A65	LP		15 15 mm				
HC	LF		16 1" or 16 mm				
CS	LU		18 1 1/8" or 18 mm				
AL	TMT		20 1 1/4" or 20 mm				
B	TTM		22 22 mm				
PA	TPT		24 1 1/2" or 24 mm				
T	TTP		25 25 mm				
	TFT		28 28 mm				
	TTF		30 30 mm				
	TTT		32 2" or 32 mm				
	C		38 38 mm				
	TC		50 50 mm				
	TP						
	R						
	P						
	AM						
	AF						
	CW						
	LW						
	DF						



P1, P2, P3 and P4 shall be described in the following orders:

- ⦿ Ferrule - Tube - NPT Thread - ISO Tapered Thread - ISO Parallel Thread - SAE/MS Straight Thread - 37° Flare - Pipe Butt Weld - Fractional Tube Socket Weld - Others
- ⦿ Describe in descending order as per size if the end connection types are the same
- ⦿ Describe the end of P1 if all end connections are the same

### Cleaning and Packaging:

- FC-01: Standard cleaning and packaging for general industrial procedures
- FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement as stated in ASTM G93 Level C

Note: "Ordering Number Description" is a reference

to understand the combination rules of FITOK product part number. Not all combinations are available.

# 37° Flared Tube Fittings



# Contents

Tube Cap Assembly - TCA



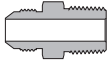
A-92

Nuts - N



A-92

Male Connectors - CM



A-92

Female Connectors - CF



A-94

Unions - U



A-95

Large Hex Unions - HU



A-95

Reducing Adapters - RA



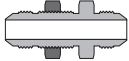
A-95

Sleeves - SL



A-95

Bulkhead Unions - BU



A-96

Bulkhead Lock Nuts - BN



A-96

Tube Caps - TC



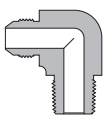
A-96

Tube Plugs - TP



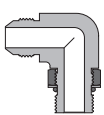
A-96

Male Elbows - LM



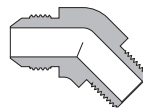
A-97

Adjustable Male Elbows - LP



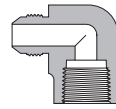
A-97

45° Male Elbows - VM



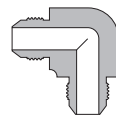
A-98

Female Elbows - LF



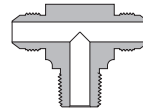
A-98

Union Elbows - LU



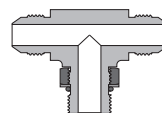
A-99

Male Branch Tees - TTM



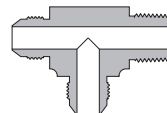
A-100

Adjustable Male Branch Tees - TTP



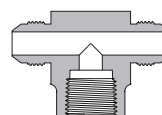
A-100

Male Run Tees - TMT



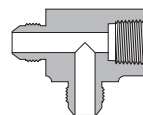
A-101

Female Branch Tees - TTF



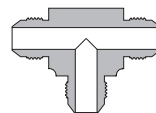
A-101

Female Run Tees - TFT



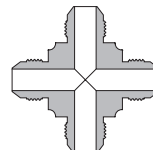
A-102

Union Tees - TTT



A-102

Union Crosses - C



A-103

## Features

- ⦿ Fittings are designed and manufactured in compliance with SAE J514
- ⦿ The hardened threads with smooth surface finish avoid galling and help to extend the fitting service life
- ⦿ Radius junction design for elbows provides smooth flow path
- ⦿ Stainless steel nut threads are silver-plated to minimize the friction with the body threads
- ⦿ Every fitting is marked with size, material and heat number
- ⦿ Fittings are easy to disconnect and retighten
- ⦿ All male threads are protected by plastic caps

## Technical Data

- ⦿ Size range from 1/8" to 2" and 3 mm to 50 mm.
- ⦿ Thread Specification:

Thread Type	Reference Specification
NPT	ASME B1.20.1, SAE AS71051
Unified (SAE)	ASME B1.1, SAE J475

- ⦿ The working temperature of FITOK 37° flare tube fittings is the same as that of FITOK 6 series tube fittings.
- ⦿ Working Pressure:

Nom. SAE Dash Size	Nom. Tube O.D. Size (in.)	37° Flare St. Thread	SAE St. Thread Union and Bulkhead (psig/bar)
2	1/8	5/16-24	5000 (345)
3	3/16	3/8-24	5000 (345)
4	1/4	7/16-20	5000 (345)
5	5/16	1/2-20	5000 (345)
6	3/8	9/16-18	5000 (345)
8	1/2	3/4-16	4500 (310)
10	5/8	7/8-14	3500 (241)
12	3/4	1 1/16-12	3500 (241)
14	7/8	1 3/16-12	3000 (207)
16	1	1 5/16-12	3000 (207)
20	1 1/4	1 5/8-12	2500 (172)
24	1 1/2	1 7/8-12	2000 (138)
32	2	2 1/2-12	1500 (103)

1. Working pressures given are for fittings of stainless steel only. Contact FITOK Group or our authorized distributors for working pressure of other materials.
2. Four times safety factor applied for above working pressure.

## Materials

Material	Bar Stock	Forging	Designator
316 Stainless Steel	ASTM A276 ASME SA479, EN 1.4401	ASTM A182, ASME SA182, EN 1.4401	SS
Aluminum	ASTM B211	ASTM B247	AL
Brass	ASTM B16/B453	ASTM B283	B
Carbon Steel	ASTM A108	ASTM A105	CS



## Ordering Information

Add the material designator as a prefix to the basic ordering number to get the complete ordering number.

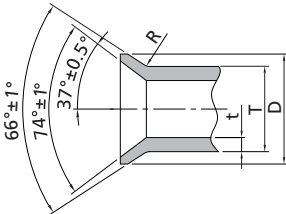
For example:

1. Male connector with 1/4" tube, 1/4 NPT thread and 316 stainless steel material, the complete ordering number is **SS-CM-AN4-NS4**.
2. Sleeve with 6 mm tube and 316 stainless steel material, the complete ordering number is **SS-SL-AN6M**.

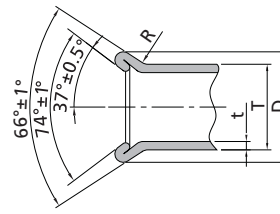
## Flaring Operation

Tube flaring is carried out in two different ways, single wall flare on thick wall tubes and double wall flare on thin wall tubes to reinforce same. Refer to the table below:

### Thick Tubes



### Thin Tubes

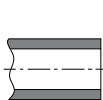


Fractional Tubing			
T-Tube O.D. in	Dimensions		
	D (mm)	t (in.)	R (mm)
1/4	8.6-9.1	0.020-0.065	0.8
5/16	10.2-10.9	0.020-0.065	0.8
3/8	11.6-12.4	0.020-0.065	1.0
1/2	16.0-16.7	0.028-0.083	1.5
5/8	19.3-20.0	0.035-0.095	1.5
3/4	23.3-24.1	0.035-0.109	2.0
7/8	26.4-27.1	0.035-0.109	2.0
1	29.7-30.4	0.035-0.120	2.3
1 1/4	37.5-38.3	0.049-0.120	2.3
1 1/2	43.2-43.9	0.049-0.120	2.8
2	59.2-59.9	0.065-0.134	2.8

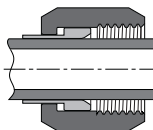
Metric Tubing			
T-Tube O.D. (mm)	Dimensions		
	D (mm)	t (mm)	R (mm)
6	8.4-9.2	0.5-1.5	0.8
8	10.1-10.8	0.5-1.5	0.8
10	12.0-12.5	0.5-1.5	1.0
12	16.0-16.7	1.0-2.0	1.5
14	18.8-19.5	1.0-2.5	1.5
15	19.4-20.0	1.0-2.5	1.5
16	19.4-20.0	1.0-2.5	1.5
18	23.5-24.0	1.0-3.0	2.0
20	24.0-24.5	1.0-3.0	2.0
22	26.2-27.2	1.0-3.0	2.0
25	29.5-30.2	1.0-3.0	2.3
30	37.4-38.0	1.5-3.0	2.3
32	37.6-38.3	1.5-3.0	2.3
38	43.5-44.5	1.5-3.0	2.8
50	58.9-59.6	1.5-3.5	2.8

## Installation Instructions

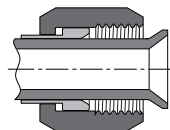
1. Cut the tube to the proper length.
2. Insert the tube into the nut and sleeve.
3. Form the flare to 37° dimension according to SAE J533. See flaring operation.
4. Finger-tighten the nut.
5. Tighten the nut 1/4 turn with wrench while holding steady the body of the fitting.



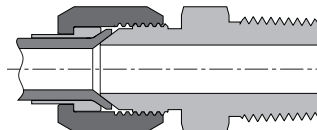
Step 1



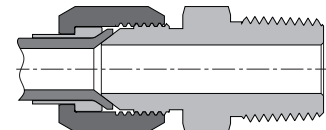
Step 2



Step 3



Step 4



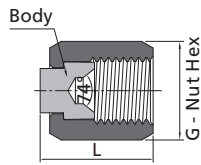
Step 5

## Cautions:

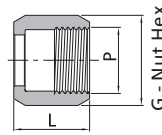
- ⊙ Do not loosen or tighten fittings when system is pressurized.
- ⊙ Please use proper thread sealants on tapered pipe threads.

## Dimensions

### Tube cap assembly



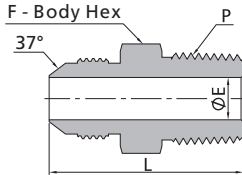
### Nuts



SAE 070112A					
T-Tube O.D.		Basic Ordering Number	Dimensions, in. (mm)		
in.	mm		L	G	
1/8	3	-TCA-AN2	0.60 (15.3)	0.37 (9.5)	
3/16	4	-TCA-AN3	0.66 (16.8)	0.44 (11.1)	
1/4	6	-TCA-AN4	0.67 (17.1)	0.56 (14.3)	
5/16	8	-TCA-AN5	0.77 (19.5)	0.63 (15.9)	
3/8	10	-TCA-AN6	0.81 (20.5)	0.69 (17.5)	
1/2	12	-TCA-AN8	0.94 (23.9)	0.87 (22.2)	
5/8	16	-TCA-AN10	1.07 (27.1)	1.00 (25.4)	
3/4	18	-TCA-AN12	1.24 (31.6)	1.25 (31.8)	
7/8	22	-TCA-AN14	1.26 (32.0)	1.37 (34.9)	
1	25	-TCA-AN16	1.29 (32.8)	1.50 (38.1)	
1 1/4	32	-TCA-AN20	1.39 (35.4)	2.00 (50.8)	
1 1/2	38	-TCA-AN24	1.70 (43.2)	2.25 (57.2)	
2	50	-TCA-AN32	2.07 (52.6)	2.87 (73.0)	

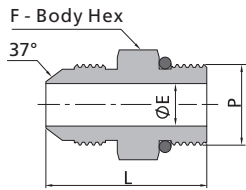
SAE 070110					
Tube O.D.		P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)	
in.	mm			L	G
1/8	3	5/16-24	-N-AN2	0.55 (14.0)	0.37 (9.5)
3/16	4	3/8-24	-N-AN3	0.61 (15.5)	0.44 (11.1)
1/4	6	7/16-20	-N-AN4	0.62 (15.8)	0.56 (14.3)
5/16	8	1/2-20	-N-AN5	0.68 (17.3)	0.63 (15.9)
3/8	10	9/16-18	-N-AN6	0.73 (18.5)	0.69 (17.5)
1/2	12	3/4-16	-N-AN8	0.85 (21.6)	0.87 (22.2)
5/8	16	7/8-14	-N-AN10	0.98 (24.9)	1.00 (25.4)
3/4	18	1 1/16-12	-N-AN12	1.03 (26.2)	1.25 (31.8)
7/8	22	1 3/16-12	-N-AN14	1.09 (27.7)	1.37 (34.9)
1	25	1 5/16-12	-N-AN16	1.13 (28.7)	1.50 (38.1)
1 1/4	32	1 5/8-12	-N-AN20	1.23 (31.2)	2.00 (50.8)
1 1/2	38	1 7/8-12	-N-AN24	1.42 (36.1)	2.25 (57.2)
2	50	2 1/2-12	-N-AN32	1.75 (44.5)	2.87 (73.0)

### Male Connectors

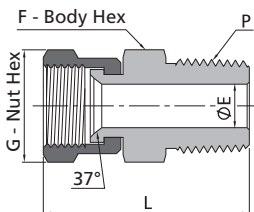


SAE 070102						
Tube O.D.		P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)		
in.	mm			L	E	F
1/8	3	1/8	-CM-AN2-NS2	1.11 (28.2)	0.06 (1.6)	0.44 (11.1)
3/16	4	1/8	-CM-AN3-NS2	1.14 (29.0)	0.13 (3.2)	0.44 (11.1)
1/4	6	1/8	-CM-AN4-NS2	1.22 (31.0)	0.17 (4.4)	0.50 (12.7)
1/4	6	1/4	-CM-AN4-NS4	1.42 (36.0)	0.17 (4.4)	0.56 (14.3)
1/4	6	1/2	-CM-AN4-NS8	1.68 (42.7)	0.17 (4.4)	0.87 (22.2)
5/16	8	1/8	-CM-AN5-NS2	1.22 (31.0)	0.19 (4.8)	0.56 (14.3)
5/16	8	1/4	-CM-AN5-NS4	1.42 (36.1)	0.24 (6.0)	0.56 (14.3)
3/8	10	1/8	-CM-AN6-NS2	1.25 (31.8)	0.19 (4.8)	0.63 (15.9)
3/8	10	1/4	-CM-AN6-NS4	1.43 (36.3)	0.28 (7.1)	0.63 (15.9)
3/8	10	3/8	-CM-AN6-NS6	1.43 (36.3)	0.30 (7.5)	0.75 (19.1)
3/8	10	1/2	-CM-AN6-NS8	1.67 (42.5)	0.30 (7.5)	0.87 (22.2)
1/2	12	1/4	-CM-AN8-NS4	1.53 (38.9)	0.28 (7.1)	0.81 (20.6)
1/2	12	3/8	-CM-AN8-NS6	1.53 (38.9)	0.39 (9.9)	0.81 (20.6)
1/2	12	1/2	-CM-AN8-NS8	1.79 (45.5)	0.39 (9.9)	0.87 (22.2)
1/2	12	3/4	-CM-AN8-NS12	1.85 (47.0)	0.39 (9.9)	1.13 (28.6)
5/8	16	3/8	-CM-AN10-NS6	1.70 (43.1)	0.38 (9.6)	0.94 (23.8)
5/8	16	1/2	-CM-AN10-NS8	1.89 (48.0)	0.48 (12.3)	0.94 (23.8)
5/8	16	3/4	-CM-AN10-NS12	1.95 (49.5)	0.48 (12.3)	1.13 (28.6)
3/4	18	3/4	-CM-AN12-NS12	2.06 (52.3)	0.61 (15.5)	1.13 (28.6)
3/4	18	1	-CM-AN12-NS16	2.25 (57.1)	0.61 (15.5)	1.37 (34.9)
7/8	22	3/4	-CM-AN14-NS12	2.09 (53.1)	0.62 (15.7)	1.25 (31.8)
1	25	3/4	-CM-AN16-NS12	2.11 (53.5)	0.62 (15.7)	1.37 (34.9)
1	25	1	-CM-AN16-NS16	2.30 (58.4)	0.85 (21.5)	1.37 (34.9)
1 1/4	32	1	-CM-AN20-NS16	2.42 (61.5)	0.88 (22.4)	1.69 (42.9)
1 1/4	32	1 1/4	-CM-AN20-NS20	2.45 (62.2)	1.08 (27.5)	1.69 (42.9)
1 1/2	38	1 1/4	-CM-AN24-NS20	2.68 (68.1)	1.13 (28.6)	2.00 (50.8)
1 1/2	38	1 1/2	-CM-AN24-NS24	2.68 (68.1)	1.30 (33.0)	2.00 (50.8)
2	50	2	-CM-AN32-NS32	3.11 (79.0)	1.77 (45.0)	2.63 (66.7)

## Male Connectors

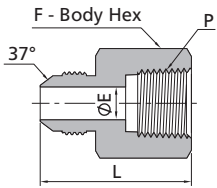


SAE 070120						
Tube O.D.		P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)		
in.	mm			L	E	F
1/8	3	5/16-24	-CM-AN2-ST5	1.06 (26.9)	0.06 (1.6)	0.44 (11.1)
3/16	4	3/8-24	-CM-AN3-ST6	1.10 (27.9)	0.13 (3.2)	0.50 (12.7)
1/4	6	7/16-20	-CM-AN4-ST7	1.23 (31.2)	0.17 (4.4)	0.56 (14.3)
1/4	6	1/2-20	-CM-AN4-ST8	1.23 (31.2)	0.17 (4.4)	0.63 (15.9)
1/4	6	9/16-18	-CM-AN4-ST9	1.30 (33.0)	0.17 (4.4)	0.69 (17.5)
1/4	6	3/4-16	-CM-AN4-ST12	1.37 (34.8)	0.17 (4.4)	0.87 (22.2)
5/16	8	1/2-20	-CM-AN5-ST8	1.23 (31.2)	0.24 (6.0)	0.63 (15.9)
3/8	10	9/16-18	-CM-AN6-ST9	1.30 (33.0)	0.30 (7.5)	0.69 (17.5)
3/8	10	3/4-16	-CM-AN6-ST12	1.38 (35.1)	0.30 (7.5)	0.87 (22.2)
3/8	10	7/8-14	-CM-AN6-ST14	1.50 (38.1)	0.30 (7.5)	1.00 (25.4)
1/2	12	9/16-18	-CM-AN8-ST9	1.44 (36.6)	0.30 (7.5)	0.81 (20.6)
1/2	12	3/4-16	-CM-AN8-ST12	1.48 (37.6)	0.39 (9.9)	0.87 (22.2)
1/2	12	7/8-14	-CM-AN8-ST14	1.60 (40.6)	0.39 (9.9)	1.00 (25.4)
1/2	12	1 1/16-12	-CM-AN8-ST17	1.76 (44.7)	0.39 (9.9)	1.25 (31.8)
5/8	16	3/4-16	-CM-AN10-ST12	1.60 (40.6)	0.42 (10.7)	0.94 (23.8)
5/8	16	7/8-14	-CM-AN10-ST14	1.70 (43.2)	0.48 (12.3)	1.00 (25.4)
5/8	16	1 1/16-12	-CM-AN10-ST17	1.86 (47.2)	0.48 (12.3)	1.25 (31.8)
3/4	18	3/4-16	-CM-AN12-ST12	1.78 (45.2)	0.42 (10.7)	1.13 (28.6)
3/4	18	7/8-14	-CM-AN12-ST14	1.83 (46.4)	0.50 (12.7)	1.13 (28.6)
3/4	18	1 1/16-12	-CM-AN12-ST17	1.97 (50.0)	0.61 (15.5)	1.25 (31.8)
3/4	18	1 5/16-12	-CM-AN12-ST21	2.00 (50.8)	0.61 (15.5)	1.50 (38.1)
7/8	22	1 3/16-12	-CM-AN14-ST19	1.99 (50.5)	0.72 (18.3)	1.37 (34.9)
7/8	22	1 5/16-12	-CM-AN14-ST21	2.02 (51.3)	0.72 (18.3)	1.50 (38.1)
1	25	1 1/16-12	-CM-AN16-ST17	2.01 (51.1)	0.66 (16.7)	1.37 (34.9)
1	25	1 3/16-12	-CM-AN16-ST19	2.04 (51.8)	0.72 (18.3)	1.37 (34.9)
1	25	1 5/16-12	-CM-AN16-ST21	2.04 (51.8)	0.85 (21.5)	1.50 (38.1)

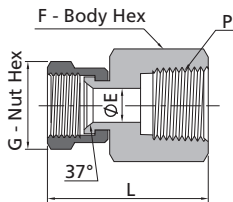


Tube O.D.		P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			
in.	mm			L	E	G	F
1/8	3	1/8	-CM-AS2-NS2	1.18 (30.0)	0.06 (1.6)	0.44 (11.1)	0.44 (11.1)
3/16	4	1/8	-CM-AS3-NS2	1.26 (32.0)	0.13 (3.2)	0.50 (12.7)	0.44 (11.1)
1/4	6	1/8	-CM-AS4-NS2	1.35 (34.2)	0.17 (4.4)	0.56 (14.3)	0.50 (12.7)
5/16	8	1/8	-CM-AS5-NS2	1.38 (35.0)	0.24 (6.0)	0.63 (15.9)	0.56 (14.3)
3/8	10	1/4	-CM-AS6-NS4	1.58 (40.2)	0.30 (7.5)	0.69 (17.5)	0.63 (15.9)
1/2	12	3/8	-CM-AS8-NS6	1.68 (42.7)	0.39 (9.9)	0.87 (22.2)	0.81 (20.6)
5/8	16	1/2	-CM-AS10-NS8	2.02 (51.3)	0.48 (12.3)	1.00 (25.4)	0.94 (23.8)
3/4	18	3/4	-CM-AS12-NS12	2.15 (54.5)	0.61 (15.5)	1.25 (31.8)	1.13 (28.6)
7/8	22	3/4	-CM-AS14-NS12	2.20 (56.0)	0.71 (18.0)	1.37 (34.9)	1.25 (31.8)
1	25	1	-CM-AS16-NS16	2.51 (63.7)	0.85 (21.5)	1.50 (38.1)	1.37 (34.9)
1 1/4	32	1 1/4	-CM-AS20-NS20	2.71 (68.9)	1.08 (27.5)	2.00 (50.8)	1.69 (42.9)
1 1/2	38	1 1/2	-CM-AS24-NS24	3.06 (77.6)	1.30 (33.0)	2.25 (57.2)	2.00 (50.8)
2	50	2	-CM-AS32-NS32	3.66 (92.9)	1.77 (45.0)	2.87 (73.0)	2.63 (66.7)

Female Connectors

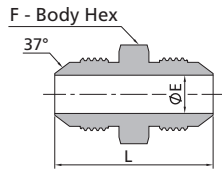


SAE 070103							
Tube O.D.		P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			F
in.	mm			L	E	F	
1/8	3	1/8	-CF-AN2-NS2	1.12 (28.4)	0.06 (1.6)	0.56 (14.3)	
3/16	4	1/8	-CF-AN3-NS2	1.13 (28.7)	0.13 (3.2)	0.56 (14.3)	
1/4	6	1/8	-CF-AN4-NS2	1.19 (30.2)	0.17 (4.4)	0.56 (14.3)	
1/4	6	1/4	-CF-AN4-NS4	1.39 (35.3)	0.17 (4.4)	0.75 (19.1)	
5/16	8	1/8	-CF-AN5-NS2	1.17 (29.7)	0.24 (6.0)	0.56 (14.3)	
5/16	8	1/4	-CF-AN5-NS4	1.39 (35.3)	0.24 (6.0)	0.75 (19.1)	
3/8	10	1/4	-CF-AN6-NS4	1.40 (35.6)	0.30 (7.5)	0.75 (19.1)	
3/8	10	3/8	-CF-AN6-NS6	1.46 (37.1)	0.30 (7.5)	0.87 (22.2)	
1/2	12	3/8	-CF-AN8-NS6	1.56 (39.6)	0.39 (9.9)	0.87 (22.2)	
1/2	12	1/2	-CF-AN8-NS8	1.80 (45.6)	0.39 (9.9)	1.13 (28.6)	
5/8	16	1/2	-CF-AN10-NS8	1.89 (48.0)	0.48 (12.3)	1.13 (28.6)	
3/4	18	1/2	-CF-AN12-NS8	2.05 (52.1)	0.61 (15.5)	1.13 (28.6)	
3/4	18	3/4	-CF-AN12-NS12	2.06 (52.3)	0.61 (15.5)	1.37 (34.9)	
7/8	22	3/4	-CF-AN14-NS12	2.06 (52.3)	0.72 (18.3)	1.37 (34.9)	
1	25	1	-CF-AN16-NS16	2.35 (59.7)	0.85 (21.5)	1.63 (41.3)	
1 1/4	32	1 1/4	-CF-AN20-NS20	2.49 (63.2)	1.08 (27.5)	2.00 (50.8)	
1 1/2	38	1 1/2	-CF-AN24-NS24	2.62 (66.5)	1.30 (33.0)	2.37 (60.3)	
2	50	2	-CF-AN32-NS32	2.97 (75.4)	1.77 (45.0)	2.87 (73.0)	



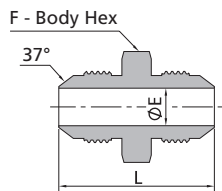
SAE 070103							
Tube O.D.		P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			
in.	mm			L	E	G	F
1/8	3	1/8	-CF-AS2-NS2	1.42 (36.1)	0.06 (1.6)	0.44 (11.1)	0.56 (14.3)
3/16	4	1/8	-CF-AS3-NS2	1.47 (37.3)	0.13 (3.2)	0.50 (12.7)	0.56 (14.3)
1/4	6	1/8	-CF-AS4-NS2	1.56 (39.7)	0.17 (4.4)	0.56 (14.3)	0.56 (14.3)
5/16	8	1/8	-CF-AS5-NS2	1.59 (40.5)	0.24 (6.0)	0.63 (15.9)	0.56 (14.3)
3/8	10	1/4	-CF-AS6-NS4	1.80 (45.8)	0.30 (7.5)	0.69 (17.5)	0.75 (19.1)
1/2	12	3/8	-CF-AS8-NS6	1.85 (47.0)	0.39 (9.9)	0.87 (22.2)	0.87 (22.2)
5/8	16	1/2	-CF-AS10-NS8	2.03 (51.6)	0.48 (12.3)	1.00 (25.4)	1.13 (28.6)
3/4	18	3/4	-CF-AS12-NS12	2.62 (66.6)	0.61 (15.5)	1.25 (31.8)	1.37 (34.9)
7/8	22	3/4	-CF-AS14-NS12	2.67 (67.8)	0.71 (18.0)	1.37 (34.9)	1.37 (34.9)
1	25	1	-CF-AS16-NS16	2.89 (73.5)	0.85 (21.5)	1.50 (38.1)	1.63 (41.3)
1 1/4	32	1 1/4	-CF-AS20-NS20	3.07 (78.1)	1.08 (27.5)	2.00 (50.8)	2.00 (50.8)
1 1/2	38	1 1/2	-CF-AS24-NS24	3.41 (86.7)	1.30 (33.0)	2.37 (60.3)	2.37 (60.3)
2	50	2	-CF-AS32-NS32	3.52 (89.3)	1.77 (45.0)	2.87 (73.0)	2.63 (66.7)

## Unions



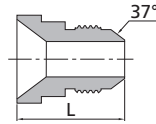
SAE 070101					
Tube O.D.		Basic Ordering Number	Dimensions, in. (mm)		
in.	mm		L	E	F
1/8	3	-U-AN2	1.17 (29.7)	0.06 (1.6)	0.44 (11.1)
3/16	4	-U-AN3	1.23 (31.2)	0.13 (3.2)	0.44 (11.1)
1/4	6	-U-AN4	1.37 (34.8)	0.17 (4.4)	0.50 (12.7)
5/16	8	-U-AN5	1.37 (34.8)	0.24 (6.0)	0.56 (14.3)
3/8	10	-U-AN6	1.41 (35.8)	0.30 (7.5)	0.63 (15.9)
1/2	12	-U-AN8	1.62 (41.1)	0.39 (9.9)	0.81 (20.6)
5/8	16	-U-AN10	1.88 (47.8)	0.48 (12.3)	0.94 (23.8)
3/4	18	-U-AN12	2.16 (54.9)	0.61 (15.5)	1.13 (28.6)
7/8	22	-U-AN14	2.21 (56.1)	0.72 (18.3)	1.25 (31.8)
1	25	-U-AN16	2.25 (57.2)	0.85 (21.5)	1.37 (34.9)
1 1/4	32	-U-AN20	2.43 (61.7)	1.08 (27.5)	1.69 (42.9)
1 1/2	38	-U-AN24	2.75 (69.8)	1.30 (33.0)	2.00 (50.8)
2	50	-U-AN32	3.40 (86.4)	1.77 (45.0)	2.63 (66.7)

## Large Hex Unions



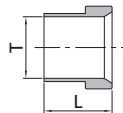
SAE 070119					
Tube O.D.		Basic Ordering Number	Dimensions, in. (mm)		
in.	mm		L	E	F
1/8	3	-HU-AN2	1.17 (29.7)	0.06 (1.6)	0.56 (14.3)
3/16	4	-HU-AN3	1.23 (31.2)	0.13 (3.2)	0.63 (15.9)
1/4	6	-HU-AN4	1.37 (34.8)	0.17 (4.4)	0.69 (17.5)
5/16	8	-HU-AN5	1.37 (34.8)	0.24 (6.0)	0.75 (19.1)
3/8	10	-HU-AN6	1.41 (35.8)	0.30 (7.5)	0.81 (20.6)
1/2	12	-HU-AN8	1.62 (41.1)	0.39 (9.9)	1.00 (25.4)
5/8	16	-HU-AN10	1.88 (47.8)	0.48 (12.3)	1.13 (28.6)
3/4	18	-HU-AN12	2.16 (54.9)	0.61 (15.5)	1.37 (34.9)
7/8	22	-HU-AN14	2.21 (56.1)	0.72 (18.3)	1.50 (38.1)
1	25	-HU-AN16	2.25 (57.2)	0.85 (21.5)	1.63 (41.3)
1 1/4	32	-HU-AN20	2.43 (61.7)	1.08 (27.5)	1.87 (47.6)
1 1/2	38	-HU-AN24	2.75 (69.8)	1.30 (33.0)	2.13 (54.0)
2	50	-HU-AN32	3.40 (86.4)	1.77 (45.0)	2.75 (69.9)

## Reducing Adapters



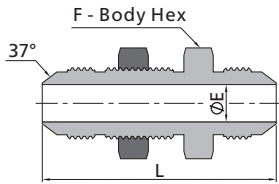
SAE 070123				
Tube O.D.		Basic Ordering Number	L	
in.-mm	in.-mm		in.	mm
3/8-10	1/4-6	-RA-AN6-AN4	0.97	(24.6)
1/2-12	1/4-6	-RA-AN8-AN4	1.00	(25.4)
1/2-12	3/8-10	-RA-AN8-AN6	1.00	(25.4)
5/8-16	1/4-6	-RA-AN10-AN4	1.03	(26.2)
5/8-16	3/8-10	-RA-AN10-AN6	1.03	(26.2)
3/4-18	1/4-6	-RA-AN12-AN4	1.09	(27.7)
3/4-18	3/8-10	-RA-AN12-AN6	1.09	(27.7)
3/4-18	1/2-12	-RA-AN12-AN8	1.19	(30.2)
7/8-22	3/8-10	-RA-AN14-AN6	1.13	(28.7)
7/8-22	5/8-16	-RA-AN14-AN10	1.33	(33.7)
1-25	1/4-6	-RA-AN16-AN4	1.22	(31.0)
1-25	3/8-10	-RA-AN16-AN6	1.22	(31.0)
1-25	1/2-12	-RA-AN16-AN8	1.27	(32.3)
1-25	5/8-16	-RA-AN16-AN10	1.38	(35.1)
1-25	3/4-18	-RA-AN16-AN12	1.47	(37.3)
1 1/4-32	3/4-18	-RA-AN20-AN12	1.53	(38.8)
1 1/4-32	1-25	-RA-AN20-AN16	1.59	(40.3)
1 1/2-38	1/2-12	-RA-AN24-AN8	1.56	(39.6)
1 1/2-38	3/4-18	-RA-AN24-AN12	1.63	(41.4)
1 1/2-38	1-25	-RA-AN24-AN16	1.63	(41.4)
2-50	1 1/2-38	-RA-AN32-AN24	1.91	(48.5)

## Sleeves



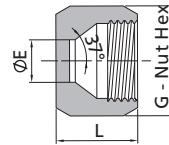
SAE 070115				
T-Tube O.D.		Basic Ordering Number		L in.(mm)
in.	mm	in.	mm	
1/8	3	-SL-AN2	-SL-AN3M	0.34 (8.6)
3/16	4	-SL-AN3	-SL-AN4M	0.34 (8.6)
1/4	6	-SL-AN4	-SL-AN6M	0.41 (10.4)
5/16	8	-SL-AN5	-SL-AN8M	0.44 (11.2)
3/8	10	-SL-AN6	-SL-AN10M	0.50 (12.7)
1/2	12	-SL-AN8	-SL-AN12M	0.56 (14.2)
5/8	16	-SL-AN10	-SL-AN16M	0.66 (16.8)
3/4	18	-SL-AN12	-SL-AN18M	0.68 (17.3)
7/8	22	-SL-AN14	-SL-AN22M	0.76 (19.3)
1	25	-SL-AN16	-SL-AN25M	0.78 (19.8)
1 1/4	32	-SL-AN20	-SL-AN32M	0.91 (23.1)
1 1/2	38	-SL-AN24	-SL-AN38M	1.12 (28.4)
2	50	-SL-AN32	-SL-AN50M	1.19 (30.2)

**Bulkhead Unions**



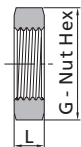
SAE 070601					
Tube O.D.		Basic Ordering Number	Dimensions, in. (mm)		
in.	mm		L	E	F
3/16	4	-BU-AN3	1.90 (48.3)	0.13 (3.2)	0.63 (15.9)
1/4	6	-BU-AN4	2.07 (52.6)	0.17 (4.4)	0.69 (17.5)
5/16	8	-BU-AN5	2.07 (52.6)	0.24 (6.0)	0.75 (19.1)
3/8	10	-BU-AN6	2.18 (55.4)	0.30 (7.5)	0.81 (20.6)
1/2	12	-BU-AN8	2.44 (62.0)	0.39 (9.9)	1.00 (25.4)
5/8	16	-BU-AN10	2.74 (69.6)	0.48 (12.3)	1.13 (28.6)
3/4	18	-BU-AN12	3.09 (78.5)	0.61 (15.5)	1.37 (34.9)
7/8	22	-BU-AN14	3.12 (79.2)	0.72 (18.3)	1.50 (38.1)
1	25	-BU-AN16	3.14 (79.8)	0.85 (21.5)	1.63 (41.3)
1 1/4	32	-BU-AN20	3.31 (84.1)	1.08 (27.5)	1.87 (47.6)
1 1/2	38	-BU-AN24	3.52 (89.4)	1.30 (33.0)	2.13 (54.0)
2	50	-BU-AN32	4.20 (106.7)	1.77 (45.0)	2.75 (69.9)

**Tube Caps**



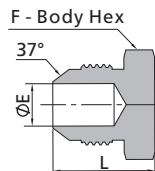
SAE 070112					
Tube O.D.		Basic Ordering Number	Dimensions, in. (mm)		
in.	mm		L	E	G
1/8	3	-TC-AN2	0.50 (12.7)	0.06 (1.6)	0.37 (9.5)
3/16	4	-TC-AN3	0.56 (14.3)	0.13 (3.2)	0.44 (11.1)
1/4	6	-TC-AN4	0.59 (15.1)	0.17 (4.4)	0.56 (14.3)
5/16	8	-TC-AN5	0.61 (15.5)	0.24 (6.0)	0.63 (15.9)
3/8	10	-TC-AN6	0.63 (15.9)	0.30 (7.5)	0.69 (17.5)
1/2	12	-TC-AN8	0.75 (19.1)	0.39 (9.9)	0.87 (22.2)
5/8	16	-TC-AN10	0.84 (21.4)	0.48 (12.3)	1.00 (25.4)
3/4	18	-TC-AN12	0.91 (23.0)	0.61 (15.5)	1.25 (31.8)
7/8	22	-TC-AN14	0.97 (24.6)	0.72 (18.3)	1.37 (34.9)
1	25	-TC-AN16	1.02 (25.8)	0.85 (21.5)	1.50 (38.1)
1 1/4	32	-TC-AN20	1.06 (27.0)	1.08 (27.5)	2.00 (50.8)
1 1/2	38	-TC-AN24	1.19 (30.2)	1.30 (33.0)	2.25 (57.2)
2	50	-TC-AN32	1.44 (36.5)	1.77 (45.0)	2.87 (73.0)

**Bulkhead Lock Nuts**



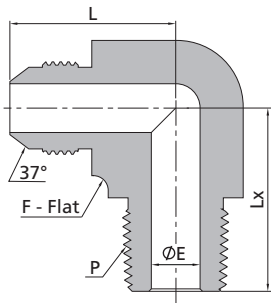
SAE 070118				
Tube O.D.		Basic Ordering Number	Dimensions, in. (mm)	
in.	mm		L	G
3/16	4	-BN-AN3	0.22 (5.6)	0.63 (15.9)
1/4	6	-BN-AN4	0.28 (7.1)	0.69 (17.5)
5/16	8	-BN-AN5	0.28 (7.1)	0.75 (19.1)
3/8	10	-BN-AN6	0.27 (6.9)	0.81 (20.6)
1/2	12	-BN-AN8	0.31 (7.9)	1.00 (25.4)
5/8	16	-BN-AN10	0.36 (9.1)	1.13 (28.6)
3/4	18	-BN-AN12	0.41 (10.4)	1.37 (34.9)
7/8	22	-BN-AN14	0.41 (10.4)	1.50 (38.1)
1	25	-BN-AN16	0.41 (10.4)	1.63 (41.3)
1 1/4	32	-BN-AN20	0.41 (10.4)	1.87 (47.6)
1 1/2	38	-BN-AN24	0.41 (10.4)	2.13 (54.0)
2	50	-BN-AN32	0.41 (10.4)	2.75 (69.9)

**Tube Plugs**



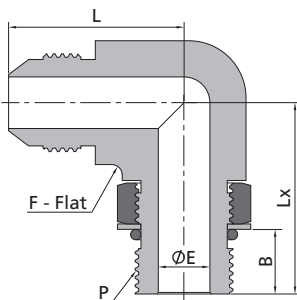
SAE 070109					
Tube O.D.		Basic Ordering Number	Dimensions, in. (mm)		
in.	mm		L	E	F
1/8	3	-TP-AN2	0.70 (17.8)	0.06 (1.6)	0.44 (11.1)
3/16	4	-TP-AN3	0.73 (18.5)	0.13 (3.2)	0.44 (11.1)
1/4	6	-TP-AN4	0.80 (20.3)	0.17 (4.4)	0.50 (12.7)
5/16	8	-TP-AN5	0.80 (20.3)	0.24 (6.0)	0.56 (14.3)
3/8	10	-TP-AN6	0.84 (21.3)	0.30 (7.5)	0.63 (15.9)
1/2	12	-TP-AN8	0.94 (23.9)	0.39 (9.9)	0.81 (20.6)
5/8	16	-TP-AN10	1.10 (27.9)	0.48 (12.3)	0.94 (23.8)
3/4	18	-TP-AN12	1.28 (32.5)	0.61 (15.5)	1.13 (28.6)
7/8	22	-TP-AN14	1.31 (33.3)	0.72 (18.3)	1.25 (31.8)
1	25	-TP-AN16	1.33 (33.8)	0.85 (21.5)	1.37 (34.9)
1 1/4	32	-TP-AN20	1.45 (36.8)	1.08 (27.5)	1.69 (42.9)
1 1/2	38	-TP-AN24	1.65 (41.9)	1.30 (33.0)	2.00 (50.8)
2	50	-TP-AN32	2.05 (52.1)	1.77 (45.0)	2.63 (66.7)

## Male Elbows



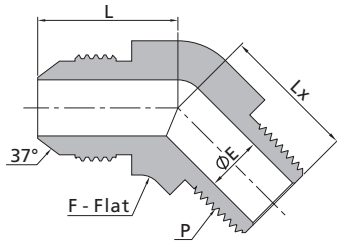
SAE 070202							
Tube O.D.		P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			
in.	mm			L	E	F	Lx
1/8	3	1/8	-LM-AN2-NS2	0.77 (19.6)	0.06 (1.6)	0.44 (11.1)	0.72 (18.3)
3/16	4	1/8	-LM-AN3-NS2	0.83 (21.1)	0.13 (3.2)	0.44 (11.1)	0.72 (18.3)
1/4	6	1/8	-LM-AN4-NS2	0.89 (22.6)	0.17 (4.4)	0.50 (12.7)	0.78 (19.8)
1/4	6	1/4	-LM-AN4-NS4	1.06 (26.9)	0.17 (4.4)	0.56 (14.3)	1.09 (27.7)
5/16	8	1/8	-LM-AN5-NS2	0.95 (24.1)	0.19 (4.8)	0.56 (14.3)	0.78 (19.8)
5/16	8	1/4	-LM-AN5-NS4	1.06 (26.9)	0.24 (6.0)	0.56 (14.3)	1.09 (27.7)
3/8	10	1/8	-LM-AN6-NS2	1.06 (26.9)	0.19 (4.8)	0.56 (14.3)	0.90 (22.8)
3/8	10	1/4	-LM-AN6-NS4	1.06 (26.9)	0.28 (7.1)	0.56 (14.3)	1.09 (27.7)
3/8	10	3/8	-LM-AN6-NS6	1.14 (29.0)	0.30 (7.5)	0.69 (17.5)	1.22 (31.0)
3/8	10	1/2	-LM-AN6-NS8	1.23 (31.2)	0.30 (7.5)	0.81 (20.6)	1.47 (37.3)
1/2	12	1/4	-LM-AN8-NS4	1.25 (31.8)	0.28 (7.1)	0.81 (20.6)	1.22 (31.0)
1/2	12	3/8	-LM-AN8-NS6	1.25 (31.8)	0.39 (9.9)	0.81 (20.6)	1.22 (31.0)
1/2	12	1/2	-LM-AN8-NS8	1.33 (33.7)	0.39 (9.9)	0.81 (20.6)	1.47 (37.3)
1/2	12	3/4	-LM-AN8-NS12	1.42 (36.0)	0.35 (9.0)	1.00 (25.4)	1.59 (40.4)
5/8	16	3/8	-LM-AN10-NS6	1.45 (36.8)	0.39 (9.9)	0.81 (20.6)	1.30 (33.0)
5/8	16	1/2	-LM-AN10-NS8	1.45 (36.8)	0.48 (12.3)	0.81 (20.6)	1.47 (37.3)
5/8	16	3/4	-LM-AN10-NS12	1.53 (38.9)	0.48 (12.3)	1.00 (25.4)	1.59 (40.4)
3/4	18	3/4	-LM-AN12-NS12	1.66 (42.2)	0.61 (15.5)	1.06 (27.0)	1.59 (40.4)
3/4	18	1	-LM-AN12-NS16	1.66 (42.2)	0.61 (15.5)	1.25 (31.8)	1.98 (50.4)
7/8	22	3/4	-LM-AN14-NS12	1.80 (45.7)	0.72 (18.3)	1.25 (31.8)	1.69 (42.9)
1	25	3/4	-LM-AN16-NS12	1.81 (46.0)	0.72 (18.3)	1.37 (34.9)	1.78 (45.2)
1	25	1	-LM-AN16-NS16	1.81 (46.0)	0.85 (21.5)	1.37 (34.9)	1.97 (50.0)
1 1/4	32	1	-LM-AN20-NS16	2.06 (52.3)	0.94 (23.8)	1.69 (42.9)	2.35 (59.6)
1 1/4	32	1 1/4	-LM-AN20-NS20	2.06 (52.3)	1.08 (27.5)	1.69 (42.9)	2.38 (60.5)

## Adjustable Male Elbows



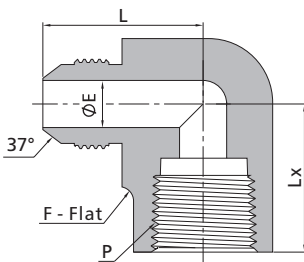
SAE 070220								
Tube O.D.		P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)				
in.	mm			L	E	F	Lx	B
1/8	3	5/16-24	-LP-AN2-ST5	0.77 (19.6)	0.06 (1.6)	0.44 (11.1)	0.89 (22.6)	0.33 (8.4)
3/16	4	3/8-24	-LP-AN3-ST6	0.83 (21.1)	0.13 (3.2)	0.44 (11.1)	0.89 (22.6)	0.33 (8.4)
1/4	6	7/16-20	-LP-AN4-ST7	0.89 (22.6)	0.17 (4.4)	0.50 (12.7)	1.03 (26.2)	0.39 (9.8)
5/16	8	1/2-20	-LP-AN5-ST8	0.95 (24.1)	0.24 (6.0)	0.56 (14.3)	1.13 (28.7)	0.39 (9.8)
3/8	10	9/16-18	-LP-AN6-ST9	1.06 (26.9)	0.30 (7.5)	0.63 (15.9)	1.25 (31.8)	0.43 (11.0)
1/2	12	3/4-16	-LP-AN8-ST12	1.25 (31.8)	0.39 (9.9)	0.81 (20.6)	1.45 (36.8)	0.49 (12.5)
5/8	16	7/8-14	-LP-AN10-ST14	1.45 (36.8)	0.48 (12.3)	0.94 (23.8)	1.70 (43.2)	0.56 (14.2)
3/4	18	1 1/16-12	-LP-AN12-ST17	1.66 (42.2)	0.61 (15.5)	1.25 (31.8)	1.94 (49.3)	0.65 (16.5)
7/8	22	1 3/16-12	-LP-AN14-ST19	1.80 (45.7)	0.72 (18.3)	1.25 (31.8)	2.00 (50.8)	0.65 (16.5)
1	25	1 5/16-12	-LP-AN16-ST21	1.81 (46.0)	0.85 (21.5)	1.37 (34.9)	2.05 (52.1)	0.65 (16.5)
1 1/4	32	1 5/8-12	-LP-AN20-ST26	2.06 (52.3)	1.08 (27.5)	1.69 (42.9)	2.25 (57.2)	0.65 (16.5)
1 1/2	38	1 7/8-12	-LP-AN24-ST30	2.33 (59.2)	1.30 (33.0)	2.00 (50.8)	2.39 (60.7)	0.65 (16.5)

45° Male Elbows



SAE 070302							
Tube O.D.		P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			
in.	mm			L	E	F	Lx
1/8	3	1/8	-VM-AN2-NS2	0.69 (17.5)	0.06 (1.6)	0.44 (11.1)	0.52 (13.2)
3/16	4	1/8	-VM-AN3-NS2	0.69 (17.5)	0.13 (3.2)	0.44 (11.1)	0.52 (13.2)
1/4	6	1/8	-VM-AN4-NS2	0.72 (18.3)	0.17 (4.4)	0.50 (12.7)	0.64 (16.3)
5/16	8	1/8	-VM-AN5-NS2	0.77 (19.6)	0.19 (4.8)	0.56 (14.3)	0.64 (16.3)
3/8	10	1/4	-VM-AN6-NS4	0.83 (21.1)	0.28 (7.1)	0.56 (14.3)	0.86 (21.8)
1/2	12	3/8	-VM-AN8-NS6	0.98 (24.9)	0.39 (9.9)	0.69 (17.5)	0.95 (24.1)
5/8	16	1/2	-VM-AN10-NS8	1.11 (28.2)	0.48 (12.3)	0.81 (20.6)	1.17 (29.7)
3/4	18	3/4	-VM-AN12-NS12	1.28 (32.5)	0.61 (15.5)	1.06 (27.0)	1.20 (30.5)
7/8	22	3/4	-VM-AN14-NS12	1.42 (36.0)	0.72 (18.3)	1.25 (31.8)	1.30 (33.0)
1	25	1	-VM-AN16-NS16	1.47 (37.3)	0.85 (21.5)	1.37 (34.9)	1.48 (37.6)
1 1/2	38	1 1/2	-VM-AN24-NS24	1.78 (45.2)	1.30 (33.0)	2.00 (50.8)	1.77 (45.0)

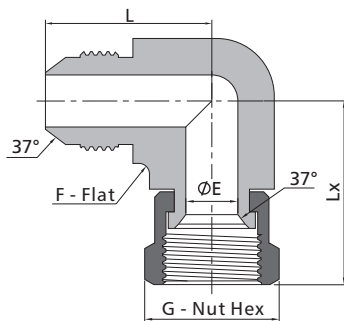
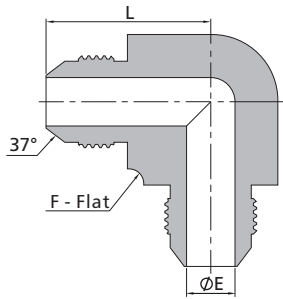
Female Elbows



SAE 070203							
Tube O.D.		P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			
in.	mm			L	E	F	Lx
1/8	3	1/8	-LF-AN2-NS2	1.00 (25.4)	0.06 (1.6)	0.56 (14.3)	0.66 (16.8)
3/16	4	1/8	-LF-AN3-NS2	1.03 (26.2)	0.13 (3.2)	0.56 (14.3)	0.66 (16.8)
1/4	6	1/8	-LF-AN4-NS2	1.08 (27.4)	0.17 (4.4)	0.56 (14.3)	0.66 (16.8)
1/4	6	1/4	-LF-AN4-NS4	1.22 (30.9)	0.17 (4.4)	0.81 (20.6)	0.88 (22.4)
5/16	8	1/8	-LF-AN5-NS2	1.08 (27.4)	0.24 (6.0)	0.56 (14.3)	0.66 (16.8)
5/16	8	1/4	-LF-AN5-NS4	1.22 (30.9)	0.24 (6.0)	0.81 (20.6)	0.88 (22.4)
3/8	10	1/8	-LF-AN6-NS2	1.06 (26.9)	0.30 (7.5)	0.63 (15.9)	0.66 (16.8)
3/8	10	1/4	-LF-AN6-NS4	1.23 (31.2)	0.30 (7.5)	0.81 (20.6)	0.88 (22.4)
3/8	10	3/8	-LF-AN6-NS6	1.31 (33.2)	0.30 (7.5)	0.94 (23.8)	1.02 (25.9)
1/2	12	1/4	-LF-AN8-NS4	1.24 (31.6)	0.39 (9.9)	0.81 (20.6)	0.88 (22.4)
1/2	12	3/8	-LF-AN8-NS6	1.42 (36.1)	0.39 (9.9)	0.94 (23.8)	1.02 (25.9)
1/2	12	1/2	-LF-AN8-NS8	1.42 (36.1)	0.39 (9.9)	1.06 (27.0)	1.23 (31.2)
5/8	16	1/2	-LF-AN10-NS8	1.64 (41.7)	0.48 (12.3)	1.06 (27.0)	1.23 (31.2)
3/4	18	1/2	-LF-AN12-NS8	1.66 (42.1)	0.61 (15.5)	1.25 (31.8)	1.23 (31.2)
3/4	18	3/4	-LF-AN12-NS12	1.89 (48.0)	0.61 (15.5)	1.37 (34.9)	1.36 (34.5)
7/8	22	3/4	-LF-AN14-NS12	1.86 (47.2)	0.72 (18.3)	1.37 (34.9)	1.42 (36.1)
1	25	1	-LF-AN16-NS16	2.17 (55.1)	0.85 (21.5)	1.69 (42.9)	1.62 (41.1)
1 1/4	32	1 1/4	-LF-AN20-NS20	2.33 (59.2)	1.08 (27.5)	2.00 (50.8)	1.70 (43.2)



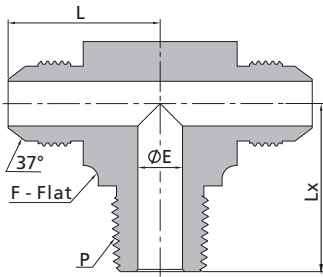
## Union Elbows



SAE 070201						
Tube O.D.		Basic Ordering Number	Dimensions, in. (mm)			
in.	mm		L	E	F	
1/8	3	-LU-AN2	0.77 (19.6)	0.06 (1.6)	0.44 (11.1)	
3/16	4	-LU-AN3	0.83 (21.1)	0.13 (3.2)	0.44 (11.1)	
1/4	6	-LU-AN4	0.89 (22.6)	0.17 (4.4)	0.50 (12.7)	
5/16	8	-LU-AN5	0.95 (24.1)	0.24 (6.0)	0.56 (14.3)	
3/8	10	-LU-AN6	1.06 (26.9)	0.30 (7.5)	0.56 (14.3)	
1/2	12	-LU-AN8	1.25 (31.8)	0.39 (9.9)	0.81 (20.6)	
5/8	16	-LU-AN10	1.45 (36.8)	0.48 (12.3)	0.81 (20.6)	
3/4	18	-LU-AN12	1.66 (42.2)	0.61 (15.5)	1.06 (27.0)	
7/8	22	-LU-AN14	1.80 (45.7)	0.72 (18.3)	1.25 (31.8)	
1	25	-LU-AN16	1.81 (46.0)	0.85 (21.5)	1.37 (34.9)	
1 1/4	32	-LU-AN20	2.06 (52.3)	1.08 (27.5)	1.69 (42.9)	
1 1/2	38	-LU-AN24	2.33 (59.2)	1.30 (33.0)	2.00 (50.8)	

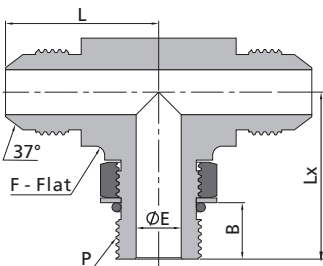
SAE 070221								
Tube O.D.		Basic Ordering Number	Dimensions, in. (mm)					
in.	mm		L	E	F	Lx	G	
1/8	3	-LU-AN2-AS2	0.77 (19.6)	0.06 (1.6)	0.44 (11.1)	0.97 (24.6)	0.44 (11.1)	
3/16	4	-LU-AN3-AS3	0.83 (21.1)	0.13 (3.2)	0.44 (11.1)	1.00 (25.4)	0.50 (12.7)	
1/4	6	-LU-AN4-AS4	0.89 (22.6)	0.17 (4.4)	0.50 (12.7)	1.00 (25.4)	0.56 (14.3)	
5/16	8	-LU-AN5-AS5	0.95 (24.1)	0.24 (6.0)	0.56 (14.3)	1.06 (26.9)	0.63 (15.9)	
3/8	10	-LU-AN6-AS6	1.06 (26.9)	0.30 (7.5)	0.56 (14.3)	1.25 (31.8)	0.69 (17.5)	
1/2	12	-LU-AN8-AS8	1.25 (31.8)	0.39 (9.9)	0.81 (20.6)	1.38 (35.1)	0.87 (22.2)	
5/8	16	-LU-AN10-AS10	1.45 (36.8)	0.48 (12.3)	0.81 (20.6)	1.62 (41.1)	1.00 (25.4)	
3/4	18	-LU-AN12-AS12	1.66 (42.2)	0.61 (15.5)	1.06 (27.0)	1.75 (44.4)	1.25 (31.8)	
7/8	22	-LU-AN14-AS14	1.80 (45.7)	0.72 (18.3)	1.25 (31.8)	1.78 (45.2)	1.37 (34.9)	
1	25	-LU-AN16-AS16	1.81 (46.0)	0.85 (21.5)	1.37 (34.9)	2.00 (50.8)	1.50 (38.1)	
1 1/4	32	-LU-AN20-AS20	2.06 (52.3)	1.08 (27.5)	1.69 (42.9)	2.31 (58.7)	2.00 (50.8)	
1 1/2	38	-LU-AN24-AS24	2.33 (59.2)	1.30 (33.0)	2.00 (50.8)	2.59 (65.8)	2.37 (60.3)	

Male Branch Tees



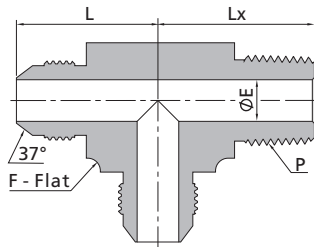
SAE 070425							
Tube O.D.		P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			
in.	mm			L	E	F	Lx
1/8	3	1/8	-TTM-AN2-NS2	0.77 (19.6)	0.06 (1.6)	0.44 (11.1)	0.72 (18.3)
3/16	4	1/8	-TTM-AN3-NS2	0.83 (21.1)	0.13 (3.2)	0.44 (11.1)	0.72 (18.3)
1/4	6	1/8	-TTM-AN4-NS2	0.89 (22.6)	0.17 (4.4)	0.50 (12.7)	0.78 (19.8)
1/4	6	1/4	-TTM-AN4-NS4	1.06 (26.9)	0.17 (4.4)	0.56 (14.3)	1.09 (27.7)
5/16	8	1/8	-TTM-AN5-NS2	0.95 (24.1)	0.19 (4.8)	0.56 (14.3)	0.78 (19.8)
5/16	8	1/4	-TTM-AN5-NS4	1.06 (26.9)	0.24 (6.0)	0.56 (14.3)	1.09 (27.7)
3/8	10	1/8	-TTM-AN6-NS2	1.06 (26.9)	0.19 (4.8)	0.56 (14.3)	0.90 (22.8)
3/8	10	1/4	-TTM-AN6-NS4	1.06 (26.9)	0.28 (7.1)	0.56 (14.3)	1.09 (27.7)
3/8	10	3/8	-TTM-AN6-NS6	1.14 (29.0)	0.30 (7.5)	0.69 (17.5)	1.22 (31.0)
3/8	10	1/2	-TTM-AN6-NS8	1.23 (31.2)	0.30 (7.5)	0.81 (20.6)	1.47 (37.3)
1/2	12	1/4	-TTM-AN8-NS4	1.25 (31.8)	0.28 (7.1)	0.81 (20.6)	1.22 (31.0)
1/2	12	3/8	-TTM-AN8-NS6	1.25 (31.8)	0.39 (9.9)	0.81 (20.6)	1.22 (31.0)
1/2	12	1/2	-TTM-AN8-NS8	1.33 (33.7)	0.39 (9.9)	0.81 (20.6)	1.47 (37.3)
1/2	12	3/4	-TTM-AN8-NS12	1.42 (36.0)	0.39 (9.9)	1.00 (25.4)	1.59 (40.4)
5/8	16	3/8	-TTM-AN10-NS6	1.45 (36.8)	0.39 (9.9)	0.81 (20.6)	1.30 (33.0)
5/8	16	1/2	-TTM-AN10-NS8	1.45 (36.8)	0.48 (12.3)	0.81 (20.6)	1.47 (37.3)
5/8	16	3/4	-TTM-AN10-NS12	1.53 (38.9)	0.48 (12.3)	1.00 (25.4)	1.59 (40.4)
3/4	18	3/4	-TTM-AN12-NS12	1.66 (42.2)	0.61 (15.5)	1.06 (27.0)	1.59 (40.4)
3/4	18	1	-TTM-AN12-NS16	1.66 (42.2)	0.61 (15.5)	1.25 (31.8)	1.98 (50.4)
7/8	22	3/4	-TTM-AN14-NS12	1.80 (45.7)	0.72 (18.3)	1.25 (31.8)	1.69 (42.9)
1	25	3/4	-TTM-AN16-NS12	1.81 (46.0)	0.72 (18.3)	1.37 (34.9)	1.78 (45.2)
1	25	1	-TTM-AN16-NS16	1.81 (46.0)	0.85 (21.5)	1.37 (34.9)	1.97 (50.0)
1 1/4	32	1	-TTM-AN20-NS16	2.06 (52.3)	0.94 (23.8)	1.69 (42.9)	2.35 (59.6)
1 1/4	32	1 1/4	-TTM-AN20-NS20	2.06 (52.3)	1.08 (27.5)	1.69 (42.9)	2.38 (60.5)

Adjustable Male Branch Tees



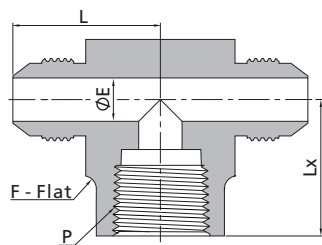
SAE 070429								
Tube O.D.		P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)				
in.	mm			L	E	F	Lx	B
1/8	3	5/16-24	-TTP-AN2-ST5	0.77 (19.6)	0.06 (1.6)	0.44 (11.1)	0.89 (22.6)	0.33 (8.4)
3/16	4	3/8-24	-TTP-AN3-ST6	0.83 (21.1)	0.13 (3.2)	0.44 (11.1)	0.89 (22.6)	0.33 (8.4)
1/4	6	7/16-20	-TTP-AN4-ST7	0.89 (22.6)	0.17 (4.4)	0.50 (12.7)	1.03 (26.2)	0.39 (9.8)
5/16	8	1/2-20	-TTP-AN5-ST8	0.95 (24.1)	0.24 (6.0)	0.56 (14.3)	1.13 (28.7)	0.39 (9.8)
3/8	10	9/16-18	-TTP-AN6-ST9	1.06 (26.9)	0.30 (7.5)	0.63 (15.9)	1.25 (31.8)	0.43 (11.0)
1/2	12	3/4-16	-TTP-AN8-ST12	1.25 (31.8)	0.39 (9.9)	0.81 (20.6)	1.45 (36.8)	0.49 (12.5)
5/8	16	7/8-14	-TTP-AN10-ST14	1.45 (36.8)	0.48 (12.3)	0.94 (23.8)	1.70 (43.2)	0.56 (14.2)
3/4	18	1 1/16-12	-TTP-AN12-ST17	1.66 (42.2)	0.61 (15.5)	1.25 (31.8)	1.94 (49.3)	0.65 (16.5)
7/8	22	1 3/16-12	-TTP-AN14-ST19	1.80 (45.7)	0.72 (18.3)	1.25 (31.8)	2.00 (50.8)	0.65 (16.5)
1	25	1 5/16-12	-TTP-AN16-ST21	1.81 (46.0)	0.85 (21.5)	1.37 (34.9)	2.05 (52.1)	0.65 (16.5)
1 1/4	32	1 5/8-12	-TTP-AN20-ST26	2.06 (52.3)	1.08 (27.5)	1.69 (42.9)	2.25 (57.2)	0.65 (16.5)
1 1/2	38	1 7/8-12	-TTP-AN24-ST30	2.33 (59.2)	1.30 (33.0)	2.00 (50.8)	2.39 (60.7)	0.65 (16.5)

## Male Run Tees



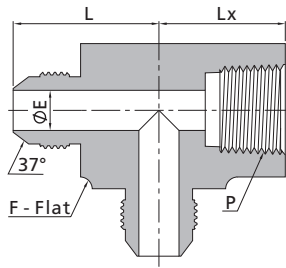
SAE 070424							
Tube O.D.		P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			
in.	mm			L	E	F	Lx
1/8	3	1/8	-TMT-AN2-NS2	0.77 (19.6)	0.06 (1.6)	0.44 (11.1)	0.72 (18.3)
3/16	4	1/8	-TMT-AN3-NS2	0.83 (21.1)	0.13 (3.2)	0.44 (11.1)	0.72 (18.3)
1/4	6	1/8	-TMT-AN4-NS2	0.89 (22.6)	0.17 (4.4)	0.50 (12.7)	0.78 (19.8)
1/4	6	1/4	-TMT-AN4-NS4	1.06 (26.9)	0.17 (4.4)	0.56 (14.3)	1.09 (27.7)
5/16	8	1/8	-TMT-AN5-NS2	0.95 (24.1)	0.19 (4.8)	0.56 (14.3)	0.78 (19.8)
5/16	8	1/4	-TMT-AN5-NS4	1.06 (26.9)	0.24 (6.0)	0.56 (14.3)	1.09 (27.7)
3/8	10	1/8	-TMT-AN6-NS2	1.06 (26.9)	0.19 (4.8)	0.56 (14.3)	0.90 (22.8)
3/8	10	1/4	-TMT-AN6-NS4	1.06 (26.9)	0.28 (7.1)	0.56 (14.3)	1.09 (27.7)
3/8	10	3/8	-TMT-AN6-NS6	1.14 (29.0)	0.30 (7.5)	0.69 (17.5)	1.22 (31.0)
3/8	10	1/2	-TMT-AN6-NS8	1.23 (31.2)	0.30 (7.5)	0.81 (20.6)	1.47 (37.3)
1/2	12	1/4	-TMT-AN8-NS4	1.25 (31.8)	0.28 (7.1)	0.81 (20.6)	1.22 (31.0)
1/2	12	3/8	-TMT-AN8-NS6	1.25 (31.8)	0.39 (9.9)	0.81 (20.6)	1.22 (31.0)
1/2	12	1/2	-TMT-AN8-NS8	1.33 (33.7)	0.39 (9.9)	0.81 (20.6)	1.47 (37.3)
1/2	12	3/4	-TMT-AN8-NS12	1.42 (36.0)	0.39 (9.9)	1.00 (25.4)	1.59 (40.4)
5/8	16	3/8	-TMT-AN10-NS6	1.45 (36.8)	0.39 (9.9)	0.81 (20.6)	1.30 (33.0)
5/8	16	1/2	-TMT-AN10-NS8	1.45 (36.8)	0.48 (12.3)	0.81 (20.6)	1.47 (37.3)
5/8	16	3/4	-TMT-AN10-NS12	1.53 (38.9)	0.48 (12.3)	1.00 (25.4)	1.59 (40.4)
3/4	18	3/4	-TMT-AN12-NS12	1.66 (42.2)	0.61 (15.5)	1.06 (27.0)	1.59 (40.4)
3/4	18	1	-TMT-AN12-NS16	1.66 (42.2)	0.61 (15.5)	1.25 (31.8)	1.98 (50.4)
7/8	22	3/4	-TMT-AN14-NS12	1.80 (45.7)	0.72 (18.3)	1.25 (31.8)	1.69 (42.9)
1	25	3/4	-TMT-AN16-NS12	1.81 (46.0)	0.72 (18.3)	1.37 (34.9)	1.78 (45.2)
1	25	1	-TMT-AN16-NS16	1.81 (46.0)	0.85 (21.5)	1.37 (34.9)	1.97 (50.0)
1 1/4	32	1	-TMT-AN20-NS16	2.06 (52.3)	0.94 (23.8)	1.69 (42.9)	2.35 (59.6)
1 1/4	32	1 1/4	-TMT-AN20-NS20	2.06 (52.3)	1.08 (27.5)	1.69 (42.9)	2.38 (60.5)

## Female Branch Tees



SAE 070427							
Tube O.D.		P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			
in.	mm			L	E	F	Lx
1/8	3	1/8	-TTF-AN2-NS2	1.00 (25.4)	0.06 (1.6)	0.56 (14.3)	0.66 (16.8)
3/16	4	1/8	-TTF-AN3-NS2	1.03 (26.2)	0.13 (3.2)	0.56 (14.3)	0.66 (16.8)
1/4	6	1/8	-TTF-AN4-NS2	1.08 (27.4)	0.17 (4.4)	0.56 (14.3)	0.66 (16.8)
1/4	6	1/4	-TTF-AN4-NS4	1.22 (30.9)	0.17 (4.4)	0.81 (20.6)	0.88 (22.4)
5/16	8	1/8	-TTF-AN5-NS2	1.08 (27.4)	0.24 (6.0)	0.56 (14.3)	0.66 (16.8)
5/16	8	1/4	-TTF-AN5-NS4	1.22 (30.9)	0.24 (6.0)	0.81 (20.6)	0.88 (22.4)
3/8	10	1/8	-TTF-AN6-NS2	1.06 (26.9)	0.30 (7.5)	0.63 (15.9)	0.66 (16.8)
3/8	10	1/4	-TTF-AN6-NS4	1.23 (31.2)	0.30 (7.5)	0.81 (20.6)	0.88 (22.4)
3/8	10	3/8	-TTF-AN6-NS6	1.31 (33.2)	0.30 (7.5)	0.94 (23.8)	1.02 (25.9)
1/2	12	1/4	-TTF-AN8-NS4	1.24 (31.6)	0.39 (9.9)	0.81 (20.6)	0.88 (22.4)
1/2	12	3/8	-TTF-AN8-NS6	1.42 (36.1)	0.39 (9.9)	0.94 (23.8)	1.02 (25.9)
1/2	12	1/2	-TTF-AN8-NS8	1.42 (36.1)	0.39 (9.9)	1.06 (27.0)	1.23 (31.2)
5/8	16	1/2	-TTF-AN10-NS8	1.64 (41.7)	0.48 (12.3)	1.06 (27.0)	1.23 (31.2)
3/4	18	1/2	-TTF-AN12-NS8	1.66 (42.1)	0.61 (15.5)	1.25 (31.8)	1.23 (31.2)
3/4	18	3/4	-TTF-AN12-NS12	1.89 (48.0)	0.61 (15.5)	1.37 (34.9)	1.36 (34.5)
7/8	22	3/4	-TTF-AN14-NS12	1.86 (47.2)	0.72 (18.3)	1.37 (34.9)	1.42 (36.1)
1	25	1	-TTF-AN16-NS16	2.17 (55.1)	0.85 (21.5)	1.69 (42.9)	1.62 (41.1)
1 1/4	32	1 1/4	-TTF-AN20-NS20	2.33 (59.2)	1.08 (27.5)	2.00 (50.8)	1.70 (43.2)

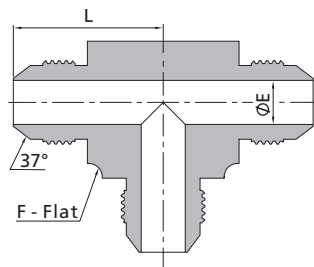
Female Run Tees



Tube Fittings

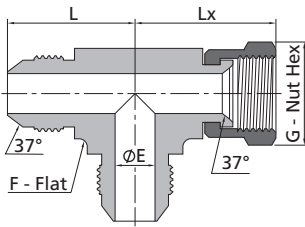
SAE 070426							
Tube O.D.		P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			
in.	mm			L	E	F	Lx
1/8	3	1/8	-TFT-AN2-NS2	1.00 (25.4)	0.06 (1.6)	0.56 (14.3)	0.66 (16.8)
3/16	4	1/8	-TFT-AN3-NS2	1.03 (26.2)	0.13 (3.2)	0.56 (14.3)	0.66 (16.8)
1/4	6	1/8	-TFT-AN4-NS2	1.08 (27.4)	0.17 (4.4)	0.56 (14.3)	0.66 (16.8)
1/4	6	1/4	-TFT-AN4-NS4	1.22 (30.9)	0.17 (4.4)	0.81 (20.6)	0.88 (22.4)
5/16	8	1/8	-TFT-AN5-NS2	1.08 (27.4)	0.24 (6.0)	0.56 (14.3)	0.66 (16.8)
5/16	8	1/4	-TFT-AN5-NS4	1.22 (30.9)	0.24 (6.0)	0.81 (20.6)	0.88 (22.4)
3/8	10	1/8	-TFT-AN6-NS2	1.06 (26.9)	0.30 (7.5)	0.63 (15.9)	0.66 (16.8)
3/8	10	1/4	-TFT-AN6-NS4	1.23 (31.2)	0.30 (7.5)	0.81 (20.6)	0.88 (22.4)
3/8	10	3/8	-TFT-AN6-NS6	1.31 (33.2)	0.30 (7.5)	0.94 (23.8)	1.02 (25.9)
1/2	12	1/4	-TFT-AN8-NS4	1.24 (31.6)	0.39 (9.9)	0.81 (20.6)	0.88 (22.4)
1/2	12	3/8	-TFT-AN8-NS6	1.42 (36.1)	0.39 (9.9)	0.94 (23.8)	1.02 (25.9)
1/2	12	1/2	-TFT-AN8-NS8	1.42 (36.1)	0.39 (9.9)	1.06 (27.0)	1.23 (31.2)
5/8	16	1/2	-TFT-AN10-NS8	1.64 (41.7)	0.48 (12.3)	1.06 (27.0)	1.23 (31.2)
3/4	18	1/2	-TFT-AN12-NS8	1.66 (42.1)	0.61 (15.5)	1.25 (31.8)	1.23 (31.2)
3/4	18	3/4	-TFT-AN12-NS12	1.89 (48.0)	0.61 (15.5)	1.37 (34.9)	1.36 (34.5)
7/8	22	3/4	-TFT-AN14-NS12	1.86 (47.2)	0.72 (18.3)	1.37 (34.9)	1.42 (36.1)
1	25	1	-TFT-AN16-NS16	2.17 (55.1)	0.85 (21.5)	1.69 (42.9)	1.62 (41.1)
1 1/4	32	1 1/4	-TFT-AN20-NS20	2.33 (59.2)	1.08 (27.5)	2.00 (50.8)	1.70 (43.2)

Union Tees

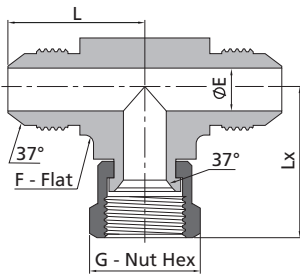


SAE 070401					
Tube O.D.		Basic Ordering Number	Dimensions, in. (mm)		
in.	mm		L	E	F
1/8	3	-TTT-AN2	0.77 (19.6)	0.06 (1.6)	0.44 (11.1)
3/16	4	-TTT-AN3	0.83 (21.1)	0.13 (3.2)	0.44 (11.1)
1/4	6	-TTT-AN4	0.89 (22.6)	0.17 (4.4)	0.50 (12.7)
5/16	8	-TTT-AN5	0.95 (24.1)	0.24 (6.0)	0.56 (14.3)
3/8	10	-TTT-AN6	1.06 (26.9)	0.30 (7.5)	0.56 (14.3)
1/2	12	-TTT-AN8	1.25 (31.8)	0.39 (9.9)	0.81 (20.6)
5/8	16	-TTT-AN10	1.45 (36.8)	0.48 (12.3)	0.81 (20.6)
3/4	18	-TTT-AN12	1.66 (42.2)	0.61 (15.5)	1.06 (27.0)
7/8	22	-TTT-AN14	1.80 (45.7)	0.72 (18.3)	1.25 (31.8)
1	25	-TTT-AN16	1.81 (46.0)	0.85 (21.5)	1.37 (34.9)
1 1/4	32	-TTT-AN20	2.06 (52.3)	1.08 (27.5)	1.69 (42.9)
1 1/2	38	-TTT-AN24	2.33 (59.2)	1.30 (33.0)	2.00 (50.8)

Union Tees

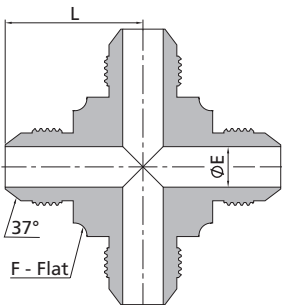


SAE 070432								
Tube O.D.		Basic Ordering Number	Dimensions, in. (mm)					
in.	mm		L	E	F	Lx	G	
1/8	3	-TTT-AN2-AS2-AN2	0.77 (19.6)	0.06 (1.6)	0.44 (11.1)	0.97 (24.6)	0.44 (11.1)	
3/16	4	-TTT-AN3-AS3-AN3	0.83 (21.1)	0.13 (3.2)	0.44 (11.1)	1.00 (25.4)	0.50 (12.7)	
1/4	6	-TTT-AN4-AS4-AN4	0.89 (22.6)	0.17 (4.4)	0.50 (12.7)	1.00 (25.4)	0.56 (14.3)	
5/16	8	-TTT-AN5-AS5-AN5	0.95 (24.1)	0.24 (6.0)	0.56 (14.3)	1.06 (26.9)	0.63 (15.9)	
3/8	10	-TTT-AN6-AS6-AN6	1.06 (26.9)	0.30 (7.5)	0.56 (14.3)	1.25 (31.8)	0.69 (17.5)	
1/2	12	-TTT-AN8-AS8-AN8	1.25 (31.8)	0.39 (9.9)	0.81 (20.6)	1.38 (35.1)	0.87 (22.2)	
5/8	16	-TTT-AN10-AS10-AN10	1.45 (36.8)	0.48 (12.3)	0.81 (20.6)	1.62 (41.1)	1.00 (25.4)	
3/4	18	-TTT-AN12-AS12-AN12	1.66 (42.2)	0.61 (15.5)	1.06 (27.0)	1.75 (44.4)	1.25 (31.8)	
7/8	22	-TTT-AN14-AS14-AN14	1.80 (45.7)	0.72 (18.3)	1.25 (31.8)	1.78 (45.2)	1.37 (34.9)	
1	25	-TTT-AN16-AS16-AN16	1.81 (46.0)	0.85 (21.5)	1.37 (34.9)	2.00 (50.8)	1.50 (38.1)	
1 1/4	32	-TTT-AN20-AS20-AN20	2.06 (52.3)	1.08 (27.5)	1.69 (42.9)	2.31 (58.7)	2.00 (50.8)	
1 1/2	38	-TTT-AN24-AS24-AN24	2.33 (59.2)	1.30 (33.0)	2.00 (50.8)	2.59 (65.8)	2.37 (60.3)	



SAE 070433								
Tube O.D.		Basic Ordering Number	Dimensions, in. (mm)					
in.	mm		L	E	F	Lx	G	
1/8	3	-TTT-AN2-AN2-AS2	0.77 (19.6)	0.06 (1.6)	0.44 (11.1)	0.97 (24.6)	0.44 (11.1)	
3/16	4	-TTT-AN3-AN3-AS3	0.83 (21.1)	0.13 (3.2)	0.44 (11.1)	1.00 (25.4)	0.50 (12.7)	
1/4	6	-TTT-AN4-AN4-AS4	0.89 (22.6)	0.17 (4.4)	0.50 (12.7)	1.00 (25.4)	0.56 (14.3)	
5/16	8	-TTT-AN5-AN5-AS5	0.95 (24.1)	0.24 (6.0)	0.56 (14.3)	1.06 (26.9)	0.63 (15.9)	
3/8	10	-TTT-AN6-AN6-AS6	1.06 (26.9)	0.30 (7.5)	0.56 (14.3)	1.25 (31.8)	0.69 (17.5)	
1/2	12	-TTT-AN8-AN8-AS8	1.25 (31.8)	0.39 (9.9)	0.81 (20.6)	1.38 (35.1)	0.87 (22.2)	
5/8	16	-TTT-AN10-AN10-AS10	1.45 (36.8)	0.48 (12.3)	0.81 (20.6)	1.62 (41.1)	1.00 (25.4)	
3/4	18	-TTT-AN12-AN12-AS12	1.66 (42.2)	0.61 (15.5)	1.06 (27.0)	1.75 (44.4)	1.25 (31.8)	
7/8	22	-TTT-AN14-AN14-AS14	1.80 (45.7)	0.72 (18.3)	1.25 (31.8)	1.78 (45.2)	1.37 (34.9)	
1	25	-TTT-AN16-AN16-AS16	1.81 (46.0)	0.85 (21.5)	1.37 (34.9)	2.00 (50.8)	1.50 (38.1)	
1 1/4	32	-TTT-AN20-AN20-AS20	2.06 (52.3)	1.08 (27.5)	1.69 (42.9)	2.31 (58.7)	2.00 (50.8)	
1 1/2	38	-TTT-AN24-AN24-AS24	2.33 (59.2)	1.30 (33.0)	2.00 (50.8)	2.59 (65.8)	2.37 (60.3)	

Union Crosses



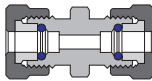
SAE 070501						
Tube O.D.		Basic Ordering Number	Dimensions, in. (mm)			
in.	mm		L	E	F	
1/8	3	-C-AN2	0.77 (19.6)	0.06 (1.6)	0.44 (11.1)	
3/16	4	-C-AN3	0.83 (21.1)	0.13 (3.2)	0.44 (11.1)	
1/4	6	-C-AN4	0.89 (22.6)	0.17 (4.4)	0.50 (12.7)	
5/16	8	-C-AN5	0.95 (24.1)	0.24 (6.0)	0.56 (14.3)	
3/8	10	-C-AN6	1.06 (26.9)	0.30 (7.5)	0.56 (14.3)	
1/2	12	-C-AN8	1.25 (31.8)	0.39 (9.9)	0.81 (20.6)	
5/8	16	-C-AN10	1.45 (36.8)	0.48 (12.3)	0.81 (20.6)	
3/4	18	-C-AN12	1.78 (45.2)	0.61 (15.5)	1.25 (31.8)	
7/8	22	-C-AN14	1.80 (45.7)	0.72 (18.3)	1.25 (31.8)	
1	25	-C-AN16	2.02 (51.2)	0.85 (21.5)	1.69 (42.9)	
1 1/4	32	-C-AN20	2.06 (52.3)	1.08 (27.5)	1.69 (42.9)	

# VL Series Vacuum Tube Fittings



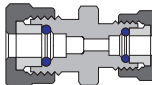
# Contents

Unions - U



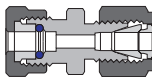
A-106

Reducing Unions - U



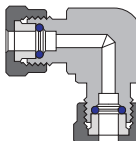
A-107

Tube Fitting Unions - U



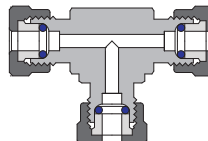
A-107

Union Elbows - LU



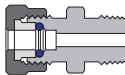
A-107

Union Tees - TTT



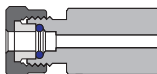
A-107

Male Connectors - CM



A-107

Adapters - CW



A-108

Nuts - N



A-108

O-rings - VI7



A-108

# VL Series

## Features

- Stainless steel construction, fluorocarbon FKM O-ring
- Available in tube sizes from 1/16" to 1 1/2"
- Working temperature: -25°F to 400°F (-31°C to 204°C)
- Knurled nut for easy, finger-tight assembly
- Reliable, repeatable sealing performance

## Testing

- The VL vacuum fitting design has been helium leak tested to a maximum leak rate of  $4 \times 10^{-9}$  std cm<sup>3</sup>/s at ambient temperature.
- The leak rate increases as temperature increases due to permeation through the O-ring.

## Cleaning and Packaging

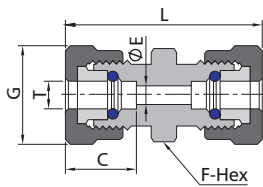
- VL vacuum fittings meet the requirements of FITOK Standard Cleaning and Packaging.
- VL vacuum fittings are cleaned to remove machine oil, grease and loose particles.

## Ordering Information

- The E dimension refers to the smallest nominal inside diameter of the part.
- To order straight fittings bored through, add T to the ordering number.  
Example: SS-TU-VL6  
SS-TCM-VL8

## Dimensions

### Unions

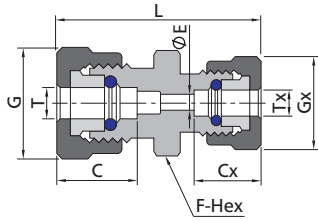


T-Tube O.D. (in.)	Ordering Number	Dimensions, in. (mm)				
		L	C	E	G	F
1/16	SS-U-VL1	1.23 (31.2)	0.43 (10.9)	0.05 (1.3)	3/8	3/8 (9.5)
1/8	SS-U-VL2	1.40 (35.6)	0.43 (10.9)	0.09 (2.3)	9/16	1/2 (12.7)
1/4	SS-U-VL4	1.63 (41.4)	0.62 (15.7)	0.18 (4.6)	11/16	5/8 (15.9)
3/8	SS-U-VL6	1.81 (46.0)	0.66 (16.8)	0.28 (7.1)	13/16	3/4 (19.1)
1/2	SS-U-VL8	1.84 (46.7)	0.80 (20.3)	0.40 (10.2)	15/16	7/8 (22.2)
5/8	SS-U-VL10	1.84 (46.7)	0.84 (21.3)	0.50 (12.7)	1 1/8	1 1/16 (27.0)
3/4	SS-U-VL12	2.05 (52.1)	0.94 (23.9)	0.62 (15.7)	1 1/4	1 3/16 (30.1)
1	SS-U-VL16	2.15 (54.6)	0.94 (23.9)	0.87 (22.1)	1 9/16	1 1/2 (38.1)
1 1/2	SS-U-VL24	2.27 (57.6)	0.94 (23.9)	1.38 (35.1)	2 1/16	2 1/8 (54.0)

Dimensions are for reference only and are subject to change.

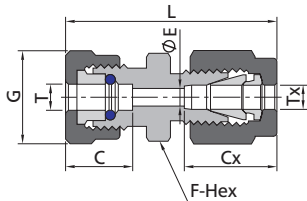


**Reducing Unions**



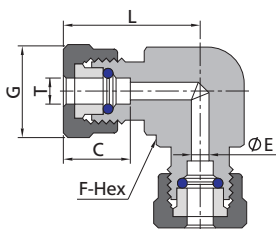
T-Tube O.D. (in.)	Tx-Tube O.D. (in.)	Ordering Number	Dimensions, in. (mm)						
			L	C	Cx	E	G	Gx	F
3/8	1/4	SS-U-VL6-VL4	1.72 (43.7)	0.66 (16.8)	0.62 (15.7)	0.18 (4.6)	13/16	11/16	3/4 (19.1)
1/2	1/4	SS-U-VL8-VL4	1.75 (44.4)	0.80 (20.3)	0.62 (15.7)	0.18 (4.6)	15/16	11/16	7/8 (22.2)

**Tube Fitting Unions**



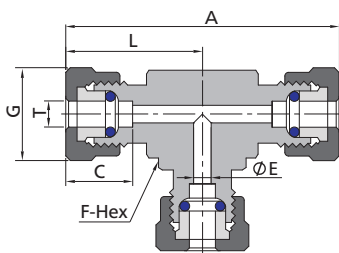
T-Tube O.D. (in.)	Tx-Tube O.D. (in.)	Ordering Number	Dimensions, in. (mm)						
			L	C	Cx	E	G	F	
1/4	1/4	SS-U-VL4-FL4	1.66 (42.2)	0.62 (15.7)	0.60 (15.2)	0.18 (4.6)	11/16	5/8 (15.9)	
3/8	3/8	SS-U-VL6-FL6	1.81 (46.0)	0.66 (16.8)	0.66 (16.8)	0.28 (7.1)	13/16	3/4 (19.1)	
1/2	1/2	SS-U-VL8-FL8	1.95 (49.5)	0.80 (20.3)	0.90 (22.9)	0.40 (10.2)	15/16	7/8 (22.2)	

**Union Elbows**



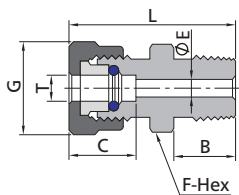
T-Tube O.D. (in.)	Ordering Number	Dimensions, in. (mm)				
		L	C	E	G	F
1/4	SS-LU-VL4	1.14 (29.0)	0.62 (15.7)	0.18 (4.6)	11/16	1/2 (12.7)
3/8	SS-LU-VL6	1.36 (34.5)	0.66 (16.8)	0.28 (7.1)	13/16	11/16 (17.5)
1/2	SS-LU-VL8	1.36 (34.5)	0.80 (20.3)	0.40 (10.2)	15/16	13/16 (20.6)

**Union Tees**



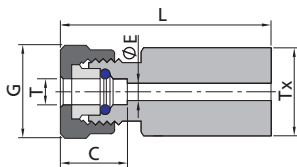
T-Tube O.D. (in.)	Ordering Number	Dimensions, in. (mm)					
		A	L	C	E	G	F
1/8	SS-TTT-VL2	2.12 (53.8)	1.06 (26.9)	0.43 (10.9)	0.09 (2.3)	9/16	1/2 (12.7)
1/4	SS-TTT-VL4	2.30 (58.4)	1.15 (29.2)	0.62 (15.7)	0.18 (4.6)	11/16	1/2 (12.7)
3/8	SS-TTT-VL6	2.72 (69.1)	1.36 (34.5)	0.66 (16.8)	0.28 (7.1)	13/16	11/16 (17.5)
1/2	SS-TTT-VL8	2.72 (69.1)	1.36 (34.5)	0.80 (20.3)	0.40 (10.2)	15/16	11/16 (17.5)
3/4	SS-TTT-VL12	3.30 (83.8)	1.65 (41.9)	0.94 (23.9)	0.62 (15.7)	1 1/4	15/16 (23.8)
1	SS-TTT-VL16	3.64 (92.4)	1.82 (46.2)	0.94 (23.9)	0.87 (22.1)	1 9/16	1 1/4 (31.8)

**Male Connectors**



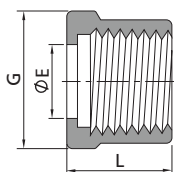
Tube O.D. (in.)	NPT Size in.	Ordering Number	Dimensions, in. (mm)					
			L	C	B	E	G	F
1/16	1/8	SS-CM-VL1-NS2	1.12 (28.4)	0.43 (10.9)	0.38 (9.6)	0.05 (1.3)	3/8	7/16 (11.1)
1/8	1/8	SS-CM-VL2-NS2	1.22 (31.0)	0.43 (10.9)	0.38 (9.6)	0.09 (2.3)	9/16	1/2 (12.7)
1/4	1/8	SS-CM-VL4-NS2	1.35 (34.3)	0.62 (15.7)	0.38 (9.6)	0.18 (4.6)	11/16	5/8 (15.9)
1/4	1/4	SS-CM-VL4-NS4	1.53 (38.9)	0.62 (15.7)	0.56 (14.2)	0.18 (4.6)	11/16	5/8 (15.9)
3/8	1/8	SS-CM-VL6-NS2	1.44 (36.6)	0.66 (16.8)	0.38 (9.6)	0.18 (4.6)	13/16	3/4 (19.1)
3/8	1/4	SS-CM-VL6-NS4	1.62 (41.1)	0.66 (16.8)	0.56 (14.2)	0.28 (7.1)	13/16	3/4 (19.1)
1/2	3/8	SS-CM-VL8-NS6	1.65 (41.9)	0.80 (20.3)	0.56 (14.2)	0.40 (10.2)	15/16	7/8 (22.2)
1/2	1/2	SS-CM-VL8-NS8	1.84 (46.7)	0.80 (20.3)	0.75 (19.1)	0.40 (10.2)	15/16	7/8 (22.2)
3/4	3/4	SS-CM-VL12-NS12	1.96 (49.8)	0.94 (23.9)	0.75 (19.1)	0.62 (15.7)	1 1/4	1 3/16 (30.1)
1	1	SS-CM-VL16-NS16	2.25 (57.2)	0.94 (23.9)	0.94 (23.9)	0.87 (22.1)	1 9/16	1 1/2 (38.1)

Adapters



T-Tube O.D. (in.)	Tx-Tube O.D. (in.)	Ordering Number	Dimensions, in. (mm)			
			L	C	E	G
1/16	1/4	SS-CW-VL1-A4	1.12 (28.4)	0.43 (10.9)	0.05 (1.3)	3/8
1/8	1/4	SS-CW-VL2-A4	1.20 (30.5)	0.43 (10.9)	0.09 (2.3)	9/16
1/8	3/8	SS-CW-VL2-A6	1.21 (30.7)	0.43 (10.9)	0.09 (2.3)	9/16
1/4	1/4	SS-CW-VL4-A4	1.34 (34.0)	0.62 (15.7)	0.18 (4.6)	11/16
1/4	3/8	SS-CW-VL4-A6	1.33 (33.8)	0.62 (15.7)	0.18 (4.6)	11/16
1/4	1/2	SS-CW-VL4-A8	1.47 (37.3)	0.62 (15.7)	0.18 (4.6)	11/16
3/8	3/8	SS-CW-VL6-A6	1.47 (37.3)	0.66 (16.8)	0.28 (7.1)	13/16
3/8	1/2	SS-CW-VL6-A8	1.58 (40.1)	0.66 (16.8)	0.28 (7.1)	13/16
1/2	5/8	SS-CW-VL8-A10	1.64 (41.7)	0.80 (20.3)	0.40 (10.2)	15/16
1/2	3/4	SS-CW-VL8-A12	1.69 (42.9)	0.80 (20.3)	0.40 (10.2)	15/16
3/4	1	SS-CW-VL12-A16	1.78 (45.2)	0.94 (23.9)	0.62 (15.7)	1 1/4
1	1 1/4	SS-CW-VL16-A20	1.80 (45.7)	0.94 (23.9)	0.87 (22.1)	1 9/16
1 1/2	1 1/2	SS-CW-VL24-A24	1.98 (50.3)	0.94 (23.9)	1.25 (31.8)	2 1/16

Nuts



T-Tube O.D. (in.)	Ordering Number	Thread Size	Dimensions, in. (mm)		
			L	E	G
1/16	SS-N-VL1	1/4-20 UNC	0.38 (9.60)	0.07 (1.80)	3/8
1/8	SS-N-VL2	3/8-20 UN	0.41 (10.4)	0.13 (3.30)	9/16
1/4	SS-N-VL4	1/2-20 UNF	0.53 (13.5)	0.26 (6.60)	11/16
3/8	SS-N-VL6	5/8-20 UN	0.62 (15.7)	0.38 (9.60)	13/16
1/2	SS-N-VL8	3/4-20 UNEF	0.62 (15.7)	0.51 (13.0)	15/16
5/8	SS-N-VL10	15/16-20 UNEF	0.62 (15.7)	0.63 (16.0)	1 1/8
3/4	SS-N-VL12	1 1/16-20 UN	0.72 (18.3)	0.76 (19.3)	1 1/4
1	SS-N-VL16	1 3/8-20 UN	0.72 (18.3)	1.01 (25.6)	1 9/16
1 1/2	SS-N-VL24	1 7/8-20 UN	0.72 (18.3)	1.51 (38.4)	2 1/16

O-rings



T-Tube O.D. (in.)	Ordering Number	Material
1/16	VI7-001	70 durometer fluorocarbon FKM
1/8	VI7-006	
1/4	VI7-010	
3/8	VI7-012	
1/2	VI7-014	
5/8	VI7-114	
3/4	VI7-116	
1	VI7-120	
1 1/2	VI7-128	

# Pipe Fittings, Weld Fittings

6 Series Pipe Fittings

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A-110

6 Series Weld Fittings

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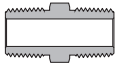
A-144

# 6 Series Pipe Fittings



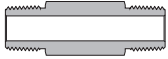
# Contents

Hex Nipples - PHN



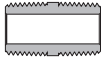
A-113

Hex Long Nipples - PLN



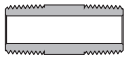
A-116

Close Nipples - PCN



A-118

Special Pipe Nipples - PSN



A-118

Adapters - PA



A-119

Reducing Bushings - PRB



A-122

Hex Couplings - PCG



A-125

Union Ball Joints - UBJ



A-126

Male Elbows - PME



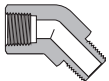
A-126

Street Elbows - PSE



A-127

45° Street Elbows - PSV



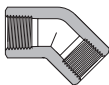
A-129

Female Elbows - PE



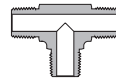
A-131

45° Female Elbows - PVE



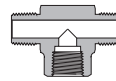
A-132

Male Tees - PMT



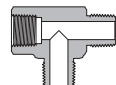
A-133

Female Branch Tees - PTB



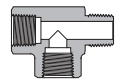
A-134

Female Run Tees - PTR



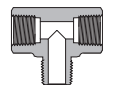
A-134

Male Street Tees - PST



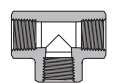
A-135

Male Branch Tees - PBT



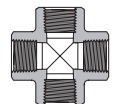
A-136

Female Tees - PT



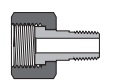
A-137

Female Crosses - PCR



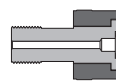
A-138

Pipe to Pipe Unions - PUP



A-138

Hand Tight Adapter Fittings - HF



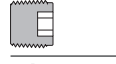
A-139

Pipe Plugs - PP



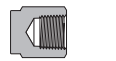
A-140

Hollow Hex Plugs - PI



A-141

Pipe Caps - PC



A-142

Ordering Number Description A-143

## Features

- ⊙ The hardened threads with smooth surface finishing avoid galling and help to extend the fitting service life
- ⊙ Radius junction design for elbows provides smooth flow path
- ⊙ Every fitting is marked with size, material and heat number

## Technical Data

- ⊙ Sizes range from 1/16 to 2
- ⊙ Thread Specifications:

Thread Type	Specification
NPT	ASME B1.20.1, SAE AS71051
ISO Tapered	ISO 7-1, BS 21, JIS B0203
ISO Parallel	ISO 228, JIS B0202
SAE/MS	ASME B1.1, SAE J475
Metric	ISO 261

- ⊙ Working Temperature:  
For the working temperatures of FITOK pipe fittings, please see A-10.

- ⊙ Working Pressure:

1. Catalog working pressures shown are based on ANSI/ASME B31.3 at ambient temperature, to determine working pressures in accordance with ANSI/ASME B31.1 multiply catalog working pressures shown by the factor from the table below.

Material	Factor
Carbon steel	0.85
Brass	1.0

2. Use the allowable working pressure at ambient temperature to multiply the elevated temperature factors to get the working pressure at elevated temperature. To know the elevated temperature factor, please see F-14.
3. To get the installation torque for NPT thread and ISO tapered thread, please see A-6.

## Materials

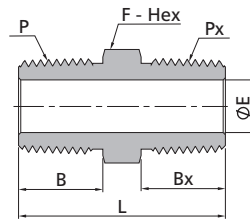
Material	Bar Stock	Forging	Designator
316 stainless steel	ASTM A276, ASME SA479, EN 1.4401	ASTM A182, ASME SA182, EN 1.4401	SS
304 stainless steel	ASTM A276, ASME SA479, EN 1.4301	ASTM A182, ASME SA182, EN 1.4301	S4
Alloy 400	ASTM B164, ASME SB164	ASTM B564 ASME SB564	M
Alloy 600	ASTM B166, ASME SB166	ASTM B564, ASME SB564	INC
Alloy C-276	ASTM B574	ASTM B564,	HC
Brass	ASME B16/ASTM B453	ASTM B283	B
Carbon steel	ASTM A108	ASTM A105	CS
904L stainless steel	ASTM B649	ASTM A182	904L

## Cautions:

- ⊙ Do not loosen or tighten fittings when system is pressurized.
- ⊙ Always use proper thread sealants on tapered pipe threads.
- ⊙ Confirm the sealing type when choosing the straight threads, make sure the construction of the matching threads comply with the sealing type.

## Dimensions

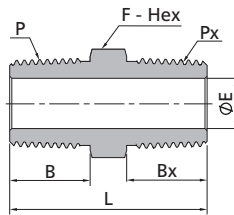
### Hex Nipples



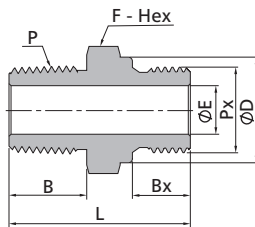
Male NPT Threads										
P-NPT Size	Px-NPT Size	Basic Ordering Number	Dimensions, in. (mm)					Working Pressure psig (bar)		
			L	F	B	Bx	E	316 SS, Steel	Brass	
1/16	1/16	-PHN-NS1	1.01 (25.6)	0.31 (7.9)	0.38 (9.7)	0.38 (9.7)	0.12 (3.0)	11000 (757)	5500 (378)	
1/8	1/16	-PHN-NS2-NS1	1.01 (25.6)	0.44 (11.1)	0.38 (9.7)	0.38 (9.7)	0.12 (3.0)	11000 (757)	5500 (378)	
1/8	1/8	-PHN-NS2	1.01 (25.6)	0.44 (11.1)	0.38 (9.7)	0.38 (9.7)	0.19 (4.8)	10000 (690)	5000 (344)	
1/4	1/16	-PHN-NS4-NS1	1.22 (31.0)	0.56 (14.3)	0.56 (14.2)	0.38 (9.7)	0.12 (3.0)	9500 (655)	4700 (324)	
1/4	1/8	-PHN-NS4-NS2	1.22 (31.0)	0.56 (14.3)	0.56 (14.2)	0.38 (9.7)	0.19 (4.8)	9500 (655)	4700 (324)	
1/4	1/4	-PHN-NS4	1.40 (35.6)	0.56 (14.3)	0.56 (14.2)	0.56 (14.2)	0.28 (7.1)	8000 (551)	4000 (275)	
3/8	1/16	-PHN-NS6-NS1	1.25 (31.8)	0.69 (17.5)	0.56 (14.2)	0.38 (9.7)	0.12 (3.0)	7800 (537)	3900 (268)	
3/8	1/8	-PHN-NS6-NS2	1.25 (31.8)	0.69 (17.5)	0.56 (14.2)	0.38 (9.7)	0.19 (4.8)	7800 (537)	3900 (268)	
3/8	1/4	-PHN-NS6-NS4	1.43 (36.3)	0.69 (17.5)	0.56 (14.2)	0.56 (14.2)	0.28 (7.1)	8000 (551)	4000 (275)	
3/8	3/8	-PHN-NS6	1.43 (36.3)	0.69 (17.5)	0.56 (14.2)	0.56 (14.2)	0.38 (9.7)	7800 (537)	3900 (268)	
1/2	1/8	-PHN-NS8-NS2	1.47 (37.3)	0.87 (22.2)	0.75 (19.1)	0.38 (9.7)	0.19 (4.8)	7700 (530)	3800 (261)	
1/2	1/4	-PHN-NS8-NS4	1.65 (41.9)	0.87 (22.2)	0.75 (19.1)	0.56 (14.2)	0.28 (7.1)	8000 (551)	4000 (275)	
1/2	3/8	-PHN-NS8-NS6	1.65 (41.9)	0.87 (22.2)	0.75 (19.1)	0.56 (14.2)	0.38 (9.7)	7800 (537)	3900 (268)	
1/2	1/2	-PHN-NS8	1.84 (46.7)	0.87 (22.2)	0.75 (19.1)	0.75 (19.1)	0.47 (11.9)	7700 (530)	3800 (261)	
3/4	1/8	-PHN-NS12-NS2	1.59 (40.4)	1.06 (27.0)	0.75 (19.1)	0.38 (9.7)	0.19 (4.8)	7300 (502)	3600 (248)	
3/4	1/4	-PHN-NS12-NS4	1.65 (41.9)	1.06 (27.0)	0.75 (19.1)	0.56 (14.2)	0.28 (7.1)	8000 (551)	4000 (275)	
3/4	3/8	-PHN-NS12-NS6	1.78 (45.2)	1.06 (27.0)	0.75 (19.1)	0.56 (14.2)	0.38 (9.7)	7800 (537)	3900 (268)	
3/4	1/2	-PHN-NS12-NS8	1.84 (46.7)	1.06 (27.0)	0.75 (19.1)	0.75 (19.1)	0.47 (11.9)	7700 (530)	3800 (261)	
3/4	3/4	-PHN-NS12	1.84 (46.7)	1.06 (27.0)	0.75 (19.1)	0.75 (19.1)	0.62 (15.7)	7300 (502)	3600 (248)	
1	1/8	-PHN-NS16-NS2	1.78 (45.2)	1.37 (34.9)	0.94 (23.9)	0.38 (9.7)	0.19 (4.8)	6500 (448)	3300 (227)	
1	1/4	-PHN-NS16-NS4	1.94 (49.3)	1.37 (34.9)	0.94 (23.9)	0.56 (14.2)	0.28 (7.1)	5300 (365)	2600 (179)	
1	3/8	-PHN-NS16-NS6	1.97 (50.0)	1.37 (34.9)	0.94 (23.9)	0.56 (14.2)	0.38 (9.7)	6500 (448)	3300 (227)	
1	1/2	-PHN-NS16-NS8	2.13 (54.1)	1.37 (34.9)	0.94 (23.9)	0.75 (19.1)	0.47 (11.9)	6500 (448)	3300 (227)	
1	3/4	-PHN-NS16-NS12	2.13 (54.1)	1.37 (34.9)	0.94 (23.9)	0.75 (19.1)	0.62 (15.7)	6500 (448)	3300 (227)	
1	1	-PHN-NS16	2.32 (58.9)	1.37 (34.9)	0.94 (23.9)	0.94 (23.9)	0.88 (22.4)	5300 (365)	2600 (179)	
1 1/4	1	-PHN-NS20-NS16	2.45 (62.2)	1.75 (44.5)	0.94 (23.9)	0.94 (23.9)	0.88 (22.4)	5300 (365)	2600 (179)	
1 1/4	1 1/4	-PHN-NS20	2.48 (62.9)	1.75 (44.5)	0.94 (23.9)	0.94 (23.9)	1.13 (28.6)	6000 (410)	3000 (200)	
1 1/2	1 1/2	-PHN-NS24	2.61 (66.3)	2.00 (50.8)	1.03 (26.2)	1.03 (26.2)	1.34 (34.0)	5000 (344)	2500 (172)	
2	2	-PHN-NS32	3.06 (77.7)	2.75 (69.9)	1.03 (26.2)	1.03 (26.2)	1.77 (45.0)	3900 (268)	1900 (130)	

Male ISO Tapered Threads										
P-RT Size	Px-RT Size	Basic Ordering Number	Dimensions, in. (mm)					Working Pressure psig (bar)		
			L	F	B	Bx	E	316 SS, Steel	Brass	
1/8	1/8	-PHN-RT2	1.01 (25.6)	0.44 (11.1)	0.38 (9.7)	0.38 (9.7)	0.19 (4.8)	10000 (690)	5000 (344)	
1/4	1/4	-PHN-RT4	1.40 (35.6)	0.56 (14.3)	0.56 (14.2)	0.56 (14.2)	0.28 (7.1)	8000 (551)	4000 (275)	
3/8	3/8	-PHN-RT6	1.43 (36.3)	0.69 (17.5)	0.56 (14.2)	0.56 (14.2)	0.38 (9.7)	7800 (537)	3900 (268)	
1/2	1/2	-PHN-RT8	1.84 (46.7)	0.87 (22.2)	0.75 (19.1)	0.75 (19.1)	0.47 (11.9)	7700 (530)	3800 (261)	
3/4	3/4	-PHN-RT12	1.84 (46.7)	1.06 (27.0)	0.75 (19.1)	0.75 (19.1)	0.62 (15.7)	7300 (502)	3600 (248)	
1	1	-PHN-RT16	2.32 (58.9)	1.37 (34.9)	0.94 (23.9)	0.94 (23.9)	0.88 (22.4)	5300 (365)	2600 (179)	

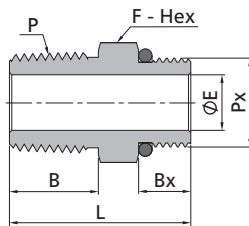
Hex Nipples



Male NPT Threads			Male ISO Tapered Threads							
P-NPT Size	Px-RT Size	Basic Ordering Number	Dimensions, in. (mm)					Working Pressure psig (bar)		
			L	F	B	Bx	E	316 SS, Steel	Brass	
1/8	1/8	-PHN-NS2-RT2	1.01 (25.6)	0.44 (11.1)	0.38 (9.7)	0.38 (9.7)	0.19 (4.8)	10000 (690)	5000 (344)	
1/4	1/4	-PHN-NS4-RT4	1.40 (35.6)	0.56 (14.3)	0.56 (14.2)	0.56 (14.2)	0.28 (7.1)	8000 (551)	4000 (275)	
3/8	3/8	-PHN-NS6-RT6	1.43 (36.3)	0.69 (17.5)	0.56 (14.2)	0.56 (14.2)	0.38 (9.7)	7800 (537)	3900 (268)	
1/2	1/2	-PHN-NS8-RT8	1.84 (46.7)	0.87 (22.2)	0.75 (19.1)	0.75 (19.1)	0.47 (11.9)	7700 (530)	3800 (261)	
3/4	3/4	-PHN-NS12-RT12	1.84 (46.7)	1.06 (27.0)	0.75 (19.1)	0.75 (19.1)	0.62 (15.7)	7300 (502)	3600 (248)	
1	1	-PHN-NS16-RT16	2.32 (58.9)	1.37 (34.9)	0.94 (23.9)	0.94 (23.9)	0.88 (22.4)	5300 (365)	2600 (179)	



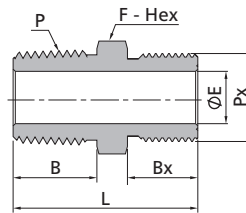
Male NPT Threads			Male ISO parallel Threads							
P-NPT Size	Px-RS Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)	
			L	F	B	Bx	E	D	316 SS, Steel	Brass
1/8	1/8	-PHN-NS2-RS2	1.09 (27.7)	0.56 (14.3)	0.38 (9.7)	0.28 (7.1)	0.16 (4.1)	0.54 (13.7)	9600 (662)	4800 (331)
1/4	1/4	-PHN-NS4-RS4	1.45 (36.8)	0.75 (19.1)	0.56 (14.2)	0.44 (11.2)	0.23 (5.8)	0.71 (18.0)	10300 (709)	5100 (351)
3/8	3/8	-PHN-NS6-RS6	1.48 (37.6)	0.87 (22.2)	0.56 (14.2)	0.44 (11.2)	0.31 (7.9)	0.85 (21.6)	7800 (537)	3900 (268)
1/2	1/2	-PHN-NS8-RS8	1.75 (44.4)	1.06 (27.0)	0.75 (19.1)	0.56 (14.2)	0.47 (11.9)	1.02 (25.9)	7600 (523)	3800 (261)
3/4	3/4	-PHN-NS12-RS12	1.93 (49.0)	1.31 (33.3)	0.75 (19.1)	0.62 (15.7)	0.62 (15.7)	1.26 (32.0)	7300 (502)	3600 (248)
1	1	-PHN-NS16-RS16	2.23 (56.6)	1.63 (41.3)	0.94 (23.9)	0.72 (18.3)	0.78 (19.8)	1.53 (38.9)	7400 (509)	3700 (254)



Male NPT Threads			Male SAE/MS Straight Threads					
P-NPT Size	Px-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)					Working Pressure psig (bar)
			L	F	B	Bx	E	316 SS, Steel
1/4	7/16-20	-PHN-NS4-ST7	1.20 (30.5)	0.56 (14.3)	0.56 (14.2)	0.36 (9.1)	0.20 (5.1)	4500 (310)
3/8	9/16-18	-PHN-NS6-ST9	1.26 (32.0)	0.69 (17.5)	0.56 (14.2)	0.36 (9.1)	0.28 (7.1)	4500 (310)
1/2	3/4-16	-PHN-NS8-ST12	1.53 (38.9)	0.87 (22.2)	0.75 (19.1)	0.44 (11.2)	0.42 (10.7)	4500 (310)
3/4	1 1/16-12	-PHN-NS12-ST17	1.75 (44.4)	1.25 (31.8)	0.75 (19.1)	0.59 (15.0)	0.62 (15.7)	3600 (248)
1	1 5/16-12	-PHN-NS16-ST21	2.00 (50.8)	1.50 (38.1)	0.94 (23.9)	0.59 (15.0)	0.88 (22.4)	2900 (199)

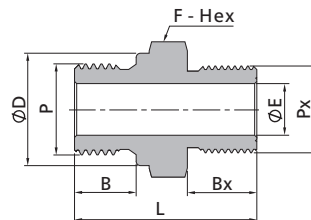


## Hex Nipples



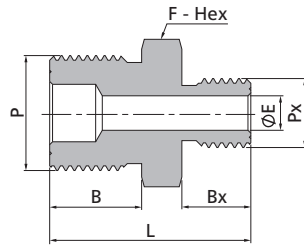
Male NPT Threads			Male Metric Threads					
P-NPT Size	Px-Metric Size	Basic Ordering Number	Dimensions, mm (in.)					Working Pressure psig (bar) 316 SS, Steel
			L	F	B	Bx	E	
1/8	M20 x 1.5	-PHN-NS2-MS20	32.7 (1.29)	22.2 (0.87)	9.7 (0.38)	16.0 (0.63)	5.0 (0.20)	7700 (530)
1/4	M8 x 1	-PHN-NS4-MS8	29.0 (1.14)	14.3 (0.56)	14.2 (0.56)	9.0 (0.35)	3.2 (0.13)	8000 (551)
1/4	M14 x 1.5	-PHN-NS4-MS14	34.2 (1.35)	15.9 (0.63)	14.2 (0.56)	13.0 (0.51)	7.0 (0.28)	8000 (551)
1/4	M16 x 1.5	-PHN-NS4-MS16	35.2 (1.39)	17.5 (0.69)	14.2 (0.56)	14.0 (0.55)	7.1 (0.28)	7800 (537)
1/4	M20 x 1.5	-PHN-NS4-MS20	37.2 (1.46)	22.2 (0.87)	14.2 (0.56)	16.0 (0.63)	7.1 (0.28)	7700 (530)
3/8	M14 x 1.5	-PHN-NS6-MS14	34.2 (1.35)	17.5 (0.69)	14.2 (0.56)	13.0 (0.51)	7.0 (0.28)	7800 (537)
3/8	M20 x 1.5	-PHN-NS6-MS20	37.2 (1.46)	22.2 (0.87)	14.2 (0.56)	16.0 (0.63)	9.5 (0.37)	7700 (530)
3/8	M24 x 1.5	-PHN-NS6-MS24	38.2 (1.50)	25.4 (1.00)	14.2 (0.56)	17.0 (0.67)	9.5 (0.37)	7400 (509)
1/2	M14 x 1.5	-PHN-NS8-MS14	39.1 (1.54)	22.2 (0.87)	19.1 (0.75)	13.0 (0.51)	7.2 (0.28)	7700 (530)
1/2	M20 x 1.5	-PHN-NS8-MS20	42.0 (1.65)	22.2 (0.87)	19.1 (0.75)	16.0 (0.63)	10.0 (0.39)	7700 (530)
1/2	M24 x 1.5	-PHN-NS8-MS24	43.5 (1.71)	25.4 (1.00)	19.1 (0.75)	17.0 (0.67)	11.9 (0.47)	7400 (509)
3/4	M20 x 1.5	-PHN-NS12-MS20	42.1 (1.66)	27.0 (1.06)	19.1 (0.75)	16.0 (0.63)	10.8 (0.43)	7300 (502)
3/4	M27 x 2	-PHN-NS12-MS27	46.7 (1.84)	31.8 (1.25)	19.1 (0.75)	18.0 (0.71)	15.8 (0.62)	6100 (420)
1	M30 x 2	-PHN-NS16-MS30	56.3 (2.22)	34.9 (1.37)	23.9 (0.94)	20.0 (0.79)	19.4 (0.76)	6100 (420)

Male ISO Tapered Threads			Male Metric Threads					
P-RT Size	Px-Metric Size	Basic Ordering Number	Dimensions, mm (in.)					Working Pressure psig (bar) 316 SS, Steel
			L	F	B	Bx	E	
1/8	M20 x 1.5	-PHN-RT2-MS20	32.7 (1.29)	22.2 (0.87)	9.7 (0.38)	16.0 (0.63)	5.0 (0.20)	7700 (530)
1/4	M12 x 1.5	-PHN-RT4-MS12	33.4 (1.31)	14.3 (0.56)	14.2 (0.56)	12.0 (0.47)	6.0 (0.24)	8000 (551)
1/4	M20 x 1.5	-PHN-RT4-MS20	37.2 (1.46)	22.2 (0.87)	14.2 (0.56)	16.0 (0.63)	7.0 (0.28)	7700 (530)
3/8	M20 x 1.5	-PHN-RT6-MS20	37.2 (1.46)	22.2 (0.87)	14.2 (0.56)	16.0 (0.63)	9.5 (0.37)	7700 (530)
1/2	M20 x 1.5	-PHN-RT8-MS20	42.0 (1.65)	22.2 (0.87)	19.1 (0.75)	16.0 (0.63)	10.0 (0.39)	7700 (530)



Male ISO Parallel Threads			Male Metric Threads						
P-RS Size	Px-Metric Size	Basic Ordering Number	Dimensions, mm (in.)						Working Pressure psig (bar) 316 SS, Steel
			L	F	B	Bx	E	D	
1/8	M20 x 1.5	-PHN-RS2-MS20	32.6 (1.28)	22.2 (0.87)	7.1 (0.28)	16.0 (0.63)	4.0 (0.16)	13.7 (0.54)	7700 (530)
1/4	M18 x 1.5	-PHN-RS4-MS18	34.2 (1.35)	20.6 (0.81)	11.2 (0.44)	15.0 (0.59)	5.9 (0.23)	18.0 (0.71)	7800 (537)
1/4	M20 x 1.5	-PHN-RS4-MS20	37.2 (1.46)	22.2 (0.87)	11.2 (0.44)	16.0 (0.63)	5.9 (0.23)	18.0 (0.71)	7700 (530)
3/8	M20 x 1.5	-PHN-RS6-MS20	37.2 (1.46)	22.2 (0.87)	11.2 (0.44)	16.0 (0.63)	7.9 (0.31)	21.6 (0.85)	7700 (530)
1/2	M20 x 1.5	-PHN-RS8-MS20	40.2 (1.58)	27.0 (1.06)	14.0 (0.55)	16.0 (0.63)	11.9 (0.47)	25.9 (1.02)	7700 (530)

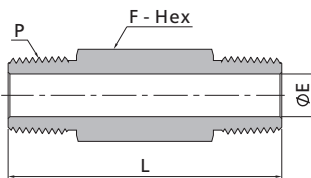
Hex Nipples



Pipe Fittings  
Weld Fittings

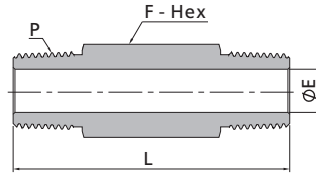
Male Metric Threads			Dimensions, mm (in.)					Working Pressure psig (bar) 316 SS, Steel
P-Metric Size	Px-Metric Size	Basic Ordering Number	L	F	B	Bx	E	
M20 x 1.5	M10 x 1	-PHN-MS20-MS10	34.0 (1.34)	22.0 (0.87)	16.0 (0.63)	11.0 (0.43)	4.0 (0.16)	10000 (690)
M20 x 1.5	M12 x 1.5	-PHN-MS20-MS12	35.0 (1.38)	22.0 (0.87)	16.0 (0.63)	12.0 (0.47)	6.0 (0.24)	9000 (620)
M20 x 1.5	M14 x 1.5	-PHN-MS20-MS14	36.0 (1.42)	22.0 (0.87)	16.0 (0.63)	13.0 (0.51)	7.2 (0.28)	8000 (551)
M20 x 1.5	M16 x 1.5	-PHN-MS20-MS16	37.0 (1.46)	22.0 (0.87)	16.0 (0.63)	14.0 (0.55)	9.0 (0.35)	7800 (537)
M20 x 1.5	M20 x 1.5	-PHN-MS20	39.0 (1.54)	22.0 (0.87)	16.0 (0.63)	16.0 (0.63)	10.8 (0.43)	7700 (530)
M27 x 2	M27 x 2	-PHN-MS27	44.5 (1.75)	30.0 (1.18)	18.0 (0.71)	18.0 (0.71)	16.1 (0.63)	7300 (502)

Hex Long Nipples



Male NPT Threads		Dimensions, in. (mm)			Working Pressure psig (bar)	
P-NPT Size	Basic Ordering Number	L	F	E	316 SS, Steel	Brass
1/8	-PLN-NS2-1.5	1.50 (38.1)	0.44 (11.1)	0.19 (4.8)	10000 (690)	5000 (344)
1/8	-PLN-NS2-2	2.00 (50.8)	0.44 (11.1)	0.19 (4.8)	10000 (690)	5000 (344)
1/8	-PLN-NS2-2.5	2.50 (63.5)	0.44 (11.1)	0.19 (4.8)	10000 (690)	5000 (344)
1/8	-PLN-NS2-3	3.00 (76.2)	0.44 (11.1)	0.19 (4.8)	10000 (690)	5000 (344)
1/4	-PLN-NS4-1.5	1.50 (38.1)	0.56 (14.3)	0.28 (7.1)	8000 (551)	4000 (275)
1/4	-PLN-NS4-2	2.00 (50.8)	0.56 (14.3)	0.28 (7.1)	8000 (551)	4000 (275)
1/4	-PLN-NS4-2.5	2.50 (63.5)	0.56 (14.3)	0.28 (7.1)	8000 (551)	4000 (275)
1/4	-PLN-NS4-3	3.00 (76.2)	0.56 (14.3)	0.28 (7.1)	8000 (551)	4000 (275)
1/4	-PLN-NS4-4	4.00 (101.6)	0.56 (14.3)	0.28 (7.1)	8000 (551)	4000 (275)
3/8	-PLN-NS6-1.5	1.50 (38.1)	0.69 (17.5)	0.38 (9.7)	7800 (537)	3900 (268)
3/8	-PLN-NS6-2	2.00 (50.8)	0.69 (17.5)	0.38 (9.7)	7800 (537)	3900 (268)
3/8	-PLN-NS6-2.5	2.50 (63.5)	0.69 (17.5)	0.38 (9.7)	7800 (537)	3900 (268)
3/8	-PLN-NS6-3	3.00 (76.2)	0.69 (17.5)	0.38 (9.7)	7800 (537)	3900 (268)
3/8	-PLN-NS6-4	4.00 (101.6)	0.69 (17.5)	0.38 (9.7)	7800 (537)	3900 (268)
1/2	-PLN-NS8-2	2.00 (50.8)	0.87 (22.2)	0.47 (11.9)	7700 (530)	3800 (261)
1/2	-PLN-NS8-3	3.00 (76.2)	0.87 (22.2)	0.47 (11.9)	7700 (530)	3800 (261)
1/2	-PLN-NS8-4	4.00 (101.6)	0.87 (22.2)	0.47 (11.9)	7700 (530)	3800 (261)
1/2	-PLN-NS8-6	6.00 (152.4)	0.87 (22.2)	0.47 (11.9)	7700 (530)	3800 (261)
3/4	-PLN-NS12-2	2.00 (50.8)	1.06 (27.0)	0.62 (15.7)	7300 (502)	3600 (248)
3/4	-PLN-NS12-3	3.00 (76.2)	1.06 (27.0)	0.62 (15.7)	7300 (502)	3600 (248)
3/4	-PLN-NS12-4	4.00 (101.6)	1.06 (27.0)	0.62 (15.7)	7300 (502)	3600 (248)
1	-PLN-NS16-3	3.00 (76.2)	1.37 (34.9)	0.88 (22.4)	5300 (365)	2600 (179)
1	-PLN-NS16-4	4.00 (101.6)	1.37 (34.9)	0.88 (22.4)	5300 (365)	2600 (179)

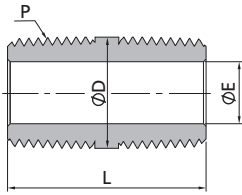
## Hex Long Nipples



## Male ISO Tapered Threads

P-RT Size	Basic Ordering Number	Dimensions, in. (mm)			Working Pressure psig (bar)	
		L	F	E	316 SS, Steel	Brass
1/8	-PLN-RT2-1.5	1.50 (38.1)	0.44 (11.1)	0.19 (4.8)	10000 (690)	5000 (344)
1/8	-PLN-RT2-2	2.00 (50.8)	0.44 (11.1)	0.19 (4.8)	10000 (690)	5000 (344)
1/8	-PLN-RT2-2.5	2.50 (63.5)	0.44 (11.1)	0.19 (4.8)	10000 (690)	5000 (344)
1/8	-PLN-RT2-3	3.00 (76.2)	0.44 (11.1)	0.19 (4.8)	10000 (690)	5000 (344)
1/4	-PLN-RT4-1.5	1.50 (38.1)	0.56 (14.3)	0.28 (7.1)	8000 (551)	4000 (275)
1/4	-PLN-RT4-2	2.00 (50.8)	0.56 (14.3)	0.28 (7.1)	8000 (551)	4000 (275)
1/4	-PLN-RT4-2.5	2.50 (63.5)	0.56 (14.3)	0.28 (7.1)	8000 (551)	4000 (275)
1/4	-PLN-RT4-3	3.00 (76.2)	0.56 (14.3)	0.28 (7.1)	8000 (551)	4000 (275)
1/4	-PLN-RT4-4	4.00 (101.6)	0.56 (14.3)	0.28 (7.1)	8000 (551)	4000 (275)
3/8	-PLN-RT6-1.5	1.50 (38.1)	0.69 (17.5)	0.38 (9.7)	7800 (537)	3900 (268)
3/8	-PLN-RT6-2	2.00 (50.8)	0.69 (17.5)	0.38 (9.7)	7800 (537)	3900 (268)
3/8	-PLN-RT6-2.5	2.50 (63.5)	0.69 (17.5)	0.38 (9.7)	7800 (537)	3900 (268)
3/8	-PLN-RT6-3	3.00 (76.2)	0.69 (17.5)	0.38 (9.7)	7800 (537)	3900 (268)
3/8	-PLN-RT6-4	4.00 (101.6)	0.69 (17.5)	0.38 (9.7)	7800 (537)	3900 (268)
1/2	-PLN-RT8-2	2.00 (50.8)	0.87 (22.2)	0.47 (11.9)	7700 (530)	3800 (261)
1/2	-PLN-RT8-3	3.00 (76.2)	0.87 (22.2)	0.47 (11.9)	7700 (530)	3800 (261)
1/2	-PLN-RT8-4	4.00 (101.6)	0.87 (22.2)	0.47 (11.9)	7700 (530)	3800 (261)
1/2	-PLN-RT8-6	6.00 (152.4)	0.87 (22.2)	0.47 (11.9)	7700 (530)	3800 (261)
3/4	-PLN-RT12-2	2.00 (50.8)	1.06 (27.0)	0.62 (15.7)	7300 (502)	3600 (248)
3/4	-PLN-RT12-3	3.00 (76.2)	1.06 (27.0)	0.62 (15.7)	7300 (502)	3600 (248)
3/4	-PLN-RT12-4	4.00 (101.6)	1.06 (27.0)	0.62 (15.7)	7300 (502)	3600 (248)
1	-PLN-RT16-3	3.00 (76.2)	1.37 (34.9)	0.88 (22.4)	5300 (365)	2600 (179)
1	-PLN-RT16-4	4.00 (101.6)	1.37 (34.9)	0.88 (22.4)	5300 (365)	2600 (179)

Close Nipples

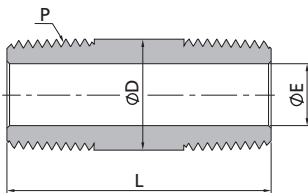


Pipe Fittings  
Weld Fittings

Male NPT Threads						
P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			Working Pressure psig (bar)	
		L	D	E	316 SS, Steel	Brass
1/16	-PCN-NS1	0.75 (19.1)	0.31 (7.9)	0.12 (3.0)	11000 (757)	5500 (378)
1/8	-PCN-NS2	0.75 (19.1)	0.41 (10.3)	0.19 (4.8)	10000 (690)	5000 (344)
1/4	-PCN-NS4	1.12 (28.4)	0.54 (13.7)	0.28 (7.1)	8000 (551)	4000 (275)
3/8	-PCN-NS6	1.12 (28.4)	0.67 (17.1)	0.38 (9.6)	7800 (537)	3900 (268)
1/2	-PCN-NS8	1.50 (38.1)	0.84 (21.3)	0.47 (11.9)	7700 (530)	3800 (261)
3/4	-PCN-NS12	1.50 (38.1)	1.05 (26.7)	0.62 (15.7)	7300 (502)	3600 (248)
1	-PCN-NS16	1.88 (47.8)	1.31 (33.4)	0.88 (22.4)	5300 (365)	2600 (179)

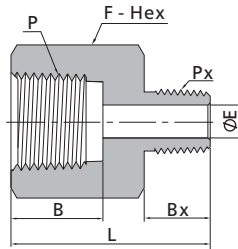
Male ISO Tapered Threads						
P-RT Size	Basic Ordering Number	Dimensions, in. (mm)			Working Pressure psig (bar)	
		L	D	E	316 SS, Steel	Brass
1/16	-PCN-RT1	0.75 (19.1)	0.31 (7.9)	0.12 (3.0)	11000 (757)	5500 (378)
1/8	-PCN-RT2	0.75 (19.1)	0.41 (10.3)	0.19 (4.8)	10000 (690)	5000 (344)
1/4	-PCN-RT4	1.12 (28.4)	0.54 (13.7)	0.28 (7.1)	8000 (551)	4000 (275)
3/8	-PCN-RT6	1.12 (28.4)	0.67 (17.1)	0.38 (9.7)	7800 (537)	3900 (268)
1/2	-PCN-RT8	1.50 (38.1)	0.84 (21.3)	0.47 (11.9)	7700 (530)	3800 (261)
3/4	-PCN-RT12	1.50 (38.1)	1.05 (26.7)	0.62 (15.7)	7300 (502)	3600 (248)
1	-PCN-RT16	1.88 (47.8)	1.31 (33.4)	0.88 (22.4)	5300 (365)	2600 (179)

Special Pipe Nipples



Male NPT Threads						
P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			Working Pressure psig (bar)	
		L	D	E	316 SS, Steel	Brass
1/8	-PSN-NS2-1.5	1.50 (38.1)	0.41 (10.3)	0.19 (4.8)	10000 (690)	5000 (344)
1/8	-PSN-NS2-2	2.00 (50.8)	0.41 (10.3)	0.19 (4.8)	10000 (690)	5000 (344)
1/8	-PSN-NS2-2.5	2.50 (63.5)	0.41 (10.3)	0.19 (4.8)	10000 (690)	5000 (344)
1/8	-PSN-NS2-3	3.00 (76.2)	0.41 (10.3)	0.19 (4.8)	10000 (690)	5000 (344)
1/4	-PSN-NS4-1.5	1.50 (38.1)	0.54 (13.7)	0.28 (7.1)	8000 (551)	4000 (275)
1/4	-PSN-NS4-2	2.00 (50.8)	0.54 (13.7)	0.28 (7.1)	8000 (551)	4000 (275)
1/4	-PSN-NS4-2.5	2.50 (63.5)	0.54 (13.7)	0.28 (7.1)	8000 (551)	4000 (275)
1/4	-PSN-NS4-3	3.00 (76.2)	0.54 (13.7)	0.28 (7.1)	8000 (551)	4000 (275)
1/4	-PSN-NS4-4	4.00 (101.6)	0.54 (13.7)	0.28 (7.1)	8000 (551)	4000 (275)
3/8	-PSN-NS6-1.5	1.50 (38.1)	0.67 (17.1)	0.38 (9.7)	7800 (537)	3900 (268)
3/8	-PSN-NS6-2	2.00 (50.8)	0.67 (17.1)	0.38 (9.7)	7800 (537)	3900 (268)
3/8	-PSN-NS6-2.5	2.50 (63.5)	0.67 (17.1)	0.38 (9.7)	7800 (537)	3900 (268)
3/8	-PSN-NS6-3	3.00 (76.2)	0.67 (17.1)	0.38 (9.7)	7800 (537)	3900 (268)
3/8	-PSN-NS6-4	4.00 (101.6)	0.67 (17.1)	0.38 (9.7)	7800 (537)	3900 (268)
1/2	-PSN-NS8-2	2.00 (50.8)	0.84 (21.3)	0.47 (11.9)	7700 (530)	3800 (261)
1/2	-PSN-NS8-3	3.00 (76.2)	0.84 (21.3)	0.47 (11.9)	7700 (530)	3800 (261)
1/2	-PSN-NS8-4	4.00 (101.6)	0.84 (21.3)	0.47 (11.9)	7700 (530)	3800 (261)
1/2	-PSN-NS8-6	6.00 (152.4)	0.84 (21.3)	0.47 (11.9)	7700 (530)	3800 (261)
3/4	-PSN-NS12-2	2.00 (50.8)	1.05 (26.7)	0.62 (15.7)	7300 (502)	3600 (248)
3/4	-PSN-NS12-3	3.00 (76.2)	1.05 (26.7)	0.62 (15.7)	7300 (502)	3600 (248)
3/4	-PSN-NS12-4	4.00 (101.6)	1.05 (26.7)	0.62 (15.7)	7300 (502)	3600 (248)
1	-PSN-NS16-3	3.00 (76.2)	1.31 (33.4)	0.88 (22.4)	5300 (365)	2600 (179)
1	-PSN-NS16-4	4.00 (101.6)	1.31 (33.4)	0.88 (22.4)	5300 (365)	2600 (179)

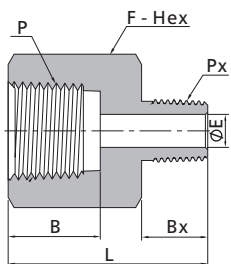
Adapters



Pipe Fittings  
Weld Fittings

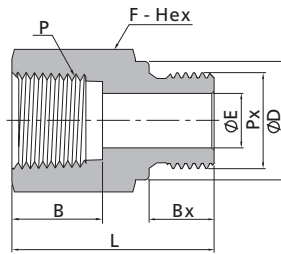
Female NPT Threads			Male NPT Threads						
P-NPT Size	Px-NPT Size	Basic Ordering Number	Dimensions, in. (mm)					Working Pressure psig (bar)	
			L	F	B	Bx	E	316 SS, Steel	Brass
1/8	1/16	-PA-NS2-NS1	1.09 (27.7)	0.56 (14.3)	0.41 (10.4)	0.38 (9.7)	0.12 (3.0)	6500 (447)	3200 (220)
1/8	1/8	-PA-NS2	1.10 (27.9)	0.56 (14.3)	0.41 (10.4)	0.38 (9.7)	0.19 (4.8)	6500 (447)	3200 (220)
1/4	1/16	-PA-NS4-NS1	1.20 (30.5)	0.75 (19.1)	0.59 (15.0)	0.38 (9.7)	0.12 (3.0)	6600 (454)	3300 (227)
1/4	1/8	-PA-NS4-NS2	1.26 (32.0)	0.75 (19.1)	0.59 (15.0)	0.38 (9.7)	0.19 (4.8)	6600 (454)	3300 (227)
1/4	1/4	-PA-NS4	1.40 (35.6)	0.75 (19.1)	0.59 (15.0)	0.56 (14.2)	0.28 (7.1)	6600 (454)	3300 (227)
3/8	1/16	-PA-NS6-NS1	1.25 (31.8)	0.87 (22.2)	0.59 (15.0)	0.38 (9.7)	0.12 (3.0)	5300 (365)	2600 (179)
3/8	1/8	-PA-NS6-NS2	1.33 (33.8)	0.87 (22.2)	0.59 (15.0)	0.38 (9.7)	0.19 (4.8)	5300 (365)	2600 (179)
3/8	1/4	-PA-NS6-NS4	1.50 (38.1)	0.87 (22.2)	0.59 (15.0)	0.56 (14.2)	0.28 (7.1)	5300 (365)	2600 (179)
3/8	3/8	-PA-NS6	1.51 (38.4)	0.87 (22.2)	0.59 (15.0)	0.56 (14.2)	0.38 (9.6)	5300 (365)	2600 (179)
1/2	1/8	-PA-NS8-NS2	1.58 (40.1)	1.06 (27.0)	0.78 (19.8)	0.38 (9.7)	0.19 (4.8)	4900 (337)	2400 (165)
1/2	1/4	-PA-NS8-NS4	1.76 (44.7)	1.06 (27.0)	0.78 (19.8)	0.56 (14.2)	0.28 (7.1)	4900 (337)	2400 (165)
1/2	3/8	-PA-NS8-NS6	1.75 (44.4)	1.06 (27.0)	0.78 (19.8)	0.56 (14.2)	0.38 (9.6)	4900 (337)	2400 (165)
1/2	1/2	-PA-NS8	1.94 (49.3)	1.06 (27.0)	0.78 (19.8)	0.75 (19.1)	0.47 (11.9)	4900 (337)	2400 (165)
3/4	1/8	-PA-NS12-NS2	1.56 (39.6)	1.31 (33.3)	0.81 (20.6)	0.38 (9.7)	0.19 (4.8)	4600 (316)	2300 (158)
3/4	1/4	-PA-NS12-NS4	1.85 (47.0)	1.31 (33.3)	0.81 (20.6)	0.56 (14.2)	0.28 (7.1)	4600 (316)	2300 (158)
3/4	3/8	-PA-NS12-NS6	1.82 (46.2)	1.31 (33.3)	0.81 (20.6)	0.56 (14.2)	0.38 (9.6)	4600 (316)	2300 (158)
3/4	1/2	-PA-NS12-NS8	2.02 (51.3)	1.31 (33.3)	0.81 (20.6)	0.75 (19.1)	0.47 (11.9)	4600 (316)	2300 (158)
3/4	3/4	-PA-NS12	2.02 (51.3)	1.31 (33.3)	0.81 (20.6)	0.75 (19.1)	0.62 (15.7)	4600 (316)	2300 (158)
1	1/8	-PA-NS16-NS2	1.81 (46.0)	1.63 (41.3)	1.00 (25.4)	0.38 (9.7)	0.19 (4.8)	4400 (303)	2200 (151)
1	1/4	-PA-NS16-NS4	1.96 (49.8)	1.63 (41.3)	1.00 (25.4)	0.56 (14.2)	0.28 (7.1)	4400 (303)	2200 (151)
1	3/8	-PA-NS16-NS6	2.00 (50.8)	1.63 (41.3)	1.00 (25.4)	0.56 (14.2)	0.38 (9.6)	4400 (303)	2200 (151)
1	1/2	-PA-NS16-NS8	2.16 (54.9)	1.63 (41.3)	1.00 (25.4)	0.75 (19.1)	0.47 (11.9)	4400 (303)	2200 (151)
1	3/4	-PA-NS16-NS12	2.17 (55.1)	1.63 (41.3)	1.00 (25.4)	0.75 (19.1)	0.62 (15.7)	4400 (303)	2200 (151)
1	1	-PA-NS16	2.28 (57.9)	1.63 (41.3)	1.00 (25.4)	0.94 (23.9)	0.88 (22.4)	4400 (303)	2200 (151)
1 1/4	1	-PA-NS20-NS16	2.47 (62.7)	2.13 (54.0)	1.00 (25.4)	0.94 (23.9)	0.88 (22.4)	5000 (344)	2500 (172)

Adapters

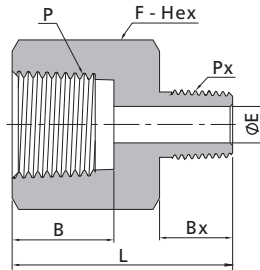


Female NPT Threads			Male ISO Tapered Threads						
P-NPT Size	Px-RT Size	Basic Ordering Number	Dimensions, in. (mm)					Working Pressure psig (bar)	
			L	F	B	Bx	E	316 SS, Steel	Brass
1/8	1/8	-PA-NS2-RT2	1.09 (27.7)	0.56 (14.3)	0.41 (10.4)	0.38 (9.7)	0.19 (4.8)	6500 (447)	3200 (220)
1/4	1/4	-PA-NS4-RT4	1.42 (36.1)	0.75 (19.1)	0.59 (15.0)	0.56 (14.2)	0.28 (7.1)	6600 (454)	3300 (227)
3/8	3/8	-PA-NS6-RT6	1.50 (38.1)	0.87 (22.2)	0.59 (15.0)	0.56 (14.2)	0.38 (9.6)	5300 (365)	2600 (179)
1/2	1/2	-PA-NS8-RT8	1.94 (49.3)	1.06 (27.0)	0.78 (19.8)	0.75 (19.1)	0.47 (11.9)	4900 (337)	2400 (165)
3/4	3/4	-PA-NS12-RT12	2.02 (51.3)	1.31 (33.3)	0.81 (20.6)	0.75 (19.1)	0.62 (15.7)	4600 (316)	2300 (158)
1	1	-PA-NS16-RT16	2.30 (58.4)	1.63 (41.3)	1.00 (25.4)	0.94 (23.9)	0.88 (22.4)	4400 (303)	2200 (151)

Adapters

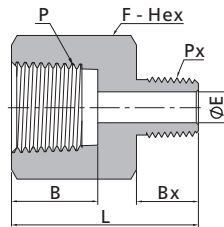


Female NPT Threads			Male ISO Parallel Threads							
P-NPT Size	Px-RS Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)	
			L	F	B	Bx	D	E	316 SS, Steel	Brass
1/8	1/8	-PA-NS2-RS2	0.99 (25.1)	0.56 (14.3)	0.39 (9.9)	0.28 (7.1)	0.54 (13.7)	0.16 (4.1)	6500 (447)	3200 (220)
1/4	1/4	-PA-NS4-RS4	1.32 (33.5)	0.75 (19.1)	0.41 (10.4)	0.44 (11.2)	0.71 (18.0)	0.23 (5.8)	6600 (454)	3300 (227)
3/8	3/8	-PA-NS6-RS6	1.41 (35.8)	0.87 (22.2)	0.59 (15.0)	0.44 (11.2)	0.85 (21.6)	0.31 (7.9)	5300 (365)	2600 (179)
1/2	1/2	-PA-NS8-RS8	1.74 (44.2)	1.06 (27.0)	0.59 (15.0)	0.56 (14.2)	1.02 (25.9)	0.47 (11.9)	4900 (337)	2400 (165)
3/4	3/4	-PA-NS12-RS12	1.89 (48.0)	1.31 (33.3)	0.81 (20.6)	0.62 (15.7)	1.26 (32.0)	0.62 (15.7)	4600 (316)	2300 (158)
1	1	-PA-NS16-RS16	2.10 (53.3)	1.63 (41.3)	1.00 (25.4)	0.72 (18.3)	1.53 (38.9)	0.78 (19.8)	4400 (303)	2200 (151)

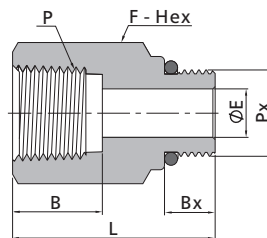


Female ISO Tapered Threads			Male ISO Tapered Threads							
P-RT Size	Px-RT Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)	
			L	F	B	Bx	E	316 SS, Steel	Brass	
1/8	1/8	-PA-RT2	1.09 (27.7)	0.56 (14.3)	0.41 (10.4)	0.38 (9.7)	0.19 (4.8)	6500 (447)	3200 (220)	
1/4	1/8	-PA-RT4-RT2	1.26 (32.0)	0.75 (19.1)	0.59 (15.0)	0.38 (9.7)	0.19 (4.8)	6600 (454)	3300 (227)	
1/4	1/4	-PA-RT4	1.42 (36.1)	0.75 (19.1)	0.59 (15.0)	0.56 (14.2)	0.28 (7.1)	6600 (454)	3300 (227)	
3/8	1/4	-PA-RT6-RT4	1.50 (38.1)	0.87 (22.2)	0.59 (15.0)	0.56 (14.2)	0.28 (7.1)	5300 (365)	2600 (179)	
3/8	3/8	-PA-RT6	1.50 (38.1)	0.87 (22.2)	0.59 (15.0)	0.56 (14.2)	0.38 (9.7)	5300 (365)	2600 (179)	
1/2	1/4	-PA-RT8-RT4	1.76 (44.7)	1.06 (27.0)	0.78 (19.8)	0.56 (14.2)	0.28 (7.1)	4900 (337)	2400 (165)	
1/2	3/8	-PA-RT8-RT6	1.75 (44.4)	1.06 (27.0)	0.78 (19.8)	0.56 (14.2)	0.38 (9.7)	4900 (337)	2400 (165)	
1/2	1/2	-PA-RT8	1.95 (49.5)	1.06 (27.0)	0.78 (19.8)	0.75 (19.1)	0.47 (11.9)	4900 (337)	2400 (165)	
3/4	3/4	-PA-RT12	2.02 (51.3)	1.31 (33.3)	0.81 (20.6)	0.75 (19.1)	0.62 (15.7)	4600 (316)	2300 (158)	
1	1	-PA-RT16	2.30 (58.4)	1.63 (41.3)	1.00 (25.4)	0.94 (23.9)	0.88 (22.4)	4400 (303)	2200 (151)	

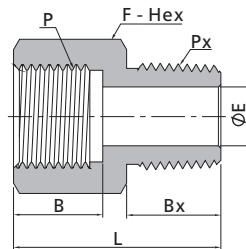
## Adapters



Female ISO Tapered Threads			Male NPT Threads						
P-RT Size	Px-NPT Size	Basic Ordering Number	Dimensions, in. (mm)					Working Pressure psig (bar)	
			L	F	B	Bx	E	316 SS, Steel	Brass
1/8	1/8	-PA-RT2-NS2	1.09 (27.7)	0.56 (14.3)	0.41 (10.4)	0.38 (9.7)	0.19 (4.8)	6500 (447)	3200 (220)
1/4	1/4	-PA-RT4-NS4	1.43 (36.3)	0.75 (19.1)	0.59 (15.0)	0.56 (14.2)	0.28 (7.1)	6600 (454)	3300 (227)
3/8	3/8	-PA-RT6-NS6	1.51 (38.4)	0.87 (22.2)	0.59 (15.0)	0.56 (14.2)	0.38 (9.6)	5300 (365)	2600 (179)
1/2	1/2	-PA-RT8-NS8	1.96 (49.8)	1.06 (27.0)	0.78 (19.8)	0.75 (19.1)	0.47 (11.9)	4900 (337)	2400 (165)
3/4	3/4	-PA-RT12-NS12	2.02 (51.3)	1.31 (33.3)	0.81 (20.6)	0.75 (19.1)	0.62 (15.7)	4600 (316)	2300 (158)
1	1	-PA-RT16-NS16	2.30 (58.4)	1.63 (41.3)	1.00 (25.4)	0.94 (23.9)	0.88 (22.4)	4400 (303)	2200 (151)

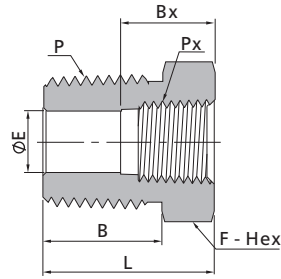


Female NPT Threads			Male SAE/MS Straight Threads					
P-NPT Size	Px-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)					Working Pressure psig (bar) 316 SS, Steel
			L	F	B	Bx	E	
1/4	7/16-20	-PA-NS4-ST7	1.32 (33.5)	0.75 (19.1)	0.59 (15.0)	0.36 (9.1)	0.20 (5.1)	4500 (310)
3/8	9/16-18	-PA-NS6-ST9	1.39 (35.3)	0.94 (23.8)	0.59 (15.0)	0.39 (9.9)	0.28 (7.1)	4500 (310)
1/2	3/4-16	-PA-NS8-ST12	1.76 (44.7)	1.06 (27.0)	0.78 (19.8)	0.44 (11.2)	0.42 (10.7)	4500 (310)
3/4	1 1/16-12	-PA-NS12-ST17	1.99 (50.5)	1.37 (34.9)	0.81 (20.6)	0.59 (15.0)	0.66 (16.8)	3600 (248)
1	1 5/16-12	-PA-NS16-ST21	2.12 (53.8)	1.63 (41.3)	1.00 (25.4)	0.59 (15.0)	0.85 (21.5)	2900 (199)



Female ISO Parallel Threads			Male NPT Threads					
P-RG Size	Px-NPT Size	Basic Ordering Number	Dimensions, in. (mm)					Working Pressure psig (bar) 316 SS, Steel
			L	F	B	Bx	E	
1/8	1/8	-PA-RG2-NS2	0.86 (21.8)	0.56 (14.3)	0.26 (6.5)	0.38 (9.7)	0.18 (4.5)	6100 (420)
1/4	1/4	-PA-RG4-NS4	1.19 (30.2)	0.75 (19.1)	0.51 (12.9)	0.56 (14.2)	0.22 (5.5)	5700 (392)
3/8	3/8	-PA-RG6-NS6	1.27 (32.2)	0.94 (23.8)	0.56 (14.2)	0.56 (14.2)	0.26 (6.5)	5700 (392)
1/2	1/2	-PA-RG8-NS8	1.68 (42.7)	1.06 (27.0)	0.74 (18.8)	0.75 (19.1)	0.28 (7.0)	3900 (268)

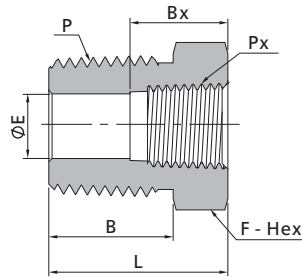
Reducing Bushings



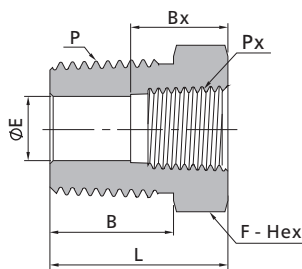
Male NPT Threads			Dimensions, in. (mm)							Female NPT Threads	
P-NPT Size	Px-NPT Size	Basic Ordering Number	L	F	B	Bx	E	Working Pressure psig (bar)			
								316 SS, Steel	Brass		
1/8	1/16	-PRB-NS2-NS1	1.03 (26.2)	0.44 (11.1)	0.38 (9.7)	0.39 (9.9)	0.19 (4.8)	6500 (447)	3200 (220)		
1/4	1/16	-PRB-NS4-NS1	0.86 (21.8)	0.56 (14.3)	0.56 (14.2)	0.39 (9.9)	0.19 (4.8)	8000 (551)	4000 (275)		
1/4	1/8	-PRB-NS4-NS2	1.06 (26.9)	0.56 (14.3)	0.56 (14.2)	0.41 (10.4)	0.28 (7.1)	6500 (447)	3300 (227)		
3/8	1/16	-PRB-NS6-NS1	0.86 (21.8)	0.69 (17.5)	0.56 (14.2)	0.39 (9.9)	0.19 (4.8)	7800 (537)	3900 (268)		
3/8	1/8	-PRB-NS6-NS2	0.86 (21.8)	0.69 (17.5)	0.56 (14.2)	0.41 (10.4)	0.34 (8.6)	7800 (537)	3900 (268)		
3/8	1/4	-PRB-NS6-NS4	1.19 (30.2)	0.75 (19.1)	0.56 (14.2)	0.59 (15.0)	0.38 (9.6)	6600 (454)	3300 (227)		
1/2	1/8	-PRB-NS8-NS2	1.08 (27.4)	0.87 (22.2)	0.75 (19.1)	0.41 (10.4)	0.34 (8.6)	8300 (571)	4400 (303)		
1/2	1/4	-PRB-NS8-NS4	1.08 (27.4)	0.87 (22.2)	0.75 (19.1)	0.59 (15.0)	0.45 (11.4)	8300 (571)	4400 (303)		
1/2	3/8	-PRB-NS8-NS6	1.41 (35.8)	0.87 (22.2)	0.75 (19.1)	0.59 (15.0)	0.47 (11.9)	5300 (365)	2600 (179)		
3/4	1/4	-PRB-NS12-NS4	1.08 (27.4)	1.06 (27.0)	0.75 (19.1)	0.59 (15.0)	0.45 (11.4)	7300 (502)	3600 (248)		
3/4	3/8	-PRB-NS12-NS6	1.08 (27.4)	1.06 (27.0)	0.75 (19.1)	0.59 (15.0)	0.59 (15.0)	7300 (502)	3600 (248)		
3/4	1/2	-PRB-NS12-NS8	1.63 (41.4)	1.06 (27.0)	0.75 (19.1)	0.78 (19.8)	0.62 (15.7)	4900 (337)	2400 (165)		
1	1/4	-PRB-NS16-NS4	1.37 (34.8)	1.37 (34.9)	0.94 (23.9)	0.59 (15.0)	0.45 (11.4)	6500 (447)	3200 (220)		
1	3/8	-PRB-NS16-NS6	1.37 (34.8)	1.37 (34.9)	0.94 (23.9)	0.59 (15.0)	0.59 (15.0)	6500 (447)	3200 (220)		
1	1/2	-PRB-NS16-NS8	1.37 (34.8)	1.37 (34.9)	0.94 (23.9)	0.78 (19.8)	0.73 (18.5)	6500 (447)	3200 (220)		
1	3/4	-PRB-NS16-NS12	1.85 (47.0)	1.37 (34.9)	0.94 (23.9)	0.81 (20.6)	0.88 (22.4)	5300 (365)	2600 (179)		
1 1/4	3/4	-PRB-NS20-NS12	1.47 (37.3)	1.75 (44.5)	0.94 (23.9)	0.81 (20.6)	0.88 (22.4)	6000 (410)	3000 (205)		
1 1/4	1	-PRB-NS20-NS16	1.47 (37.3)	1.75 (44.5)	0.94 (23.9)	1.00 (25.4)	0.88 (22.4)	3500 (241)	1750 (120)		
1 1/2	1	-PRB-NS24-NS16	1.58 (40.1)	2.00 (50.8)	1.03 (26.2)	1.00 (25.4)	0.88 (22.4)	5000 (344)	2500 (172)		
1 1/2	1 1/4	-PRB-NS24-NS20	2.20 (56.0)	2.13 (54.0)	1.03 (26.2)	1.00 (25.4)	1.34 (34.0)	5000 (344)	2500 (172)		



## Reducing Bushings

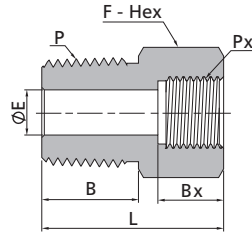


Male NPT Threads			Female ISO Tapered Threads						
P-NPT Size	Px-RT Size	Basic Ordering Number	Dimensions, in. (mm)					Working Pressure psig (bar)	
			L	F	B	Bx	E	316 SS, Steel	Brass
1/8	1/16	-PRB-NS2-RT1	1.03 (26.2)	0.44 (11.1)	0.38 (9.7)	0.39 (9.9)	0.19 (4.8)	6500 (447)	3200 (220)
1/4	1/16	-PRB-NS4-RT1	0.86 (21.8)	0.56 (14.3)	0.56 (14.2)	0.39 (9.9)	0.19 (4.8)	8000 (551)	4000 (275)
1/4	1/8	-PRB-NS4-RT2	1.06 (26.9)	0.56 (14.3)	0.56 (14.2)	0.41 (10.4)	0.28 (7.1)	6500 (447)	3300 (227)
3/8	1/16	-PRB-NS6-RT1	0.86 (21.8)	0.69 (17.5)	0.56 (14.2)	0.39 (9.9)	0.19 (4.8)	7800 (537)	3900 (268)
3/8	1/8	-PRB-NS6-RT2	0.86 (21.8)	0.69 (17.5)	0.56 (14.2)	0.41 (10.4)	0.28 (7.1)	7800 (537)	3900 (268)
3/8	1/4	-PRB-NS6-RT4	1.19 (30.2)	0.75 (19.1)	0.56 (14.2)	0.59 (15.0)	0.38 (9.7)	6600 (454)	3300 (227)
1/2	1/8	-PRB-NS8-RT2	1.08 (27.4)	0.87 (22.2)	0.75 (19.1)	0.41 (10.4)	0.28 (7.1)	8300 (571)	4400 (303)
1/2	1/4	-PRB-NS8-RT4	1.08 (27.4)	0.87 (22.2)	0.75 (19.1)	0.59 (15.0)	0.41 (10.4)	8300 (571)	4400 (303)
1/2	3/8	-PRB-NS8-RT6	1.41 (35.8)	0.87 (22.2)	0.75 (19.1)	0.59 (15.0)	0.47 (11.9)	5300 (365)	2600 (179)
3/4	1/4	-PRB-NS12-RT4	1.08 (27.4)	1.06 (27.0)	0.75 (19.1)	0.59 (15.0)	0.41 (10.4)	7300 (502)	3600 (248)
3/4	3/8	-PRB-NS12-RT6	1.08 (27.4)	1.06 (27.0)	0.75 (19.1)	0.59 (15.0)	0.50 (12.7)	7300 (502)	3600 (248)
3/4	1/2	-PRB-NS12-RT8	1.63 (41.4)	1.06 (27.0)	0.75 (19.1)	0.78 (19.8)	0.62 (15.7)	4900 (337)	2400 (165)
1	1/4	-PRB-NS16-RT4	1.37 (34.8)	1.37 (34.9)	0.94 (23.9)	0.59 (15.0)	0.41 (10.4)	6500 (447)	3200 (220)
1	3/8	-PRB-NS16-RT6	1.37 (34.8)	1.37 (34.9)	0.94 (23.9)	0.59 (15.0)	0.50 (12.7)	6500 (447)	3200 (220)
1	1/2	-PRB-NS16-RT8	1.37 (34.8)	1.37 (34.9)	0.94 (23.9)	0.78 (19.8)	0.62 (15.7)	6500 (447)	3200 (220)
1	3/4	-PRB-NS16-RT12	1.85 (47.0)	1.37 (34.9)	0.94 (23.9)	0.81 (20.6)	0.88 (22.4)	5300 (365)	2600 (179)
1 1/4	3/4	-PRB-NS20-RT12	1.47 (37.3)	1.75 (44.5)	0.94 (23.9)	0.81 (20.6)	0.88 (22.4)	6000 (410)	3000 (205)
1 1/4	1	-PRB-NS20-RT16	1.47 (37.3)	1.75 (44.5)	0.94 (23.9)	1.00 (25.4)	0.88 (22.4)	3500 (241)	1750 (120)
1 1/2	1	-PRB-NS24-RT16	1.58 (40.1)	2.00 (50.8)	1.03 (26.2)	1.00 (25.4)	0.88 (22.4)	5000 (344)	2500 (172)
1 1/2	1 1/4	-PRB-NS24-RT20	2.20 (56.0)	2.13 (54.0)	1.03 (26.2)	1.00 (25.4)	1.34 (34.0)	5000 (344)	2500 (172)

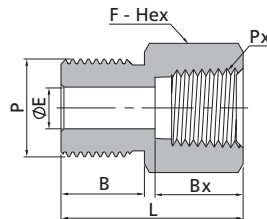


Male ISO Tapered Threads			Female ISO Tapered Threads						
P-RT Size	Px-RT Size	Basic Ordering Number	Dimensions, in. (mm)					Working Pressure psig (bar)	
			L	F	B	Bx	E	316 SS, Steel	Brass
1/4	1/8	-PRB-RT4-RT2	1.06 (26.9)	0.56 (14.3)	0.56 (14.2)	0.41 (10.4)	0.28 (7.1)	6500 (447)	3200 (220)
3/8	1/4	-PRB-RT6-RT4	1.19 (30.2)	0.75 (19.1)	0.56 (14.2)	0.59 (15.0)	0.38 (9.6)	6600 (454)	3300 (227)
1/2	1/4	-PRB-RT8-RT4	1.08 (27.4)	0.87 (22.2)	0.75 (19.1)	0.59 (15.0)	0.44 (11.2)	8300 (571)	4400 (303)
1/2	3/8	-PRB-RT8-RT6	1.41 (35.8)	0.87 (22.2)	0.75 (19.1)	0.59 (15.0)	0.47 (11.9)	5300 (365)	2600 (179)

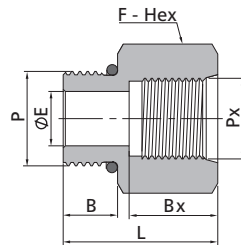
Reducing Bushings



Male NPT Threads			Female ISO Parallel Threads					Working Pressure psig (bar)
P-NPT Size	Px-RG Size	Basic Ordering Number	Dimensions, in. (mm)					
			L	F	B	Bx	E	316 SS, Steel
3/8	1/4	-PRB-NS6-RG4	1.19 (30.2)	0.75 (19.1)	0.56 (14.2)	0.51 (12.9)	0.22 (5.6)	5700 (392)
1/2	3/8	-PRB-NS8-RG6	1.41 (35.8)	0.87 (22.2)	0.75 (19.1)	0.56 (14.2)	0.26 (6.6)	5700 (392)
3/4	1/2	-PRB-NS12-RG8	1.63 (41.4)	1.06 (27.0)	0.75 (19.1)	0.74 (18.8)	0.28 (7.1)	3900 (268)

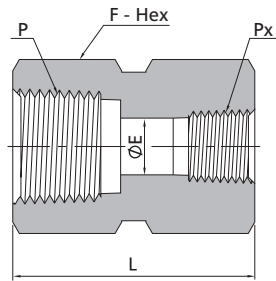


Male ISO Parallel Threads			Female NPT Threads					Working Pressure psig (bar)	
P-BP Size	Px-NPT Size	Basic Ordering Number	Dimensions, in. (mm)					316 SS, Steel	Brass
			L	F	B	Bx	E		
1/4	1/8	-PRB-BP4-NS2	1.06 (26.9)	0.56 (14.3)	0.51 (12.9)	0.41 (10.4)	0.18 (4.5)	6500 (447)	3200 (220)
3/8	1/4	-PRB-BP6-NS4	1.22 (31.0)	0.75 (19.1)	0.56 (14.2)	0.59 (15.0)	0.28 (7.1)	6600 (454)	3300 (227)
1/2	3/8	-PRB-BP8-NS6	1.41 (35.8)	0.87 (22.2)	0.74 (18.8)	0.59 (15.0)	0.26 (6.6)	5300 (365)	2600 (179)



Male SAE/MS Straight Threads			Female SAE/MS Straight Threads					Working Pressure psig (bar)
P-SAE/MS Thread Size	Px-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)					
			L	F	B	Bx	E	316 SS, Steel
9/16-18	7/16-20	-PRB-ST9-US7	1.12 (28.4)	0.81 (20.6)	0.39 (9.9)	0.55 (14.0)	0.28 (7.1)	4500 (310)
3/4-16	7/16-20	-PRB-ST12-US7	0.98 (24.9)	0.87 (22.2)	0.44 (11.2)	0.55 (14.0)	0.39 (9.9)	4500 (310)
3/4-16	9/16-18	-PRB-ST12-US9	1.19 (30.2)	1.00 (25.4)	0.44 (11.2)	0.63 (16.0)	0.42 (10.7)	4500 (310)
7/8-14	9/16-18	-PRB-ST14-US9	1.10 (27.9)	1.00 (25.4)	0.50 (12.7)	0.63 (16.0)	0.50 (12.7)	3600 (248)
7/8-14	3/4-16	-PRB-ST14-US12	1.42 (36.1)	1.19 (30.2)	0.50 (12.7)	0.71 (18.0)	0.50 (12.7)	3600 (248)
1 1/16-12	3/4-16	-PRB-ST17-US12	1.27 (32.3)	1.25 (31.8)	0.59 (15.0)	0.71 (18.0)	0.65 (16.5)	3600 (248)
1 5/16-12	1 1/16-12	-PRB-ST21-US17	1.61 (40.9)	1.63 (41.3)	0.59 (15.0)	0.94 (24.0)	0.87 (22.1)	2900 (199)
1 5/8-12	1 5/16-12	-PRB-ST26-US21	1.98 (50.3)	2.13 (54.0)	0.59 (15.0)	0.94 (24.0)	1.09 (27.7)	2300 (158)
1 7/8-12	1 5/16-12	-PRB-ST30-US21	1.27 (32.3)	2.13 (54.0)	0.59 (15.0)	0.94 (24.0)	1.23 (31.2)	2300 (158)

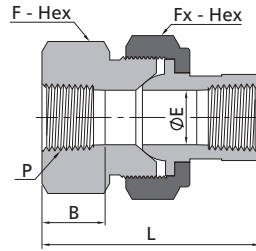
## Hex Couplings



Female NPT Threads								
P-NPT Size	Px-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			Working Pressure psig (bar)		
			L	F	E	316 SS, Steel	Brass	
1/16	1/16	-PCG-NS1	0.78 (19.8)	0.44 (11.1)	0.19 (4.8)	6700 (460)	3300 (227)	
1/8	1/8	-PCG-NS2	0.81 (20.6)	0.56 (14.3)	0.34 (8.6)	6500 (447)	3200 (220)	
1/4	1/8	-PCG-NS4-NS2	1.22 (31.0)	0.75 (19.1)	0.34 (8.6)	6600 (454)	3300 (227)	
1/4	1/4	-PCG-NS4	1.19 (30.2)	0.75 (19.1)	0.45 (11.4)	6600 (454)	3300 (227)	
3/8	1/4	-PCG-NS6-NS4	1.38 (35.1)	0.87 (22.2)	0.45 (11.4)	5300 (365)	2600 (179)	
3/8	3/8	-PCG-NS6	1.31 (33.3)	0.87 (22.2)	0.59 (15.0)	5300 (365)	2600 (179)	
1/2	1/8	-PCG-NS8-NS2	1.56 (39.6)	1.06 (27.0)	0.34 (8.6)	4900 (337)	2400 (165)	
1/2	1/4	-PCG-NS8-NS4	1.75 (44.4)	1.06 (27.0)	0.45 (11.4)	4900 (337)	2400 (165)	
1/2	3/8	-PCG-NS8-NS6	1.78 (45.2)	1.06 (27.0)	0.59 (15.0)	4900 (337)	2400 (165)	
1/2	1/2	-PCG-NS8	1.56 (39.6)	1.06 (27.0)	0.73 (18.5)	4900 (337)	2400 (165)	
3/4	1/4	-PCG-NS12-NS4	1.81 (46.0)	1.31 (33.3)	0.45 (11.4)	4600 (316)	2300 (158)	
3/4	1/2	-PCG-NS12-NS8	2.06 (52.3)	1.31 (33.3)	0.73 (18.5)	4600 (316)	2300 (158)	
3/4	3/4	-PCG-NS12	1.62 (41.1)	1.31 (33.3)	0.94 (23.9)	4600 (316)	2300 (158)	
1	1/2	-PCG-NS16-NS8	2.19 (55.6)	1.63 (41.3)	0.73 (18.5)	4400 (303)	2200 (151)	
1	3/4	-PCG-NS16-NS12	2.25 (57.2)	1.63 (41.3)	0.94 (23.9)	4400 (303)	2200 (151)	
1	1	-PCG-NS16	2.00 (50.8)	1.63 (41.3)	1.17 (29.7)	4400 (303)	2200 (151)	

Female ISO Tapered Threads								
P-RT Size	Px-RT Size	Basic Ordering Number	Dimensions, in. (mm)			Working Pressure psig (bar)		
			L	F	E	316 SS, Steel	Brass	
1/8	1/8	-PCG-RT2	0.81 (20.6)	0.56 (14.3)	0.33 (8.4)	6500 (447)	3200 (220)	
1/4	1/4	-PCG-RT4	1.19 (30.2)	0.75 (19.1)	0.44 (11.2)	6600 (454)	3300 (227)	
3/8	1/4	-PCG-RT6-RT4	1.38 (35.1)	0.87 (22.2)	0.44 (11.2)	5300 (365)	2600 (179)	
3/8	3/8	-PCG-RT6	1.31 (33.3)	0.87 (22.2)	0.58 (14.7)	5300 (365)	2600 (179)	
1/2	1/4	-PCG-RT8-RT4	1.75 (44.4)	1.06 (27.0)	0.44 (11.2)	4900 (337)	2400 (165)	
1/2	3/8	-PCG-RT8-RT6	1.78 (45.2)	1.06 (27.0)	0.58 (14.7)	4900 (337)	2400 (165)	
1/2	1/2	-PCG-RT8	1.56 (39.6)	1.06 (27.0)	0.72 (18.3)	4900 (337)	2400 (165)	

Union Ball Joints

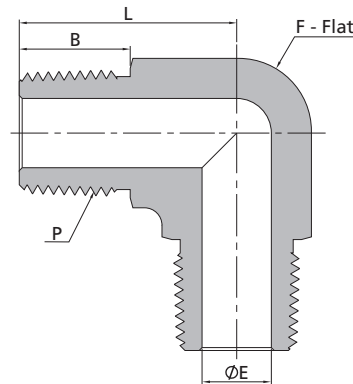


Pipe Fittings  
Weld Fittings

Female NPT Threads							
P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)					Working Pressure psig (bar) 316 SS, Steel
		L	F	Fx	B	E	
1/8	-UBJ-NS2	1.81 (46.0)	0.94 (23.8)	1.13 (28.6)	0.41 (10.4)	0.27 (6.8)	8400 (578)
1/4	-UBJ-NS4	2.34 (59.4)	1.19 (30.2)	1.37 (34.9)	0.59 (15.0)	0.36 (9.1)	6600 (454)
3/8	-UBJ-NS6	2.50 (63.5)	1.31 (33.3)	1.50 (38.1)	0.59 (15.0)	0.52 (13.2)	5300 (365)
1/2	-UBJ-NS8	2.69 (68.3)	1.63 (41.3)	1.75 (44.5)	0.78 (19.8)	0.62 (15.7)	6000 (410)
3/4	-UBJ-NS12	3.12 (79.2)	1.87 (47.6)	2.13 (54.0)	0.81 (20.6)	0.88 (22.4)	4600 (316)
1	-UBJ-NS16	3.56 (90.4)	2.37 (60.3)	2.50 (63.5)	1.00 (25.4)	1.03 (26.2)	6800 (468)

Female ISO Tapered Threads							
P-RT Size	Basic Ordering Number	Dimensions, in. (mm)					Working Pressure psig (bar) 316 SS, Steel
		L	F	Fx	B	E	
1/8	-UBJ-RT2	1.81 (46.0)	0.94 (23.8)	1.13 (28.6)	0.41 (10.4)	0.27 (6.8)	8400 (578)
1/4	-UBJ-RT4	2.34 (59.4)	1.19 (30.2)	1.37 (34.9)	0.59 (15.0)	0.36 (9.1)	6600 (454)
3/8	-UBJ-RT6	2.50 (63.5)	1.31 (33.3)	1.50 (38.1)	0.59 (15.0)	0.52 (13.2)	5300 (365)
1/2	-UBJ-RT8	2.69 (68.3)	1.63 (41.3)	1.75 (44.5)	0.78 (19.8)	0.62 (15.7)	6000 (410)
3/4	-UBJ-RT12	3.12 (79.2)	1.87 (47.6)	2.13 (54.0)	0.81 (20.6)	0.88 (22.4)	4600 (316)
1	-UBJ-RT16	3.56 (90.4)	2.37 (60.3)	2.50 (63.5)	1.00 (25.4)	1.03 (26.2)	6800 (468)

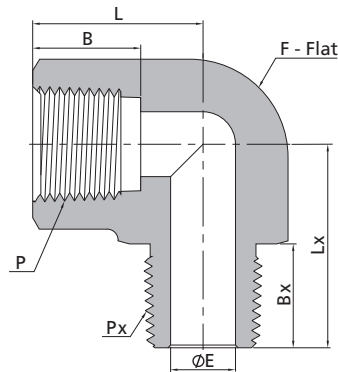
Male Elbows



Male NPT Threads							
P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)				Working Pressure psig (bar)	
		L	F	B	E	316 SS, Steel	Brass
1/16	-PME-NS1	0.67 (17.0)	0.37 (9.5)	0.38 (9.7)	0.12 (3.0)	11000 (757)	5500 (378)
1/8	-PME-NS2	0.88 (22.4)	0.44 (11.1)	0.38 (9.7)	0.19 (4.8)	10000 (690)	5000 (344)
1/4	-PME-NS4	1.05 (26.7)	0.50 (12.7)	0.56 (14.2)	0.28 (7.1)	8000 (551)	4000 (275)
3/8	-PME-NS6	1.17 (29.7)	0.69 (17.5)	0.56 (14.2)	0.38 (9.6)	7800 (537)	3900 (268)
1/2	-PME-NS8	1.45 (36.8)	0.81 (20.6)	0.75 (19.1)	0.47 (11.9)	7700 (530)	3800 (261)
3/4	-PME-NS12	1.59 (40.4)	1.06 (27.0)	0.75 (19.1)	0.62 (15.7)	7300 (502)	3600 (248)
1	-PME-NS16	1.97 (50.0)	1.37 (34.9)	0.94 (23.9)	0.88 (22.4)	5300 (365)	2600 (179)

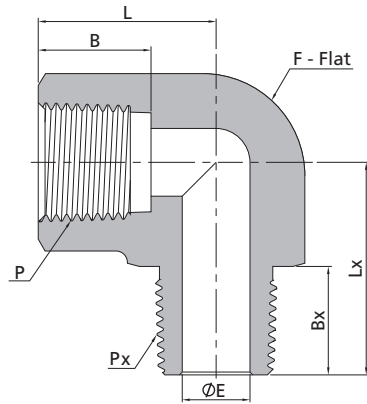
Male ISO Tapered Threads							
P-RT Size	Basic Ordering Number	Dimensions, in. (mm)				Working Pressure psig (bar)	
		L	F	B	E	316 SS, Steel	Brass
1/16	-PME-RT1	0.67 (17.0)	0.37 (9.5)	0.38 (9.7)	0.12 (3.0)	11000 (757)	5500 (378)
1/8	-PME-RT2	0.88 (22.4)	0.44 (11.1)	0.38 (9.7)	0.19 (4.8)	10000 (690)	5000 (344)
1/4	-PME-RT4	1.05 (26.7)	0.50 (12.7)	0.56 (14.2)	0.28 (7.1)	8000 (551)	4000 (275)
3/8	-PME-RT6	1.17 (29.7)	0.69 (17.5)	0.56 (14.2)	0.38 (9.6)	7800 (537)	3900 (268)
1/2	-PME-RT8	1.45 (36.8)	0.81 (20.6)	0.75 (19.1)	0.47 (11.9)	7700 (530)	3800 (261)
3/4	-PME-RT12	1.59 (40.4)	1.06 (27.0)	0.75 (19.1)	0.62 (15.7)	7300 (502)	3600 (248)
1	-PME-RT16	1.97 (50.0)	1.37 (34.9)	0.94 (23.9)	0.88 (22.4)	5300 (365)	2600 (179)

## Street Elbows



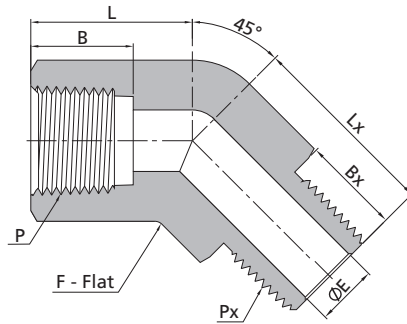
Female NPT Threads				Male NPT Threads							
P-NPT Size	Px-NPT Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)		
			L	F	B	E	Lx	Bx	316 SS, Steel	Brass	
1/16	1/16	-PSE-NS1	0.86 (21.8)	0.44 (11.1)	0.39 (9.9)	0.12 (3.0)	0.88 (22.4)	0.38 (9.7)	9200 (633)	4600 (316)	
1/16	1/8	-PSE-NS1-NS2	0.86 (21.8)	0.44 (11.1)	0.39 (9.9)	0.19 (4.8)	0.88 (22.4)	0.38 (9.7)	9200 (633)	4600 (316)	
1/16	1/4	-PSE-NS1-NS4	0.88 (22.4)	0.56 (14.3)	0.39 (9.9)	0.19 (4.8)	1.09 (27.7)	0.56 (14.2)	8000 (551)	4000 (275)	
1/16	3/8	-PSE-NS1-NS6	0.88 (22.4)	0.69 (17.5)	0.39 (9.9)	0.19 (4.8)	1.17 (29.7)	0.56 (14.2)	7800 (537)	3900 (268)	
1/8	1/16	-PSE-NS2-NS1	1.04 (26.4)	0.50 (12.7)	0.41 (10.4)	0.12 (3.0)	0.87 (22.1)	0.38 (9.7)	6200 (426)	3100 (213)	
1/8	1/8	-PSE-NS2	1.04 (26.4)	0.50 (12.7)	0.41 (10.4)	0.19 (4.8)	0.87 (22.1)	0.38 (9.7)	6200 (426)	3100 (213)	
1/8	1/4	-PSE-NS2-NS4	0.88 (22.4)	0.56 (14.3)	0.41 (10.4)	0.28 (7.1)	1.09 (27.7)	0.56 (14.2)	6500 (447)	3200 (220)	
1/8	3/8	-PSE-NS2-NS6	0.88 (22.4)	0.69 (17.5)	0.41 (10.4)	0.28 (7.1)	1.17 (29.7)	0.56 (14.2)	7800 (537)	3900 (268)	
1/8	1/2	-PSE-NS2-NS8	0.95 (24.1)	0.81 (20.6)	0.41 (10.4)	0.28 (7.1)	1.45 (36.8)	0.75 (19.1)	7700 (530)	3800 (261)	
1/8	3/4	-PSE-NS2-NS12	1.00 (25.4)	1.06 (27.0)	0.41 (10.4)	0.28 (7.1)	1.59 (40.4)	0.75 (19.1)	7300 (502)	3600 (248)	
1/8	1	-PSE-NS2-NS16	1.04 (26.4)	1.37 (34.9)	0.41 (10.4)	0.28 (7.1)	1.97 (50.0)	0.94 (23.9)	5300 (365)	2600 (179)	
1/4	1/8	-PSE-NS4-NS2	1.17 (29.7)	0.69 (17.5)	0.59 (15.0)	0.19 (4.8)	1.00 (25.4)	0.38 (9.7)	7200 (496)	3600 (248)	
1/4	1/4	-PSE-NS4	1.17 (29.7)	0.69 (17.5)	0.59 (15.0)	0.28 (7.1)	1.17 (29.7)	0.56 (14.2)	7200 (496)	3600 (248)	
1/4	3/8	-PSE-NS4-NS6	1.17 (29.7)	0.69 (17.5)	0.59 (15.0)	0.34 (8.6)	1.17 (29.7)	0.56 (14.2)	7200 (496)	3600 (248)	
1/4	1/2	-PSE-NS4-NS8	1.00 (25.4)	0.81 (20.6)	0.59 (15.0)	0.34 (8.6)	1.45 (36.8)	0.75 (19.1)	7200 (496)	3600 (248)	
1/4	3/4	-PSE-NS4-NS12	1.00 (25.4)	1.06 (27.0)	0.59 (15.0)	0.34 (8.6)	1.59 (40.4)	0.75 (19.1)	7300 (502)	3600 (248)	
1/4	1	-PSE-NS4-NS16	1.63 (41.4)	1.37 (34.9)	0.59 (15.0)	0.34 (8.6)	1.97 (50.0)	0.94 (23.9)	5300 (365)	2600 (179)	
3/8	1/4	-PSE-NS6-NS4	1.42 (36.1)	0.81 (20.6)	0.59 (15.0)	0.28 (7.1)	1.26 (32.0)	0.56 (14.2)	5600 (385)	2800 (192)	
3/8	3/8	-PSE-NS6	1.42 (36.1)	0.81 (20.6)	0.59 (15.0)	0.38 (9.6)	1.26 (32.0)	0.56 (14.2)	5600 (385)	2800 (192)	
3/8	1/2	-PSE-NS6-NS8	1.42 (36.1)	0.81 (20.6)	0.59 (15.0)	0.47 (11.9)	1.45 (36.8)	0.75 (19.1)	5600 (385)	2800 (192)	
3/8	3/4	-PSE-NS6-NS12	1.23 (31.2)	1.06 (27.0)	0.59 (15.0)	0.47 (11.9)	1.59 (40.4)	0.75 (19.1)	7300 (502)	3600 (248)	
3/8	1	-PSE-NS6-NS16	1.63 (41.4)	1.37 (34.9)	0.59 (15.0)	0.47 (11.9)	1.97 (50.0)	0.94 (23.9)	5300 (365)	2600 (179)	
1/2	1/4	-PSE-NS8-NS4	1.56 (39.6)	1.00 (25.4)	0.78 (19.8)	0.28 (7.1)	1.38 (35.1)	0.56 (14.2)	5600 (385)	2800 (192)	
1/2	3/8	-PSE-NS8-NS6	1.56 (39.6)	1.00 (25.4)	0.78 (19.8)	0.38 (9.6)	1.38 (35.1)	0.56 (14.2)	5600 (385)	2800 (192)	
1/2	1/2	-PSE-NS8	1.56 (39.6)	1.00 (25.4)	0.78 (19.8)	0.47 (11.9)	1.56 (39.6)	0.75 (19.1)	5600 (385)	2800 (192)	
1/2	3/4	-PSE-NS8-NS12	1.23 (31.2)	1.06 (27.0)	0.78 (19.8)	0.62 (15.7)	1.59 (40.4)	0.75 (19.1)	5600 (385)	2800 (192)	
1/2	1	-PSE-NS8-NS16	1.63 (41.4)	1.37 (34.9)	0.78 (19.8)	0.62 (15.7)	1.97 (50.0)	0.94 (23.9)	5300 (365)	2600 (179)	
3/4	3/4	-PSE-NS12	1.92 (48.8)	1.25 (31.8)	0.81 (20.6)	0.62 (15.7)	1.67 (42.4)	0.75 (19.1)	5100 (351)	2500 (172)	
3/4	1	-PSE-NS12-NS16	1.63 (41.4)	1.37 (34.9)	0.81 (20.6)	0.88 (22.4)	1.97 (50.0)	0.94 (23.9)	5100 (351)	2500 (172)	
1	1	-PSE-NS16	1.91 (48.5)	1.69 (42.9)	1.00 (25.4)	0.88 (22.4)	1.94 (49.3)	0.94 (23.9)	5300 (365)	2600 (179)	
1 1/4	1 1/4	-PSE-NS20	2.38 (60.5)	2.00 (50.8)	1.00 (25.4)	1.25 (31.8)	2.38 (60.5)	0.94 (23.9)	3100 (213)	1600 (110)	

Street Elbows



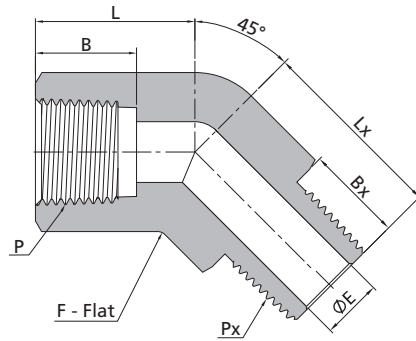
Female ISO Tapered Threads			Male ISO Tapered Threads							
P-RT Size	Px-RT Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)	
			L	F	B	E	Lx	Bx	316 SS, Steel	Brass
1/16	1/16	-PSE-RT1	0.86 (21.8)	0.44 (11.1)	0.39 (9.9)	0.12 (3.0)	0.88 (22.4)	0.38 (9.7)	9200 (633)	4600 (316)
1/16	1/8	-PSE-RT1-RT2	0.86 (21.8)	0.44 (11.1)	0.39 (9.9)	0.19 (4.8)	0.88 (22.4)	0.38 (9.7)	9200 (633)	4600 (316)
1/16	1/4	-PSE-RT1-RT4	0.88 (22.4)	0.56 (14.3)	0.39 (9.9)	0.19 (4.8)	1.09 (27.7)	0.56 (14.2)	8000 (551)	4000 (275)
1/16	3/8	-PSE-RT1-RT6	0.88 (22.4)	0.69 (17.5)	0.39 (9.9)	0.19 (4.8)	1.17 (29.7)	0.56 (14.2)	7800 (537)	3900 (268)
1/8	1/16	-PSE-RT2-RT1	1.04 (26.4)	0.50 (12.7)	0.41 (10.4)	0.12 (3.0)	0.87 (22.1)	0.38 (9.7)	6200 (426)	3100 (213)
1/8	1/8	-PSE-RT2	1.04 (26.4)	0.50 (12.7)	0.41 (10.4)	0.19 (4.8)	0.87 (22.1)	0.38 (9.7)	6200 (426)	3100 (213)
1/8	1/4	-PSE-RT2-RT4	0.88 (22.4)	0.56 (14.3)	0.41 (10.4)	0.28 (7.1)	1.09 (27.7)	0.56 (14.2)	6500 (447)	3200 (220)
1/8	3/8	-PSE-RT2-RT6	0.88 (22.4)	0.69 (17.5)	0.41 (10.4)	0.28 (7.1)	1.17 (29.7)	0.56 (14.2)	7800 (537)	3900 (268)
1/8	1/2	-PSE-RT2-RT8	0.95 (24.1)	0.81 (20.6)	0.41 (10.4)	0.28 (7.1)	1.45 (36.8)	0.75 (19.1)	7700 (530)	3800 (261)
1/8	3/4	-PSE-RT2-RT12	1.00 (25.4)	1.06 (27.0)	0.41 (10.4)	0.28 (7.1)	1.59 (40.4)	0.75 (19.1)	7300 (502)	3600 (248)
1/8	1	-PSE-RT2-RT16	1.04 (26.4)	1.37 (34.9)	0.41 (10.4)	0.28 (7.1)	1.97 (50.0)	0.94 (23.9)	5300 (365)	2600 (179)
1/4	1/8	-PSE-RT4-RT2	1.17 (29.7)	0.69 (17.5)	0.59 (15.0)	0.19 (4.8)	1.00 (25.4)	0.38 (9.7)	7200 (496)	3600 (248)
1/4	1/4	-PSE-RT4	1.17 (29.7)	0.69 (17.5)	0.59 (15.0)	0.28 (7.1)	1.17 (29.7)	0.56 (14.2)	7200 (496)	3600 (248)
1/4	3/8	-PSE-RT4-RT6	1.17 (29.7)	0.69 (17.5)	0.59 (15.0)	0.34 (8.6)	1.17 (29.7)	0.56 (14.2)	7200 (496)	3600 (248)
1/4	1/2	-PSE-RT4-RT8	1.00 (25.4)	0.81 (20.6)	0.59 (15.0)	0.34 (8.6)	1.45 (36.8)	0.75 (19.1)	7200 (496)	3600 (248)
1/4	3/4	-PSE-RT4-RT12	1.00 (25.4)	1.06 (27.0)	0.59 (15.0)	0.34 (8.6)	1.59 (40.4)	0.75 (19.1)	7300 (502)	3600 (248)
1/4	1	-PSE-RT4-RT16	1.63 (41.4)	1.37 (34.9)	0.59 (15.0)	0.34 (8.6)	1.97 (50.0)	0.94 (23.9)	5300 (365)	2600 (179)
3/8	1/4	-PSE-RT6-RT4	1.42 (36.1)	0.81 (20.6)	0.59 (15.0)	0.28 (7.1)	1.26 (32.0)	0.56 (14.2)	5600 (385)	2800 (192)
3/8	3/8	-PSE-RT6	1.42 (36.1)	0.81 (20.6)	0.59 (15.0)	0.38 (9.6)	1.26 (32.0)	0.56 (14.2)	5600 (385)	2800 (192)
3/8	1/2	-PSE-RT6-RT8	1.42 (36.1)	0.81 (20.6)	0.59 (15.0)	0.47 (11.9)	1.45 (36.8)	0.75 (19.1)	5600 (385)	2800 (192)
3/8	3/4	-PSE-RT6-RT12	1.23 (31.2)	1.06 (27.0)	0.59 (15.0)	0.47 (11.9)	1.59 (40.4)	0.75 (19.1)	7300 (502)	3600 (248)
3/8	1	-PSE-RT6-RT16	1.63 (41.4)	1.37 (34.9)	0.59 (15.0)	0.47 (11.9)	1.97 (50.0)	0.94 (23.9)	5300 (365)	2600 (179)
1/2	1/4	-PSE-RT8-RT4	1.56 (39.6)	1.00 (25.4)	0.78 (19.8)	0.28 (7.1)	1.38 (35.1)	0.56 (14.2)	5600 (385)	2800 (192)
1/2	3/8	-PSE-RT8-RT6	1.56 (39.6)	1.00 (25.4)	0.78 (19.8)	0.38 (9.6)	1.38 (35.1)	0.56 (14.2)	5600 (385)	2800 (192)
1/2	1/2	-PSE-RT8	1.56 (39.6)	1.00 (25.4)	0.78 (19.8)	0.47 (11.9)	1.56 (39.6)	0.75 (19.1)	5600 (385)	2800 (192)
1/2	3/4	-PSE-RT8-RT12	1.23 (31.2)	1.06 (27.0)	0.78 (19.8)	0.62 (15.7)	1.59 (40.4)	0.75 (19.1)	5600 (385)	2800 (192)
1/2	1	-PSE-RT8-RT16	1.63 (41.4)	1.37 (34.9)	0.78 (19.8)	0.62 (15.7)	1.97 (50.0)	0.94 (23.9)	5300 (365)	2600 (179)
3/4	3/4	-PSE-RT12	1.92 (48.8)	1.25 (31.8)	0.81 (20.6)	0.62 (15.7)	1.67 (42.4)	0.75 (19.1)	5100 (351)	2500 (172)
3/4	1	-PSE-RT12-RT16	1.63 (41.4)	1.37 (34.9)	0.81 (20.6)	0.88 (22.4)	1.97 (50.0)	0.94 (23.9)	5100 (351)	2500 (172)
1	1	-PSE-RT16	1.91 (48.5)	1.69 (42.9)	1.00 (25.4)	0.88 (22.4)	1.94 (49.3)	0.94 (23.9)	5300 (365)	2600 (179)
1 1/4	1 1/4	-PSE-RT20	2.38 (60.5)	2.00 (50.8)	1.00 (25.4)	1.25 (31.8)	2.38 (60.5)	0.94 (23.9)	3100 (213)	1600 (110)

## 45° Street Elbows



Female NPT Threads			Male NPT Threads							
P-NPT Size	Px-NPT Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)	
			L	F	B	E	Lx	Bx	316 SS, Steel	Brass
1/16	1/16	-PSV-NS1	0.66 (16.8)	0.44 (11.1)	0.39 (9.9)	0.12 (3.0)	0.66 (16.8)	0.38 (9.7)	9200 (633)	4600 (316)
1/16	1/8	-PSV-NS1-NS2	0.66 (16.8)	0.44 (11.1)	0.39 (9.9)	0.19 (4.8)	0.66 (16.8)	0.38 (9.7)	9200 (633)	4600 (316)
1/16	1/4	-PSV-NS1-NS4	0.66 (16.8)	0.56 (14.3)	0.39 (9.9)	0.19 (4.8)	0.86 (21.8)	0.56 (14.2)	8000 (551)	4000 (275)
1/16	3/8	-PSV-NS1-NS6	0.88 (22.4)	0.69 (17.5)	0.39 (9.9)	0.19 (4.8)	0.94 (23.8)	0.56 (14.2)	7800 (537)	3900 (268)
1/8	1/16	-PSV-NS2-NS1	0.80 (20.2)	0.50 (12.7)	0.41 (10.4)	0.12 (3.0)	0.68 (17.2)	0.38 (9.7)	6200 (426)	3100 (213)
1/8	1/8	-PSV-NS2	0.80 (20.2)	0.50 (12.7)	0.41 (10.4)	0.19 (4.8)	0.68 (17.2)	0.38 (9.7)	6200 (426)	3100 (213)
1/8	1/4	-PSV-NS2-NS4	0.66 (16.8)	0.56 (14.3)	0.41 (10.4)	0.28 (7.1)	0.86 (21.8)	0.56 (14.2)	6500 (447)	3200 (220)
1/8	3/8	-PSV-NS2-NS6	0.88 (22.4)	0.69 (17.5)	0.41 (10.4)	0.28 (7.1)	0.94 (23.8)	0.56 (14.2)	7800 (537)	3900 (268)
1/8	1/2	-PSV-NS2-NS8	0.87 (22.2)	0.81 (20.6)	0.41 (10.4)	0.28 (7.1)	1.14 (29.0)	0.75 (19.1)	7700 (530)	3800 (261)
1/8	3/4	-PSV-NS2-NS12	1.00 (25.4)	1.06 (27.0)	0.41 (10.4)	0.28 (7.1)	1.20 (30.5)	0.75 (19.1)	7300 (502)	3600 (248)
1/8	1	-PSV-NS2-NS16	1.04 (26.4)	1.37 (34.9)	0.41 (10.4)	0.28 (7.1)	1.94 (49.3)	0.94 (23.9)	5300 (365)	2600 (179)
1/4	1/8	-PSV-NS4-NS2	1.00 (25.4)	0.69 (17.5)	0.59 (15.0)	0.19 (4.8)	0.76 (19.3)	0.38 (9.7)	7200 (496)	3600 (248)
1/4	1/4	-PSV-NS4	1.00 (25.4)	0.69 (17.5)	0.59 (15.0)	0.28 (7.1)	0.76 (19.3)	0.56 (14.2)	7200 (496)	3600 (248)
1/4	3/8	-PSV-NS4-NS6	1.00 (25.4)	0.69 (17.5)	0.59 (15.0)	0.34 (8.6)	0.94 (23.8)	0.56 (14.2)	7200 (496)	3600 (248)
1/4	1/2	-PSV-NS4-NS8	0.87 (22.2)	0.81 (20.6)	0.59 (15.0)	0.34 (8.6)	1.14 (29.0)	0.75 (19.1)	7200 (496)	3600 (248)
1/4	3/4	-PSV-NS4-NS12	1.00 (25.4)	1.06 (27.0)	0.59 (15.0)	0.34 (8.6)	1.20 (30.5)	0.75 (19.1)	7300 (502)	3600 (248)
1/4	1	-PSV-NS4-NS16	1.26 (32.0)	1.37 (34.9)	0.59 (15.0)	0.34 (8.6)	1.48 (37.6)	0.94 (23.9)	5300 (365)	2600 (179)
3/8	1/4	-PSV-NS6-NS4	1.06 (27.0)	0.81 (20.6)	0.59 (15.0)	0.28 (7.1)	0.95 (24.2)	0.56 (14.2)	5600 (385)	2800 (192)
3/8	3/8	-PSV-NS6	1.06 (27.0)	0.81 (20.6)	0.59 (15.0)	0.38 (9.6)	0.95 (24.2)	0.56 (14.2)	5600 (385)	2800 (192)
3/8	1/2	-PSV-NS6-NS8	1.06 (27.0)	0.81 (20.6)	0.59 (15.0)	0.47 (11.9)	1.14 (29.0)	0.75 (19.1)	5600 (385)	2800 (192)
3/8	3/4	-PSV-NS6-NS12	1.06 (27.0)	1.06 (27.0)	0.59 (15.0)	0.47 (11.9)	1.20 (30.5)	0.75 (19.1)	7300 (502)	3600 (248)
3/8	1	-PSV-NS6-NS16	1.26 (32.0)	1.37 (34.9)	0.59 (15.0)	0.47 (11.9)	1.48 (37.6)	0.94 (23.9)	5300 (365)	2600 (179)
1/2	1/4	-PSV-NS8-NS4	1.26 (32.0)	1.00 (25.4)	0.78 (19.8)	0.28 (7.1)	0.99 (25.2)	0.56 (14.2)	5600 (385)	2800 (192)
1/2	3/8	-PSV-NS8-NS6	1.26 (32.0)	1.00 (25.4)	0.78 (19.8)	0.38 (9.6)	0.99 (25.2)	0.56 (14.2)	5600 (385)	2800 (192)
1/2	1/2	-PSV-NS8	1.26 (32.0)	1.00 (25.4)	0.78 (19.8)	0.47 (11.9)	1.26 (32.0)	0.75 (19.1)	5600 (385)	2800 (192)
1/2	3/4	-PSV-NS8-NS12	1.28 (32.5)	1.06 (27.0)	0.78 (19.8)	0.62 (15.7)	1.20 (30.5)	0.75 (19.1)	5600 (385)	2800 (192)
1/2	1	-PSV-NS8-NS16	1.48 (37.6)	1.37 (34.9)	0.78 (19.8)	0.62 (15.7)	1.48 (37.6)	0.94 (23.9)	5300 (365)	2600 (179)
3/4	3/4	-PSV-NS12	1.36 (34.5)	1.25 (31.8)	0.81 (20.6)	0.62 (15.7)	1.36 (34.5)	0.75 (19.1)	5100 (351)	2500 (172)
3/4	1	-PSV-NS12-NS16	1.48 (37.6)	1.37 (34.9)	0.81 (20.6)	0.88 (22.4)	1.48 (37.6)	0.94 (23.9)	5100 (351)	2500 (172)
1	1	-PSV-NS16	1.81 (46.0)	1.69 (42.9)	1.00 (25.4)	0.88 (22.4)	1.81 (46.0)	0.94 (23.9)	5300 (365)	2600 (179)
1 1/4	1 1/4	-PSV-NS20	2.00 (50.8)	2.00 (50.8)	1.00 (25.4)	1.25 (31.8)	2.00 (50.8)	0.94 (23.9)	3100 (213)	1600 (110)

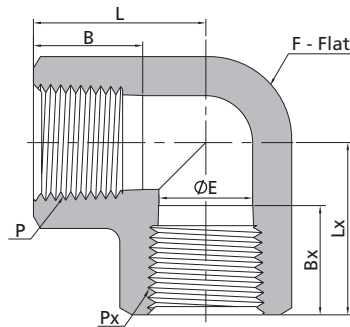
45° Street Elbows



Female ISO Tapered Threads			Male ISO Tapered Threads							
P-RT Size	Px-RT Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)	
			L	F	B	E	Lx	Bx	316 SS, Steel	Brass
1/16	1/16	-PSV-RT1	0.66 (16.8)	0.44 (11.1)	0.39 (9.9)	0.12 (3.0)	0.66 (16.8)	0.38 (9.7)	9200 (633)	4600 (316)
1/16	1/8	-PSV-RT1-RT2	0.66 (16.8)	0.44 (11.1)	0.39 (9.9)	0.19 (4.8)	0.66 (16.8)	0.38 (9.7)	9200 (633)	4600 (316)
1/16	1/4	-PSV-RT1-RT4	0.66 (16.8)	0.56 (14.3)	0.39 (9.9)	0.19 (4.8)	0.86 (21.8)	0.56 (14.2)	8000 (551)	4000 (275)
1/16	3/8	-PSV-RT1-RT6	0.88 (22.4)	0.69 (17.5)	0.39 (9.9)	0.19 (4.8)	0.94 (23.8)	0.56 (14.2)	7800 (537)	3900 (268)
1/8	1/16	-PSV-RT2-RT1	0.80 (20.2)	0.50 (12.7)	0.41 (10.4)	0.12 (3.0)	0.68 (17.2)	0.38 (9.7)	6200 (426)	3100 (213)
1/8	1/8	-PSV-RT2	0.80 (20.2)	0.50 (12.7)	0.41 (10.4)	0.19 (4.8)	0.68 (17.2)	0.38 (9.7)	6200 (426)	3100 (213)
1/8	1/4	-PSV-RT2-RT4	0.66 (16.8)	0.56 (14.3)	0.41 (10.4)	0.28 (7.1)	0.86 (21.8)	0.56 (14.2)	6500 (447)	3200 (220)
1/8	3/8	-PSV-RT2-RT6	0.88 (22.4)	0.69 (17.5)	0.41 (10.4)	0.28 (7.1)	0.94 (23.8)	0.56 (14.2)	7800 (537)	3900 (268)
1/8	1/2	-PSV-RT2-RT8	0.87 (22.2)	0.81 (20.6)	0.41 (10.4)	0.28 (7.1)	1.14 (29.0)	0.75 (19.1)	7700 (530)	3800 (261)
1/8	3/4	-PSV-RT2-RT12	1.00 (25.4)	1.06 (27.0)	0.41 (10.4)	0.28 (7.1)	1.20 (30.5)	0.75 (19.1)	7300 (502)	3600 (248)
1/8	1	-PSV-RT2-RT16	1.04 (26.4)	1.37 (34.9)	0.41 (10.4)	0.28 (7.1)	1.94 (49.3)	0.94 (23.9)	5300 (365)	2600 (179)
1/4	1/8	-PSV-RT4-RT2	1.00 (25.4)	0.69 (17.5)	0.59 (15.0)	0.19 (4.8)	0.76 (19.3)	0.38 (9.7)	7200 (496)	3600 (248)
1/4	1/4	-PSV-RT4	1.00 (25.4)	0.69 (17.5)	0.59 (15.0)	0.28 (7.1)	0.76 (19.3)	0.56 (14.2)	7200 (496)	3600 (248)
1/4	3/8	-PSV-RT4-RT6	1.00 (25.4)	0.69 (17.5)	0.59 (15.0)	0.34 (8.6)	0.94 (23.8)	0.56 (14.2)	7200 (496)	3600 (248)
1/4	1/2	-PSV-RT4-RT8	0.87 (22.2)	0.81 (20.6)	0.59 (15.0)	0.34 (8.6)	1.14 (29.0)	0.75 (19.1)	7200 (496)	3600 (248)
1/4	3/4	-PSV-RT4-RT12	1.00 (25.4)	1.06 (27.0)	0.59 (15.0)	0.34 (8.6)	1.20 (30.5)	0.75 (19.1)	7300 (502)	3600 (248)
1/4	1	-PSV-RT4-RT16	1.26 (32.0)	1.37 (34.9)	0.59 (15.0)	0.34 (8.6)	1.48 (37.6)	0.94 (23.9)	5300 (365)	2600 (179)
3/8	1/4	-PSV-RT6-RT4	1.06 (27.0)	0.81 (20.6)	0.59 (15.0)	0.28 (7.1)	0.95 (24.2)	0.56 (14.2)	5600 (385)	2800 (192)
3/8	3/8	-PSV-RT6	1.06 (27.0)	0.81 (20.6)	0.59 (15.0)	0.38 (9.6)	0.95 (24.2)	0.56 (14.2)	5600 (385)	2800 (192)
3/8	1/2	-PSV-RT6-RT8	1.06 (27.0)	0.81 (20.6)	0.59 (15.0)	0.47 (11.9)	1.14 (29.0)	0.75 (19.1)	5600 (385)	2800 (192)
3/8	3/4	-PSV-RT6-RT12	1.06 (27.0)	1.06 (27.0)	0.59 (15.0)	0.47 (11.9)	1.20 (30.5)	0.75 (19.1)	7300 (502)	3600 (248)
3/8	1	-PSV-RT6-RT16	1.26 (32.0)	1.37 (34.9)	0.59 (15.0)	0.47 (11.9)	1.48 (37.6)	0.94 (23.9)	5300 (365)	2600 (179)
1/2	1/4	-PSV-RT8-RT4	1.26 (32.0)	1.00 (25.4)	0.78 (19.8)	0.28 (7.1)	0.99 (25.2)	0.56 (14.2)	5600 (385)	2800 (192)
1/2	3/8	-PSV-RT8-RT6	1.26 (32.0)	1.00 (25.4)	0.78 (19.8)	0.38 (9.6)	0.99 (25.2)	0.56 (14.2)	5600 (385)	2800 (192)
1/2	1/2	-PSV-RT8	1.26 (32.0)	1.00 (25.4)	0.78 (19.8)	0.47 (11.9)	1.26 (32.0)	0.75 (19.1)	5600 (385)	2800 (192)
1/2	3/4	-PSV-RT8-RT12	1.28 (32.5)	1.06 (27.0)	0.78 (19.8)	0.62 (15.7)	1.20 (30.5)	0.75 (19.1)	5600 (385)	2800 (192)
1/2	1	-PSV-RT8-RT16	1.48 (37.6)	1.37 (34.9)	0.78 (19.8)	0.62 (15.7)	1.48 (37.6)	0.94 (23.9)	5300 (365)	2600 (179)
3/4	3/4	-PSV-RT12	1.36 (34.5)	1.25 (31.8)	0.81 (20.6)	0.62 (15.7)	1.36 (34.5)	0.75 (19.1)	5100 (351)	2500 (172)
3/4	1	-PSV-RT12-RT16	1.48 (37.6)	1.37 (34.9)	0.81 (20.6)	0.88 (22.4)	1.48 (37.6)	0.94 (23.9)	5100 (351)	2500 (172)
1	1	-PSV-RT16	1.81 (46.0)	1.69 (42.9)	1.00 (25.4)	0.88 (22.4)	1.81 (46.0)	0.94 (23.9)	5300 (365)	2600 (179)
1 1/4	1 1/4	-PSV-RT20	2.00 (50.8)	2.00 (50.8)	1.00 (25.4)	1.25 (31.8)	2.00 (50.8)	0.94 (23.9)	3100 (213)	1600 (110)



## Female Elbows



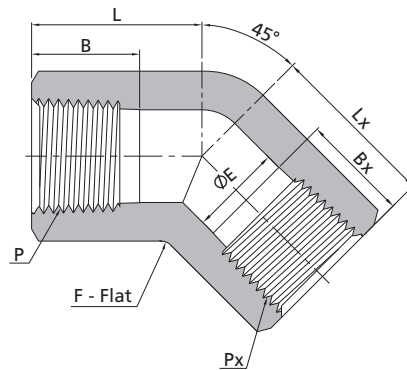
## Female NPT Threads

P-NPT Size	Px-NPT Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)	
			L	F	B	E	Lx	Bx	316 SS, Steel	Brass
1/16	1/16	-PE-NS1	0.86 (21.8)	0.44 (11.1)	0.39 (9.9)	0.19 (4.8)	0.86 (21.8)	0.39 (9.9)	6700 (460)	3300 (227)
1/8	1/16	-PE-NS2-NS1	1.04 (26.4)	0.50 (12.7)	0.41 (10.4)	0.19 (4.8)	1.04 (26.4)	0.39 (9.9)	6200 (427)	3100 (213)
1/8	1/8	-PE-NS2	1.04 (26.4)	0.50 (12.7)	0.41 (10.4)	0.28 (7.1)	1.04 (26.4)	0.41 (10.4)	6200 (427)	3100 (213)
1/4	1/8	-PE-NS4-NS2	1.17 (29.7)	0.69 (17.5)	0.59 (15.0)	0.28 (7.1)	1.17 (29.7)	0.41 (10.4)	7200 (496)	3600 (248)
1/4	1/4	-PE-NS4	1.17 (29.7)	0.69 (17.5)	0.59 (15.0)	0.41 (10.4)	1.17 (29.7)	0.59 (15.0)	7200 (496)	3600 (248)
3/8	3/8	-PE-NS6	1.42 (36.1)	0.81 (20.6)	0.59 (15.0)	0.50 (12.7)	1.42 (36.1)	0.59 (15.0)	5600 (385)	2800 (192)
1/2	1/2	-PE-NS8	1.56 (39.6)	1.00 (25.4)	0.78 (19.8)	0.67 (17.1)	1.56 (39.6)	0.78 (19.8)	5600 (385)	2800 (192)
3/4	3/4	-PE-NS12	1.92 (48.8)	1.25 (31.8)	0.81 (20.6)	0.88 (22.4)	1.92 (48.8)	0.81 (20.6)	5100 (351)	2500 (172)
1	1	-PE-NS16	1.91 (48.5)	1.69 (42.9)	1.00 (25.4)	1.11 (28.1)	1.91 (48.5)	1.00 (25.4)	6400 (440)	3200 (220)
1 1/4	1 1/4	-PE-NS20	2.35 (59.8)	2.00 (50.8)	1.00 (25.4)	1.09 (27.7)	2.35 (59.8)	1.00 (25.4)	3100 (213)	1600 (110)

## Female ISO Tapered Threads

P-RT Size	Px-RT Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)	
			L	F	B	E	Lx	Bx	316 SS, Steel	Brass
1/16	1/16	-PE-RT1	0.86 (21.8)	0.44 (11.1)	0.39 (9.9)	0.19 (4.8)	0.86 (21.8)	0.39 (9.9)	6700 (460)	3300 (227)
1/8	1/16	-PE-RT2-RT1	1.04 (26.4)	0.50 (12.7)	0.41 (10.4)	0.19 (4.8)	1.04 (26.4)	0.39 (9.9)	6200 (427)	3100 (213)
1/8	1/8	-PE-RT2	1.04 (26.4)	0.50 (12.7)	0.41 (10.4)	0.28 (7.1)	1.04 (26.4)	0.41 (10.4)	6200 (427)	3100 (213)
1/4	1/8	-PE-RT4-RT2	1.17 (29.7)	0.69 (17.5)	0.59 (15.0)	0.28 (7.1)	1.17 (29.7)	0.41 (10.4)	7200 (496)	3600 (248)
1/4	1/4	-PE-RT4	1.17 (29.7)	0.69 (17.5)	0.59 (15.0)	0.41 (10.4)	1.17 (29.7)	0.59 (15.0)	7200 (496)	3600 (248)
3/8	3/8	-PE-RT6	1.42 (36.1)	0.81 (20.6)	0.59 (15.0)	0.50 (12.7)	1.42 (36.1)	0.59 (15.0)	5600 (385)	2800 (192)
1/2	1/2	-PE-RT8	1.56 (39.6)	1.00 (25.4)	0.78 (19.8)	0.67 (17.1)	1.56 (39.6)	0.78 (19.8)	5600 (385)	2800 (192)
3/4	3/4	-PE-RT12	1.92 (48.8)	1.25 (31.8)	0.81 (20.6)	0.88 (22.4)	1.92 (48.8)	0.81 (20.6)	5100 (351)	2500 (172)
1	1	-PE-RT16	1.91 (48.5)	1.69 (42.9)	1.00 (25.4)	1.11 (28.1)	1.91 (48.5)	1.00 (25.4)	6400 (440)	3200 (220)
1 1/4	1 1/4	-PE-RT20	2.35 (59.8)	2.00 (50.8)	1.00 (25.4)	1.09 (27.7)	2.35 (59.8)	1.00 (25.4)	3100 (213)	1600 (110)

45° Female Elbows

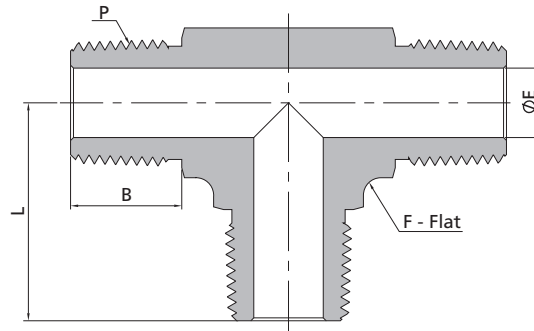


Pipe Fittings  
Weld Fittings

Female NPT Threads										
P-NPT Size	Px-NPT Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)	
			L	F	B	E	Lx	Bx	316 SS, Steel	Brass
1/16	1/16	-PVE-NS1	0.66 (16.8)	0.44 (11.1)	0.39 (9.9)	0.19 (4.8)	0.66 (16.8)	0.39 (9.9)	6700 (460)	3300 (227)
1/8	1/16	-PVE-NS2-NS1	0.80 (20.2)	0.50 (12.7)	0.41 (10.4)	0.19 (4.8)	0.80 (20.2)	0.39 (9.9)	6200 (427)	3100 (213)
1/8	1/8	-PVE-NS2	0.80 (20.2)	0.50 (12.7)	0.41 (10.4)	0.28 (7.1)	0.80 (20.2)	0.41 (10.4)	6200 (427)	3100 (213)
1/4	1/8	-PVE-NS4-NS2	1.00 (25.4)	0.69 (17.5)	0.59 (15.0)	0.28 (7.1)	1.00 (25.4)	0.41 (10.4)	7200 (496)	3600 (248)
1/4	1/4	-PVE-NS4	1.00 (25.4)	0.69 (17.5)	0.59 (15.0)	0.41 (10.4)	1.00 (25.4)	0.59 (15.0)	7200 (496)	3600 (248)
3/8	3/8	-PVE-NS6	1.06 (27.0)	0.81 (20.6)	0.59 (15.0)	0.50 (12.7)	1.06 (27.0)	0.59 (15.0)	5600 (385)	2800 (192)
1/2	1/2	-PVE-NS8	1.26 (32.0)	1.00 (25.4)	0.78 (19.8)	0.67 (17.1)	1.26 (32.0)	0.78 (19.8)	5600 (385)	2800 (192)
3/4	3/4	-PVE-NS12	1.36 (34.5)	1.25 (31.8)	0.81 (20.6)	0.88 (22.4)	1.36 (34.5)	0.81 (20.6)	5100 (351)	2500 (172)
1	1	-PVE-NS16	2.46 (62.6)	2.00 (50.8)	1.00 (25.4)	1.11 (28.1)	1.81 (46.0)	1.00 (25.4)	6400 (440)	3200 (220)
1 1/4	1 1/4	-PVE-NS20	1.70 (43.2)	2.00 (50.8)	1.00 (25.4)	1.09 (27.7)	1.70 (43.2)	1.00 (25.4)	3100 (213)	1600 (110)

Female ISO Tapered Threads										
P-RT Size	Px-RT Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)	
			L	F	B	E	Lx	Bx	316 SS, Steel	Brass
1/16	1/16	-PVE-RT1	0.66 (16.8)	0.44 (11.1)	0.39 (9.9)	0.19 (4.8)	0.66 (16.8)	0.39 (9.9)	6700 (460)	3300 (227)
1/8	1/16	-PVE-RT2-RT1	0.80 (20.2)	0.50 (12.7)	0.41 (10.4)	0.19 (4.8)	0.80 (20.2)	0.39 (9.9)	6200 (427)	3100 (213)
1/8	1/8	-PVE-RT2	0.80 (20.2)	0.50 (12.7)	0.41 (10.4)	0.28 (7.1)	0.80 (20.2)	0.41 (10.4)	6200 (427)	3100 (213)
1/4	1/8	-PVE-RT4-RT2	1.00 (25.4)	0.69 (17.5)	0.59 (15.0)	0.28 (7.1)	1.00 (25.4)	0.41 (10.4)	7200 (496)	3600 (248)
1/4	1/4	-PVE-RT4	1.00 (25.4)	0.69 (17.5)	0.59 (15.0)	0.41 (10.4)	1.00 (25.4)	0.59 (15.0)	7200 (496)	3600 (248)
3/8	3/8	-PVE-RT6	1.06 (27.0)	0.81 (20.6)	0.59 (15.0)	0.50 (12.7)	1.06 (27.0)	0.59 (15.0)	5600 (385)	2800 (192)
1/2	1/2	-PVE-RT8	1.26 (32.0)	1.00 (25.4)	0.78 (19.8)	0.67 (17.1)	1.26 (32.0)	0.78 (19.8)	5600 (385)	2800 (192)
3/4	3/4	-PVE-RT12	1.36 (34.5)	1.25 (31.8)	0.81 (20.6)	0.88 (22.4)	1.36 (34.5)	0.81 (20.6)	5100 (351)	2500 (172)
1	1	-PVE-RT16	2.46 (62.6)	2.00 (50.8)	1.00 (25.4)	1.11 (28.1)	1.81 (46.0)	1.00 (25.4)	6400 (440)	3200 (220)
1 1/4	1 1/4	-PVE-RT20	1.70 (43.2)	2.00 (50.8)	1.00 (25.4)	1.09 (27.7)	1.70 (43.2)	1.00 (25.4)	3100 (213)	1600 (110)

## Male Tees



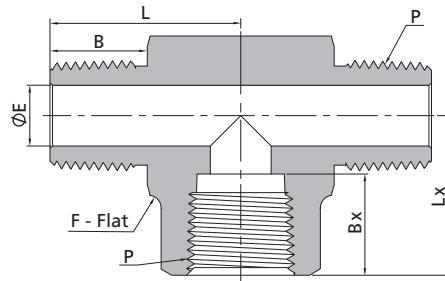
## Male NPT Threads

P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)				Working Pressure psig (bar)	
		L	F	B	E	316 SS, Steel	Brass
1/16	-PMT-NS1	0.67 (17.0)	0.37 (9.5)	0.38 (9.7)	0.12 (3.0)	11000 (757)	5500 (378)
1/8	-PMT-NS2	0.88 (22.4)	0.44 (11.1)	0.38 (9.7)	0.19 (4.8)	10000 (690)	5000 (344)
1/4	-PMT-NS4	1.05 (26.7)	0.50 (12.7)	0.56 (14.2)	0.28 (7.1)	8000 (551)	4000 (275)
3/8	-PMT-NS6	1.17 (29.7)	0.69 (17.5)	0.56 (14.2)	0.38 (9.6)	7800 (537)	3900 (268)
1/2	-PMT-NS8	1.45 (36.8)	0.81 (20.6)	0.75 (19.1)	0.47 (11.9)	7700 (530)	3800 (261)
3/4	-PMT-NS12	1.67 (42.4)	1.06 (27.0)	0.75 (19.1)	0.62 (15.7)	7300 (502)	3600 (248)
1	-PMT-NS16	1.94 (49.3)	1.37 (34.9)	0.94 (23.9)	0.88 (22.4)	5300 (365)	2600 (179)

## Male ISO Tapered Threads

P-RT Size	Basic Ordering Number	Dimensions, in. (mm)				Working Pressure psig (bar)	
		L	F	B	E	316 SS, Steel	Brass
1/16	-PMT-RT1	0.67 (17.0)	0.37 (9.5)	0.38 (9.7)	0.12 (3.0)	11000 (757)	5500 (378)
1/8	-PMT-RT2	0.88 (22.4)	0.44 (11.1)	0.38 (9.7)	0.19 (4.8)	10000 (690)	5000 (344)
1/4	-PMT-RT4	1.05 (26.7)	0.50 (12.7)	0.56 (14.2)	0.28 (7.1)	8000 (551)	4000 (275)
3/8	-PMT-RT6	1.17 (29.7)	0.69 (17.5)	0.56 (14.2)	0.38 (9.6)	7800 (537)	3900 (268)
1/2	-PMT-RT8	1.45 (36.8)	0.81 (20.6)	0.75 (19.1)	0.47 (11.9)	7700 (530)	3800 (261)
3/4	-PMT-RT12	1.67 (42.4)	1.06 (27.0)	0.75 (19.1)	0.62 (15.7)	7300 (502)	3600 (248)
1	-PMT-RT16	1.94 (49.3)	1.37 (34.9)	0.94 (23.9)	0.88 (22.4)	5300 (365)	2600 (179)

Female Branch Tees

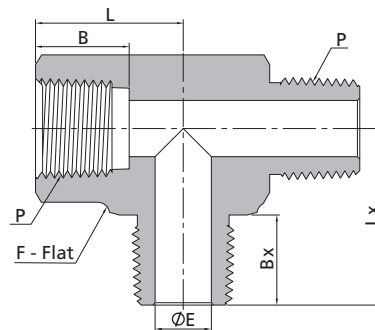


Pipe Fittings  
Weld Fittings

NPT Threads									
P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)	
		L	F	E	B	Lx	Bx	316 SS, Steel	Brass
1/16	-PTB-NS1	0.72 (18.3)	0.44 (11.1)	0.12 (3.0)	0.38 (9.7)	0.86 (21.8)	0.39 (9.9)	9200 (633)	4600 (316)
1/8	-PTB-NS2	0.87 (22.1)	0.50 (12.7)	0.19 (4.8)	0.38 (9.7)	1.04 (26.4)	0.41 (10.4)	6200 (427)	3100 (213)
1/4	-PTB-NS4	1.17 (29.7)	0.69 (17.5)	0.28 (7.1)	0.56 (14.2)	1.17 (29.7)	0.59 (15.0)	7200 (496)	3600 (248)
3/8	-PTB-NS6	1.26 (32.0)	0.81 (20.6)	0.38 (9.6)	0.56 (14.2)	1.42 (36.1)	0.59 (15.0)	5600 (385)	2800 (192)
1/2	-PTB-NS8	1.56 (39.6)	1.00 (25.4)	0.47 (11.9)	0.75 (19.1)	1.56 (39.6)	0.78 (19.8)	5600 (385)	2800 (192)
3/4	-PTB-NS12	1.67 (42.4)	1.25 (31.8)	0.62 (15.7)	0.75 (19.1)	1.92 (48.8)	0.81 (20.6)	5100 (351)	2500 (172)
1	-PTB-NS16	1.94 (49.3)	1.69 (42.9)	0.88 (22.4)	0.94 (23.9)	1.91 (48.5)	1.00 (25.4)	5300 (365)	2600 (179)

ISO Tapered Threads									
P-RT Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)	
		L	F	E	B	Lx	Bx	316 SS, Steel	Brass
1/16	-PTB-RT1	0.72 (18.3)	0.44 (11.1)	0.12 (3.0)	0.38 (9.7)	0.86 (21.8)	0.39 (9.9)	9200 (633)	4600 (316)
1/8	-PTB-RT2	0.87 (22.1)	0.50 (12.7)	0.19 (4.8)	0.38 (9.7)	1.04 (26.4)	0.41 (10.4)	6200 (427)	3100 (213)
1/4	-PTB-RT4	1.17 (29.7)	0.69 (17.5)	0.28 (7.1)	0.56 (14.2)	1.17 (29.7)	0.59 (15.0)	7200 (496)	3600 (248)
3/8	-PTB-RT6	1.26 (32.0)	0.81 (20.6)	0.38 (9.6)	0.56 (14.2)	1.42 (36.1)	0.59 (15.0)	5600 (385)	2800 (192)
1/2	-PTB-RT8	1.56 (39.6)	1.00 (25.4)	0.47 (11.9)	0.75 (19.1)	1.56 (39.6)	0.78 (19.8)	5600 (385)	2800 (192)
3/4	-PTB-RT12	1.67 (42.4)	1.25 (31.8)	0.62 (15.7)	0.75 (19.1)	1.92 (48.8)	0.81 (20.6)	5100 (351)	2500 (172)
1	-PTB-RT16	1.94 (49.3)	1.69 (42.9)	0.88 (22.4)	0.94 (23.9)	1.91 (48.5)	1.00 (25.4)	5300 (365)	2600 (179)

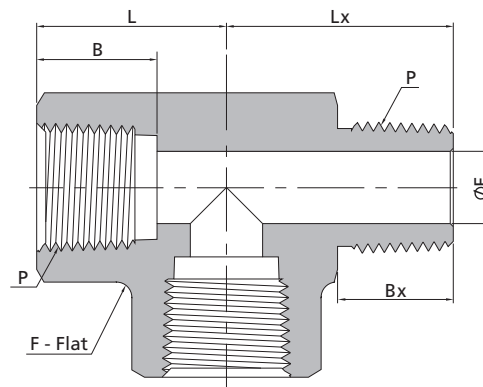
Female Run Tees



NPT Threads									
P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)	
		L	F	E	B	Lx	Bx	316 SS, Steel	Brass
1/16	-PTR-NS1	0.86 (21.8)	0.44 (11.1)	0.12 (3.0)	0.39 (9.9)	0.72 (18.3)	0.38 (9.7)	9200 (633)	4600 (316)
1/8	-PTR-NS2	1.04 (26.4)	0.50 (12.7)	0.19 (4.8)	0.41 (10.4)	0.87 (22.1)	0.38 (9.7)	6200 (427)	3100 (213)
1/4	-PTR-NS4	1.17 (29.7)	0.69 (17.5)	0.28 (7.1)	0.59 (15.0)	1.17 (29.7)	0.56 (14.2)	7200 (496)	3600 (248)
3/8	-PTR-NS6	1.42 (36.1)	0.81 (20.6)	0.38 (9.6)	0.59 (15.0)	1.26 (32.0)	0.56 (14.2)	5600 (385)	2800 (192)
1/2	-PTR-NS8	1.56 (39.6)	1.00 (25.4)	0.47 (11.9)	0.78 (19.8)	1.56 (39.6)	0.75 (19.1)	5600 (385)	2800 (192)
3/4	-PTR-NS12	1.92 (48.8)	1.25 (31.8)	0.62 (15.7)	0.81 (20.6)	1.67 (42.4)	0.75 (19.1)	5100 (351)	2500 (172)
1	-PTR-NS16	1.91 (48.5)	1.69 (42.9)	0.88 (22.4)	1.00 (25.4)	1.94 (49.3)	0.94 (23.9)	5300 (365)	2600 (179)

ISO Tapered Threads									
P-RT Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)	
		L	F	E	B	Lx	Bx	316 SS, Steel	Brass
1/16	-PTR-RT1	0.86 (21.8)	0.44 (11.1)	0.12 (3.0)	0.39 (9.9)	0.72 (18.3)	0.38 (9.7)	9200 (633)	4600 (316)
1/8	-PTR-RT2	1.04 (26.4)	0.50 (12.7)	0.19 (4.8)	0.41 (10.4)	0.87 (22.1)	0.38 (9.7)	6200 (427)	3100 (213)
1/4	-PTR-RT4	1.17 (29.7)	0.69 (17.5)	0.28 (7.1)	0.59 (15.0)	1.17 (29.7)	0.56 (14.2)	7200 (496)	3600 (248)
3/8	-PTR-RT6	1.42 (36.1)	0.81 (20.6)	0.38 (9.6)	0.59 (15.0)	1.26 (32.0)	0.56 (14.2)	5600 (385)	2800 (192)
1/2	-PTR-RT8	1.56 (39.6)	1.00 (25.4)	0.47 (11.9)	0.78 (19.8)	1.56 (39.6)	0.75 (19.1)	5600 (385)	2800 (192)
3/4	-PTR-RT12	1.92 (48.8)	1.25 (31.8)	0.62 (15.7)	0.81 (20.6)	1.67 (42.4)	0.75 (19.1)	5100 (351)	2500 (172)
1	-PTR-RT16	1.91 (48.5)	1.69 (42.9)	0.88 (22.4)	1.00 (25.4)	1.94 (49.3)	0.94 (23.9)	5300 (365)	2600 (179)

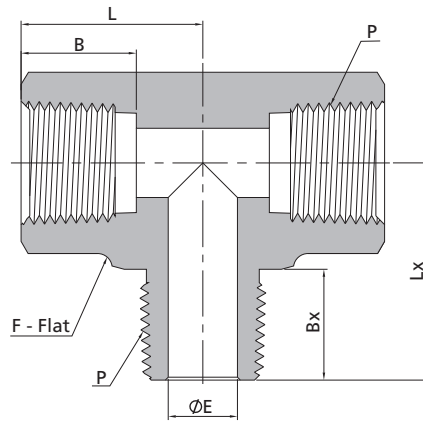
## Male Street Tees



NPT Threads									
P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)	
		L	F	E	B	Lx	Bx	316 SS, Steel	Brass
1/16	-PST-NS1	0.86 (21.8)	0.44 (11.1)	0.12 (3.0)	0.39 (9.9)	0.72 (18.3)	0.38 (9.7)	9200 (633)	4600 (316)
1/8	-PST-NS2	1.04 (26.4)	0.50 (12.7)	0.19 (4.8)	0.41 (10.4)	0.87 (22.1)	0.38 (9.7)	6200 (427)	3100 (213)
1/4	-PST-NS4	1.17 (29.7)	0.69 (17.5)	0.28 (7.1)	0.59 (15.0)	1.17 (29.7)	0.56 (14.2)	7200 (496)	3600 (248)
3/8	-PST-NS6	1.42 (36.1)	0.81 (20.6)	0.38 (9.6)	0.59 (15.0)	1.26 (32.0)	0.56 (14.2)	5600 (385)	2800 (192)
1/2	-PST-NS8	1.56 (39.6)	1.00 (25.4)	0.47 (11.9)	0.78 (19.8)	1.56 (39.6)	0.75 (19.1)	5600 (385)	2800 (192)
3/4	-PST-NS12	1.92 (48.8)	1.25 (31.8)	0.62 (15.7)	0.81 (20.6)	1.67 (42.4)	0.75 (19.1)	5100 (351)	2500 (172)
1	-PST-NS16	1.91 (48.5)	1.69 (42.9)	0.88 (22.4)	1.00 (25.4)	1.94 (49.3)	0.94 (23.9)	5300 (365)	2600 (179)

ISO Tapered Threads									
P-RT Size	Basic Ordering Number	Dimensions, in. (mm)						Working Pressure psig (bar)	
		L	F	E	B	Lx	Bx	316 SS, Steel	Brass
1/16	-PST-RT1	0.86 (21.8)	0.44 (11.1)	0.12 (3.0)	0.39 (9.9)	0.72 (18.3)	0.38 (9.7)	9200 (633)	4600 (316)
1/8	-PST-RT2	1.04 (26.4)	0.50 (12.7)	0.19 (4.8)	0.41 (10.4)	0.87 (22.1)	0.38 (9.7)	6200 (427)	3100 (213)
1/4	-PST-RT4	1.17 (29.7)	0.69 (17.5)	0.28 (7.1)	0.59 (15.0)	1.17 (29.7)	0.56 (14.2)	7200 (496)	3600 (248)
3/8	-PST-RT6	1.42 (36.1)	0.81 (20.6)	0.38 (9.6)	0.59 (15.0)	1.26 (32.0)	0.56 (14.2)	5600 (385)	2800 (192)
1/2	-PST-RT8	1.56 (39.6)	1.00 (25.4)	0.47 (11.9)	0.78 (19.8)	1.56 (39.6)	0.75 (19.1)	5600 (385)	2800 (192)
3/4	-PST-RT12	1.92 (48.8)	1.25 (31.8)	0.62 (15.7)	0.81 (20.6)	1.67 (42.4)	0.75 (19.1)	5100 (351)	2500 (172)
1	-PST-RT16	1.91 (48.5)	1.69 (42.9)	0.88 (22.4)	1.00 (25.4)	1.94 (49.3)	0.94 (23.9)	5300 (365)	2600 (179)

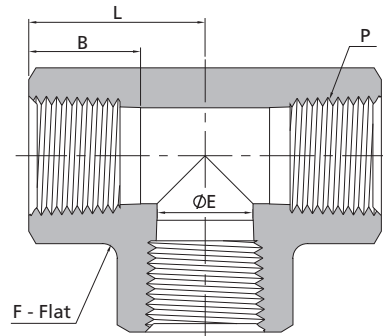
Male Branch Tees



NPT Threads		Dimensions, in. (mm)						Working Pressure psig (bar)	
P-NPT Size	Basic Ordering Number	L	F	E	B	Lx	Bx	316 SS, Steel	Brass
		1/16	-PBT-NS1	0.86 (21.8)	0.44 (11.1)	0.12 (3.0)	0.39 (9.9)	0.72 (18.3)	0.38 (9.7)
1/8	-PBT-NS2	1.04 (26.4)	0.50 (12.7)	0.19 (4.8)	0.41 (10.4)	0.87 (22.1)	0.38 (9.7)	6200 (427)	3100 (213)
1/4	-PBT-NS4	1.17 (29.7)	0.69 (17.5)	0.28 (7.1)	0.59 (15.0)	1.17 (29.7)	0.56 (14.2)	7200 (496)	3600 (248)
3/8	-PBT-NS6	1.42 (36.1)	0.81 (20.6)	0.38 (9.6)	0.59 (15.0)	1.26 (32.0)	0.56 (14.2)	5600 (385)	2800 (192)
1/2	-PBT-NS8	1.56 (39.6)	1.00 (25.4)	0.47 (11.9)	0.78 (19.8)	1.56 (39.6)	0.75 (19.1)	5600 (385)	2800 (192)
3/4	-PBT-NS12	1.92 (48.8)	1.25 (31.8)	0.62 (15.7)	0.81 (20.6)	1.67 (42.4)	0.75 (19.1)	5100 (351)	2500 (172)
1	-PBT-NS16	1.91 (48.5)	1.69 (42.9)	0.88 (22.4)	1.00 (25.4)	1.94 (49.3)	0.94 (23.9)	5300 (365)	2600 (179)

ISO Tapered Threads		Dimensions, in. (mm)						Working Pressure psig (bar)	
P-RT Size	Basic Ordering Number	L	F	E	B	Lx	Bx	316 SS, Steel	Brass
		1/16	-PBT-RT1	0.86 (21.8)	0.44 (11.1)	0.12 (3.0)	0.39 (9.9)	0.72 (18.3)	0.38 (9.7)
1/8	-PBT-RT2	1.04 (26.4)	0.50 (12.7)	0.19 (4.8)	0.41 (10.4)	0.87 (22.1)	0.38 (9.7)	6200 (427)	3100 (213)
1/4	-PBT-RT4	1.17 (29.7)	0.69 (17.5)	0.28 (7.1)	0.59 (15.0)	1.17 (29.7)	0.56 (14.2)	7200 (496)	3600 (248)
3/8	-PBT-RT6	1.42 (36.1)	0.81 (20.6)	0.38 (9.6)	0.59 (15.0)	1.26 (32.0)	0.56 (14.2)	5600 (385)	2800 (192)
1/2	-PBT-RT8	1.56 (39.6)	1.00 (25.4)	0.47 (11.9)	0.78 (19.8)	1.56 (39.6)	0.75 (19.1)	5600 (385)	2800 (192)
3/4	-PBT-RT12	1.92 (48.8)	1.25 (31.8)	0.62 (15.7)	0.81 (20.6)	1.67 (42.4)	0.75 (19.1)	5100 (351)	2500 (172)
1	-PBT-RT16	1.91 (48.5)	1.69 (42.9)	0.88 (22.4)	1.00 (25.4)	1.94 (49.3)	0.94 (23.9)	5300 (365)	2600 (179)

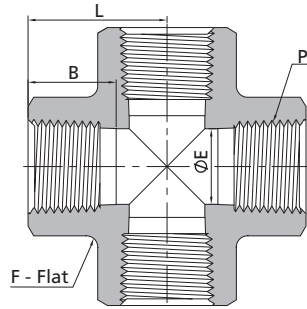
## Female Tees



Female NPT Threads							
P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)				Working Pressure psig (bar)	
		L	F	E	B	316 SS, Steel	Brass
1/16	-PT-NS1	0.86 (21.8)	0.44 (11.1)	0.19 (4.8)	0.39 (9.9)	6700 (460)	3300 (227)
1/8	-PT-NS2	1.04 (26.4)	0.50 (12.7)	0.34 (8.6)	0.41 (10.4)	6200 (427)	3100 (213)
1/4	-PT-NS4	1.17 (29.7)	0.69 (17.5)	0.45 (11.4)	0.59 (15.0)	7200 (496)	3600 (248)
3/8	-PT-NS6	1.42 (36.1)	0.81 (20.6)	0.59 (15.0)	0.59 (15.0)	5600 (385)	2800 (192)
1/2	-PT-NS8	1.56 (39.6)	1.00 (25.4)	0.73 (18.5)	0.78 (19.8)	5600 (385)	2800 (192)
3/4	-PT-NS12	1.92 (48.8)	1.25 (31.8)	0.94 (23.9)	0.81 (20.6)	5100 (351)	2500 (172)
1	-PT-NS16	1.91 (48.5)	1.69 (42.9)	1.17 (29.7)	1.00 (25.4)	6400 (440)	3200 (220)
1 1/4	-PT-NS20	2.35 (59.8)	2.00 (50.8)	1.46 (37.2)	1.00 (25.4)	3100 (213)	1600 (110)
1 1/2	-PT-NS24	2.56 (65.0)	2.50 (63.5)	1.70 (43.3)	1.09 (27.7)	5100 (351)	2500 (172)

Female ISO Tapered Threads							
P-RT Size	Basic Ordering Number	Dimensions, in. (mm)				Working Pressure psig (bar)	
		L	F	E	B	316 SS, Steel	Brass
1/16	-PT-RT1	0.86 (21.8)	0.44 (11.1)	0.19 (4.8)	0.39 (9.9)	6700 (460)	3300 (227)
1/8	-PT-RT2	1.04 (26.4)	0.50 (12.7)	0.34 (8.6)	0.41 (10.4)	6200 (427)	3100 (213)
1/4	-PT-RT4	1.17 (29.7)	0.69 (17.5)	0.44 (11.2)	0.59 (15.0)	7200 (496)	3600 (248)
3/8	-PT-RT6	1.42 (36.1)	0.81 (20.6)	0.58 (14.7)	0.59 (15.0)	5600 (385)	2800 (192)
1/2	-PT-RT8	1.56 (39.6)	1.00 (25.4)	0.72 (18.3)	0.78 (19.8)	5600 (385)	2800 (192)
3/4	-PT-RT12	1.92 (48.8)	1.25 (31.8)	0.94 (23.9)	0.81 (20.6)	5100 (351)	2500 (172)
1	-PT-RT16	1.91 (48.5)	1.69 (42.9)	1.17 (29.7)	1.00 (25.4)	6400 (440)	3200 (220)
1 1/4	-PT-RT20	2.35 (59.8)	2.00 (50.8)	1.46 (37.2)	1.00 (25.4)	3100 (213)	1600 (110)
1 1/2	-PT-RT24	2.56 (65.0)	2.50 (63.5)	1.70 (43.3)	1.09 (27.7)	5100 (351)	2500 (172)

Female Crosses

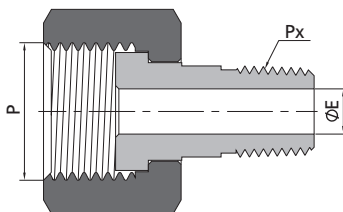


Pipe Fittings  
Weld Fittings

Female NPT Threads							
P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)				Working Pressure psig (bar)	
		L	F	E	B	316 SS, Steel	Brass
1/16	-PCR-NS1	0.86 (21.8)	0.44 (11.1)	0.19 (4.8)	0.39 (9.9)	6700 (460)	3300 (227)
1/8	-PCR-NS2	1.04 (26.4)	0.50 (12.7)	0.34 (8.6)	0.41 (10.4)	6200 (427)	3100 (213)
1/4	-PCR-NS4	1.17 (29.7)	0.69 (17.5)	0.45 (11.4)	0.59 (15.0)	7200 (496)	3600 (248)
3/8	-PCR-NS6	1.42 (36.1)	0.81 (20.6)	0.59 (15.0)	0.59 (15.0)	5600 (385)	2800 (192)
1/2	-PCR-NS8	1.56 (39.6)	1.00 (25.4)	0.73 (18.5)	0.78 (19.8)	5600 (385)	2800 (192)
3/4	-PCR-NS12	1.92 (48.8)	1.25 (31.8)	0.94 (23.9)	0.81 (20.6)	5100 (351)	2500 (172)
1	-PCR-NS16	1.91 (48.5)	1.69 (42.9)	1.17 (29.7)	1.00 (25.4)	6400 (440)	3200 (220)

Female ISO Tapered Threads							
P-RT Size	Basic Ordering Number	Dimensions, in. (mm)				Working Pressure psig (bar)	
		L	F	E	B	316 SS, Steel	Brass
1/16	-PCR-RT1	0.86 (21.8)	0.44 (11.1)	0.19 (4.8)	0.39 (9.9)	6700 (460)	3300 (227)
1/8	-PCR-RT2	1.04 (26.4)	0.50 (12.7)	0.34 (8.6)	0.41 (10.4)	6200 (427)	3100 (213)
1/4	-PCR-RT4	1.17 (29.7)	0.69 (17.5)	0.45 (11.4)	0.59 (15.0)	7200 (496)	3600 (248)
3/8	-PCR-RT6	1.42 (36.1)	0.81 (20.6)	0.59 (15.0)	0.59 (15.0)	5600 (385)	2800 (192)
1/2	-PCR-RT8	1.56 (39.6)	1.00 (25.4)	0.73 (18.5)	0.78 (19.8)	5600 (385)	2800 (192)
3/4	-PCR-RT12	1.92 (48.8)	1.25 (31.8)	0.94 (23.9)	0.81 (20.6)	5100 (351)	2500 (172)
1	-PCR-RT16	1.91 (48.5)	1.69 (42.9)	1.17 (29.7)	1.00 (25.4)	6400 (440)	3200 (220)

Pipe to Pipe Unions



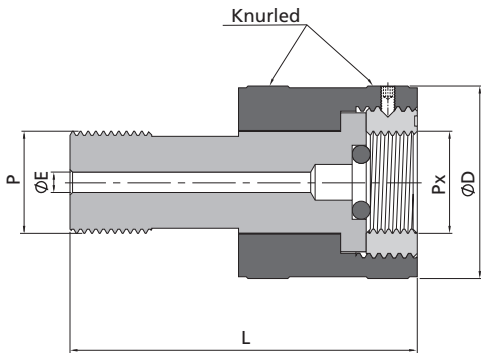
Metric Threads			NPT Threads	
P-Metric Thread Size	Px-NPT Size	Basic Ordering Number	Dimensions, in. (mm)	Working Pressure psig (bar)
			E	316 SS, Steel
M20 x 1.5	1/8	-PUP-MS20-NS2	0.19 (4.8)	4500 (310)
M20 x 1.5	1/4	-PUP-MS20-NS4	0.28 (7.1)	4500 (310)

Metric Threads			ISO Tapered Threads	
P-Metric Thread Size	Px-RT Size	Basic Ordering Number	Dimensions, in. (mm)	Working Pressure psig (bar)
			E	316 SS, Steel
M20 x 1.5	1/8	-PUP-MS20-RT2	0.19 (4.8)	4500 (310)
M20 x 1.5	1/4	-PUP-MS20-RT4	0.28 (7.1)	4500 (310)



ISO Parallel Threads			NPT Threads	
P-ISO Pipe Size	Px-NPT Size	Basic Ordering Number	Dimensions, in. (mm)	
			E	Working Pressure psig (bar) 316 SS, Steel
1/2	1/8	-PUP-RG8-NS2	0.19 (4.8)	4900 (337)
1/2	1/4	-PUP-RG8-NS4	0.28 (7.1)	4900 (337)

### Hand Tight Adapter Fittings

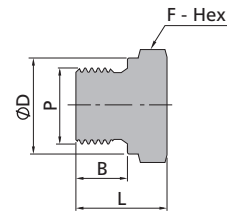
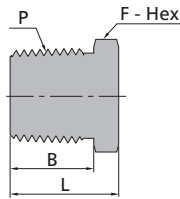


Metric Threads						
P-Metric Thread Size	Px-Metric Thread Size	Basic Ordering Number	Dimensions, mm (in.)			Working Pressure psig (bar) 316 SS, Steel
			L	D	E	
M14 x 1.5	M14 x 1.5	-HF-MS14	58.0 (2.28)	27.0 (1.06)	3.2 (0.13)	6100 (425)
M14 x 1.5	M20 x 1.5	-HF-MS14-MS20	58.0 (2.28)	37.5 (1.48)	3.2 (0.13)	5700 (393)
M20 x 1.5	M14 x 1.5	-HF-MS20-MS14	68.0 (2.68)	32.0 (1.26)	4.0 (0.16)	6100 (425)
M20 x 1.5	M20 x 1.5	-HF-MS20	68.0 (2.68)	37.5 (1.48)	4.0 (0.16)	5700 (393)
M20 x 1.5	M22 x 1.5	-HF-MS20-MS22	68.0 (2.68)	37.5 (1.48)	4.0 (0.16)	4000 (275)

Metric Threads			ISO Parallel Threads			
P-Metric Thread Size	Px-ISO Thread Size	Basic Ordering Number	Dimensions, mm (in.)			Working Pressure psig (bar) 316 SS, Steel
			L	D	E	
M20 x 1.5	1/4	-HF-MS20-RG4	68.0 (2.68)	32.0 (1.26)	3.2 (0.13)	6500 (447)
M20 x 1.5	3/8	-HF-MS20-RG6	68.0 (2.68)	32.0 (1.26)	3.6 (0.14)	4300 (297)
M20 x 1.5	1/2	-HF-MS20-RG8	68.0 (2.68)	37.5 (1.48)	4.0 (0.16)	4800 (334)

ISO Parallel Threads						
P-ISO Thread Size	Px-ISO Thread Size	Basic Ordering Number	Dimensions, mm (in.)			Working Pressure psig (bar) 316 SS, Steel
			L	D	E	
1/2	1/4	-HF-BP8-RG4	68.0 (2.68)	32.0 (1.26)	3.2 (0.13)	6500 (447)
1/2	3/8	-HF-BP8-RG6	68.0 (2.68)	32.0 (1.26)	3.6 (0.14)	4300 (297)
1/2	1/2	-HF-BP8-RG8	68.0 (2.68)	37.5 (1.48)	4.0 (0.16)	4800 (334)

Pipe Plugs



Male NPT Threads

P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)		
		L	F	B
1/16	-PP-NS1	0.56 (14.2)	0.31 (7.9)	0.38 (9.7)
1/8	-PP-NS2	0.56 (14.2)	0.44 (11.1)	0.38 (9.7)
1/4	-PP-NS4	0.75 (19.1)	0.56 (14.3)	0.56 (14.2)
3/8	-PP-NS6	0.78 (19.8)	0.69 (17.5)	0.56 (14.2)
1/2	-PP-NS8	0.97 (24.6)	0.87 (22.2)	0.75 (19.1)
3/4	-PP-NS12	1.21 (30.7)	1.06 (27.0)	0.75 (19.1)
1	-PP-NS16	1.50 (38.1)	1.37 (34.9)	0.94 (23.9)
1 1/4	-PP-NS20	1.51 (38.4)	1.75 (44.5)	0.94 (23.9)
1 1/2	-PP-NS24	1.72 (43.7)	2.00 (50.8)	1.03 (26.2)
2	-PP-NS32	2.00 (50.8)	2.75 (69.9)	1.03 (26.2)

Male ISO Parallel Threads

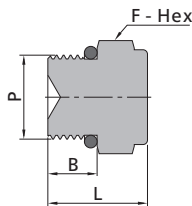
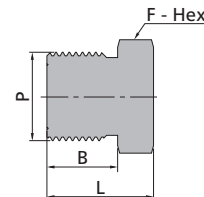
P-RS Size	Basic Ordering Number	Dimensions, in. (mm)			
		L	F	B	D
1/8	-PP-RS2	0.55 (14.0)	0.56 (14.3)	0.28 (7.1)	0.54 (13.7)
1/4	-PP-RS4	0.78 (19.8)	0.75 (19.1)	0.44 (11.2)	0.71 (18.0)
3/8	-PP-RS6	0.78 (19.8)	0.87 (22.2)	0.44 (11.2)	0.86 (21.8)
1/2	-PP-RS8	0.99 (25.1)	1.06 (27.0)	0.55 (14.0)	1.02 (25.9)
3/4	-PP-RS12	1.13 (28.7)	1.31 (33.3)	0.62 (15.7)	1.26 (32.0)
1	-PP-RS16	1.21 (30.7)	1.63 (41.3)	0.71 (18.0)	1.54 (39.1)

Male Metric Threads

P-Metric Size	Basic Ordering Number	Dimensions, mm (in.)			
		L	F	B	D
M14 x 1.5	-PP-MRS14	21.0 (0.83)	20.6 (0.81)	12.0 (0.47)	18.8 (0.74)
M16 x 1.5	-PP-MRS16	23.0 (0.91)	22.2 (0.87)	12.0 (0.47)	20.8 (0.82)
M18 x 1.5	-PP-MRS18	25.0 (0.98)	23.8 (0.94)	12.0 (0.47)	22.8 (0.90)
M20 x 1.5	-PP-MRS20	26.5 (1.04)	25.4 (1.00)	14.0 (0.55)	24.8 (0.98)
M22 x 1.5	-PP-MRS22	28.8 (1.13)	28.6 (1.13)	14.0 (0.55)	26.8 (1.06)
M24 x 1.5	-PP-MRS24	29.0 (1.14)	35.0 (1.38)	14.0 (0.55)	28.8 (1.13)
M27 x 2	-PP-MRS27	30.0 (1.18)	36.5 (1.44)	16.0 (0.63)	31.8 (1.25)

Male ISO Tapered Threads

P-RT Size	Basic Ordering Number	Dimensions, in. (mm)		
		L	F	B
1/16	-PP-RT1	0.56 (14.2)	0.31 (7.9)	0.38 (9.7)
1/8	-PP-RT2	0.56 (14.2)	0.44 (11.1)	0.38 (9.7)
1/4	-PP-RT4	0.75 (19.1)	0.56 (14.3)	0.56 (14.2)
3/8	-PP-RT6	0.78 (19.8)	0.69 (17.5)	0.56 (14.2)
1/2	-PP-RT8	0.97 (24.6)	0.87 (22.2)	0.75 (19.1)
3/4	-PP-RT12	1.21 (30.7)	1.06 (27.0)	0.75 (19.1)
1	-PP-RT16	1.50 (38.1)	1.37 (34.9)	0.94 (23.9)
1 1/4	-PP-RT20	1.51 (38.4)	1.75 (44.5)	0.94 (23.9)
1 1/2	-PP-RT24	1.72 (43.7)	2.00 (50.8)	1.03 (26.2)
2	-PP-RT32	2.00 (50.8)	2.75 (69.9)	1.03 (26.2)



Male SAE/MS Straight Threads

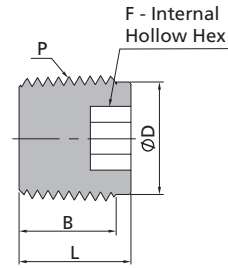
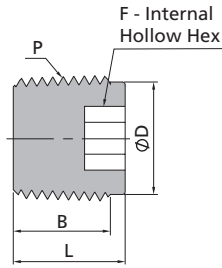
P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)		
		L	F	B
7/16-20	-PP-ST7	0.76 (19.3)	0.56 (14.3)	0.36 (9.1)
9/16-18	-PP-ST9	0.82 (20.8)	0.69 (17.5)	0.39 (9.9)
3/4-16	-PP-ST12	0.89 (22.6)	0.87 (22.2)	0.44 (11.2)
1 1/16-12	-PP-ST17	1.12 (28.4)	1.25 (31.8)	0.59 (15.0)
1 5/16-12	-PP-ST21	1.18 (30.0)	1.50 (38.1)	0.59 (15.0)

Male Metric Threads

P-Metric Size	Basic Ordering Number	Dimensions, mm (in.)		
		L	F	B
M14 x 1.5	-PP-MS14	18.0 (0.71)	16.0 (0.63)	13.0 (0.51)
M16 x 1.5	-PP-MS16	20.0 (0.79)	18.0 (0.71)	14.0 (0.55)
M18 x 1.5	-PP-MS18	22.0 (0.87)	19.0 (0.75)	15.0 (0.59)
M20 x 1.5	-PP-MS20	24.0 (0.94)	22.0 (0.87)	16.0 (0.63)
M22 x 1.5	-PP-MS22	26.0 (1.02)	24.0 (0.94)	17.0 (0.67)
M24 x 1.5	-PP-MS24	26.0 (1.02)	27.0 (1.06)	17.0 (0.67)
M27 x 2	-PP-MS27	27.0 (1.06)	30.0 (1.18)	18.0 (0.71)
M30 x 2	-PP-MS30	32.0 (1.26)	32.0 (1.26)	20.0 (0.79)

Dimensions are for reference only, subject to change.

Hollow Hex Plugs



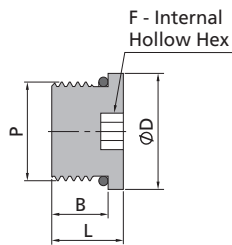
Pipe Fittings  
Weld Fittings

Male NPT Threads

P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			
		L	F	B	D
1/16	-PI-NS1	0.30 (7.6)	0.16 (4.0)	0.29 (7.4)	0.29 (7.4)
1/8	-PI-NS2	0.41 (10.4)	0.19 (4.8)	0.29 (7.4)	0.37 (9.4)
1/4	-PI-NS4	0.61 (15.5)	0.25 (6.4)	0.49 (12.4)	0.48 (12.1)
3/8	-PI-NS6	0.59 (15.0)	0.31 (7.9)	0.47 (11.9)	0.62 (15.7)
1/2	-PI-NS8	0.76 (19.3)	0.37 (9.5)	0.64 (16.2)	0.76 (19.3)
3/4	-PI-NS12	0.78 (19.8)	0.56 (14.3)	0.66 (16.7)	1.01 (25.7)
1	-PI-NS16	0.82 (20.8)	0.63 (15.9)	0.70 (17.7)	1.25 (31.8)

Male ISO Tapered Threads

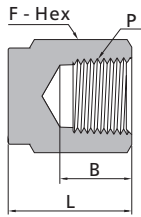
P-RT Size	Basic Ordering Number	Dimensions, in. (mm)			
		L	F	B	D
1/16	-PI-RT1	0.30 (7.6)	0.16 (4.0)	0.29 (7.4)	0.29 (7.4)
1/8	-PI-RT2	0.41 (10.4)	0.19 (4.8)	0.29 (7.4)	0.37 (9.4)
1/4	-PI-RT4	0.61 (15.5)	0.25 (6.4)	0.49 (12.4)	0.48 (12.1)
3/8	-PI-RT6	0.61 (15.5)	0.31 (7.9)	0.49 (12.4)	0.62 (15.7)
1/2	-PI-RT8	0.76 (19.3)	0.37 (9.5)	0.64 (16.2)	0.76 (19.3)
3/4	-PI-RT12	0.78 (19.8)	0.56 (14.3)	0.66 (16.7)	1.01 (25.7)
1	-PI-RT16	0.82 (20.8)	0.63 (15.9)	0.70 (17.7)	1.25 (31.8)



Male SAE/MS Straight Threads

P-SAE/MS Thread Size	Basic Ordering Number	Dimensions, in. (mm)			
		L	F	B	D
7/16-20	-PI-ST7	0.45 (11.4)	0.19 (4.8)	0.36 (9.1)	0.56 (14.2)
9/16-18	-PI-ST9	0.48 (12.2)	0.25 (6.4)	0.39 (9.9)	0.69 (17.5)
3/4-16	-PI-ST12	0.56 (14.2)	0.31 (7.9)	0.44 (11.2)	0.88 (22.4)
1 1/16-12	-PI-ST17	0.75 (19.1)	0.56 (14.3)	0.59 (15.0)	1.25 (31.8)
1 5/16-12	-PI-ST21	0.75 (19.1)	0.63 (15.9)	0.59 (15.0)	1.50 (38.1)

**Pipe Caps**

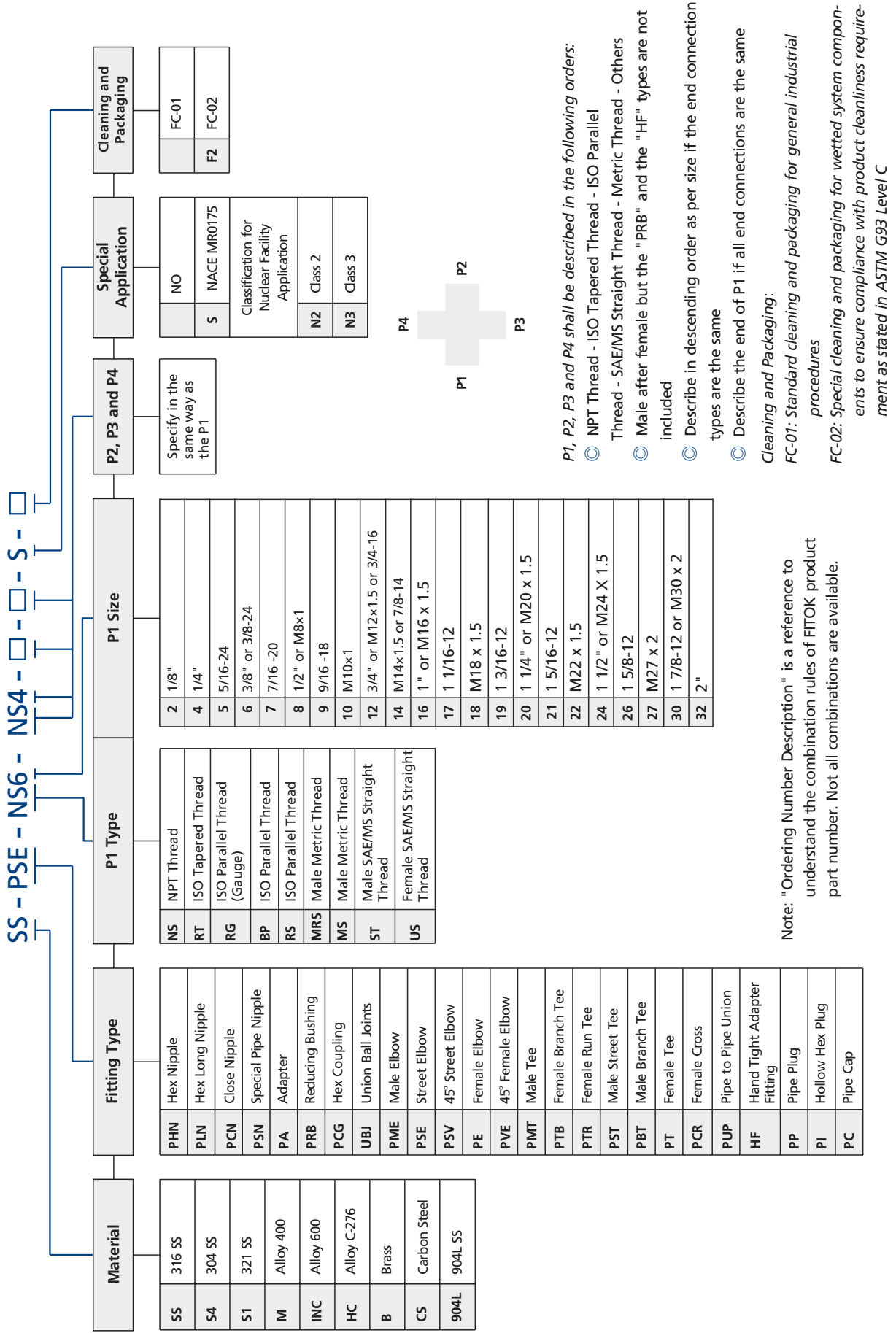


Pipe Fittings  
Weld Fittings

Female NPT Threads						
P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			Working Pressure psig (bar)	
		L	F	B	316 SS, Steel	Brass
1/16	-PC-NS1	0.50 (12.7)	0.44 (11.1)	0.39 (9.9)	6700 (460)	3300 (227)
1/8	-PC-NS2	0.75 (19.1)	0.56 (14.3)	0.41 (10.4)	6500 (447)	3200 (220)
1/4	-PC-NS4	0.91 (23.1)	0.75 (19.1)	0.59 (15.0)	6600 (454)	3300 (277)
3/8	-PC-NS6	1.03 (26.2)	0.87 (22.2)	0.59 (15.0)	5300 (365)	2600 (179)
1/2	-PC-NS8	1.34 (34.0)	1.06 (27.0)	0.78 (19.8)	4900 (337)	2400 (165)
3/4	-PC-NS12	1.44 (36.6)	1.31 (33.3)	0.81 (20.6)	4600 (316)	2300 (158)
1	-PC-NS16	1.62 (41.1)	1.63 (41.3)	1.00 (25.4)	4400 (303)	2200 (151)

Female ISO Tapered Threads						
P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)			Working Pressure psig (bar)	
		L	F	B	316 SS, Steel	Brass
1/16	-PC-RT1	0.50 (12.7)	0.44 (11.1)	0.39 (9.9)	6700 (460)	3300 (227)
1/8	-PC-RT2	0.75 (19.1)	0.56 (14.3)	0.41 (10.4)	6500 (447)	3200 (220)
1/4	-PC-RT4	0.91 (23.1)	0.75 (19.1)	0.59 (15.0)	6600 (454)	3300 (277)
3/8	-PC-RT6	1.03 (26.2)	0.87 (22.2)	0.59 (15.0)	5300 (365)	2600 (179)
1/2	-PC-RT8	1.34 (34.0)	1.06 (27.0)	0.78 (19.8)	4900 (337)	2400 (165)
3/4	-PC-RT12	1.44 (36.6)	1.31 (33.3)	0.81 (20.6)	4600 (316)	2300 (158)
1	-PC-RT16	1.62 (41.1)	1.63 (41.3)	1.00 (25.4)	4400 (303)	2200 (151)

# Ordering Number Description



# 6 Series Weld Fittings

Pipe Fittings  
Weld Fittings



# Contents

## Tube Butt Weld Fittings

### Male Connectors - WM



A-147

### Female Connectors - WF



A-148

### Reducing Unions - WU



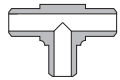
A-148

### Union Elbows - WLU



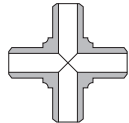
A-149

### Union Tees - WT



A-149

### Union Crosses - WC



A-150

## Tube Socket Weld Fittings

### Male Connectors - WM



A-150

### Female Connectors - WF



A-151

### Male Elbows - WLM



A-151

### Female Elbows - WLF



A-152

### Unions - WU



A-153

### Reducing Unions - WU



A-153

### Union Elbows - WLU



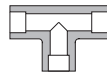
A-153

### Union 45° Elbows - WV



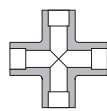
A-154

### Union Tees - WT



A-154

### Union Crosses - WC



A-155

## Pipe Butt Weld Fittings

### Male Connectors - WM



A-155

### Female Connectors - WF



A-156

## Pipe Socket Weld Fittings

### Male Connectors - WM



A-156

### Female Connectors - WF



A-156

### Unions - WU



A-157

## Weld Adapters

### Tube Butt Weld to Tube Socket Weld - WA



A-157

### Pipe Butt Weld to Tube Socket Weld - WA



A-157

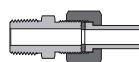
## Pipe to Weld Fittings

### Pipe to Tube Butt Weld - PUW



A-158

### Male Pipe to Tube Butt Weld - MUW



A-159

### Ordering Number Description

A-160

## Features

- ⦿ 316 stainless steel as standard material. Other materials are available upon request
- ⦿ Straight fittings are manufactured from quality bar stock. Shaped fittings are made by forging
- ⦿ Quality machining of all ports ensures consistent welding
- ⦿ Radius junction design for elbows provides smooth flow path
- ⦿ All fittings are cleaned to remove oil, grease and loose particles
- ⦿ Every fitting is marked with size, material and heat number

## Technical Data

- ⦿ Sizes range from 1/8" to 2" and 6 mm to 38 mm.
- ⦿ Working Temperature:

Material	Minimum Temperature	Maximum Temperature
316 stainless steel	-325°F (-198°C)	1000°F (538°C)
316L stainless steel	-325°F (-198°C)	850°F (454°C)
904L stainless steel	-325°F (-198°C)	700°F (371°C)

- ⦿ Working Pressure:

1. The working pressures shown are based on ANSI/ASME B31.3 at ambient temperature, to determine working pressures in accordance with ANSI/ASME B31.1, multiply the working pressures by 0.94.
2. Use the allowable working pressure at ambient temperature to multiply the elevated temperature factors to get the working pressure at elevated temperature. To know the elevated temperature factor, please see F-14.

## Materials

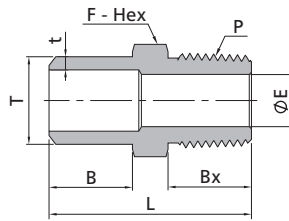
Material	Bar Stock	Forgings	Designator
316 stainless steel	ASTM A276, ASME SA479	ASTM A182, ASME SA182	SS
316L stainless steel			6L
904L stainless steel	ASTM B649	ASTM A182	904L

- ⦿ *Using the same materials to weld will ensure the same coefficients of expansion and good welding.*
- ⦿ *Tungsten Inert Gas (TIG) Welding is recommended.*



# Tube Butt Weld Fittings

## Male Connectors

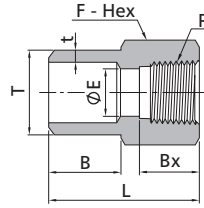


Fractional Tube				NPT Thread					
T-Tube O.D. (in.)	t-Wall Thickness (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)					Working Pressure psig (bar)
				L	B	Bx	F	E	
1/4	0.065	1/4	-WM-TB4-NS4	1.17 (29.7)	0.38 (9.7)	0.56 (14.2)	0.56 (14.3)	0.28 (7.1)	8000 (551)
1/4	0.065	1/2	-WM-TB4-NS8	1.45 (36.8)	0.38 (9.7)	0.75 (19.1)	0.87 (22.2)	0.47 (11.9)	7700 (530)
3/8	0.095	1/4	-WM-TB6-NS4	1.17 (29.7)	0.38 (9.7)	0.56 (14.2)	0.56 (14.3)	0.28 (7.1)	8000 (551)
3/8	0.095	1/2	-WM-TB6-NS8	1.45 (36.8)	0.38 (9.7)	0.75 (19.1)	0.87 (22.2)	0.47 (11.9)	7700 (530)
1/2	0.095	1/4	-WM-TB8-NS4	1.35 (34.3)	0.56 (14.2)	0.56 (14.2)	0.56 (14.3)	0.28 (7.1)	6780 (468)
1/2	0.095	1/2	-WM-TB8-NS8	1.63 (41.4)	0.56 (14.2)	0.75 (19.1)	0.87 (22.2)	0.47 (11.9)	6780 (468)
5/8	0.109	1/4	-WM-TB10-NS4	1.37 (34.8)	0.56 (14.2)	0.56 (14.2)	0.69 (17.5)	0.28 (7.1)	5760 (397)
5/8	0.109	1/2	-WM-TB10-NS8	1.63 (41.4)	0.56 (14.2)	0.75 (19.1)	0.87 (22.2)	0.47 (11.9)	5760 (397)
3/4	0.120	1/4	-WM-TB12-NS4	1.58 (40.1)	0.75 (19.1)	0.56 (14.2)	0.81 (20.6)	0.28 (7.1)	5530 (381)
3/4	0.120	1/2	-WM-TB12-NS8	1.82 (46.2)	0.75 (19.1)	0.75 (19.1)	0.87 (22.2)	0.47 (11.9)	5530 (381)
1	0.134	1/4	-WM-TB16-NS4	1.69 (42.9)	0.75 (19.1)	0.56 (14.2)	1.06 (27.0)	0.28 (7.1)	4480 (309)
1	0.134	1/2	-WM-TB16-NS8	1.88 (47.8)	0.75 (19.1)	0.75 (19.1)	1.06 (27.0)	0.47 (11.9)	4480 (309)

Metric Tube				NPT Thread					
T-Tube O.D. (mm)	t-Wall Thickness (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)					Working Pressure psig (bar)
				L	B	Bx	F	E	
12	2.2	1/4	-WM-MTB12-NS4	34.3 (1.35)	14.2 (0.56)	14.2 (0.56)	14.0 (0.55)	7.1 (0.28)	6470 (446)
12	2.2	1/2	-WM-MTB12-NS8	41.1 (1.62)	14.2 (0.56)	19.1 (0.75)	22.0 (0.87)	11.9 (0.47)	6470 (446)
14	2.5	1/4	-WM-MTB14-NS4	34.3 (1.35)	14.2 (0.56)	14.2 (0.56)	15.0 (0.59)	7.1 (0.28)	6280 (433)
14	2.5	1/2	-WM-MTB14-NS8	41.4 (1.63)	14.2 (0.56)	19.1 (0.75)	22.0 (0.87)	11.9 (0.47)	6280 (433)
15	2.5	1/4	-WM-MTB15-NS4	34.8 (1.37)	14.2 (0.56)	14.2 (0.56)	16.0 (0.63)	7.1 (0.28)	5770 (398)
16	2.8	1/4	-WM-MTB16-NS4	35.6 (1.40)	14.2 (0.56)	14.2 (0.56)	18.0 (0.71)	7.1 (0.28)	6140 (423)
16	2.8	1/2	-WM-MTB16-NS8	41.1 (1.62)	14.2 (0.56)	19.1 (0.75)	22.0 (0.87)	11.9 (0.47)	6140 (423)
20	3.0	1/2	-WM-MTB20-NS8	46.2 (1.82)	19.1 (0.75)	19.1 (0.75)	22.0 (0.87)	11.9 (0.47)	5110 (352)
22	3.0	1/4	-WM-MTB22-NS4	41.2 (1.62)	19.1 (0.75)	14.2 (0.56)	24.0 (0.94)	7.1 (0.28)	4620 (319)
22	3.0	1/2	-WM-MTB22-NS8	46.1 (1.81)	19.1 (0.75)	19.1 (0.75)	24.0 (0.94)	11.9 (0.47)	4620 (319)
25	3.5	3/4	-WM-MTB25-NS12	47.8 (1.88)	19.1 (0.75)	19.1 (0.75)	27.0 (1.06)	15.7 (0.62)	4730 (326)
25	3.5	1	-WM-MTB25-NS16	54.9 (2.16)	19.1 (0.75)	23.9 (0.94)	35.0 (1.38)	22.4 (0.88)	4730 (326)
28	4.0	1/2	-WM-MTB28-NS8	54.2 (2.13)	21.4 (0.84)	19.1 (0.75)	30.0 (1.18)	11.9 (0.47)	4850 (335)

Dimensions are for reference only, subject to change.

Female Connectors

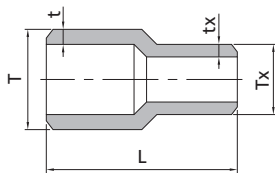


Pipe Fittings  
Weld Fittings

Fractional Tube				Dimensions, in. (mm)					NPT Thread	Working Pressure psig (bar)
T-Tube O.D. (in.)	t-Wall Thickness (in.)	P-NPT Size	Basic Ordering Number	L	B	Bx	F	E		
1/4	0.065	1/4	-WF-TB4-NS4	1.10 (27.9)	0.38 (9.7)	0.59 (15.0)	0.75 (19.1)	0.12 (3.0)	6600 (454)	
1/4	0.065	3/8	-WF-TB4-NS6	1.16 (29.5)	0.38 (9.7)	0.59 (15.0)	0.87 (22.2)	0.12 (3.0)	5300 (365)	
3/8	0.095	1/4	-WF-TB6-NS4	1.10 (27.9)	0.38 (9.7)	0.59 (15.0)	0.75 (19.1)	0.19 (4.7)	6600 (454)	
3/8	0.095	3/8	-WF-TB6-NS6	1.16 (29.5)	0.38 (9.7)	0.59 (15.0)	0.87 (22.2)	0.19 (4.7)	5300 (365)	
1/2	0.095	1/4	-WF-TB8-NS4	1.34 (34.0)	0.56 (14.2)	0.59 (15.0)	0.75 (19.1)	0.31 (7.9)	6600 (454)	
1/2	0.095	3/8	-WF-TB8-NS6	1.34 (34.0)	0.56 (14.2)	0.59 (15.0)	0.87 (22.2)	0.31 (7.9)	5300 (365)	
1/2	0.095	1/2	-WF-TB8-NS8	1.53 (38.9)	0.56 (14.2)	0.78 (19.8)	1.06 (27.0)	0.31 (7.9)	4900 (337)	

Metric Tube				Dimensions, mm (in.)					NPT Thread	Working Pressure psig (bar)
T-Tube O.D. (mm)	t-Wall Thickness (mm)	P-NPT Size	Basic Ordering Number	L	B	Bx	F	E		
14	2.5	1/4	-WF-MTB14-NS4	33.0 (1.30)	14.2 (0.56)	15.0 (0.59)	19.0 (0.75)	9.0 (0.35)	6280 (433)	
14	2.5	1/2	-WF-MTB14-NS8	38.9 (1.53)	14.2 (0.56)	19.8 (0.78)	27.0 (1.06)	9.0 (0.35)	4900 (337)	
20	3.0	1/2	-WF-MTB20-NS8	43.7 (1.72)	19.1 (0.75)	19.8 (0.78)	27.0 (1.06)	14.0 (0.55)	4900 (337)	
28	4.0	1/2	-WF-MTB28-NS8	49.8 (1.96)	23.9 (0.94)	19.8 (0.78)	30.0 (1.18)	15.7 (0.62)	4850 (335)	

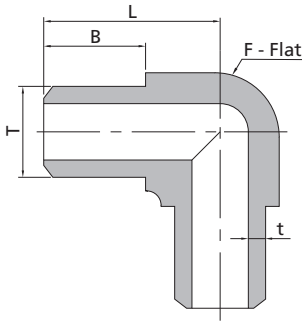
Reducing Unions



Fractional Tube				Fractional Tube		
T-Tube O.D. (in.)	t-Wall Thickness (in.)	Tx-Tube O.D. (in.)	tx-Wall Thickness (in.)	Basic Ordering Number	L in. (mm)	Working Pressure psig (bar)
3/8	0.095	1/4	0.065	-WU-TB6-TB4	1.50 (38.1)	9930 (685)
1/2	0.095	1/4	0.065	-WU-TB8-TB4	1.50 (38.1)	6780 (468)
1/2	0.095	3/8	0.095	-WU-TB8-TB6	1.50 (38.1)	6780 (468)
3/4	0.120	1/2	0.095	-WU-TB12-TB8	1.50 (38.1)	5530 (381)
1	0.134	3/4	0.120	-WU-TB16-TB12	1.50 (38.1)	4480 (309)

Metric Tube				Metric Tube		
T-Tube O.D. (mm)	t-Wall Thickness (mm)	Tx-Tube O.D. (mm)	tx-Wall Thickness (mm)	Basic Ordering Number	L mm (in.)	Working Pressure psig (bar)
20	3.0	14	2.5	-WU-MTB20-MTB14	38.1 (1.50)	6470 (445)
22	3.0	14	2.5	-WU-MTB22-MTB14	38.1 (1.50)	5780 (395)
22	3.0	18	2.8	-WU-MTB22-MTB18	38.1 (1.50)	5780 (395)
25	3.5	22	3.0	-WU-MTB25-MTB22	38.1 (1.50)	5780 (395)
38	5.0	25	3.5	-WU-MTB38-MTB25	38.1 (1.50)	5540 (380)

## Union Elbows



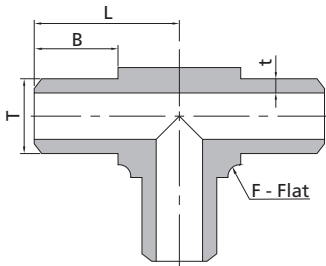
## Fractional Tube

T-Tube O.D. (in.)	t-Wall Thickness (in.)	Basic Ordering Number	Dimensions, in. (mm)			Working Pressure psig (bar)
			L	B	F	
1/4	0.065	-WLU-TB4	0.64 (16.3)	0.38 (9.7)	0.37 (9.5)	10320 (712)
3/8	0.095	-WLU-TB6	0.71 (18.0)	0.38 (9.7)	0.44 (11.1)	9930 (685)
1/2	0.095	-WLU-TB8	0.96 (24.4)	0.56 (14.2)	0.56 (14.3)	6780 (468)
3/4	0.120	-WLU-TB12	1.31 (33.3)	0.75 (19.1)	0.81 (20.6)	5530 (381)
1	0.134	-WLU-TB16	1.46 (37.1)	0.75 (19.1)	1.06 (27.0)	4480 (309)

## Metric Tube

T-Tube O.D. (mm)	t-Wall Thickness (mm)	Basic Ordering Number	Dimensions, mm (in.)			Working Pressure psig (bar)
			L	B	F	
10	2.2	-WLU-MTB10	18.0 (0.71)	9.7 (0.38)	11.1 (0.44)	8160 (563)
14	2.5	-WLU-MTB14	25.4 (1.00)	14.2 (0.56)	15.9 (0.63)	6280 (433)
16	2.8	-WLU-MTB16	26.2 (1.03)	14.2 (0.56)	17.5 (0.69)	6140 (423)
20	3.0	-WLU-MTB20	33.3 (1.31)	19.1 (0.75)	20.6 (0.81)	5110 (352)
22	3.0	-WLU-MTB22	35.3 (1.39)	19.1 (0.75)	23.8 (0.94)	4620 (319)
25	3.5	-WLU-MTB25	37.1 (1.46)	19.1 (0.75)	27.0 (1.06)	4730 (326)

## Union Tees



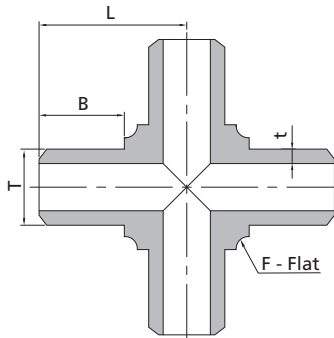
## Fractional Tube

T-Tube O.D. (in.)	t-Wall Thickness (in.)	Basic Ordering Number	Dimensions, in. (mm)			Working Pressure psig (bar)
			L	B	F	
1/4	0.065	-WT-TB4	0.64 (16.3)	0.38 (9.7)	0.37 (9.5)	10320 (712)
3/8	0.095	-WT-TB6	0.71 (18.0)	0.38 (9.7)	0.44 (11.1)	9930 (685)
1/2	0.095	-WT-TB8	0.96 (24.4)	0.56 (14.2)	0.56 (14.3)	6780 (468)
3/4	0.120	-WT-TB12	1.31 (33.3)	0.75 (19.1)	0.81 (20.6)	5530 (381)
1	0.134	-WT-TB16	1.46 (37.1)	0.75 (19.1)	1.06 (27.0)	4480 (309)

## Metric Tube

T-Tube O.D. (mm)	t-Wall Thickness (mm)	Basic Ordering Number	Dimensions, mm (in.)			Working Pressure psig (bar)
			L	B	F	
6	1.8	-WT-MTB6	16.3 (0.64)	9.7 (0.38)	9.5 (0.37)	12660 (873)
8	1.8	-WT-MTB8	16.3 (0.64)	9.7 (0.38)	9.5 (0.37)	8320 (574)
10	2.2	-WT-MTB10	18.0 (0.71)	9.7 (0.38)	11.1 (0.44)	8160 (563)
12	2.2	-WT-MTB12	24.4 (0.96)	14.2 (0.56)	14.3 (0.56)	6470 (446)
14	2.5	-WT-MTB14	25.4 (1.00)	14.2 (0.56)	15.9 (0.63)	6280 (433)
16	2.8	-WT-MTB16	26.2 (1.03)	14.2 (0.56)	17.5 (0.69)	6140 (423)
20	3.0	-WT-MTB20	33.3 (1.31)	19.1 (0.75)	20.6 (0.81)	5110 (352)
22	3.0	-WT-MTB22	35.3 (1.39)	19.1 (0.75)	23.8 (0.94)	4620 (319)
25	3.5	-WT-MTB25	37.1 (1.46)	19.1 (0.75)	27.0 (1.06)	4730 (326)
32	4.5	-WT-MTB32	49.3 (1.94)	23.9 (0.94)	34.9 (1.37)	4730 (326)

Union Crosses



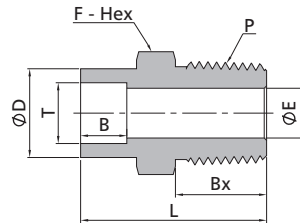
Pipe Fittings  
Weld Fittings

Fractional Tube						
T-Tube O.D. (in.)	t-Wall Thickness (in.)	Basic Ordering Number	Dimensions, in. (mm)			Working Pressure psig (bar)
			L	B	F	
1/4	0.065	-WC-TB4	0.64 (16.3)	0.38 (9.7)	0.37 (9.5)	10320 (712)
3/8	0.095	-WC-TB6	0.71 (18.0)	0.38 (9.7)	0.44 (11.1)	9930 (685)
1/2	0.095	-WC-TB8	0.96 (24.4)	0.56 (14.2)	0.56 (14.3)	6780 (468)
3/4	0.120	-WC-TB12	1.31 (33.3)	0.75 (19.1)	0.81 (20.6)	5530 (381)
1	0.134	-WC-TB16	1.63 (41.3)	0.75 (19.1)	1.25 (31.8)	4480 (309)

Metric Tube						
T-Tube O.D. (mm)	t-Wall Thickness (mm)	Basic Ordering Number	Dimensions, mm (in.)			Working Pressure psig (bar)
			L	B	F	
6	1.8	-WC-MTB6	16.3 (0.64)	9.7 (0.38)	9.5 (0.37)	12660 (873)
8	1.8	-WC-MTB8	16.3 (0.64)	9.7 (0.38)	9.5 (0.37)	8320 (574)
10	2.2	-WC-MTB10	18.0 (0.71)	9.7 (0.38)	11.1 (0.44)	8160 (563)

Tube Socket Weld Fittings

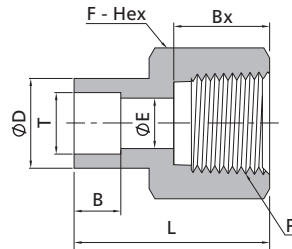
Male Connectors



Fractional Tube							NPT Thread		
T-Tube Size (in.)	P-NPT Size	Basic Ordering Number	Dimensions, in. (mm)					Working Pressure psig (bar)	
			L	D	B	Bx	F		E
1/4	1/4	-WM-TS4-NS4	1.15 (29.2)	0.48 (12.2)	0.28 (7.1)	0.56 (14.2)	0.56 (14.3)	0.19 (4.8)	8000 (551)
3/8	1/4	-WM-TS6-NS4	1.25 (31.8)	0.60 (15.2)	0.31 (7.9)	0.56 (14.2)	0.63 (15.9)	0.28 (7.1)	8000 (551)
3/8	3/8	-WM-TS6-NS6	1.25 (31.8)	0.60 (15.2)	0.31 (7.9)	0.56 (14.2)	0.69 (17.5)	0.28 (7.1)	7800 (537)
3/8	1/2	-WM-TS6-NS8	1.47 (37.3)	0.60 (15.2)	0.31 (7.9)	0.75 (19.1)	0.87 (22.2)	0.28 (7.1)	7700 (530)
1/2	1/4	-WM-TS8-NS4	1.31 (33.3)	0.73 (18.5)	0.38 (9.7)	0.56 (14.2)	0.75 (19.1)	0.28 (7.1)	6600 (454)
1/2	3/8	-WM-TS8-NS6	1.31 (33.3)	0.73 (18.5)	0.38 (9.7)	0.56 (14.2)	0.75 (19.1)	0.38 (9.6)	6600 (454)
1/2	1/2	-WM-TS8-NS8	1.53 (38.9)	0.73 (18.5)	0.38 (9.7)	0.75 (19.1)	0.87 (22.2)	0.41 (10.4)	6600 (454)
3/4	3/4	-WM-TS12-NS12	1.78 (45.1)	1.04 (26.4)	0.44 (11.2)	0.75 (19.1)	1.06 (27.0)	0.62 (15.7)	5900 (406)
1	1	-WM-TS16-NS16	2.11 (53.6)	1.36 (34.5)	0.62 (15.7)	0.94 (23.9)	1.37 (34.9)	0.88 (22.4)	5300 (365)

Metric Tube							NPT Thread		
T-Tube Size (mm)	P-NPT Size	Basic Ordering Number	Dimensions, mm (in.)					Working Pressure psig (bar)	
			L	D	B	Bx	F		E
6	1/4	-WM-MTS6-NS4	29.2 (1.15)	12.0 (0.47)	7.1 (0.28)	14.2 (0.56)	14.0 (0.55)	4.8 (0.19)	8000 (551)
12	1/2	-WM-MTS12-NS8	38.9 (1.53)	20.2 (0.80)	9.7 (0.38)	19.1 (0.75)	22.0 (0.87)	9.5 (0.37)	6820 (470)
14	1/4	-WM-MTS14-NS4	33.3 (1.31)	23.8 (0.94)	10.0 (0.39)	14.2 (0.56)	24.0 (0.94)	7.1 (0.28)	6930 (478)
14	3/8	-WM-MTS14-NS6	35.0 (1.38)	23.8 (0.94)	10.0 (0.39)	14.2 (0.56)	24.0 (0.94)	9.6 (0.38)	6930 (478)
14	1/2	-WM-MTS14-NS8	40.0 (1.57)	23.8 (0.94)	10.0 (0.39)	19.1 (0.75)	24.0 (0.94)	10.4 (0.41)	6930 (478)
16	1/4	-WM-MTS16-NS4	35.0 (1.38)	23.8 (0.94)	10.4 (0.41)	14.2 (0.56)	24.0 (0.94)	7.1 (0.28)	6190 (426)
16	1/2	-WM-MTS16-NS8	40.0 (1.57)	23.8 (0.94)	10.4 (0.41)	19.1 (0.75)	24.0 (0.94)	11.9 (0.47)	6190 (426)
18	1/4	-WM-MTS18-NS4	40.1 (1.58)	26.0 (1.02)	11.2 (0.44)	14.2 (0.56)	27.0 (1.06)	7.1 (0.28)	6050 (417)
28	3/4	-WM-MTS28-NS12	55.5 (2.19)	40.0 (1.57)	20.0 (0.79)	19.1 (0.75)	41.0 (1.61)	15.7 (0.62)	5040 (348)
38	1 1/4	-WM-MTS38-NS20	68.3 (2.69)	50.8 (2.00)	22.0 (0.87)	23.9 (0.94)	52.0 (2.05)	28.6 (1.13)	5000 (344)

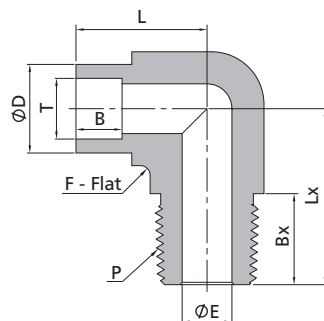
## Female Connectors



Fractional Tube			Dimensions, in. (mm)							NPT Thread	Working Pressure psig (bar)
T-Tube Size (in.)	P-NPT Size	Basic Ordering Number	L	D	B	Bx	F	E			
1/8	1/8	-WF-TS2-NS2	0.83 (21.1)	0.29 (7.4)	0.10 (2.5)	0.41 (10.4)	0.56 (14.3)	0.09 (2.3)		6500 (447)	
1/4	1/8	-WF-TS4-NS2	1.05 (26.7)	0.48 (12.2)	0.28 (7.1)	0.41 (10.4)	0.56 (14.3)	0.19 (4.8)		6500 (447)	
1/4	1/4	-WF-TS4-NS4	1.18 (30.0)	0.48 (12.2)	0.28 (7.1)	0.59 (15.0)	0.75 (19.1)	0.19 (4.8)		6600 (454)	
3/8	1/4	-WF-TS6-NS4	1.24 (31.5)	0.60 (15.2)	0.31 (7.9)	0.59 (15.0)	0.75 (19.1)	0.28 (7.1)		6600 (454)	
1/2	3/8	-WF-TS8-NS6	1.36 (34.5)	0.73 (18.5)	0.38 (9.7)	0.59 (15.0)	0.87 (22.2)	0.41 (10.4)		5300 (365)	
1/2	1/2	-WF-TS8-NS8	1.59 (40.4)	0.73 (18.5)	0.38 (9.7)	0.78 (19.8)	1.06 (27.0)	0.41 (10.4)		4900 (337)	
3/4	3/4	-WF-TS12-NS12	1.73 (43.9)	1.04 (26.4)	0.44 (11.2)	0.81 (20.6)	1.31 (33.3)	0.63 (16.0)		4600 (316)	
1	1	-WF-TS16-NS16	2.13 (54.1)	1.36 (34.5)	0.62 (15.7)	1.00 (25.4)	1.63 (41.3)	0.88 (22.4)		4400 (303)	

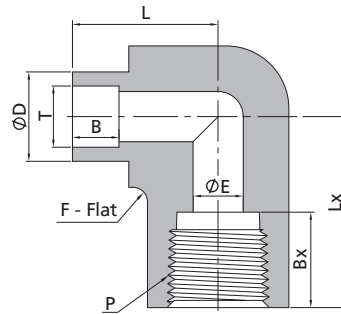
Metric Tube			Dimensions, mm (in.)							NPT Thread	Working Pressure psig (bar)
T-Tube Size (mm)	P-NPT Size	Basic Ordering Number	L	D	B	Bx	F	E			
8	1/4	-WF-MTS8-NS4	27.0 (1.06)	14.3 (0.56)	7.9 (0.31)	15.0 (0.59)	19.0 (0.75)	4.8 (0.19)		6600 (454)	
10	1/4	-WF-MTS10-NS4	29.0 (1.14)	16.5 (0.65)	7.9 (0.31)	15.0 (0.59)	19.0 (0.75)	7.1 (0.28)		6600 (454)	
14	1/4	-WF-MTS14-NS4	32.0 (1.26)	23.8 (0.94)	10.0 (0.39)	15.0 (0.59)	24.0 (0.94)	9.5 (0.37)		6930 (478)	
28	3/4	-WF-MTS28-NS12	54.1 (2.13)	40.0 (1.57)	20.0 (0.79)	20.6 (0.81)	41.0 (1.61)	19.8 (0.78)		4600 (316)	

## Male Elbows



Fractional Tube			Dimensions, in. (mm)							NPT Thread	Working Pressure psig (bar)
T-Tube Size (in.)	P-NPT Size	Basic Ordering Number	L	Lx	D	B	Bx	F	E		
1/4	1/4	SS-WLM-TS4-NS4	0.79 (20.1)	1.05 (26.7)	0.58 (14.7)	0.28 (7.1)	0.56 (14.2)	0.50 (12.7)	0.19 (4.8)	8000 (551)	
3/8	1/4	SS-WLM-TS6-NS4	1.04 (26.4)	1.05 (26.7)	0.58 (14.7)	0.31 (7.9)	0.56 (14.2)	0.50 (12.7)	0.28 (7.1)	8000 (551)	
3/8	3/8	SS-WLM-TS6-NS6	0.97 (24.6)	1.17 (29.7)	0.80 (20.2)	0.31 (7.9)	0.56 (14.2)	0.69 (17.5)	0.28 (7.1)	7800 (537)	
3/8	1/2	SS-WLM-TS6-NS8	1.02 (25.9)	1.45 (36.8)	0.94 (23.8)	0.31 (7.9)	0.75 (19.1)	0.81 (20.6)	0.28 (7.1)	7700 (530)	
1/2	1/2	SS-WLM-TS8-NS8	1.08 (27.4)	1.45 (36.8)	0.94 (23.8)	0.38 (9.7)	0.75 (19.1)	0.81 (20.6)	0.41 (10.4)	6600 (454)	
3/4	3/4	SS-WLM-TS12-NS12	1.53 (38.9)	1.56 (39.6)	1.04 (26.4)	0.44 (11.2)	0.75 (19.1)	1.06 (27.0)	0.62 (15.7)	5900 (406)	

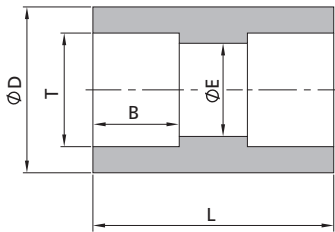
Female Elbows



Pipe Fittings  
Weld Fittings

Fractional Tube			Dimensions, in. (mm)							NPT Thread	Working Pressure psig (bar)
T-Tube Size (in.)	P-NPT Size	Basic Ordering Number	L	Lx	D	B	Bx	F	E		
1/4	1/4	SS-WLF-TS4-NS4	0.90 (22.9)	1.17 (29.7)	0.80 (20.2)	0.28 (7.1)	0.59 (15.0)	0.69 (17.5)	0.19 (4.8)		7400 (509)
3/8	1/4	SS-WLF-TS6-NS4	0.99 (25.1)	1.17 (29.7)	0.80 (20.2)	0.31 (7.9)	0.59 (15.0)	0.69 (17.5)	0.28 (7.1)		7400 (509)
3/8	1/2	SS-WLF-TS6-NS8	1.13 (28.7)	1.56 (39.6)	1.15 (29.3)	0.31 (7.9)	0.78 (19.8)	1.00 (25.4)	0.28 (7.1)		5700 (392)
1/2	1/2	SS-WLF-TS8-NS8	1.19 (30.2)	1.56 (39.6)	1.15 (29.3)	0.38 (9.7)	0.78 (19.8)	1.00 (25.4)	0.41 (10.4)		5700 (392)

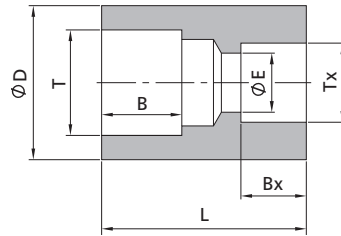
Unions



Fractional Tube		Dimensions, in. (mm)				Working Pressure psig (bar)
T-Tube Size (in.)	Basic Ordering Number	L	D	B	E	
1/4	SS-WU-TS4	0.75 (19.1)	0.48 (12.2)	0.28 (7.1)	0.19 (4.8)	10700 (737)
3/8	SS-WU-TS6	0.88 (22.4)	0.60 (15.2)	0.31 (7.9)	0.28 (7.1)	8100 (558)
1/2	SS-WU-TS8	1.06 (26.9)	0.73 (18.5)	0.38 (9.7)	0.41 (10.4)	6600 (454)
5/8	SS-WU-TS10	1.19 (30.2)	0.92 (23.4)	0.41 (10.4)	0.50 (12.7)	6200 (427)
3/4	SS-WU-TS12	1.31 (33.3)	1.04 (26.4)	0.44 (11.2)	0.63 (16.0)	5900 (406)
7/8	SS-WU-TS14	1.40 (35.5)	1.24 (31.5)	0.50 (12.7)	0.74 (18.8)	5730 (395)
1	SS-WU-TS16	1.44 (36.6)	1.36 (34.5)	0.62 (15.7)	0.88 (22.4)	5600 (385)

Metric Tube		Dimensions, mm (in.)				Working Pressure psig (bar)
T-Tube Size (mm)	Basic Ordering Number	L	D	B	E	
8	SS-WU-MTS8	22.4 (0.88)	14.3 (0.56)	7.9 (0.31)	6.4 (0.25)	9790 (675)
10	SS-WU-MTS10	23.6 (0.93)	16.5 (0.65)	7.9 (0.31)	7.4 (0.29)	8100 (558)
12	SS-WU-MTS12	26.9 (1.06)	20.2 (0.80)	9.7 (0.38)	9.5 (0.37)	6820 (470)
14	SS-WU-MTS14	28.0 (1.10)	23.8 (0.94)	10.0 (0.39)	10.4 (0.41)	6930 (478)
16	SS-WU-MTS16	30.2 (1.19)	23.8 (0.94)	10.4 (0.41)	12.7 (0.50)	6190 (426)
20	SS-WU-MTS20	28.0 (1.10)	27.0 (1.06)	11.2 (0.44)	17.0 (0.67)	5510 (380)

## Reducing Unions

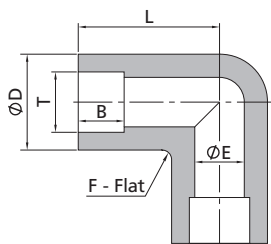


Fractional Tube			Dimensions, in. (mm)					Working Pressure psig (bar)
T-Tube Size (in.)	Tx-Tube Size (in.)	Basic Ordering Number	L	D	B	E	Bx	Working Pressure psig (bar)
3/8	1/4	-WU-TS6-TS4	0.88 (22.4)	0.60 (15.2)	0.31 (7.9)	0.19 (4.8)	0.28 (7.1)	
1/2	1/4	-WU-TS8-TS4	0.96 (24.3)	0.73 (18.5)	0.38 (9.7)	0.19 (4.8)	0.28 (7.1)	6600 (454)
1/2	3/8	-WU-TS8-TS6	1.03 (26.1)	0.73 (18.5)	0.38 (9.7)	0.28 (7.1)	0.31 (7.9)	6600 (454)
3/4	3/8	-WU-TS12-TS6	1.17 (29.8)	1.04 (26.4)	0.44 (11.2)	0.28 (7.1)	0.31 (7.9)	5900 (406)
3/4	1/2	-WU-TS12-TS8	1.24 (31.6)	1.04 (26.4)	0.44 (11.2)	0.41 (10.4)	0.38 (9.7)	5900 (406)
1	3/4	-WU-TS16-TS12	1.26 (32.1)	1.36 (34.5)	0.62 (15.7)	0.63 (16.0)	0.44 (11.2)	5600 (385)

Metric Tube			Dimensions, mm (in.)					Working Pressure psig (bar)
T-Tube Size (mm)	Tx-Tube Size (mm)	Basic Ordering Number	L	D	B	E	Bx	Working Pressure psig (bar)
14	10	-WU-MTS14-MTS10	26.0 (1.02)	23.8 (0.94)	10.4 (0.41)	7.4 (0.29)	7.9 (0.31)	
25	14	-WU-MTS25-MTS14	30.0 (1.18)	34.5 (1.36)	15.7 (0.62)	10.4 (0.41)	10.0 (0.39)	5450 (376)
25	22	-WU-MTS25-MTS22	35.8 (1.41)	34.5 (1.36)	15.7 (0.62)	19.0 (0.75)	13.5 (0.53)	5450 (376)

Metric Tube			Dimensions, mm (in.)					Working Pressure psig (bar)
T-Tube Size (mm)	Tx-Tube Size (in.)	Basic Ordering Number	L	D	B	E	Bx	Working Pressure psig (bar)
20	3/4	-WU-MTS20-TS12	28.0 (1.10)	27.0 (1.06)	11.2 (0.44)	15.7 (0.62)	11.2 (0.44)	
28	3/4	-WU-MTS28-TS12	36.8 (1.45)	40.0 (1.57)	20.0 (0.79)	15.7 (0.62)	11.2 (0.44)	5040 (348)

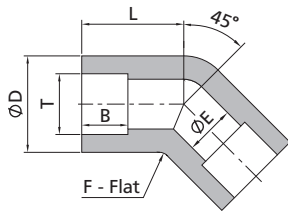
## Union Elbows



Fractional Tube		Dimensions, in. (mm)					Working Pressure psig (bar)
T-Tube Size (in.)	Basic Ordering Number	L	D	B	F	E	Working Pressure psig (bar)
1/8	-WLU-TS2	0.59 (15.0)	0.43 (11.0)	0.10 (2.5)	0.37 (9.5)	0.09 (2.3)	
1/4	-WLU-TS4	0.86 (21.8)	0.50 (12.8)	0.28 (7.1)	0.44 (11.1)	0.19 (4.8)	10700 (737)
3/8	-WLU-TS6	1.04 (26.4)	0.65 (16.5)	0.31 (7.9)	0.56 (14.3)	0.28 (7.1)	8100 (558)
1/2	-WLU-TS8	1.17 (29.7)	0.80 (20.2)	0.38 (9.7)	0.69 (17.5)	0.41 (10.4)	6600 (454)
5/8	-WLU-TS10	1.42 (36.1)	0.94 (23.8)	0.41 (10.4)	0.81 (20.6)	0.50 (12.7)	6200 (427)
3/4	-WLU-TS12	1.56 (39.6)	1.15 (29.3)	0.44 (11.2)	1.00 (25.4)	0.63 (16.0)	5900 (406)
1	-WLU-TS16	1.92 (48.8)	1.44 (36.7)	0.62 (15.7)	1.25 (31.8)	0.88 (22.4)	5600 (385)

Metric Tube		Dimensions, mm (in.)					Working Pressure psig (bar)
T-Tube Size (mm)	Basic Ordering Number	L	D	B	F	E	Working Pressure psig (bar)
10	-WLU-MTS10	24.6 (0.97)	16.5 (0.65)	7.9 (0.31)	14.3 (0.56)	7.4 (0.29)	
12	-WLU-MTS12	29.7 (1.17)	20.2 (0.80)	9.7 (0.38)	17.5 (0.69)	9.5 (0.37)	6820 (470)
14	-WLU-MTS14	31.7 (1.25)	23.8 (0.94)	10.0 (0.39)	20.6 (0.81)	10.4 (0.41)	6930 (478)
16	-WLU-MTS16	34.7 (1.37)	23.8 (0.94)	10.4 (0.41)	20.6 (0.81)	12.7 (0.50)	6190 (426)

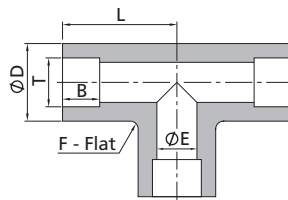
Union 45° Elbows



Fractional Tube		Dimensions, in. (mm)					Working Pressure psig (bar)
T-Tube Size (in.)	Basic Ordering Number	L	D	B	F	E	
1/4	SS-WV-TS4	0.59 (15.0)	0.58 (14.7)	0.28 (7.1)	0.50 (12.7)	0.19 (4.8)	10700 (737)
3/8	SS-WV-TS6	0.78 (19.7)	0.65 (16.5)	0.31 (7.9)	0.56 (14.3)	0.28 (7.1)	8100 (558)
1/2	SS-WV-TS8	0.84 (21.3)	0.80 (20.2)	0.38 (9.7)	0.69 (17.5)	0.41 (10.4)	6600 (454)
3/4	SS-WV-TS12	1.13 (28.7)	1.15 (29.3)	0.44 (11.2)	1.00 (25.4)	0.63 (16.0)	5900 (406)
1	SS-WV-TS16	1.57 (40.0)	1.59 (40.3)	0.62 (15.7)	1.37 (34.9)	0.88 (22.4)	5600 (385)

Metric Tube		Dimensions, mm (in.)					Working Pressure psig (bar)
T-Tube Size (mm)	Basic Ordering Number	L	D	B	F	E	
8	SS-WV-MTS8	17.3 (0.68)	14.7 (0.58)	7.9 (0.31)	12.7 (0.50)	6.4 (0.25)	9790 (675)
10	SS-WV-MTS10	19.1 (0.75)	16.5 (0.65)	7.9 (0.31)	14.3 (0.56)	7.4 (0.29)	8100 (558)
12	SS-WV-MTS12	21.3 (0.84)	20.2 (0.80)	9.7 (0.38)	17.5 (0.69)	9.5 (0.37)	6820 (470)
14	SS-WV-MTS14	26.4 (1.04)	23.8 (0.94)	10.0 (0.39)	20.6 (0.81)	10.4 (0.41)	6930 (478)
16	SS-WV-MTS16	26.4 (1.04)	23.8 (0.94)	10.4 (0.41)	20.6 (0.81)	12.7 (0.50)	6190 (426)
20	SS-WV-MTS20	28.7 (1.13)	29.3 (1.15)	11.2 (0.44)	25.4 (1.00)	17.0 (0.67)	5510 (380)
22	SS-WV-MTS22	29.7 (1.17)	31.2 (1.23)	13.5 (0.53)	27.0 (1.06)	19.0 (0.75)	5700 (396)
23	SS-WV-MTS25	40.0 (1.57)	40.3 (1.59)	15.7 (0.62)	34.9 (1.37)	22.0 (0.87)	5450 (376)

Union Tees

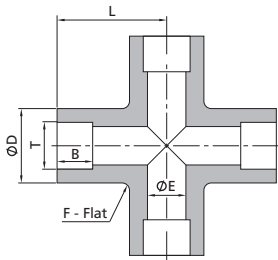


Fractional Tube		Dimensions, in. (mm)					Working Pressure psig (bar)
T-Tube Size (in.)	Basic Ordering Number	L	D	B	F	E	
1/8	-WT-TS2	0.59 (15.0)	0.39 (10.0)	0.10 (2.5)	0.44 (11.1)	0.09 (2.3)	12600 (868)
1/4	-WT-TS4	0.86 (21.8)	0.50 (12.8)	0.28 (7.1)	0.44 (11.1)	0.19 (4.8)	10700 (737)
3/8	-WT-TS6	1.04 (26.4)	0.65 (16.5)	0.31 (7.9)	0.56 (14.3)	0.28 (7.1)	8100 (558)
1/2	-WT-TS8	1.17 (29.7)	0.80 (20.2)	0.38 (9.7)	0.69 (17.5)	0.41 (10.4)	6600 (454)
5/8	-WT-TS10	1.42 (36.1)	0.94 (23.8)	0.41 (10.4)	0.81 (20.6)	0.50 (12.7)	6200 (428)
3/4	-WT-TS12	1.56 (39.6)	1.15 (29.3)	0.44 (11.2)	1.00 (25.4)	0.63 (16.0)	5900 (406)
1	-WT-TS16	1.92 (48.8)	1.44 (36.7)	0.62 (15.7)	1.25 (31.8)	0.88 (22.4)	5600 (385)

Metric Tube		Dimensions, mm (in.)					Working Pressure psig (bar)
T-Tube Size (mm)	Basic Ordering Number	L	D	B	F	E	
8	-WT-MTS8	19.8 (0.78)	14.7 (0.58)	7.9 (0.31)	12.7 (0.50)	6.4 (0.25)	9790 (675)
10	-WT-MTS10	24.6 (0.97)	16.5 (0.65)	7.9 (0.31)	14.3 (0.56)	7.4 (0.29)	8100 (558)
12	-WT-MTS12	29.7 (1.17)	20.2 (0.80)	9.7 (0.38)	17.5 (0.69)	9.5 (0.37)	6820 (470)
14	-WT-MTS14	31.7 (1.25)	23.8 (0.94)	10.0 (0.39)	20.6 (0.81)	10.4 (0.41)	6930 (478)
16	-WT-MTS16	36.0 (1.42)	23.8 (0.94)	10.4 (0.41)	20.6 (0.81)	12.7 (0.50)	6190 (426)
20	-WT-MTS20	39.6 (1.56)	29.3 (1.15)	11.2 (0.44)	25.4 (1.00)	17.0 (0.67)	5510 (380)
22	-WT-MTS22	41.3 (1.63)	31.2 (1.23)	13.5 (0.53)	27.0 (1.06)	19.0 (0.75)	5700 (396)
25	-WT-MTS25	48.8 (1.92)	36.7 (1.44)	15.7 (0.62)	31.8 (1.25)	22.0 (0.87)	5450 (376)



## Union Crosses

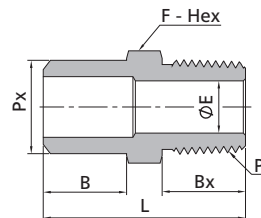


Fractional Tube		Dimensions, in. (mm)					Working Pressure psig (bar)
T-Tube Size (in.)	Basic Ordering Number	L	D	B	F	E	
1/8	-WC-TS2	0.59 (15.0)	0.43 (11.0)	0.10 (2.5)	0.44 (11.1)	0.09 (2.3)	12600 (863)
1/4	-WC-TS4	0.86 (21.8)	0.50 (12.8)	0.28 (7.1)	0.44 (11.1)	0.19 (4.8)	10700 (737)
3/8	-WC-TS6	1.04 (26.4)	0.58 (14.7)	0.31 (7.9)	0.50 (12.7)	0.28 (7.1)	8100 (558)
1/2	-WC-TS8	1.17 (29.7)	0.80 (20.2)	0.38 (9.7)	0.69 (17.5)	0.41 (10.4)	6600 (454)
5/8	-WC-TS10	1.42 (36.1)	0.94 (23.8)	0.41 (10.4)	0.81 (20.6)	0.50 (12.7)	6200 (428)
3/4	-WC-TS12	1.56 (39.6)	1.15 (29.3)	0.44 (11.2)	1.00 (25.4)	0.63 (16.0)	5900 (406)
1	-WC-TS16	1.92 (48.8)	1.44 (36.7)	0.62 (15.7)	1.25 (31.8)	0.88 (22.4)	5600 (385)

Metric Tube		Dimensions, mm (in.)					Working Pressure psig (bar)
T-Tube Size (mm)	Basic Ordering Number	L	D	B	F	E	
8	-WC-MTS8	19.8 (0.78)	14.7 (0.58)	7.9 (0.31)	12.7 (0.50)	6.4 (0.25)	9790 (675)
10	-WC-MTS10	24.6 (0.97)	16.5 (0.65)	7.9 (0.31)	14.3 (0.56)	7.1 (0.28)	8100 (558)
12	-WC-MTS12	29.7 (1.17)	20.2 (0.80)	9.7 (0.38)	17.5 (0.69)	9.5 (0.37)	6820 (470)
14	-WC-MTS14	31.7 (1.25)	23.8 (0.94)	10.0 (0.39)	20.6 (0.81)	10.4 (0.41)	6930 (478)
16	-WC-MTS16	36.0 (1.42)	23.8 (0.94)	10.4 (0.41)	20.6 (0.81)	12.7 (0.50)	6190 (426)
20	-WC-MTS20	39.6 (1.56)	29.3 (1.15)	11.2 (0.44)	25.4 (1.00)	17.0 (0.67)	5510 (380)
22	-WC-MTS22	1.22 (31.00)	31.2 (1.23)	13.5 (0.53)	27.0 (1.06)	19.0 (0.75)	5700 (396)
25	-WC-MTS25	48.8 (1.92)	36.7 (1.44)	15.7 (0.62)	31.8 (1.25)	22.0 (0.87)	5450 (376)

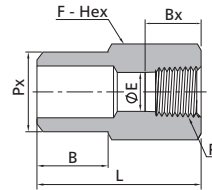
## Pipe Butt Weld Fittings

## Male Connectors



Pipe			Dimensions, in. (mm)					Working Pressure psig (bar)
Px-Sch80 Pipe Size	P-NPT Size	Basic Ordering Number	L	B	Bx	F	E	
1/4	1/4	-WM-PB4-NS4	1.35 (34.3)	0.56 (14.2)	0.56 (14.2)	0.56 (14.3)	0.28 (7.1)	8000 (551)
1/4	1/2	-WM-PB4-NS8	1.63 (41.3)	0.56 (14.2)	0.75 (19.1)	0.87 (22.2)	0.30 (7.7)	7700 (537)
3/8	1/4	-WM-PB6-NS4	1.37 (34.8)	0.56 (14.2)	0.56 (14.2)	0.69 (17.5)	0.28 (7.1)	6650 (459)
3/8	1/2	-WM-PB6-NS8	1.63 (41.3)	0.56 (14.2)	0.75 (19.1)	0.87 (22.2)	0.42 (10.7)	6650 (459)
1/2	1/4	-WM-PB8-NS4	1.63 (41.3)	0.75 (19.1)	0.56 (14.2)	0.87 (22.2)	0.28 (7.1)	6190 (427)
1/2	1/2	-WM-PB8-NS8	1.82 (46.2)	0.75 (19.1)	0.75 (19.1)	0.87 (22.2)	0.47 (11.9)	6190 (427)
3/4	1/4	-WM-PB12-NS4	1.69 (42.9)	0.75 (19.1)	0.56 (14.2)	1.06 (27.0)	0.28 (7.1)	5040 (348)
3/4	1/2	-WM-PB12-NS8	1.88 (47.8)	0.75 (19.1)	0.75 (19.1)	1.06 (27.0)	0.47 (11.9)	5040 (348)
1	1/4	-WM-PB16-NS4	1.97 (50.0)	0.94 (23.9)	0.56 (14.2)	1.37 (34.9)	0.28 (7.1)	4640 (320)
1	1/2	-WM-PB16-NS8	2.16 (54.9)	0.94 (23.9)	0.75 (19.1)	1.37 (34.9)	0.47 (11.9)	4640 (320)

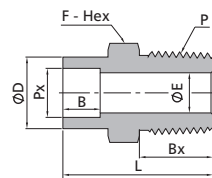
Female Connectors



Pipe			Dimensions, in. (mm)					NPT Thread	Working Pressure psig (bar)
Px-Sch80 Pipe Size	P-NPT Size	Basic Ordering Number	L	B	Bx	F	E		
1/4	1/2	-WF-PB4-NS8	1.53 (38.9)	0.56 (14.2)	0.78 (19.8)	1.06 (27.0)	0.30 (7.6)	4900 (337)	
3/8	1/2	-WF-PB6-NS8	1.53 (38.9)	0.56 (14.2)	0.78 (19.8)	1.06 (27.0)	0.42 (10.7)	4900 (337)	
1/2	1/4	-WF-PB8-NS4	1.47 (37.3)	0.75 (19.1)	0.59 (15.0)	0.87 (22.2)	0.41 (10.4)	7500 (516)	
1/2	1/2	-WF-PB8-NS8	1.72 (43.7)	0.75 (19.1)	0.78 (19.8)	1.06 (27.0)	0.55 (13.9)	4900 (337)	

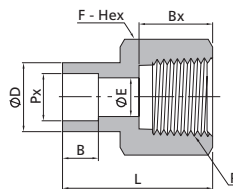
Pipe Socket Weld Fittings

Male Connectors



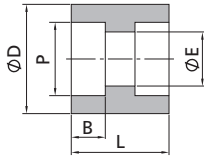
Pipe			Dimensions, in. (mm)					NPT Thread	Working Pressure psig (bar)
Px-Pipe Size	P-NPT Size	Basic Ordering Number	L	D	B	Bx	F	E	
1/4	1/4	-WM-PS4-NS4	1.39 (35.2)	0.88 (22.4)	0.39 (9.9)	0.56 (14.2)	0.94 (23.8)	0.28 (7.1)	8000 (551)
1/4	1/2	-WM-PS4-NS8	1.57 (40.0)	0.88 (22.4)	0.39 (9.9)	0.75 (19.1)	0.94 (23.8)	0.36 (9.1)	7700 (530)
3/8	3/8	-WM-PS6-NS6	1.50 (38.0)	1.03 (26.2)	0.39 (9.9)	0.56 (14.2)	1.06 (27.0)	0.38 (9.7)	7100 (489)
3/8	1/2	-WM-PS6-NS8	1.69 (42.9)	1.03 (26.2)	0.39 (9.9)	0.75 (19.1)	1.06 (27.0)	0.47 (11.9)	7100 (489)
1/2	3/8	-WM-PS8-NS6	1.59 (40.3)	1.25 (31.8)	0.39 (9.9)	0.56 (14.2)	1.31 (33.3)	0.38 (9.7)	6800 (468)
1/2	1/2	-WM-PS8-NS8	1.78 (45.2)	1.25 (31.8)	0.39 (9.9)	0.75 (19.1)	1.31 (33.3)	0.47 (11.9)	6800 (468)
3/4	1/2	-WM-PS12-NS8	2.14 (54.3)	1.47 (37.3)	0.51 (13.0)	0.75 (19.1)	1.50 (38.1)	0.47 (11.9)	5800 (399)
3/4	3/4	-WM-PS12-NS12	2.14 (54.3)	1.47 (37.3)	0.51 (13.0)	0.75 (19.1)	1.50 (38.1)	0.62 (15.7)	5800 (399)
1	3/4	-WM-PS16-NS12	2.20 (55.8)	1.86 (47.2)	0.51 (13.0)	0.75 (19.1)	1.87 (47.6)	0.62 (15.7)	6100 (420)
1	1	-WM-PS16-NS16	2.39 (60.6)	1.86 (47.2)	0.51 (13.0)	0.94 (23.9)	1.87 (47.6)	0.88 (22.4)	5300 (365)

Female Connectors



Pipe			Dimensions, in. (mm)					NPT Thread	Working Pressure psig (bar)
Px-Pipe Size	P-NPT Size	Basic Ordering Number	L	D	B	Bx	F	E	
1/4	1/4	-WF-PS4-NS4	1.32 (33.5)	0.88 (22.4)	0.39 (9.9)	0.59 (15.0)	0.94 (23.8)	0.36 (9.1)	8000 (551)
1/4	3/8	-WF-PS4-NS6	1.32 (33.5)	0.88 (22.4)	0.39 (9.9)	0.59 (15.0)	0.94 (23.8)	0.36 (9.1)	6790 (463)
3/8	3/8	-WF-PS6-NS6	1.34 (34.1)	1.03 (26.2)	0.39 (9.9)	0.59 (15.0)	1.06 (27.0)	0.49 (12.4)	7100 (489)
3/8	1/2	-WF-PS6-NS8	1.54 (39.1)	1.03 (26.2)	0.39 (9.9)	0.78 (19.8)	1.06 (27.0)	0.49 (12.4)	4900 (337)
1/2	1/2	-WF-PS8-NS8	1.57 (40.0)	1.25 (31.8)	0.39 (9.9)	0.78 (19.8)	1.31 (33.3)	0.62 (15.7)	6800 (468)
1/2	3/4	-WF-PS8-NS12	1.60 (40.6)	1.25 (31.8)	0.39 (9.9)	0.81 (20.6)	1.31 (33.3)	0.62 (15.7)	4600 (316)
3/4	3/4	-WF-PS12-NS12	2.09 (53.2)	1.47 (37.3)	0.51 (13.0)	0.81 (20.6)	1.50 (38.1)	0.82 (20.8)	5800 (399)
3/4	1	-WF-PS12-NS16	2.29 (58.1)	1.47 (37.3)	0.51 (13.0)	1.00 (25.4)	1.63 (41.3)	0.82 (20.8)	4400 (303)

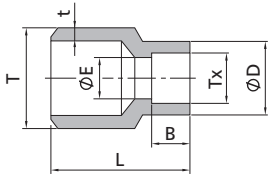
## Unions



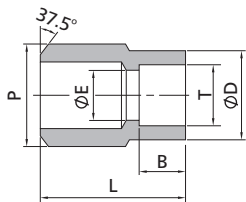
Pipe		Dimensions, in. (mm)				Working Pressure psig (bar)
P-Pipe Size	Basic Ordering Number	L	D	B	E	
1/8	-WU-PS2	1.01 (25.7)	0.67 (17.1)	0.39 (9.9)	0.28 (7.0)	8230 (568)
1/4	-WU-PS4	1.06 (26.9)	0.88 (22.4)	0.39 (9.9)	0.38 (9.7)	8000 (551)
3/8	-WU-PS6	1.12 (28.4)	1.03 (26.2)	0.39 (9.9)	0.49 (12.4)	7100 (489)
1/2	-WU-PS8	1.16 (29.5)	1.25 (31.8)	0.39 (9.9)	0.62 (15.7)	6800 (468)
3/4	-WU-PS12	1.75 (44.5)	1.47 (37.3)	0.51 (13.0)	0.82 (20.8)	5800 (399)
1	-WU-PS16	1.75 (44.5)	1.86 (47.2)	0.51 (13.0)	1.05 (26.7)	6100 (420)

## Weld Adapters

## Tube Butt Weld to Tube Socket Weld



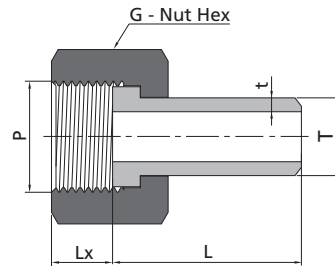
Fractional Tube								
T-Tube O.D. (in.)	t-Wall Thickness (in.)	Tx-Tube Size (in.)	Basic Ordering Number	Dimensions, in. (mm)				Working Pressure psig (bar)
				L	B	D	E	
1/4	0.083	1/8	-WA-TB4-TS2	0.56 (14.2)	0.10 (2.5)	0.31 (8.0)	0.09 (2.3)	12600 (868)
3/8	0.095	1/4	-WA-TB6-TS4	0.75 (19.1)	0.28 (7.1)	0.48 (12.2)	0.19 (4.8)	8200 (564)
1/2	0.095	1/4	-WA-TB8-TS4	0.88 (22.4)	0.28 (7.1)	0.50 (12.7)	0.19 (4.8)	7500 (516)
1/2	0.095	3/8	-WA-TB8-TS6	0.88 (22.4)	0.31 (7.9)	0.60 (15.2)	0.28 (7.1)	7500 (516)
3/4	0.120	1/2	-WA-TB12-TS8	1.12 (28.4)	0.38 (9.7)	0.73 (18.5)	0.41 (10.4)	6300 (434)
1	0.134	1/2	-WA-TB16-TS8	1.38 (35.1)	0.38 (9.7)	0.73 (18.5)	0.41 (10.4)	5300 (365)
1	0.134	3/4	-WA-TB16-TS12	1.50 (38.1)	0.44 (11.2)	1.04 (26.4)	0.63 (16.0)	5300 (365)

Pipe Butt Weld to  
Tube Socket Weld

Pipe			Fractional Tube				Working Pressure psig (bar)
P-Sch80 Pipe Size	T-Tube Size (in.)	Basic Ordering Number	Dimensions, in. (mm)				
			L	B	D	E	
1/4	1/4	-WA-PB4-TS4	0.88 (22.4)	0.28 (7.1)	0.48 (12.2)	0.19 (4.8)	10810 (744)
3/8	1/4	-WA-PB6-TS4	1.03 (26.2)	0.31 (7.9)	0.48 (12.2)	0.19 (4.8)	8500 (586)
3/8	3/8	-WA-PB6-TS6	1.03 (26.2)	0.31 (7.9)	0.60 (15.2)	0.28 (7.1)	8500 (586)
3/8	1/2	-WA-PB6-TS8	1.00 (25.4)	0.38 (9.7)	0.73 (18.5)	0.41 (10.4)	6930 (476)
1/2	1/4	-WA-PB8-TS4	1.12 (28.4)	0.28 (7.1)	0.48 (12.2)	0.19 (4.8)	8190 (563)
1/2	3/8	-WA-PB8-TS6	1.12 (28.4)	0.31 (7.9)	0.60 (15.2)	0.28 (7.1)	8190 (563)
1/2	1/2	-WA-PB8-TS8	1.19 (30.2)	0.38 (9.7)	0.73 (18.5)	0.41 (10.4)	6930 (476)
3/4	1/4	-WA-PB12-TS4	1.50 (38.1)	0.28 (7.1)	0.48 (12.2)	0.19 (4.8)	6930 (476)
3/4	3/8	-WA-PB12-TS6	1.50 (38.1)	0.31 (7.9)	0.60 (15.2)	0.28 (7.1)	6930 (476)
3/4	1/2	-WA-PB12-TS8	1.50 (38.1)	0.38 (9.7)	0.73 (18.5)	0.41 (10.4)	6930 (476)
3/4	3/4	-WA-PB12-TS12	1.50 (38.1)	0.44 (11.2)	1.04 (26.4)	0.63 (16.0)	6190 (483)
1	3/8	-WA-PB16-TS6	1.38 (35.1)	0.31 (7.9)	0.60 (15.2)	0.28 (7.1)	6300 (434)
1	1/2	-WA-PB16-TS8	1.56 (39.6)	0.38 (9.7)	0.73 (18.5)	0.41 (10.4)	6300 (434)

## Pipe to Weld Fittings

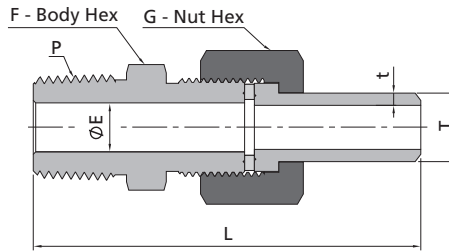
### Pipe to Tube Butt Weld



ISO Parallel Thread				Metric Tube			
P-ISO Thread Size	T-Tube O.D. (mm)	t-Wall Thickness (mm)	Basic Ordering Number	Dimensions, mm (in.)			Working Pressure psig (bar)
				L	G	Lx	
1/2	12	2.2	-PUW-RG8-MTB12	34.0 (1.34)	27.0 (1.06)	11.0 (0.43)	6470 (446)
1/2	14	2.5	-PUW-RG8-MTB14	34.0 (1.34)	27.0 (1.06)	11.0 (0.43)	6280 (433)
1/2	16	2.8	-PUW-RG8-MTB16	34.0 (1.34)	27.0 (1.06)	11.0 (0.43)	6140 (423)

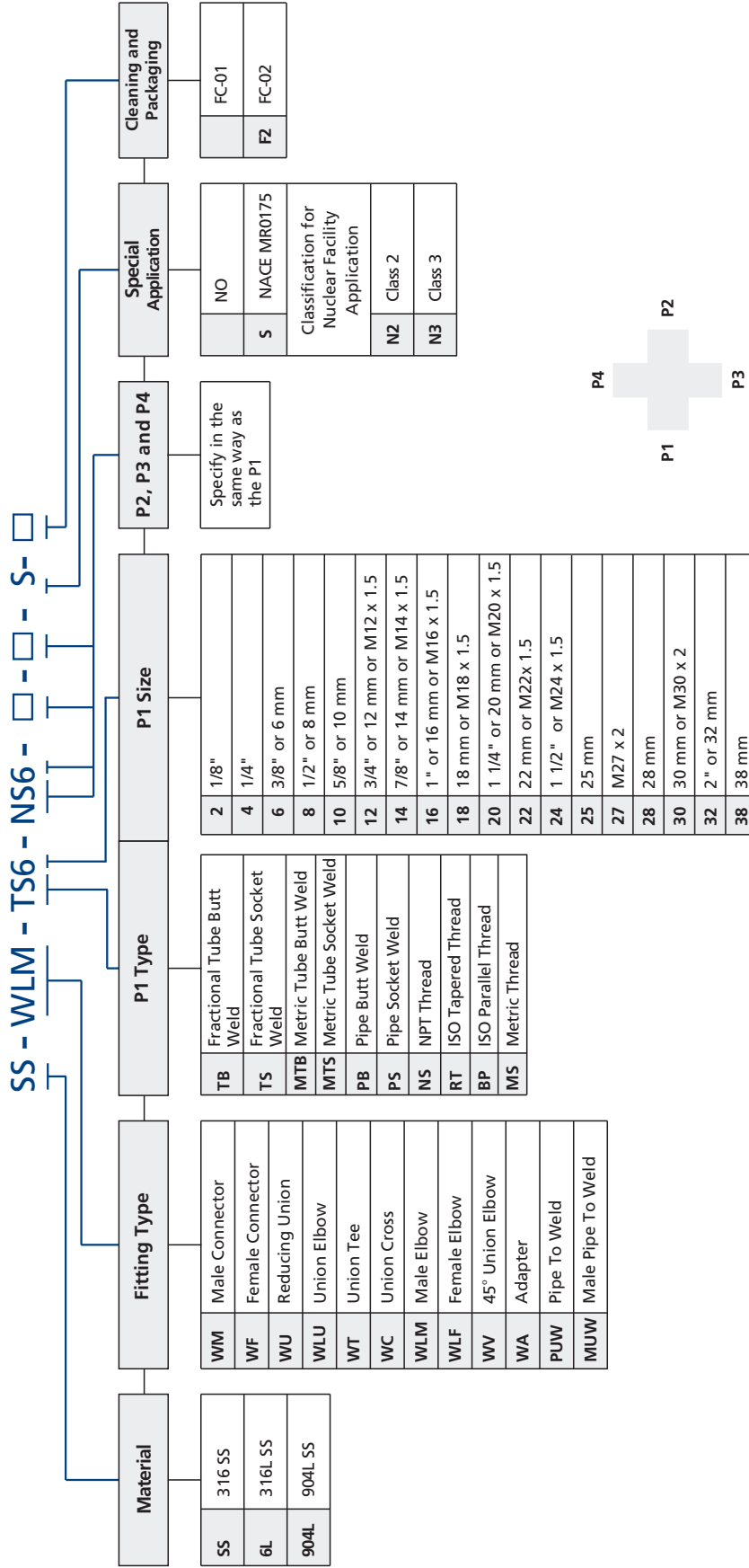
Metric Thread				Metric Tube			
P-Metric Thread Size	T-Tube O.D. (mm)	t-Wall Thickness (mm)	Basic Ordering Number	Dimensions, mm (in.)			Working Pressure psig (bar)
				L	G	Lx	
M12 x 1.5	6	1.8	-PUW-MS12-MTB6	25.0 (0.98)	16.0 (0.63)	9.0 (0.35)	12660 (873)
M12 x 1.5	8	1.8	-PUW-MS12-MTB8	30.0 (1.18)	16.0 (0.63)	9.0 (0.35)	8320 (574)
M14 x 1.5	8	1.8	-PUW-MS14-MTB8	30.0 (1.18)	18.0 (0.71)	9.0 (0.35)	8320 (574)
M14 x 1.5	10	2.2	-PUW-MS14-MTB10	30.0 (1.18)	18.0 (0.71)	9.0 (0.35)	8160 (563)
M16 x 1.5	8	1.8	-PUW-MS16-MTB8	30.0 (1.18)	22.0 (0.87)	9.0 (0.35)	8320 (574)
M16 x 1.5	10	2.2	-PUW-MS16-MTB10	30.0 (1.18)	22.0 (0.87)	9.0 (0.35)	8160 (563)
M16 x 1.5	12	2.2	-PUW-MS16-MTB12	34.0 (1.34)	22.0 (0.87)	9.0 (0.35)	6470 (446)
M18 x 1.5	10	2.2	-PUW-MS18-MTB10	34.0 (1.34)	22.0 (0.87)	10.0 (0.39)	8160 (563)
M18 x 1.5	12	2.2	-PUW-MS18-MTB12	34.0 (1.34)	22.0 (0.87)	10.0 (0.39)	6470 (446)
M18 x 1.5	14	2.5	-PUW-MS18-MTB14	34.0 (1.34)	22.0 (0.87)	10.0 (0.39)	6280 (433)
M20 x 1.5	10	2.2	-PUW-MS20-MTB10	34.0 (1.34)	25.0 (0.98)	11.0 (0.43)	8160 (563)
M20 x 1.5	12	2.2	-PUW-MS20-MTB12	34.0 (1.34)	25.0 (0.98)	11.0 (0.43)	6470 (446)
M20 x 1.5	14	2.5	-PUW-MS20-MTB14	34.0 (1.34)	25.0 (0.98)	11.0 (0.43)	6280 (433)
M20 x 1.5	15	2.5	-PUW-MS20-MTB15	34.0 (1.34)	25.0 (0.98)	11.0 (0.43)	6160 (425)
M20 x 1.5	16	2.8	-PUW-MS20-MTB16	34.0 (1.34)	25.0 (0.98)	11.0 (0.43)	6140 (423)
M22 x 1.5	14	2.5	-PUW-MS22-MTB14	34.0 (1.34)	27.0 (1.06)	11.0 (0.43)	6280 (433)
M22 x 1.5	16	2.8	-PUW-MS22-MTB16	34.0 (1.34)	27.0 (1.06)	11.0 (0.43)	6140 (423)
M24 x 1.5	16	2.8	-PUW-MS24-MTB16	34.0 (1.34)	30.0 (1.18)	11.0 (0.43)	6140 (423)
M24 x 1.5	18	2.8	-PUW-MS24-MTB18	34.0 (1.34)	30.0 (1.18)	11.0 (0.43)	5670 (392)
M24 x 1.5	20	3.0	-PUW-MS24-MTB20	34.0 (1.34)	30.0 (1.18)	11.0 (0.43)	5110 (352)
M27 x 2	14	2.5	-PUW-MS27-MTB14	34.0 (1.34)	32.0 (1.26)	14.0 (0.55)	6280 (433)
M27 x 2	16	2.8	-PUW-MS27-MTB16	34.0 (1.34)	32.0 (1.26)	14.0 (0.55)	6140 (423)
M27 x 2	18	2.8	-PUW-MS27-MTB18	34.0 (1.34)	32.0 (1.26)	14.0 (0.55)	5670 (392)
M27 x 2	20	3.0	-PUW-MS27-MTB20	40.0 (1.57)	32.0 (1.26)	14.0 (0.55)	5110 (352)
M27 x 2	22	3.0	-PUW-MS27-MTB22	40.0 (1.57)	32.0 (1.26)	14.0 (0.55)	4620 (319)
M30 x 2	22	3.0	-PUW-MS30-MTB22	40.0 (1.57)	35.0 (1.38)	18.0 (0.71)	4620 (319)
M30 x 2	25	3.5	-PUW-MS30-MTB25	45.0 (1.77)	35.0 (1.38)	18.0 (0.71)	4730 (326)
M33 x 2	28	4.0	-PUW-MS33-MTB28	45.0 (1.77)	41.0 (1.61)	18.0 (0.71)	5160 (356)
M36 x 2	30	4.0	-PUW-MS36-MTB30	45.0 (1.77)	41.0 (1.61)	18.0 (0.71)	4760 (328)

## Male Pipe to Tube Butt Weld



NPT Thread				Metric Tube				
P-NPT Size	T-Tube O.D. (mm)	t-Wall Thickness (mm)	Basic Ordering Number	Dimensions, mm (in.)				Working Pressure psig (bar)
				L	F	G	E	
1/8	14	2.5	-MUW-NS2-MTB14	69.0 (2.72)	19.0 (0.75)	22.0 (0.87)	4.8 (0.19)	6280 (433)
1/4	6	1.8	-MUW-NS4-MTB6	60.0 (2.36)	14.0 (0.55)	14.0 (0.55)	3.0 (0.12)	8240 (566)
1/4	8	1.8	-MUW-NS4-MTB8	73.2 (2.88)	14.0 (0.55)	16.0 (0.63)	4.0 (0.16)	8240 (566)
1/4	10	2.2	-MUW-NS4-MTB10	73.2 (2.88)	15.0 (0.59)	18.0 (0.71)	6.0 (0.24)	8160 (563)
1/4	12	2.2	-MUW-NS4-MTB12	73.2 (2.88)	18.0 (0.71)	22.0 (0.87)	7.0 (0.28)	6470 (446)
1/4	14	2.5	-MUW-NS4-MTB14	73.2 (2.88)	19.0 (0.75)	22.0 (0.87)	7.1 (0.28)	6280 (433)
1/4	16	2.8	-MUW-NS4-MTB16	73.2 (2.88)	22.0 (0.87)	25.0 (0.98)	7.1 (0.28)	6140 (423)
1/4	18	2.8	-MUW-NS4-MTB18	74.2 (2.92)	24.0 (0.94)	27.0 (1.06)	7.1 (0.28)	5670 (392)
3/8	14	2.5	-MUW-NS6-MTB14	73.2 (2.88)	19.0 (0.75)	22.0 (0.87)	9.7 (0.38)	6280 (433)
1/2	12	2.2	-MUW-NS8-MTB12	78.0 (3.07)	18.0 (0.71)	22.0 (0.87)	7.0 (0.28)	6470 (446)
1/2	14	2.5	-MUW-NS8-MTB14	78.0 (3.07)	19.0 (0.75)	22.0 (0.87)	9.0 (0.35)	6280 (433)
1/2	16	2.8	-MUW-NS8-MTB16	78.0 (3.07)	22.0 (0.87)	25.0 (0.98)	10.0 (0.39)	6140 (423)
1/2	22	3.0	-MUW-NS8-MTB22	82.0 (3.23)	30.0 (1.18)	32.0 (1.26)	11.9 (0.47)	4620 (319)
1/2	25	2.8	-MUW-NS8-MTB25	86.0 (3.39)	32.0 (1.26)	35.0 (1.38)	11.9 (0.47)	4730 (326)
1	25	3.5	-MUW-NS16-MTB25	103.0 (4.06)	35.0 (1.38)	35.0 (1.38)	17.0 (0.67)	4730 (326)

# Ordering Number Description



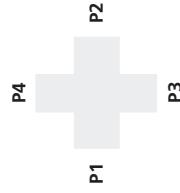
Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

P1, P2, P3 and P4 shall be described in the following orders:

- ☉ Pipe thread connection type after weld connection type ("PUW" and "MUW" excluded)
- ☉ Pipe Butt Weld - Tube Butt Weld - Pipe Socket Weld - Tube Socket Weld - Others
- ☉ Describe in descending order as per size if the end connection types are the same
- ☉ Describe the end of P1 if all end connections are the same

**Cleaning and Packaging:**

- FC-01: Standard cleaning and packaging for general industrial procedures
- FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement as stated in ASTM G93 Level C



# Ball Valves, Plug Valves

Ball Valves

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B-02

Plug Valves

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B-54

# Ball Valves

BF, BFH, BG, BH, BO, BP,  
BR and BV Series

Ball Valves  
Plug Valves





# Contents

## Trunnion Ball Valves

BF and BFH Series



B-04

## 3-piece Ball Valves

BG Series



B-10

## 3-piece Ball Valves

BH Series



B-15

## One-piece Instrumentation Ball Valves

BO Series



B-21

## Bar Stock Ball Valves

BP Series



B-35

## Hex Bar Stock Ball Valves

BR Series



B-41

## High Performance Ball Valves

BV Series



B-45

## Important Information about Ball Valves

- ⦿ FITOK ball valves are designed to be used in fully open or fully closed position.
- ⦿ Packing adjustment may be required during the valve's life (except for BF and BFH series).
- ⦿ For better quality maintenance, FITOK ball valves should be kept in fully open position in warehouse.
- ⦿ Valves that have not been cycled for a period of time may have a higher initial actuation torque.

# Trunnion Ball Valves

## BF and BFH Series

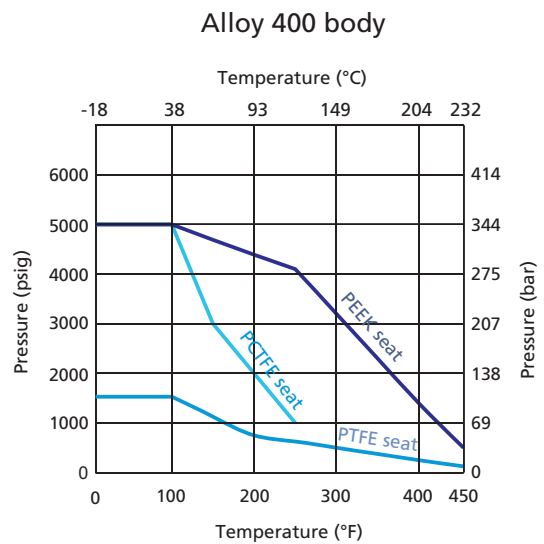
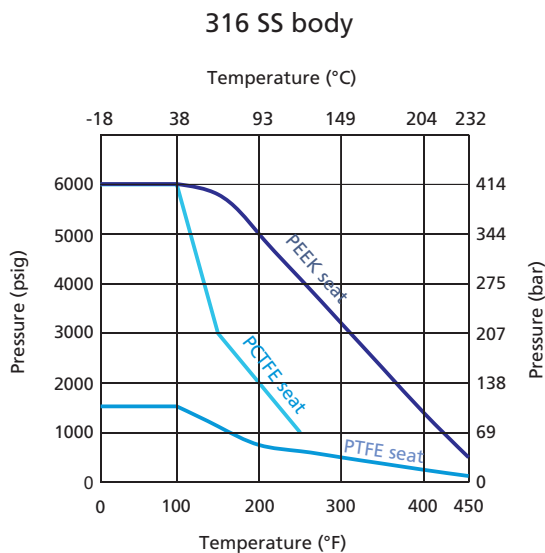
### Features

- ⦿ Working pressure up to: 10,000 psig (690 bar)
- ⦿ Working temperature: 0°F to 450°F (-18°C to 232°C)
- ⦿ Orifice size: 0.19" (4.8 mm)
- ⦿ Fixed ball with double sealing
- ⦿ Trunnion-style ball to prevent ball blowout
- ⦿ Automatic compensation of seat sealing
- ⦿ Low operating torque
- ⦿ Blowout proof stem
- ⦿ Handle as indicator of flow direction
- ⦿ Positive handle stop
- ⦿ Handle color options available
- ⦿ Pneumatic and electric actuator available
- ⦿ Panel mountable
- ⦿ Leak-tight performance testing with nitrogen or compressed air for every valve at the rated pressure (not higher than 6000 psig) to meet the requirement of no visible leak
- ⦿ Compact maximum-flow design
- ⦿ 2- or 3-way flow patterns
- ⦿ Spring-load seats to provide leak tight integrity in both low-and high-pressure systems and reduce seat wear from pressure surges
- ⦿ The inlet of 3-way valve can be any port
- ⦿ Low-temperature service option available for BF series



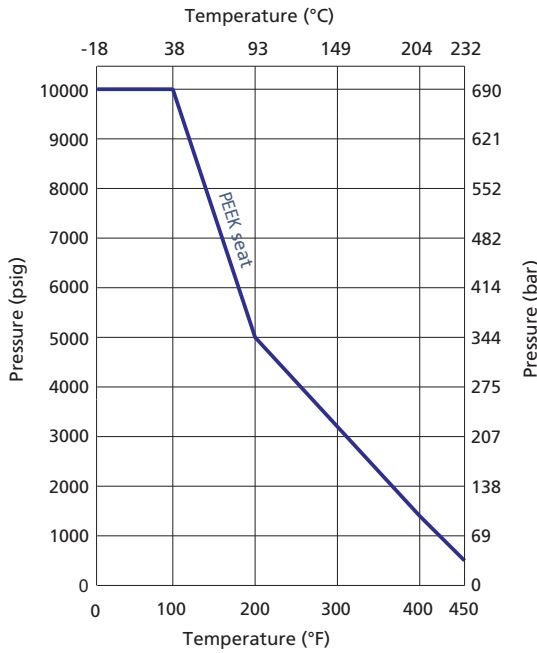
### Pressure vs. Temperature

#### BF Series



## BFH Series

### 316 SS body



### Pressure Rating @ 100°F (38°C)

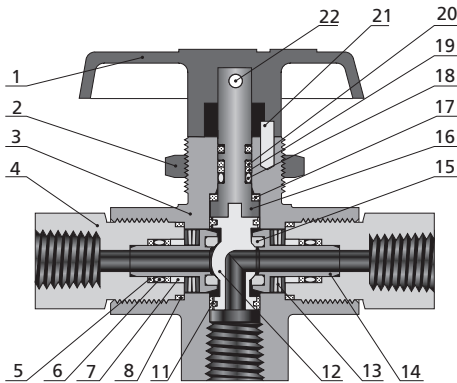
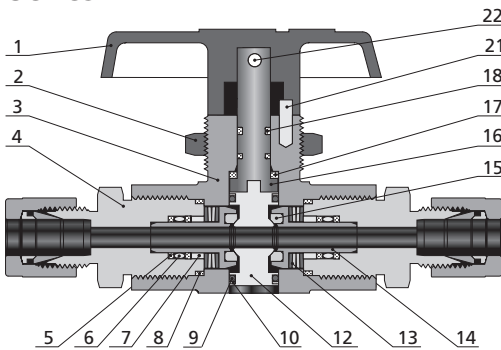
Material	End Connection	Pressure Rating, psig ( bar )
316 SS	FNS2, FNS4 FL4, ML6	10000 (690)
	ML10	8400 (578)
	FL6/ML8	7500 (516)
	FL8	6700 (461)
	ML12	6800 (470)

Note: Maximum working pressure of BFH Series ball valves is 10,000 psig. The specified pressure rating is restricted by end connections.

Ball Valves  
Plug Valves

## Standard Materials of Construction

### BF Series

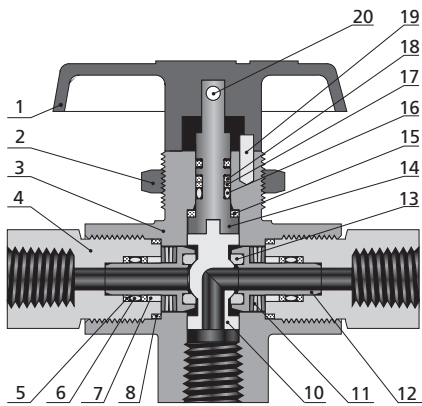
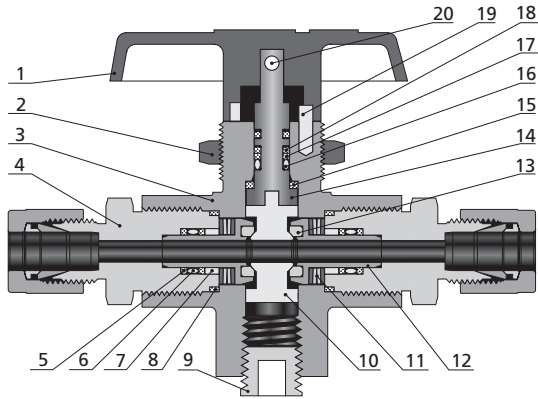


Item	Component	Valve Body Material			
		316 SS		Alloy 400	
		2-way	3-way	2-way	3-way
Material Grade/ASTM Specification					
1	Handle	Nylon with SS insert			
2	Panel Nut	316 SS/A479			
3	Body	316 SS/A182		Alloy 400/B164	
4	End Connection	316 SS/A479		Alloy 400/B164	
5	Seat Retainer Backup Ring	Reinforced PTFE			
6	Seat Retainer O-ring	Fluorocarbon FKM			
7	Seat Retainer Guide	316 SS/A479		Alloy 400/B164	
8	End Connection Seal	PTFE/D1710			
9	Trunnion O-ring	Fluorocarbon FKM	—	Fluorocarbon FKM	—
10	Trunnion Backup Ring	Reinforced PTFE	—	Reinforced PTFE	—
11	Trunnion Bearing	—	PEEK	—	PEEK
12	Ball	316 SS/A479		Alloy 400/B164	
13	Seat Spring	Alloy X-750/AMS 5542			
14	Seat Retainer	316 SS/A479		Alloy 400/B164	
15	Seat	PTFE or PEEK or PCTFE			
16	Stem	316 SS/A479		Alloy 400/B164	
17	Stem Washer	PEEK			
18	Stem O-ring	Fluorocarbon FKM		Fluorocarbon FKM	
19	Secondary Stem Backup Ring	—	PTFE/D1710	—	PTFE/D1710
20	Primary Stem Backup Ring	—	PEEK	—	PEEK
21	Stop Pin	SS			
22	Set Screw	Galvanized carbon steel			
Lubricants		Fluorinated-based			

Note: Wetted components are listed in italics.

1. Ball trunnions are PTFE coated for BF series 2-way valves.
2. For other materials, please contact FITOK Group or our authorized distributors.

**BFH Series**



Item	Component	2-way	3-way
		Material Grade/ASTM Specification	
1	<i>Handle</i>	<i>Nylon with SS insert</i>	
2	<i>Panel Nut</i>	<i>316 SS/A479</i>	
3	<i>Body</i>	<i>316 SS/A182</i>	
4	<i>End Connection</i>	<i>316 SS/A479</i>	
5	<i>Seat Retainer Backup Ring</i>	<i>Reinforced PTFE</i>	
6	<i>Seat Retainer O-ring</i>	<i>Fluorocarbon FKM</i>	
7	<i>Seat Retainer Guide</i>	<i>316 SS/A479</i>	
8	<i>End Connection Seal</i>	<i>PTFE/D1710</i>	
9	<i>Plug</i>	<i>316 SS/A479</i>	
10	<i>Ball</i>	<i>S21800/A479</i>	
11	<i>Seat Spring</i>	<i>Alloy X-750/AMS 5542</i>	
12	<i>Seat Retainer</i>	<i>316 SS/A479</i>	
13	<i>Seat</i>	<i>PEEK</i>	
14	<i>Stem</i>	<i>316 SS/A479</i>	
15	<i>Stem Washer</i>	<i>PEEK</i>	
16	<i>Stem O-ring</i>	<i>Fluorocarbon FKM</i>	
17	<i>Secondary Stem Backup Ring</i>	<i>PTFE/D1710</i>	
18	<i>Primary Stem Backup Ring</i>	<i>PEEK</i>	
19	<i>Stop Pin</i>	<i>SS</i>	
20	<i>Set Screw</i>	<i>Galvanized carbon steel</i>	
<i>Lubricants</i>		<i>Fluorinated-based</i>	

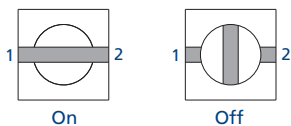
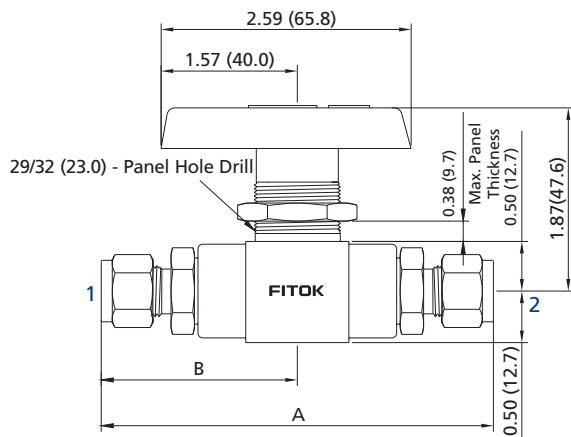
Note: Wetted components are listed in italics.

1. Ball trunnions are PTFE coated for BFH series ball valves.

2. For other materials, please contact FITOK Group or our authorized distributors.

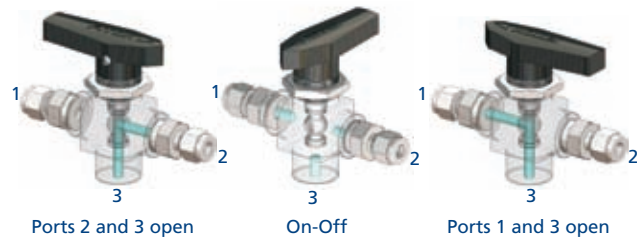
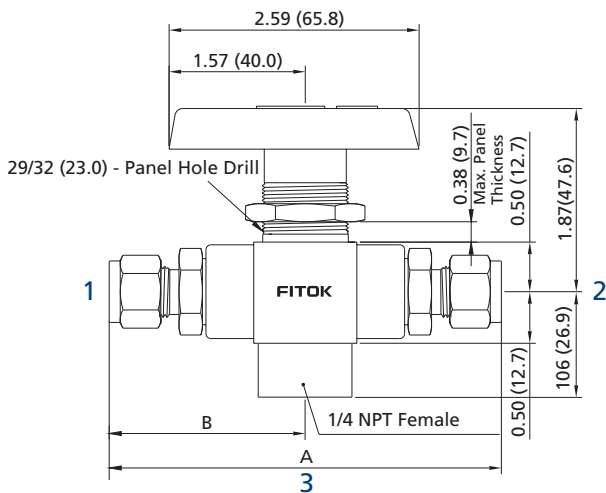
**Dimensions**

**2-way Valves**



Basic Ordering Number		Connection Type and Size		Cv	Dimensions, in. (mm)	
BF Series	BFH Series	Connection 1	Connection 2		A	B
BF□□-FNS2	BFH□□-FNS2-P	1/8 Female NPT	1/8 Female NPT	1.2	2.94 (74.7)	1.47 (37.3)
BF□□-FNS4	BFH□□-FNS4-P	1/4 Female NPT	1/4 Female NPT	1.0		
BF□□-FNS8	BFH□□-FNS8-P	1/2 Female NPT	1/2 Female NPT	1.2	4.25 (108.0)	2.13 (54.1)
BF□□-FL4	BFH□□-FL4-P	1/4" FITOK	1/4" FITOK	1.6	4.14 (105.2)	2.07 (52.6)
BF□□-FL6	BFH□□-FL6-P	3/8" FITOK	3/8" FITOK	1.4	4.39 (111.5)	2.19 (55.6)
BF□□-FL8	BFH□□-FL8-P	1/2" FITOK	1/2" FITOK	1.0	4.60 (116.8)	2.30 (58.4)
BF□□-ML6	BFH□□-ML6-P	6 mm FITOK	6 mm FITOK	1.6	4.14 (105.2)	2.07 (52.6)
BF□□-ML8	BFH□□-ML8-P	8 mm FITOK	8 mm FITOK	1.5	4.15 (105.4)	
BF□□-ML10	BFH□□-ML10-P	10 mm FITOK	10 mm FITOK	1.3	4.41 (112.0)	2.20 (55.9)
BF□□-ML12	BFH□□-ML12-P	12 mm FITOK	12 mm FITOK	1.0	4.60 (116.8)	2.30 (58.4)

### 3-way Valves



Basic Ordering Number		Connection Type and Size			Cv	Dimensions, in. (mm)	
BF Series	BFH Series	Connection 1	Connection 2	Connection 3		A	B
BF□□-FNS2-3	BFH□□-FNS2-P-3	1/8 Female NPT	1/8 Female NPT	1/4 Female NPT	0.75	2.94 (74.7)	1.47 (37.3)
BF□□-FNS4-3	BFH□□-FNS4-P-3	1/4 Female NPT	1/4 Female NPT				
BF□□-FL4-3	BFH□□-FL4-P-3	1/4" FITOK	1/4" FITOK			4.14 (105.2)	2.07 (52.6)
BF□□-FL6-3	BFH□□-FL6-P-3	3/8" FITOK	3/8" FITOK			4.39 (111.5)	2.19 (55.6)
BF□□-FL8-3	BFH□□-FL8-P-3	1/2" FITOK	1/2" FITOK			4.60 (116.8)	2.30 (58.4)
BF□□-ML6-3	BFH□□-ML6-P-3	6 mm FITOK	6 mm FITOK			4.14 (105.2)	2.07 (52.6)
BF□□-ML8-3	BFH□□-ML8-P-3	8 mm FITOK	8 mm FITOK			4.15 (105.4)	
BF□□-ML10-3	BFH□□-ML10-P-3	10 mm FITOK	10 mm FITOK			4.41 (112.0)	2.20 (55.9)
BF□□-ML12-3	BFH□□-ML12-P-3	12 mm FITOK	12 mm FITOK			4.60 (116.8)	2.30 (58.4)

1. FITOK means FITOK double ferrule tube fittings.
2. Sizes and types listed are standard. Other sizes and types are available upon request, please contact FITOK Group or our authorized distributors.
3. Dimensions are shown with tube fitting nuts finger-tightened. All dimensions are for reference only and are subject to change.  
For dimensions not shown above, please contact FITOK Group or our authorized distributors.
4. Bottom port of all 3-way valves is 1/4 in. female NPT.

## Low-Temperature Service Option

Trunnion ball valves for low-temperature service, with a temperature rating of -40°F to 248°F (-40°C to 120°C), are available.

Low-temperature valves have low-temperature FKM O-rings.

All other materials are the same as those of standard valves.

To order a valve for low-temperature service, insert -LT into the valve ordering number.

For example: BFSS-FL4-P-LT

## Low-Temperature BF Series Pressure-Temperature Ratings

Seat Material	PEEK	PCTFE	PTFE
Temperature °C (°F)	Working Pressure psig (bar)		
-40 (-40) to 38 (100)	3770 (260)	3770 (260)	1500 (103)
65 (150)		Refer to Pressure vs. Temperature curve of standard valves	Refer to Pressure vs. Temperature curve of standard valves
120 (248)			

## BF & BFH Series Seal Kits

Seal kits contain components of the same materials as new components. See "**Standard Materials of Construction**".

To order the seal kits, please add the seat material code to the basic ordering number in the table below.

PTFE's code is T, PCTFE's code is K, PEEK's code is P.

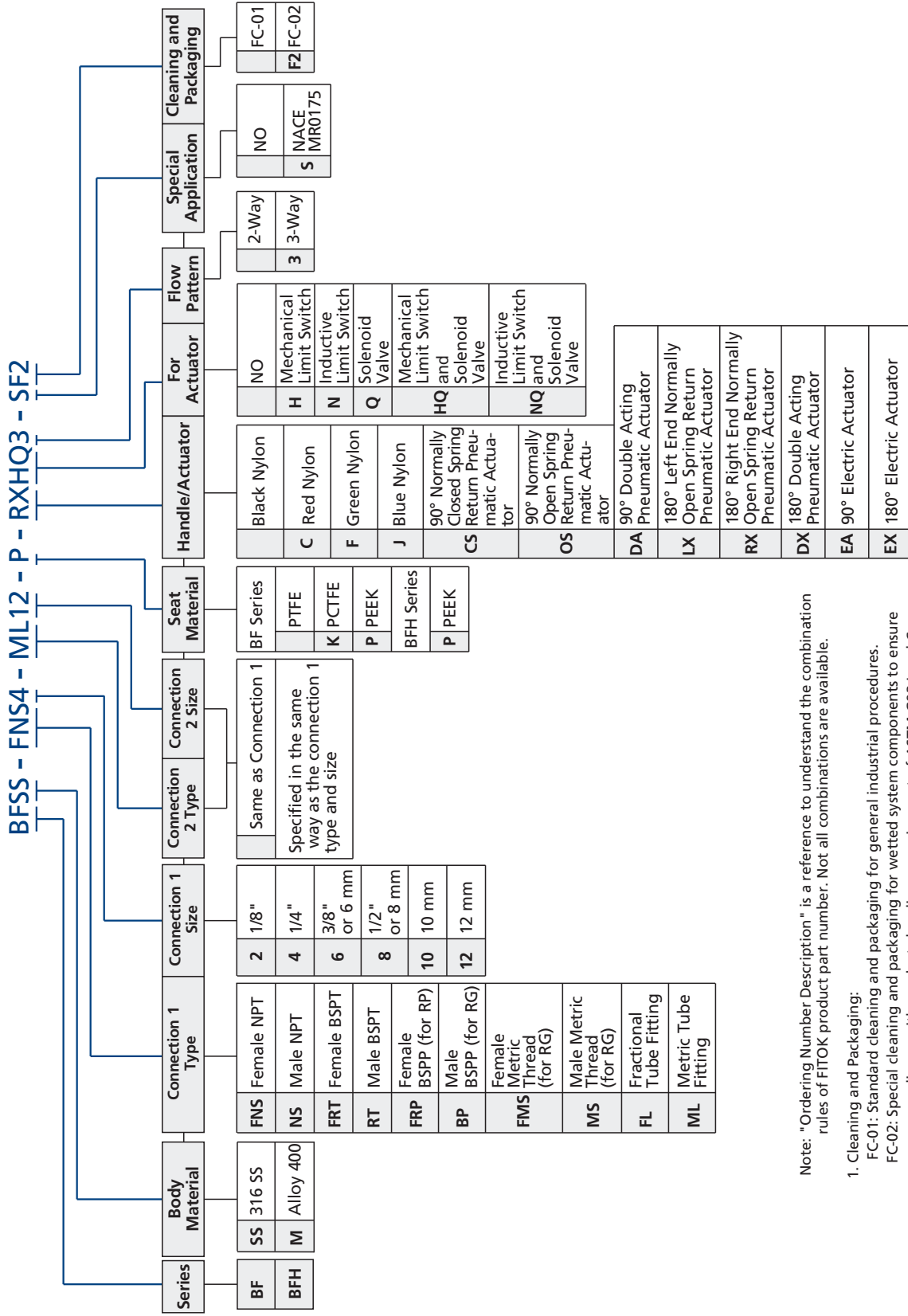
Example: BFSS-2-ZT

Valve Series	Basic Seal Kit Ordering Number	Kit Contents
BF 2-way	BFSS-2-Z	Instructions, O-rings, stem washer, ball, seat subassemblies (seats and seat retainers), seat springs, end connection seals, lubricant
BF 3-way	BFSS-3-Z	Instructions, stem, O-rings, backup rings, stem washer, trunnion bearing, ball, seat subassemblies (seats and seat retainers), seat springs, end connection seals, lubricant
BFH 2-way	BFHSS-2-Z	Instructions, stem, O-rings, backup rings, stem washer, ball, seat subassemblies (seats and seat retainers), seat springs, end connection seals, lubricant
BFH 3-way	BFHSS-3-Z	

Basic seal kit ordering numbers specify 316 SS material. To order other materials, please replace the ordering number of the SS with the appropriate material designator.

For example, alloy 400 seal kit, please replace SS with M. Example: BFM-2-ZP.

# Ordering Number Description



Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

- Cleaning and Packaging:  
 FC-01: Standard cleaning and packaging for general industrial procedures.  
 FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.
- For more information about pneumatic actuator ball valves, please refer to the catalog **Automatic Control Ball Valves**.

# 3-piece Ball Valves

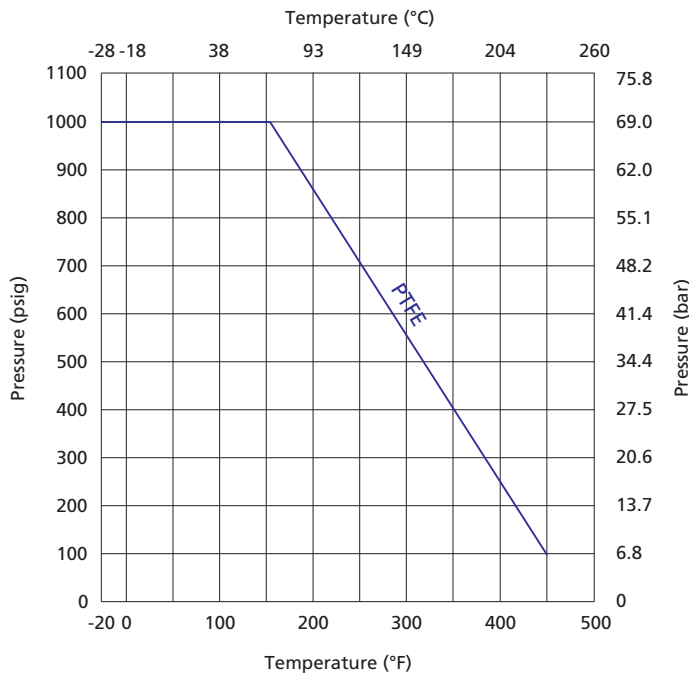
## BG Series

### Features

- ⦿ Working pressure up to: 1000 psig (69.0 bar)
- ⦿ Working temperature: -20°F to 450°F (-28°C to 232°C)
- ⦿ End connections:
  - 1/8 to 1 thread
  - 1/8" to 1" pipe butt or socket weld
  - 1/4" to 1" and 6 mm to 25 mm tube butt or socket weld
  - 1/4" to 1" and 6 mm to 25 mm tube fitting
- ⦿ Orifice sizes: 0.19" (4.8 mm) to 1" (25 mm)
- ⦿ Blowout proof stem
- ⦿ Bidirectional flow
- ⦿ Leak-tight performance testing with nitrogen or compressed air for every valve at the rated pressure to meet the requirement of no visible leak



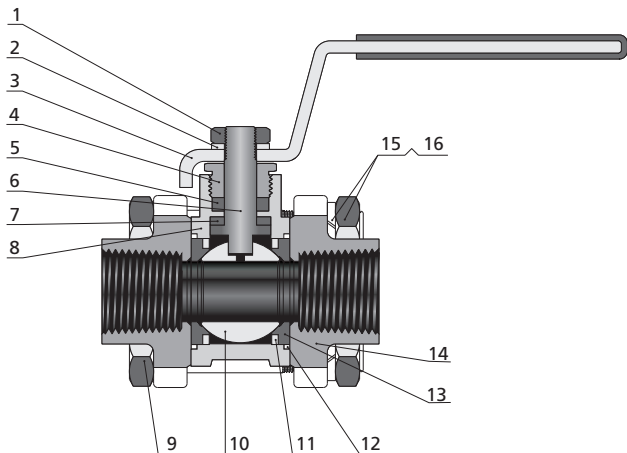
### Pressure vs. Temperature



Note: The temperature and pressure rating are based on valves of standard materials.



## Standard Materials of Construction



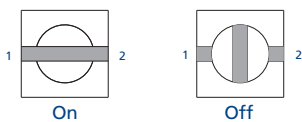
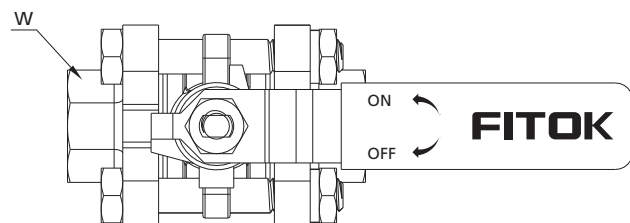
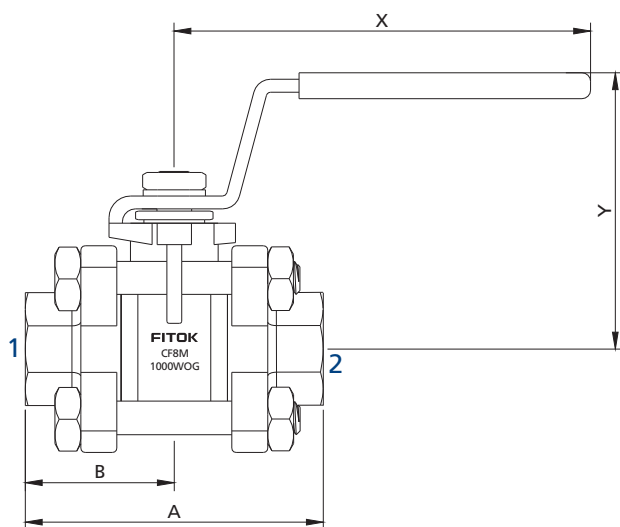
Item	Component	Valve Body Material	
		CF8M/A351	CF8/A351
1	Stem Nut	SS	
2	Gasket	SS	
3	Handle	304 SS/A240 (with vinyl sleeve)	
4	Gland	316 SS/A479 or 304 SS/A479	
5	Stem Packing	PTFE/D1710	
6	Stem	316 SS/A479 or 304 SS/A479	
7	Stem Bearing	PTFE/D1710	
8	Body	CF8M/A351	CF8/A351
9	Body Bolt	SS	
10	Ball	316 SS/A479 or 304 SS/A479	
11	Support Ring	316 SS/A240 or 304 SS/A240	
12	Flange Seal	PTFE/D1710	
13	Seat	PTFE/D1710	
14	End Connection	CF8M/A351	CF8/A351
15	Gasket	SS	
16	Nut	SS	
Lubricants		Silicone-based and PTFE-based	

Ball Valves  
Plug Valves

Note: Wetted components are listed in italics.

For other materials, please contact FITOK Group or our authorized distributors.

## Dimensions



## B-12 Ball Valves

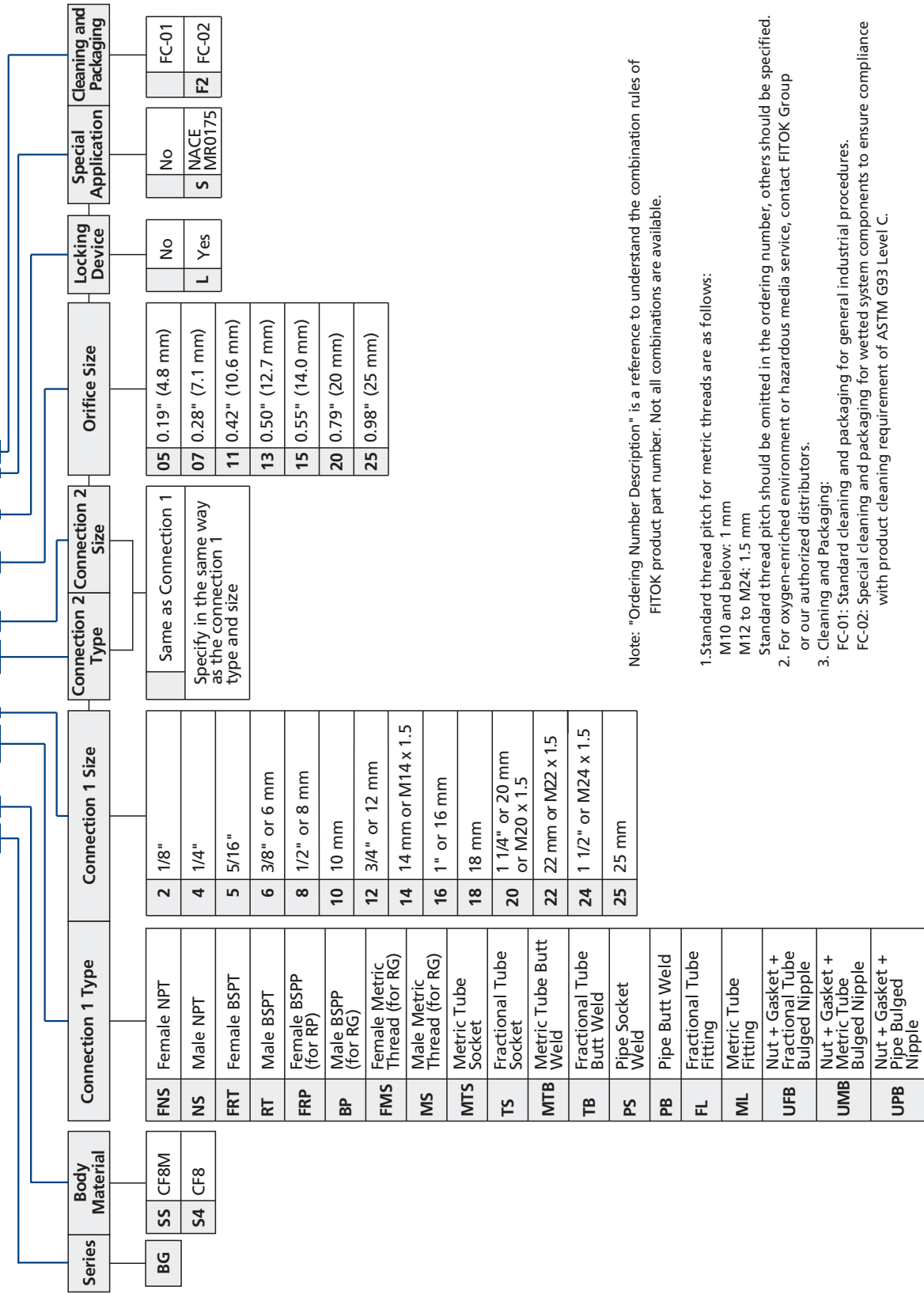
Basic Ordering Number	Connection Type and Size		Orifice in. (mm)	Cv	Dimensions, in. (mm)				
	Connection 1	Connection 2			A	B	W	X	Y
BG□□-FNS2-05	1/8 Female NPT	1/8 Female NPT	0.19 (4.8)	1.2	2.05 (52.1)	1.03 (26.0)	0.63 (16.0)	2.69 (68.3)	1.46 (37.0)
BG□□-FRP2-05	1/8 Female BSPP	1/8 Female BSPP							
BG□□-PB4-05	1/4 PB, Schedule Number: 80	1/4 PB, Schedule Number: 80							
BG□□-FL4-05	1/4" FITOK	1/4" FITOK							
BG□□-ML6-05	6 mm FITOK	6 mm FITOK							
BG□□-ML8-05	8 mm FITOK	8 mm FITOK	0.28 (7.1)	3.8	2.05 (52.1)	1.03 (26.0)	0.63 (16.0)	2.69 (68.3)	1.46 (37.0)
BG□□-FNS4-07	1/4 Female NPT	1/4 Female NPT							
BG□□-FRP4-07	1/4 Female BSPP	1/4 Female BSPP							
BG□□-FL6-07	3/8" FITOK	3/8" FITOK							
BG□□-ML10-07	10 mm FITOK	10 mm FITOK	0.42 (10.6)	7.5	4.04 (103.0)	2.02 (51.3)	0.93 (23.5)	3.94 (100.0)	2.19 (55.7)
BG□□-FL8-11	1/2" FITOK	1/2" FITOK							
BG□□-ML12-11	12 mm FITOK	12 mm FITOK							
BG□□-ML14-11	14 mm FITOK	14 mm FITOK							
BG□□-FNS6-13	3/8 Female NPT	3/8 Female NPT	0.50 (12.7)	11.3	2.57 (65.2)	1.28 (32.6)	0.93 (23.5)	3.94 (100.0)	2.19 (55.7)
BG□□-FRP6-13	3/8 Female BSPP	3/8 Female BSPP							
BG□□-PS6-13	3/8 PS	3/8 PS							
BG□□-PB8-13	1/2 PB, Schedule Number: 80	1/2 PB, Schedule Number: 80							
BG□□-FL10-13	5/8" FITOK	5/8" FITOK							
BG□□-ML16-13	16 mm FITOK	16 mm FITOK	0.55 (14.0)	13.0	2.74 (69.5)	1.37 (34.8)	1.06 (27.0)	5.18 (131.5)	2.26 (57.5)
BG□□-FNS8-15	1/2 Female NPT	1/2 Female NPT							
BG□□-FRP8-15	1/2 Female BSPP	1/2 Female BSPP							
BG□□-PS8-15	1/2 PS	1/2 PS							
BG□□-MTB22-15	22 mm MTB	22 mm MTB							
BG□□-TS12-15	3/4" TS	3/4" TS							
BG□□-MTS18-15	18 mm	18 mm							
BG□□-FL12-15	3/4" FITOK	3/4" FITOK							
BG□□-ML18-15	18 mm FITOK	18 mm FITOK	0.79 (20.0)	50.0	3.15 (80.0)	1.57 (40.0)	1.34 (34.0)	5.18 (131.5)	2.66 (67.5)
BG□□-FNS12-20	3/4 Female NPT	3/4 Female NPT							
BG□□-FRP12-20	3/4 Female BSPP	3/4 Female BSPP							

Basic Ordering Number	Connection Type and Size		Orifice in. (mm)	Cv	Dimensions, in. (mm)				
	Connection 1	Connection 2			A	B	W	X	Y
BG□□-PB12-20	3/4 PB Schedule Number: 80	3/4 PB Schedule Number: 80	0.79 (20.0)	50.0	3.15 (80.0)	1.57 (40.0)	1.34 (34.0)	5.18 (131.5)	2.66 (67.5)
BG□□-PS12-20	3/4 PS	3/4 PS							
BG□□-TS16-20	1" TS	1" TS							
BG□□-MTB25-20	25 mm MTB Schedule Number: 80	25 mm MTB Schedule Number: 80							
BG□□-MTS25-20	25 mm MTS	25 mm MTS			5.12 (130.0)	2.56 (65.0)	1.57 (40.0)	5.95 (151.2)	3.08 (78.2)
BG□□-FL16-20	1" FITOK	1" FITOK							
BG□□-ML22-20	22 mm FITOK	22 mm FITOK							
BG□□-ML25-20	25 mm FITOK	25 mm FITOK							
BG□□-FNS16-25	1 Female NPT	1 Female NPT	0.98 (25.0)	93.0	3.54 (90.0)	1.77 (45.0)	1.57 (40.0)	5.95 (151.2)	3.08 (78.2)
BG□□-FRP16-25	1 Female BSPP	1 Female BSPP							
BG□□-PS16-25	1 PS	1 PS							
BG□□-PB16-25	1 PB Schedule Number: 80	1 PB Schedule Number: 80							

1. FITOK means FITOK double ferrule tube fittings, TS means fractional tube socket weld, MTS means metric tube socket weld, TB means fractional tube butt weld, MTB means metric tube butt weld, PS means pipe socket weld, and PB means pipe butt weld.
2. Sizes and types listed are standard. Other sizes and types are available upon request, please contact FITOK Group or our authorized distributors.
3. Dimensions are shown with tube fitting nuts finger-tightened. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

# Ordering Number Description

## BGSS - FNS8 - ML18 - 15 - L - SF2



Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

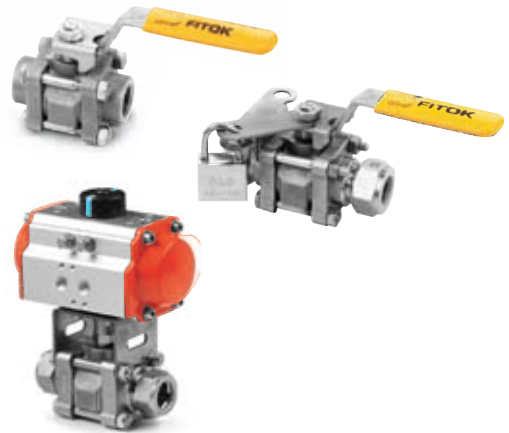
- Standard thread pitch for metric threads are as follows:  
M10 and below: 1 mm  
M12 to M24: 1.5 mm  
Standard thread pitch should be omitted in the ordering number, others should be specified.
- For oxygen-enriched environment or hazardous media service, contact FITOK Group or our authorized distributors.
- Cleaning and Packaging:  
FC-01: Standard cleaning and packaging for general industrial procedures.  
FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleaning requirement of ASTM G93 Level C.

# 3-piece Ball Valves

## BH Series

### Features

- ⦿ Working pressure up to: 3000 psig (207 bar)
- ⦿ Working temperature: -20°F to 450°F (-28°C to 232°C)
- ⦿ End connections:
  - 1/8" to 2" thread
  - 1/8" to 2" pipe butt or socket weld
  - 1/4" to 2" and 6 mm to 50 mm tube butt or socket weld
  - 1/4" to 2" and 6 mm to 38 mm tube fitting
- ⦿ 3-piece precision cast body construction
- ⦿ Pneumatic and electric actuator available
- ⦿ Bidirectional flow for 2-way valves
- ⦿ Bottom port as inlet for 3-way valves
- ⦿ Leak-tight performance testing with nitrogen or compressed air for every valve at the rated pressure to meet the requirement of no visible leak

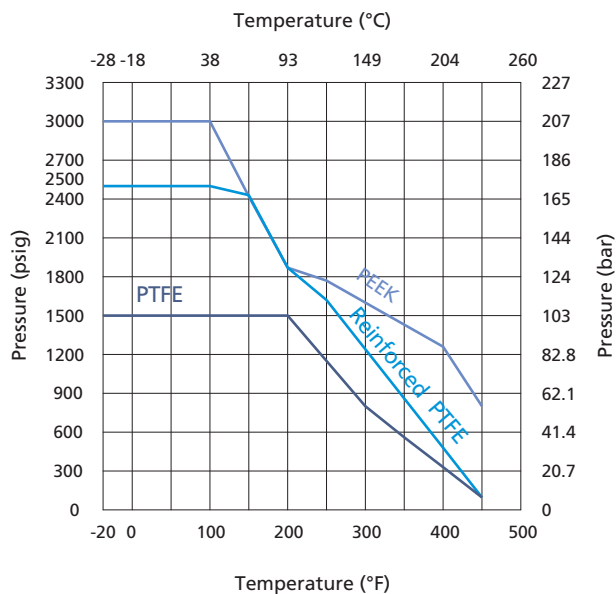


Ball Valves  
Plug Valves

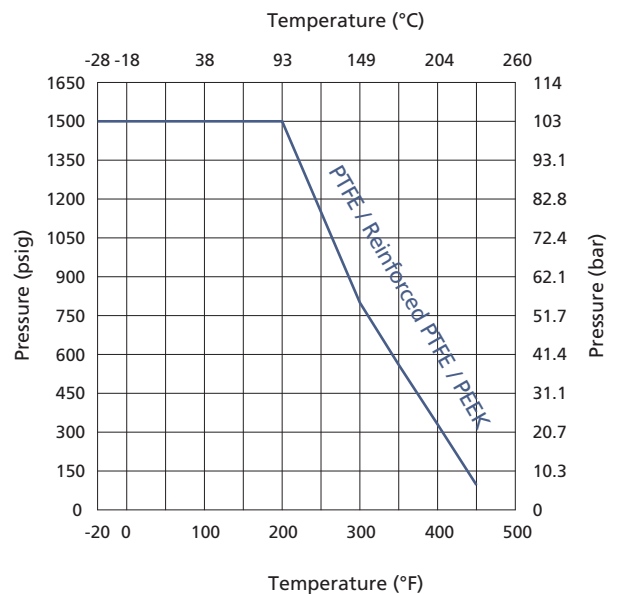
## Pressure vs. Temperature

### 2-way Valves

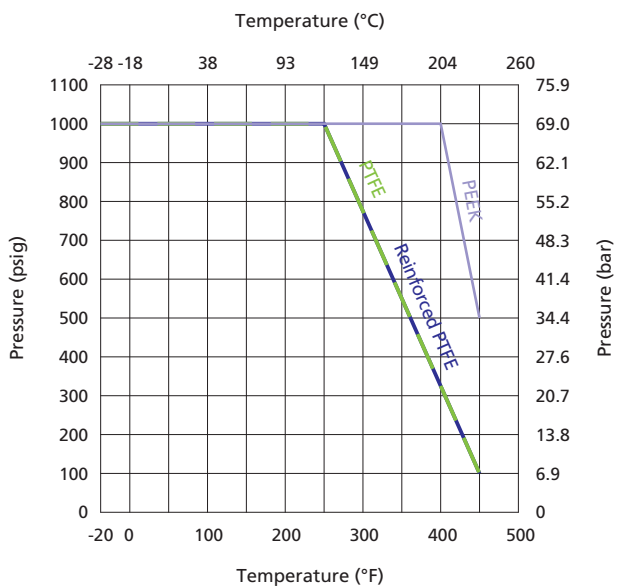
Orifice Size: 0.19", 0.28", 0.41", 0.52" & 0.88"



Orifice Size: 1.13", 1.25" & 1.50"

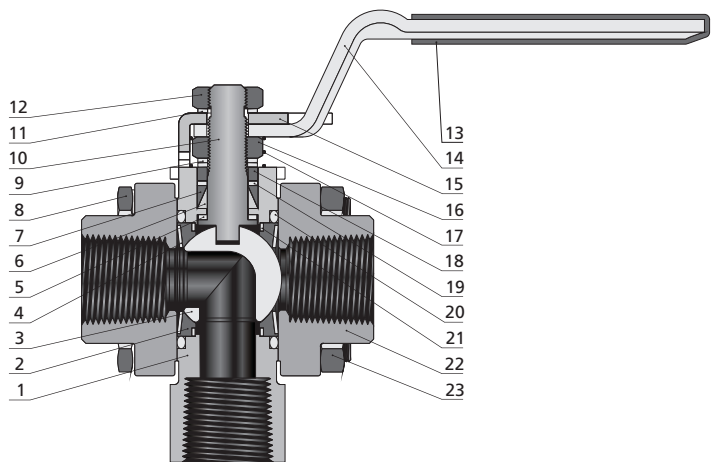
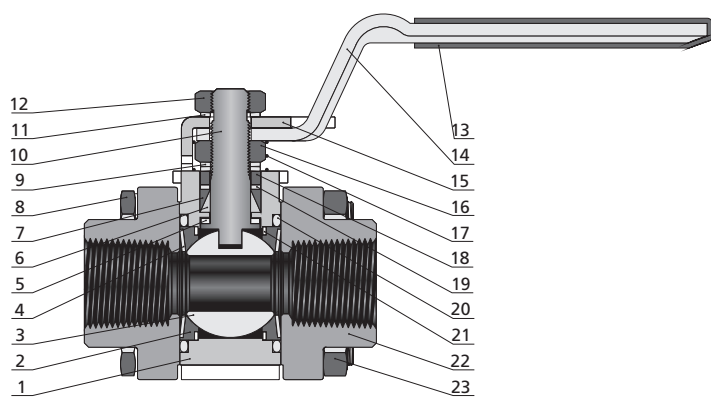


### 3-way Valves



Note: The temperature and pressure rating are based on valves of standard materials.

### Standard Materials of Construction

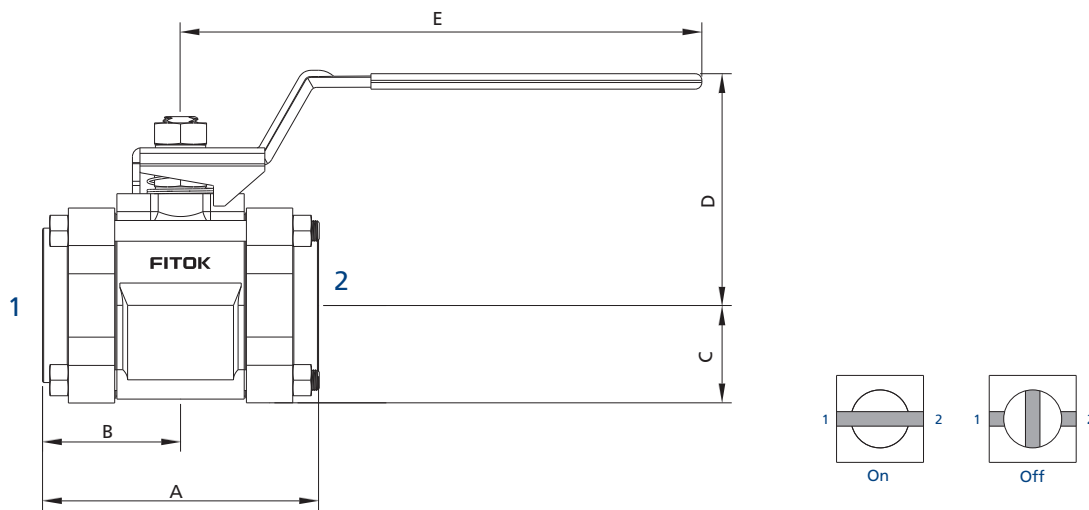


Item	Component	Material Grade/ASME Specification	
1	<i>Body</i>	<i>CF8M/A351</i>	<i>CF8/A351</i>
2	<i>Seat</i>	<i>PTFE or Reinforced PTFE or PEEK</i>	
3	<i>Ball</i>	<i>316 SS/A479</i>	
4	<i>Coned-disc Spring</i>	<i>Strain-hardened 316 SS/A240</i>	
5	<i>Stem Bearing</i>	<i>PEEK</i>	
6	<i>Lower Packing</i>	<i>Reinforced PTFE</i>	
7	<i>Upper Packing</i>	<i>Reinforced PTFE</i>	
8	<i>Body Bolt</i>	<i>Gr. B8M/A193</i>	
9	<i>Stem Spring</i>	<i>Strain-hardened 316 SS/A240</i>	
10	<i>Stem</i>	<i>316 SS/A479</i>	
11	<i>Stem Spring</i>	<i>Strain-hardened 316 SS/A240</i>	
12	<i>Stem Nut</i>	<i>Gr. 8M/A194</i>	
13	<i>Handle Sleeve</i>	<i>Vinyl</i>	
14	<i>Handle</i>	<i>304 SS/A240</i>	
15	<i>Stop Plate</i>	<i>304 SS/A240</i>	
16	<i>Stem Nut</i>	<i>Gr. 8M/A194</i>	
17	<i>Grounding Spring</i>	<i>302 SS/A313</i>	
18	<i>Gland</i>	<i>PTFE-coated 316 SS/A479</i>	
19	<i>Packing Support</i>	<i>PEEK</i>	
20	<i>Flange Seal</i>	<i>PTFE/D1710</i>	
21	<i>Support Ring</i>	<i>316 SS/A240</i>	
22	<i>End Connection</i>	<i>CF8M/A351</i>	<i>CF8/A351</i>
23	<i>Body Nut</i>	<i>Gr.8M/A194</i>	
	<i>Lubricants</i>	<i>Silicone-based and PTTE-based</i>	

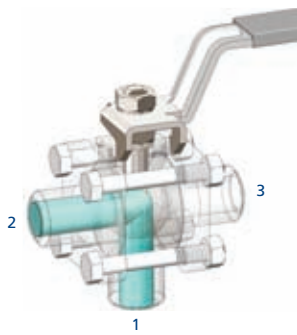
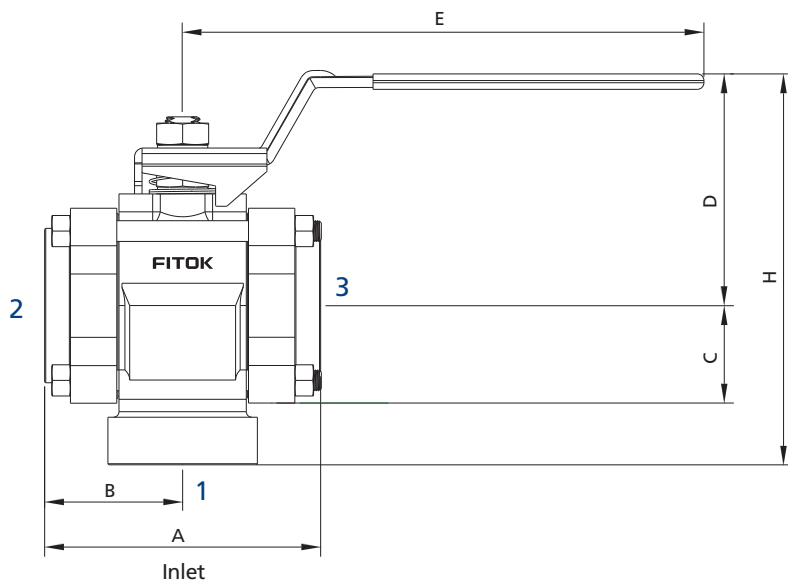
Note: Wetted components are listed in italics. For other materials, please contact FITOK Group or our authorized distributors.

## Dimensions

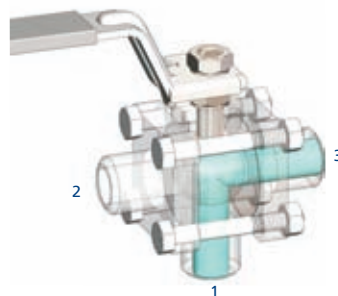
### 2-way Valves



### 3-way Valves



Port 1 to port 2



Port 1 to port 3

B-18 Ball Valves

Ball Valves  
Plug Valves

Basic Ordering Number		Connection Type and Size		Orifice in. (mm)	Cv	Dimensions, in. (mm)												
2-way	3-way	Connection 1	Connection 2/3			A	B	C	D	E	H							
BH□□-FL4-05	BH□□-FL4-05-3	1/4" FITOK	1/4" FITOK	0.19 (4.8)	1.2	3.17 (80.5)	1.59 (40.4)	0.68 (17.3)	1.66 (42.2)	2.37 (60.2)	3.35 (85.1)							
BH□□-ML6-05	BH□□-ML6-05-3	6 mm FITOK	6 mm FITOK		2.5													
BH□□-ML8-05	BH□□-ML8-05-3	8 mm FITOK	8 mm FITOK		1.2	2.16 (54.9)	1.08 (27.4)											
BH□□-TS4-05	—	1/4" TS	1/4" TS			2.08 (52.8)	1.04 (26.4)											
BH□□-MTS6-05	—	6 mm MTS	6 mm MTS			—												
BH□□-PB4-05	—	1/4 PB, Schedule Number: 80	1/4 PB, Schedule Number: 80		0.28 (7.1)	3.8	2.16 (54.9)					1.08 (27.4)	0.68 (17.3)	1.66 (42.2)	2.37 (60.2)	3.12 (79.2)		
BH□□-FNS2-07	BH□□-FNS2-07-3	1/8 Female NPT	1/8 Female NPT															
BH□□-FRT2-07	BH□□-FRT2-07-3	1/8 Female BSPT	1/8 Female BSPT															
BH□□-FRP2-07	BH□□-FRP2-07-3	1/8 Female BSPP	1/8 Female BSPP															
BH□□-FNS4-07	BH□□-FNS4-07-3	1/4 Female NPT	1/4 Female NPT															
BH□□-FRT4-07	BH□□-FRT4-07-3	1/4 Female BSPT	1/4 Female BSPT															
BH□□-FRP4-07	BH□□-FRP4-07-3	1/4 Female BSPP	1/4 Female BSPP															
BH□□-FL6-07	BH□□-FL6-07-3	3/8" FITOK	3/8" FITOK	3.17 (80.5)				1.59 (40.4)	4.37 (111)									
BH□□-ML10-07	BH□□-ML10-07-3	10 mm FITOK	10 mm FITOK	3.20 (81.3)				1.60 (40.6)										
BH□□-TS6-07	—	3/8" TS	3/8" TS	2.16 (54.9)				1.08 (27.4)										
BH□□-PB6-07	—	3/8 PB, Schedule Number: 80	3/8 PB, Schedule Number: 80	2.08 (52.8)	1.04 (26.4)													
BH□□-FL8-10	BH□□-FL8-10-3	1/2" FITOK	1/2" FITOK	0.41 (10.4)	7.5	4.04 (103)	2.02 (51.3)	0.89 (22.6)	2.35 (59.7)	4.50 (114)	4.48 (114)							
BH□□-ML12-10	BH□□-ML12-10-3	12 mm FITOK	12 mm FITOK	0.41 (10.4)														
BH□□-TS8-10	—	1/2" TS	1/2" TS	0.41 (10.4)								2.70 (68.6)	1.34 (34)					
BH□□-FNS6-13	BH□□-FNS6-13-3	3/8 Female NPT	3/8 Female NPT	0.52 (13.1)	12	2.70 (68.6)	1.35 (34.3)	0.89 (22.6)	2.35 (59.7)	4.50 (114)	4.19 (106)							
BH□□-FRT6-13	BH□□-FRT6-13-3	3/8 Female BSPT	3/8 Female BSPT															
BH□□-FRP6-13	BH□□-FRP6-13-3	3/8 Female BSPP	3/8 Female BSPP															
BH□□-FNS8-13	BH□□-FNS8-13-3	1/2 Female NPT	1/2 Female NPT															
BH□□-FRT8-13	BH□□-FRT8-13-3	1/2 Female BSPT	1/2 Female BSPT															
BH□□-FRP8-13	BH□□-FRP8-13-3	1/2 Female BSPP	1/2 Female BSPP															
BH□□-FL12-13	BH□□-FL12-13-3	3/4" FITOK	3/4" FITOK									13.6	4.04 (103)	2.02 (51.3)	0.89 (22.6)	2.35 (59.7)	4.50 (114)	4.48 (114)
BH□□-ML16-13	BH□□-ML16-13-3	16 mm FITOK	16 mm FITOK															
BH□□-ML18-13	BH□□-ML18-13-3	18 mm FITOK	18 mm FITOK															
BH□□-TS12-13	—	3/4" TS	3/4" TS										2.70 (68.6)	1.34 (34)				
BH□□-PS8-13	—	1/2 PS	1/2 PS	15	—	—	—	—	—	—	—							
BH□□-PB8-13	—	1/2 PB, Schedule Number: 80	1/2 PB, Schedule Number: 80	6.8	2.69 (68.3)	1.34 (34)	—	—	—	—	—							

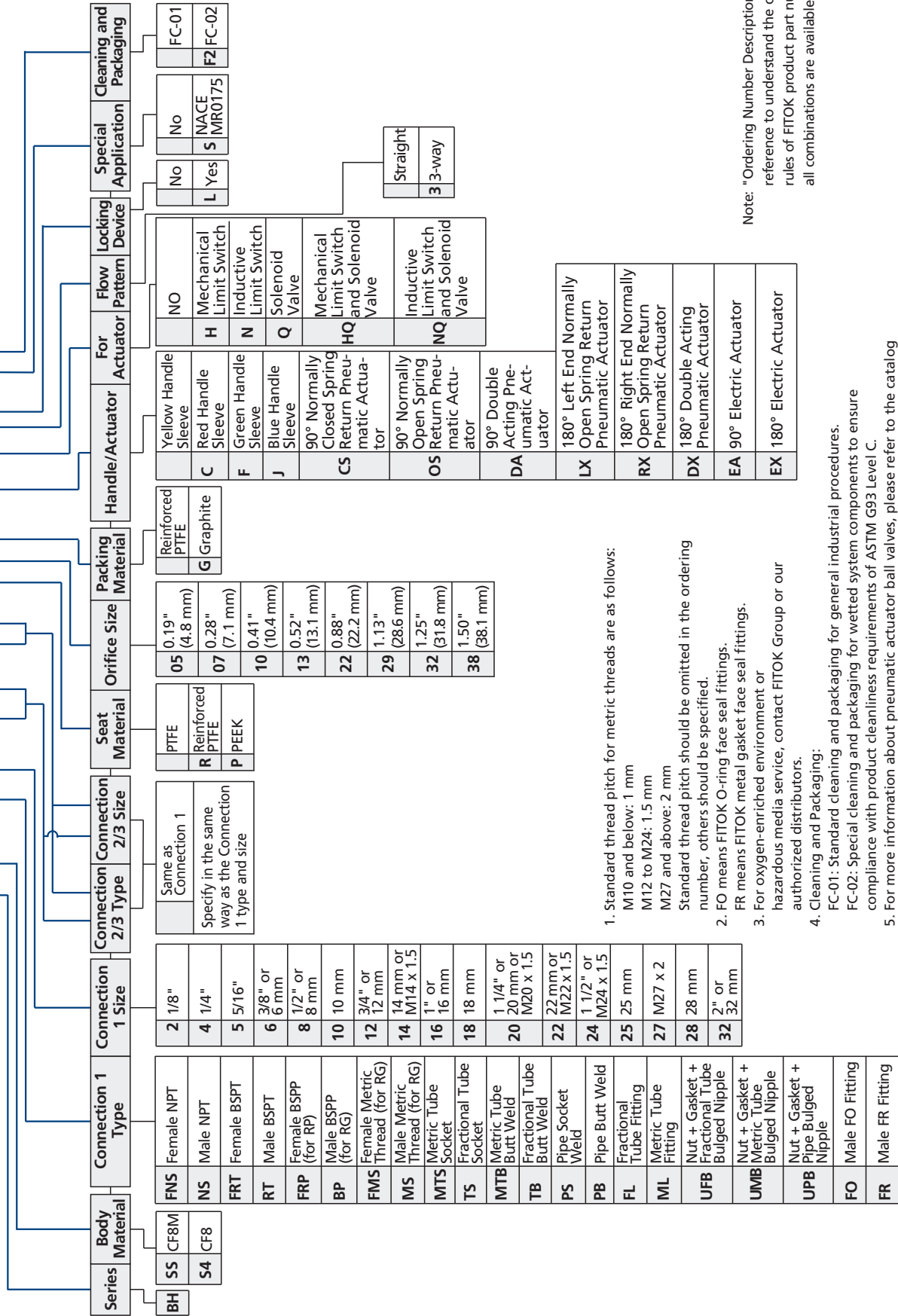


Basic Ordering Number		Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in. (mm)					
2-way	3-way	Connection 1	Connection 2/3			A	B	C	D	E	H
BH□□-PB12-13	—	3/4 PB, Schedule Number: 80	3/4 PB, Schedule Number: 80	0.52 (13.1)	13.6	2.69 (68.3)	1.34 (34)	0.89 (22.6)	2.35 (59.7)	4.50 (114)	—
BH□□-FNS12-22	BH□□-FNS12-22-3	3/4 Female NPT	3/4 Female NPT	0.88 (22.2)	31	3.59 (91.2)	1.8 (45.7)	1.25 (31.8)	2.94 (74.7)	6.00 (152)	5.45 (138)
BH□□-FRT12-22	BH□□-FRT12-22-3	3/4 Female BSPT	3/4 Female BSPT								
BH□□-FRP12-22	BH□□-FRP12-22-3	3/4 Female BSPP	3/4 Female BSPP								
BH□□-FNS16-22	BH□□-FNS16-22-3	1 Female NPT	1 Female NPT								
BH□□-FRT16-22	BH□□-FRT16-22-3	1 Female BSPT	1 Female BSPT								
BH□□-FRP16-22	BH□□-FRP16-22-3	1 Female BSPP	1 Female BSPP								
BH□□-FL16-22	BH□□-FL16-22-3	1" FITOK	1" FITOK								
BH□□-FL20-22	BH□□-FL20-22-3	1 1/4" FITOK	1 1/4" FITOK								
BH□□-ML25-22	BH□□-ML25-22-3	25 mm FITOK	25 mm FITOK								
BH□□-ML28-22	BH□□-ML28-22-3	28 mm FITOK	28 mm FITOK								
BH□□-TS16-22	—	1" TS	1" TS								
BH□□-MTS25-22	—	25 mm MTS	25 mm MTS								
BH□□-PS12-22	—	3/4 PS	3/4 PS								
BH□□-PS16-22	—	1 PS	1 PS								
BH□□-PB16-22	—	1 PB Schedule Number: 80	1 PB Schedule Number: 80								
BH□□-TS20-29	—	1 1/4" TS	1 1/4" TS		1.13 (28.6)	80	4.39 (112)				2.19 (55.6)
BH□□-PB20-32	—	1 1/4 PB, Schedule Number: 80	1 1/4 PB, Schedule Number: 80	4.57 (116)			2.28 (57.9)				
BH□□-FNS20-32	BH□□-FNS20-32-3	1 1/4 Female NPT	1 1/4 Female NPT	1.25 (31.8)	90	4.39 (112)	2.19 (55.6)	1.53 (38.9)	4.03 (102)	9.14 (232)	6.86 (174)
BH□□-FNS24-32	BH□□-FNS24-32-3	1 1/2 Female NPT	1 1/2 Female NPT								
BH□□-TS24-32	—	1 1/2" TS	1 1/2" TS								
BH□□-PS20-32	—	1 1/4 PS	1 1/4 PS								
BH□□-PS24-32	—	1 1/2 PS	1 1/2 PS								
BH□□-PB24-32	—	1 1/2 PB, Schedule Number: 80	1 1/2 PB, Schedule Number: 80								
BH□□-FNS32-38	BH□□-FNS32-38-3	2 Female NPT	2 Female NPT	1.50 (38.1)	130	4.94 (125)	2.47 (62.5)	1.74 (44.2)	4.16 (106)	9.14 (232)	7.21 (183)
BH□□-FRT32-38	BH□□-FRT32-38-3	2 Female BSPT	2 Female BSPT								
BH□□-TS32-38	—	2" TS	2" TS								
BH□□-PS32-38	—	2 PS	2 PS								
BH□□-PB32-38	—	2 PB, Schedule Number: 80	2 PB, Schedule Number: 80								6.14 (156)

1. FITOK means FITOK double ferrule tube fittings, TS means fractional tube socket weld, MTS means metric tube socket weld, TB means fractional tube butt weld, MTB means metric tube butt weld, PS means pipe socket weld, and PB means pipe butt weld.
2. Sizes and types listed are standard. Other sizes and types are available upon request, please contact FITOK Group or our authorized distributors.
3. Dimensions are shown with tube fitting nuts finger-tightened. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

# Ordering Number Description

## BHS4 - FNS8 - FRT8 - FL8 - P13G - OSHQ3L - SF2



Series	Body Material	Connection 1 Type	Connection 1 Size	Connection 2/3 Type	Connection 2/3 Size	Seat Material	Orifice Size	Packing Material	Handle/Actuator	For Actuator	Flow Locking Device	Special Application	Cleaning and Packaging
BH	SS CF8M	FNS Female NPT	2 1/8"		Same as Connection 1	PTFE	05 0.19" (4.8 mm)	Reinforced PTFE	Yellow Handle Sleeve	H	NO	No	FC-01
	S4 CF8	NS Male NPT	4 1/4"		Specify in the same way as the Connection 1 type and size	R Reinforced PTFE	07 0.28" (7.1 mm)	G Graphite	Red Handle Sleeve	N	Mechanical Limit Switch	No	F2 FC-02
		FRT Female BSPT	5 5/16"			P PEEK	10 0.41" (10.4 mm)		Green Handle Sleeve	Q	Inductive Limit Switch	L Yes	F2 FC-02
		RT Male BSPT	3/8" or 6 mm				13 0.52" (13.1 mm)		Blue Handle Sleeve	HQ	Mechanical Limit Switch and Solenoid Valve	S NACE MR0175	
		FRP Female BSPP (for RP)	1/2" or 8 mm				22 0.88" (22.2 mm)		90° Normally Closed Spring Return Pneumatic Actuator				
		BP Male BSPP (for RG)	10 10 mm				29 1.13" (28.6 mm)		90° Normally Open Spring Return Pneumatic Actuator				
		FMS Female Metric Thread (for RG)	3/4" or 12 mm				32 1.25" (31.8 mm)		90° Double Acting Pneumatic Actuator				
		MS Male Metric Thread (for RG)	14 14 mm or M14 x 1.5				38 1.50" (38.1 mm)		180° Left End Normally Open Spring Return Pneumatic Actuator				
		MTS Metric Tube Socket	1" or 16 mm						180° Right End Normally Open Spring Return Pneumatic Actuator				
		TS Fractional Tube Socket	18 18 mm						180° Double Acting Pneumatic Actuator				
		MTB Metric Tube Butt Weld	1 1/4" or 20 mm or M20 x 1.5										
		TB Fractional Tube Butt Weld	22 22 mm or M22 x 1.5										
		PS Pipe Socket Weld	1 1/2" or M24 x 1.5										
		PB Pipe Butt Weld	25 25 mm										
		FL Fractional Tube Fitting	27 M27 x 2										
		ML Metric Tube Fitting	28 28 mm										
		UFB Nut + Gasket + Fractional Tube Bulged Nipple	2" or 32 mm										
		UMB Nut + Gasket + Metric Tube Bulged Nipple											
		UPB Nut + Gasket + Pipe Bulged Nipple											
		FO Male FO Fitting											
		FR Male FR Fitting											

1. Standard thread pitch for metric threads are as follows:

- M10 and below: 1 mm
- M12 to M24: 1.5 mm
- M27 and above: 2 mm

Standard thread pitch should be omitted in the ordering number, others should be specified.

2. FO means FITOK O-ring face seal fittings.

FR means FITOK metal gasket face seal fittings. For oxygen-enriched environment or hazardous media service, contact FITOK Group or our authorized distributors.

4. Cleaning and Packaging:

- FC-01: Standard cleaning and packaging for general industrial procedures.
- FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirements of ASTM G93 Level C.

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

5. For more information about pneumatic actuator ball valves, please refer to the catalog **Automatic Control Ball Valves**.

# One-piece Instrumentation Ball Valves

## BO Series

### Features

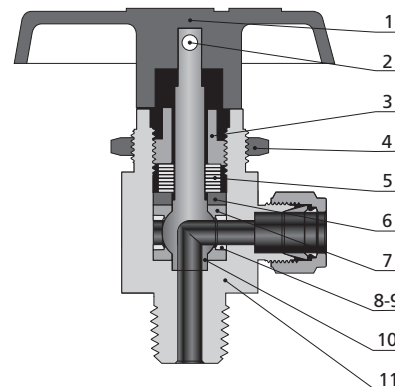
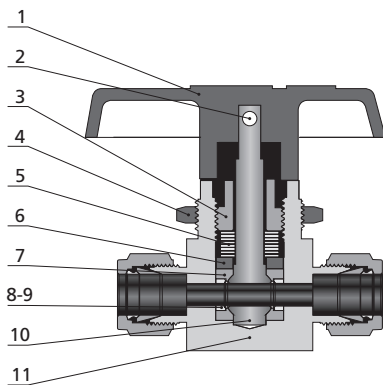
- ⦿ Working pressure up to: 3000 psig (207 bar)
- ⦿ Working temperature: -65°F to 300°F (-54°C to 148°C)
- ⦿ End connections:  
1/4 to 1/2 thread  
1/16" to 3/4" and 3 mm to 18 mm tube fitting
- ⦿ 2-, 3-, 4-, 5-, 6- and 7-way models for on-off, switching and crossover service available
- ⦿ One-piece body and one-piece ball stem
- ⦿ No dead space
- ⦿ Top-loaded design to allow adjustment with the valve in-line
- ⦿ Thermal cycle performance improved and wear compensated by live-loaded design
- ⦿ Any reasonable connections available
- ⦿ Pneumatic and electric actuator available
- ⦿ Handle color options available
- ⦿ Full operating pressure at any port
- ⦿ Leak-tight performance testing with nitrogen or compressed air for every valve at the rated pressure to meet the requirement of no visible leak
- ⦿ The inlet can be any port except for valves with vent ports



### Note:

1. To prevent seat leakage, packing adjustment may be required periodically during the service life of the valve.
2. A higher initial actuation torque may happen to the valves that have not been cycled for a period of time.
3. Before installation, instrumentation ball valves exposed to dynamic temperature conditions may lose their initial packing load. Stem packing adjustment should be required.

## Standard Materials of Construction



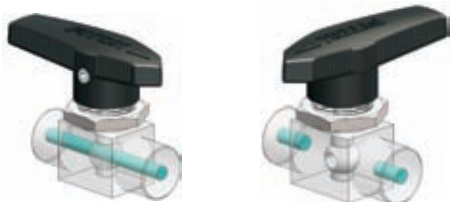
Item	Component	Valve Body Material		
		316 SS	Brass	Alloy 400
		Material Grade/ASTM Specification		
1	Handle	Nylon or Aluminium		
2	Set Screw	Galvanized carbon steel		
3	Packing Bolt	316 SS/A479	Brass C36000/B16	Alloy 400/B164
4	Panel Nut	316 SS/A479	Brass C36000/B16	316 SS/A479
5	Disc Spring	S17700/A693		
6	Gland	316 SS/A479	316 SS/A479	Alloy 400/B164
7	<i>Packing Seat</i>	<i>PTFE/D1710 or UHMWPE/D4020 or PFA/D3307</i>		
8	<i>Support Ring</i>	316 SS/A479	316 SS/A479	Alloy 400/B164
9	<i>Support Disc</i>			
10	<i>Ball Stem</i>	316 SS/A479	Brass C36000/B16	Alloy 400/B164
11	<i>Body</i>	316 SS/A182	Brass C37700/B16	Alloy 400/B164
<i>Wetted Lubricant</i>		<i>Fluorinated-based and silicone-based</i>		
Non-wetted Lubricant		Molybdenum disulfide with hydrocarbon binder coat		

Note: Wetted components are listed in italics.  
For other materials, please contact FITOK Group or our authorized distributors.

## On-Off (2-way) Valves

### Standard Flow Path

#### Straight Pattern



On

Off

#### Angle Pattern



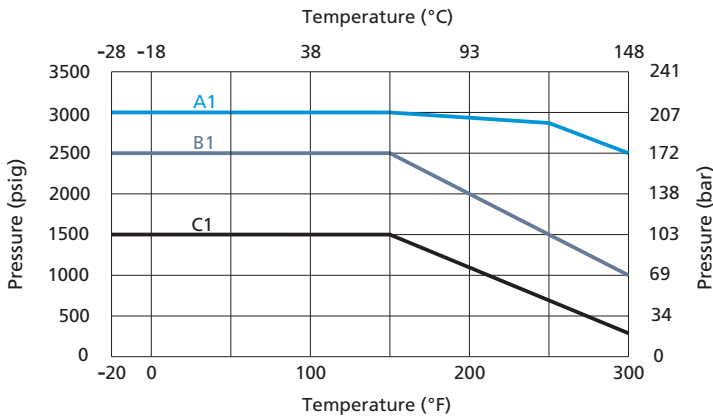
On

Off

## Pressure vs. Temperature

Straight Pattern and Angle Pattern

### PTFE Packing Seat



A1: Straight Pattern Valves (orifice 0.19")

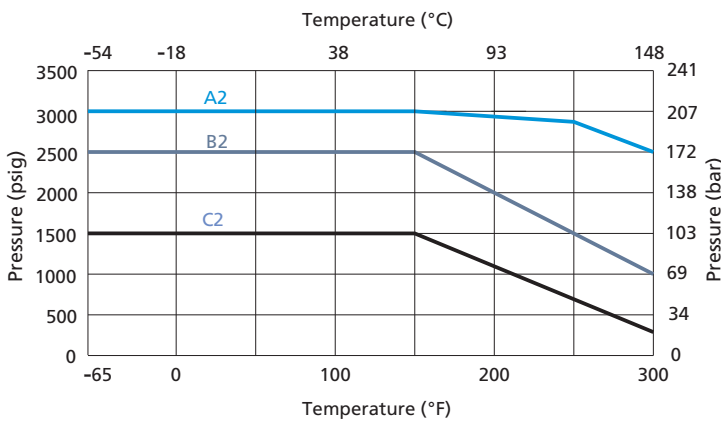
B1: Straight Pattern Valves (orifice 0.05" & 0.06" & 0.09" & 0.13" & 0.28" & 0.41")

Angle Pattern Valves (orifice 0.05" & 0.06" & 0.09" & 0.13" & 0.19")

C1: Angle Pattern Valves (orifice 0.28" & 0.41")

### PFA, UHMWPE Packing Seat

The working temperature of UHMWPE packing seat should not be higher than 150°F (65°C).



A2: Straight Pattern Valves (orifice 0.19")

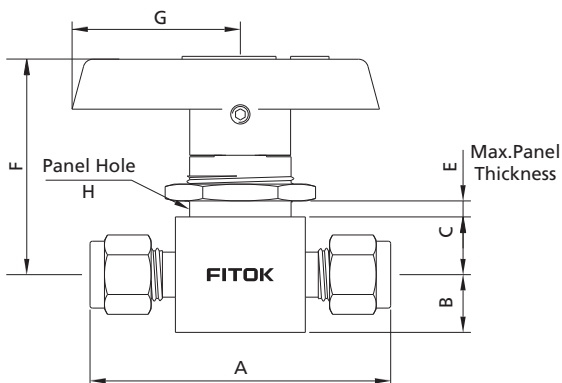
B2: Straight Pattern Valves (orifice 0.05" & 0.06" & 0.09" & 0.13" & 0.28" & 0.41")

Angle Pattern Valves (orifice 0.05" & 0.06" & 0.09" & 0.13" & 0.19")

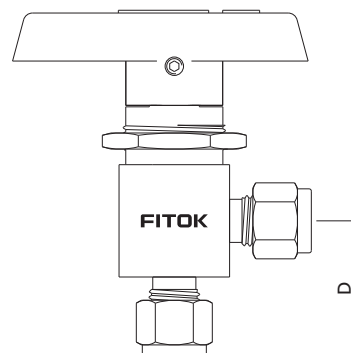
C2: Angle Valves (orifice 0.28" & 0.41")

## Dimensions

### Straight Pattern



### Angle Pattern



B-24 Ball Valves

Ball Valves  
Plug Valves

Basic Ordering Number	Connection Type and Size	Orifice in. (mm)	Cv		Dimensions, in. (mm)								
			Straight	Angle	A	B	C	D	E	F	G	H	
BO□□-FL1-00	1/16" FITOK	0.05 (1.3)	0.10	—	1.68 (42.7)				—				
BO□□-FL2-02	1/8" FITOK	0.09 (2.4)	0.20	0.15	2.01 (51.1)	0.28 (7.1)	0.34 (8.6)	0.97 (24.6)	0.25 (6.4)	1.43 (36.2)	1.10 (28)	19/32 (15.1)	
BO□□-FL4-03	1/4" FITOK	0.13 (3.2)	0.60	0.35	2.21 (56.1)			1.07 (27.2)					
BO□□-FL4-05		0.19 (4.8)	1.40	0.90	2.39 (60.7)	0.38 (9.7)	0.44 (11.2)	1.17 (29.7)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)	
BO□□-FL6-05	3/8" FITOK		1.50		2.58 (65.5)			1.29 (32.8)					
BO□□-FL6-07		0.28 (7.1)	6.00	2.00	3.05 (77.5)	0.56 (14.2)	0.56 (14.2)	1.43 (36.3)	0.35 (9)	2.19 (55.5)	2.05 (52)	1 1/8 (28.6)	
BO□□-FL8-10	1/2" FITOK	0.41 (10.3)	6.40	3.80	3.92 (99.6)	0.69 (17.5)	0.69 (17.5)	1.74 (44.2)	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)	
BO□□-FL12-10	3/4" FITOK		12.00	4.60									
BO□□-ML3-02	3 mm FITOK	0.09 (2.4)	0.20	0.15	2.01 (51.1)	0.28 (7.1)	0.34 (8.6)	0.97 (24.6)	0.25 (6.4)	1.43 (36.2)	1.10 (28)	19/32 (15.1)	
BO□□-ML6-03	6 mm FITOK	0.13 (3.2)	0.60	0.35	2.21 (56.1)			1.07 (27.2)					
BO□□-ML6-05		0.19 (4.8)	1.40	0.90	2.39 (60.7)	0.38 (9.7)	0.44 (11.2)	1.17 (29.7)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)	
BO□□-ML8-05	8 mm FITOK		1.50		2.46 (62.5)			1.20 (30.5)					
BO□□-ML10-07	10 mm FITOK	0.28 (7.1)	6.00	2.00	3.07 (78.0)	0.56 (14.2)	0.56 (14.2)	1.43 (36.3)	0.35 (9)	2.19 (55.5)	2.05 (52)	1 1/8 (28.6)	
BO□□-ML12-10	12 mm FITOK	0.41 (10.3)	12.00	4.60	3.92 (99.6)	0.69 (17.5)	0.69 (17.5)	1.74 (44.2)	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)	
BO□□-FNS2-03	1/8 Female NPT	0.13 (3.2)	0.50	0.30	1.63 (41.4)	0.28 (7.1)	0.34 (8.6)	0.81 (20.6)	0.25 (6.4)	1.43 (36.2)	1.10 (28)	19/32 (15.1)	
BO□□-FNS2-05		0.19 (4.8)	1.20	0.70	2.00 (50.8)	0.38 (9.7)	0.44 (11.2)	1.00 (25.4)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)	
BO□□-FNS4-05	1/4 Female NPT		0.90	0.75	2.06 (52.3)			1.03 (26.2)					
BO□□-FNS4-07		0.28 (7.1)	3.00	1.70	2.50 (63.5)	0.56 (14.2)	0.56 (14.2)	1.25 (31.8)	0.35 (9)	2.19 (55.5)	2.05 (52)	1 1/8 (28.6)	
BO□□-FNS6-07	3/8 Female NPT		2.60	1.50									
BO□□-FNS8-10	1/2 Female NPT	0.41 (10.3)	6.30	3.50	3.12 (79.2)	0.69 (17.5)	0.69 (17.5)	1.56 (39.6)	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)	
BO□□-NS4-05	1/4 Male NPT	0.19 (4.8)	1.20	0.75	2.00 (50.8)	0.38 (9.7)	0.44 (11.2)	1.03 (26.2)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)	
BO□□-FRT4-05	1/4 Female BSPT		0.90			2.06 (52.3)							
BO□□-FRT6-07	3/8 Female BSPT	0.28 (7.1)	2.60	—	2.50 (63.5)	0.56 (14.2)	0.56 (14.2)	—	0.35 (9)	2.19 (55.5)	2.05 (52)	1 1/8 (28.6)	
BO□□-FRT8-10	1/2 Female BSPT	0.41 (10.3)	6.30	—	3.12 (79.2)	0.69 (17.5)	0.69 (17.5)	—	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)	
BO□□-FO4-03	1/4 Male FO	0.13 (3.2)	0.60	0.35	1.75 (44.4)		0.34 (8.6)	0.94 (23.9)	0.25 (6.4)	1.43 (36.2)	1.10 (28)	19/32 (15.1)	
BO□□-FO4-05		0.19 (4.8)	2.40	0.90	1.88 (47.8)	0.38 (9.7)	0.44 (11.2)		0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)	
BO□□-FR4-03	1/4 Male FR	0.13 (3.2)	0.60	0.35	2.13 (54.1)		0.34 (8.6)	1.09 (27.7)	0.25 (6.4)	1.43 (36.2)	1.10 (28)	19/32 (15.1)	
BO□□-FR4-05		0.19 (4.8)	2.40	0.90			0.44 (11.2)		0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)	
BO□□-FR8-07	1/2 Male FR	0.28 (7.1)	6.00	—	2.88 (73.2)	0.56 (14.2)	—	—	0.35 (9)	2.19 (55.5)	2.05 (52)	1 1/8 (28.6)	
BO□□-FR8-10		0.41 (10.3)	12.00	—	3.12 (79.2)	0.69 (17.5)	—	—	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)	

## Switching (3-, 4-, 5-, 6- and 7-way) Valves

### Standard Flow Path

#### 3-way Valves

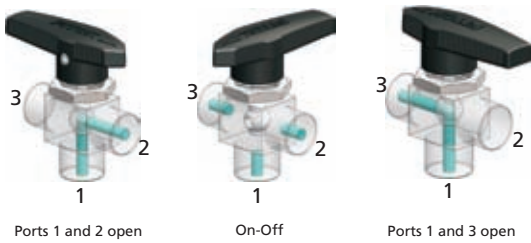


#### 4-way Valves



#### 3L Flow Path

This type of valve can connect one side port to the bottom port or shut off 3 ports. Switch between 0°, 90° and 180° positions with 180° rotation handle.

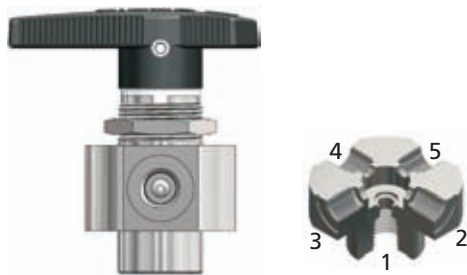


#### 4L Flow Path

This type of valve can connect one side port to the bottom port, and shut off other 2 side ports at the same time. Switching can be done in 120° increments with 360° rotation handle.

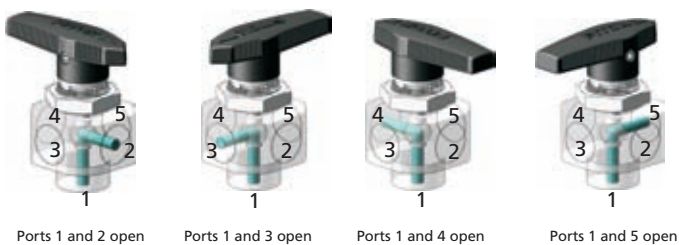


#### 5-way Valves



#### 5L Flow Path

This type of valve can connect one side port to the bottom port, and shut off other 3 side ports at the same time. Switching can be done in 90° increments with 360° rotation handle.



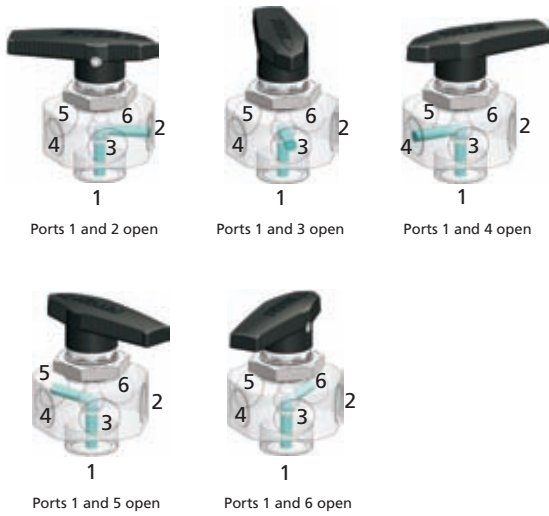
# B-26 Ball Valves

## 6-way Valves

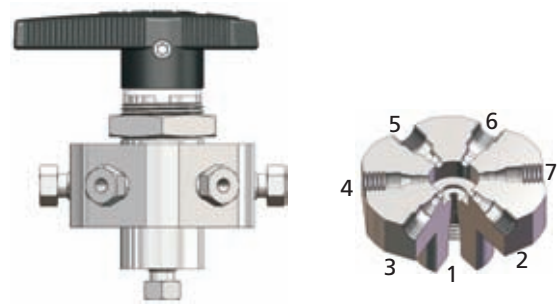


### 6L Flow Path

This type of valve can connect one side port to the bottom port, and shut off other 4 side ports at the same time. Switching can be done in 72° increments with 360° rotation handle.

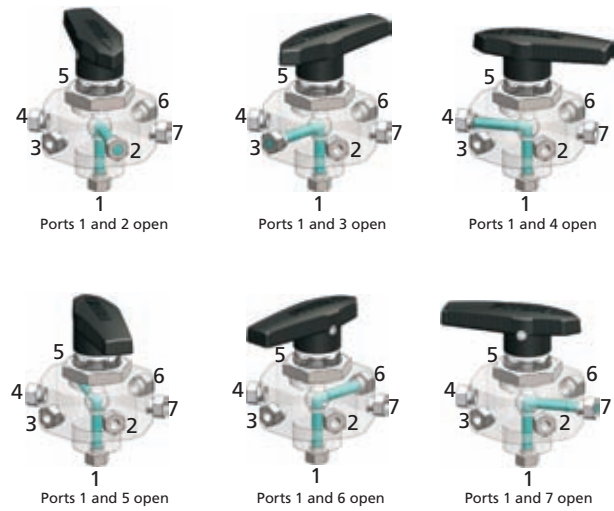


## 7-way Valves



### 7L Flow Path

This type of valve can connect one side port to the bottom port, and shut off other 5 side ports at the same time. Switching can be done in 60° increments with 360° rotation handle.

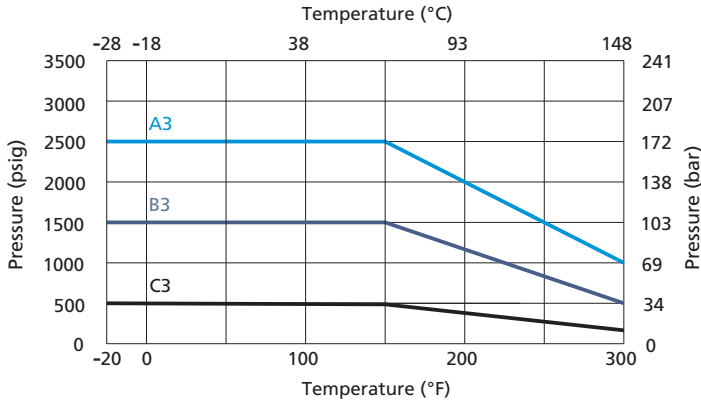




## Pressure vs. Temperature

Switching Valves

### PTFE Packing Seat



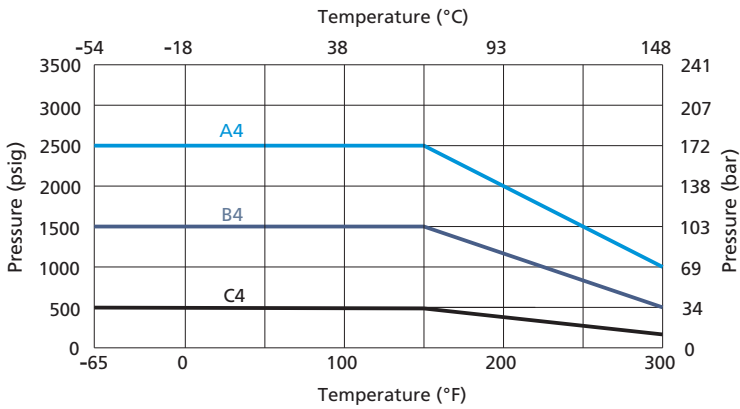
A3: 3-way (orifice 0.05" & 0.06" & 0.09" & 0.13" & 0.19")  
4-way / 5-way (orifice 0.06")

B3: 3-way (orifice 0.28" & 0.41")  
4-way / 5-way (orifice 0.41")

C3: 6-way / 7-way (orifice 0.05" & 0.06")

### PFA, UHMWPE Packing Seat

The working temperature of UHMWPE packing seat should not be higher than 150°F (65°C).



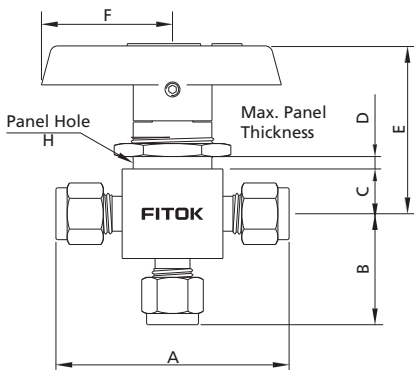
A4: 3-way (orifice 0.05" & 0.06" & 0.09" & 0.13" & 0.19")  
4-way / 5-way (orifice 0.06")

B4: 3-way (orifice 0.28" & 0.41")  
4-way / 5-way (orifice 0.41")

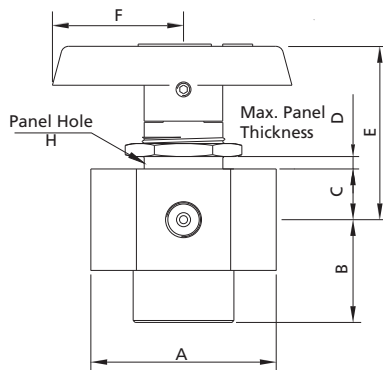
C4: 6-way / 7-way (orifice 0.05" & 0.06")

## Dimensions

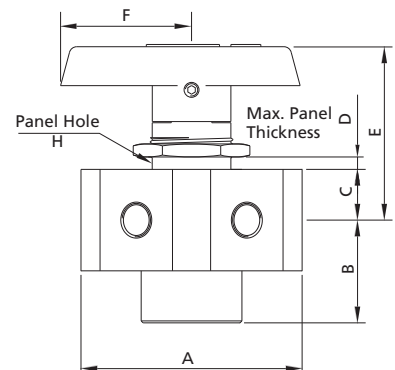
### 3-way Valves



### 4-and 5-way Valves



### 6-and 7-way Valves



B-28 Ball Valves

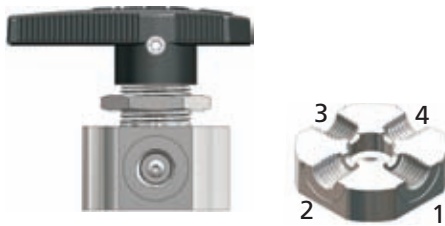
Ball Valves  
Plug Valves

Basic Ordering Number	Connection Type and Size	Orifice in. (mm)	Cv	Dimensions, in. (mm)						
				A	B	C	D	E	F	H
<b>3-way Valves</b>										
BO□□-FL1-00-3L	1/16" FITOK	0.05 (1.3)	0.08	1.68 (42.7)	0.81 (20.6)					
BO□□-FL2-02-3L	1/8" FITOK	0.09 (2.4)	0.15	2.01 (51.1)	0.97 (24.6)	0.34 (8.6)	0.25 (6.4)	1.43 (36.2)	1.10 (28)	19/32 (15.1)
BO□□-FL4-03-3L	1/4" FITOK	0.13 (3.2)	0.35	2.21 (56.1)	1.07 (27.2)					
BO□□-FL4-05-3L		0.19 (4.8)	0.90	2.39 (60.7)	1.17 (29.7)	0.44 (11.2)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)
BO□□-FL6-07-3L	3/8" FITOK	0.28 (7.1)	2.00	2.89 (73.4)	1.43 (36.3)	0.56 (14.2)	0.35 (9)	2.19 (55.5)	2.05 (52)	11/8 (28.6)
BO□□-FL8-10-3L	1/2" FITOK	0.41 (10.3)	4.60	3.48 (88.4)	1.74 (44.2)	0.69 (17.5)	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	11/2 (38.1)
BO□□-FL12-10-3L	3/4" FITOK		4.90							
BO□□-ML3-02-3L	3 mm FITOK	0.09 (2.4)	0.15	2.01 (51.1)	0.97 (24.6)	0.34 (8.6)	0.25 (6.4)	1.43 (36.2)	1.10 (28)	19/32 (15.1)
BO□□-ML6-03-3L	6 mm FITOK	0.13 (3.2)	0.35	2.21 (56.1)	1.07 (27.2)					
BO□□-ML6-05-3L		0.19 (4.8)	0.90	2.39 (60.7)	1.17 (29.7)	0.44 (11.2)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)
BO□□-ML8-05-3L		8 mm FITOK	0.19 (4.8)	0.80	2.46 (62.5)	1.20 (30.5)				
BO□□-ML10-07-3L	10 mm FITOK	0.28 (7.1)	2.00	2.89 (73.4)	1.43 (36.3)	0.56 (14.2)	0.35 (9)	2.19 (55.5)	2.05 (52)	1 1/8 (28.6)
BO□□-ML12-10-3L	12 mm FITOK	0.41 (10.3)	4.60	3.48 (88.4)	1.74 (44.2)	0.69 (17.5)	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)
BO□□-FNS2-03-3L	1/8 Female NPT	0.13 (3.2)	0.30	1.63 (41.4)	0.81 (20.6)	0.34 (8.6)	0.25 (6.4)	1.43 (36.2)	1.10 (28)	19/32 (15.1)
BO□□-FNS4-05-3L	1/4 Female NPT	0.19 (4.8)	0.75	2.06 (52.3)	1.03 (26.2)	0.44 (11.2)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)
BO□□-FNS4-07-3L		0.28 (7.1)	1.70	2.5 (63.5)	1.18 (30)	0.56 (14.2)	0.35 (9)	2.19 (55.5)	2.05 (52)	1 1/8 (28.6)
BO□□-FNS6-07-3L		3/8 Female NPT	0.28 (7.1)	1.50						
BO□□-FNS8-10-3L	1/2 Female NPT	0.41 (10.3)	3.50	3.13 (79.5)	1.56 (39.6)	0.69 (17.5)	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)
BO□□-FRT4-05-3L	1/4 Female BSPT	0.19 (4.8)	0.75	2.06 (52.3)	1.03 (26.2)	0.44 (11.2)	0.19 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)
BO□□-FRT6-07-3L	3/8 Female BSPT	0.28 (7.1)	1.50	2.5 (63.5)	1.18 (30)	0.56 (14.2)	0.35 (9)	2.19 (55.5)	2.05 (52)	1 1/8 (28.6)
BO□□-FRT8-10-3L	1/2 Female BSPT	0.41 (10.3)	3.50	3.13 (79.5)	1.56 (39.6)	0.69 (17.5)	0.49 (12.5)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)
<b>4 - &amp; 5-way Valves</b>										
BO□□-FL2-01-4L	1/8" Female FITOK Tube Fitting	0.06 (1.6)	0.07	2.36 (60)	1.32 (33.5)	0.44 (11.2)	0.20 (5.2)	1.76 (44.6)	1.57 (39.9)	29/32 (23.1)
BO□□-FL2-01-5L				1.85 (47)	0.88 (22.4)					
BO□□-FNS2-01-4L	1/8 Female NPT	0.06 (1.6)	0.07	1.55 (39.4)						
BO□□-FNS2-01-5L										
BO□□-FNS8-10-4L	1/2 Female NPT	0.41 (10.3)	3.50	3.13 (79.5)	1.56 (39.6)	0.69 (17.5)	0.41 (10.5)	2.67 (70.2)	2.63 (66.7)	1 1/2 (38.1)
BO□□-FNS8-10-5L										
<b>6 - &amp; 7-way Valves</b>										
BO□□-FL1-00-6L	1/16" Female FITOK Tube Fitting	0.05 (1.3)	0.05	2.64 (67)	1.32 (33.5)	0.44 (11.2)	0.28 (7)	1.76 (44.6)	1.57 (39.9)	29/32 (23.1)
BO□□-FL1-00-7L										
BO□□-FL2-01-6L	1/8" Female FITOK Tube Fitting	0.06 (1.6)	0.07	2.26 (57.6)	0.97 (24.7)					
BO□□-FL2-01-7L										

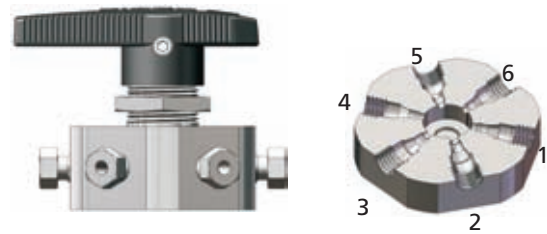
## Crossover (4-, 6-way) Valves

### Standard Flow Path

#### 4-way Valves

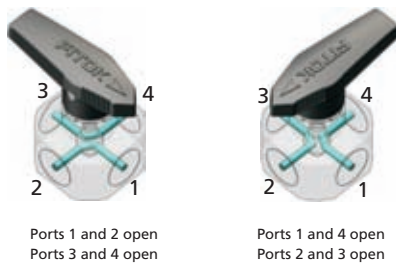


#### 6-way Valves



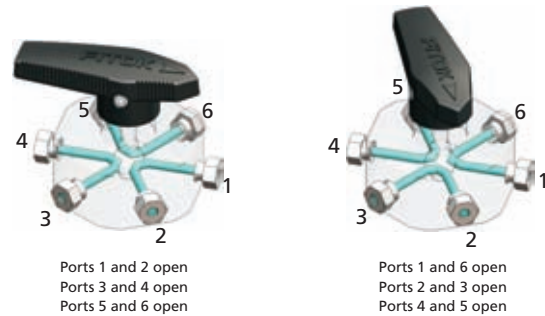
#### 4C Flow Path

This type of valve can connect two groups of adjacent ports at the same time. Switch between 0° and 90° positions with 90° rotation handle.



#### 6C Flow Path

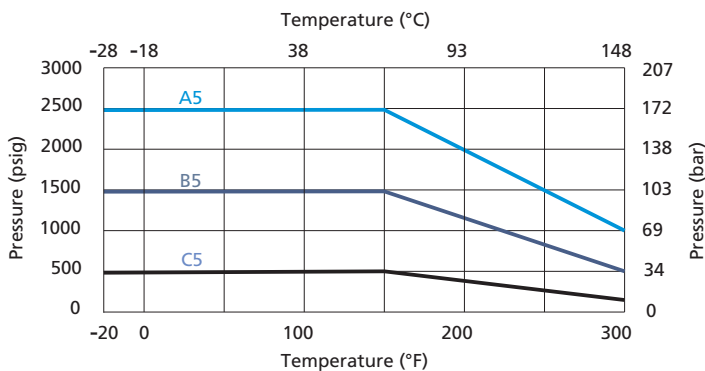
This type of valve can connect three groups of adjacent ports at the same time. Switch between 0° and 60° positions with 60° rotation handle.



## Pressure vs. Temperature

### Crossover Valves

#### PTFE Packing Seat



A5: 4-way (orifice 0.06")

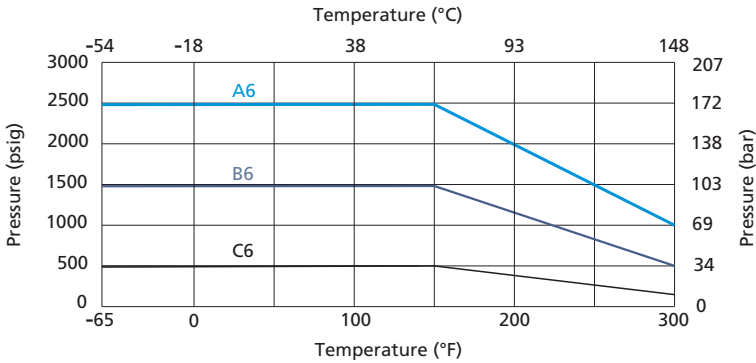
B5: 4-way (orifice 0.41")

C5: 6-way (orifice 0.05" & 0.06")

## B-30 Ball Valves

### PFA, UHMWPE Packing Seat

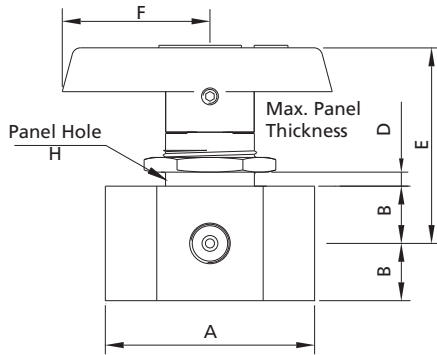
The working temperature of UHMWPE packing seat should not be higher than 150°F (65°C).



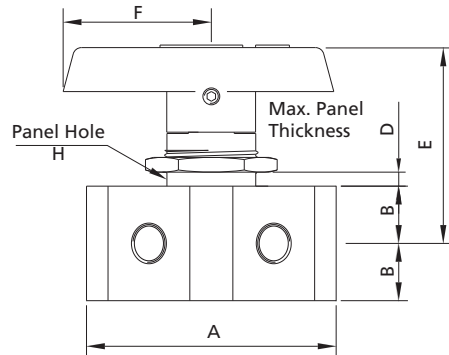
- A6: 4-way (orifice 0.06")
- B6: 6-way (orifice 0.41")
- C6: 6-way (orifice 0.05" & 0.06")

## Dimensions

### 4-way Valves



### 6-way Valves



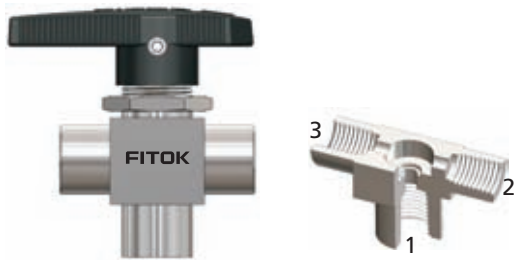
Basic Ordering Number	Connection Type and Size	Orifice in. (mm)	Cv	Dimensions, in. (mm)					
				A	B	D	E	F	H
<b>4-way Valve</b>									
BO□□-FL1-00-4C	1/16" Female FITOK Tube Fitting	0.05 (1.3)	0.06	1.95 (49.6)					
BO□□-FL2-01-4C	1/8" Female FITOK Tube Fitting	0.06 (1.6)	0.08	2.61 (66.3)	0.44 (11.2)	3/16 (4.8)	1.64 (41.7)	1.57 (39.9)	25/32 (19.8)
BO□□-FNS2-01-4C	1/8 Female NPT			1.55 (39.4)					
BO□□-FNS8-07-4C	1/2 Female NPT	0.28 (7.1)	1.60	3.13 (79.5)	0.69 (17.5)	0.48 (12.2)	2.67 (67.7)	3.13 (79.6)	1 1/2 (38.1)
<b>6-way Valve</b>									
BO□□-FL1-00-6C	1/16" Female FITOK Tube Fitting	0.05 (1.3)	0.06	1.95 (49.5)	0.44 (11.2)	3/16 (4.8)	1.68 (42.7)	1.53 (38.9)	29/32 (23.1)
BO□□-FL2-01-6C	1/8" Female FITOK Tube Fitting	0.06 (1.6)	0.08	2.59 (65.8)					

Note: Connection type for ball valves in 4L, 5L, 6L, 7L, 4C, 6C, 4H, 4HL, 4V, 5HL, 5H and 5LV flow path is female FITOK tube fitting, which can not be used directly with standard FT and MT connections. Please contact FITOK Group or authorized distributors for use with standard FT and MT connections.

1. FITOK means FITOK double ferrule tube fittings.
  2. Sizes and types listed are standard. Other sizes and types are available upon request, please contact FITOK Group or our authorized distributors.
  3. Dimensions are shown with tube fitting nuts finger-tightened. All dimensions are for reference only and are subject to change.
- For dimensions not shown above, please contact FITOK Group or our authorized distributors.

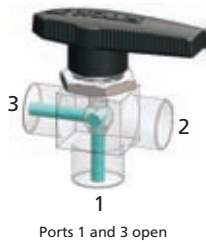
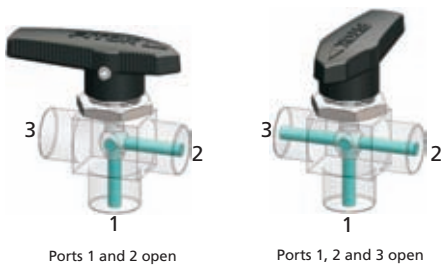
## Special Flow Path

### 3-way Valves



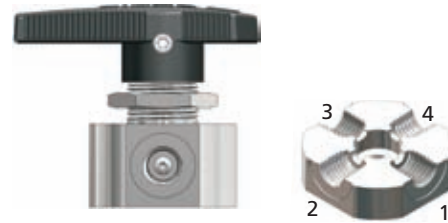
### 3HL Flow Path

This type of valve can connect one side port to the bottom port, or connect two side ports to the bottom port. Switching can be done in 90° increments with 180° rotation handle.



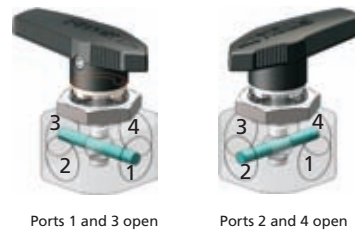
Note: For Temperature VS. Pressure curves and dimensions of 3-way and 4-way valves, see Switching (3-, 4-, 5-, 6- and 7-way) Valves above.

### 4-way Valves



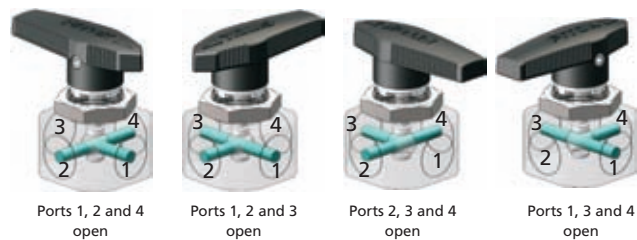
### 4H Flow Path

This type of valve can connect two opposite ports. Switch between 0° and 90° positions with 90° rotation handle.



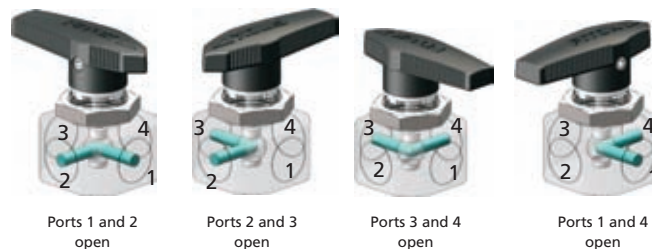
### 4HL Flow Path

This type of valve can connect three adjacent ports and shut off other ports. Switching can be done in 90° increments with 360° rotation handle.



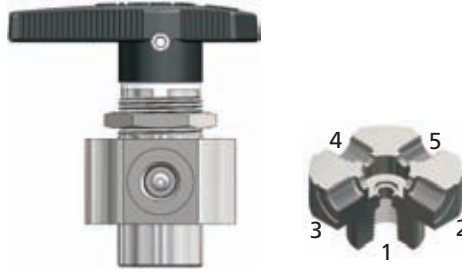
### 4V Flow Path

This type of valve can connect two adjacent ports and shut off other ports. Switching can be done in 90° increments with 360° rotation handle.



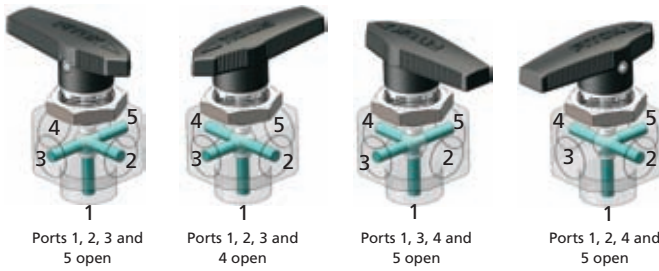
## B-32 Ball Valves

### 5-way Valves



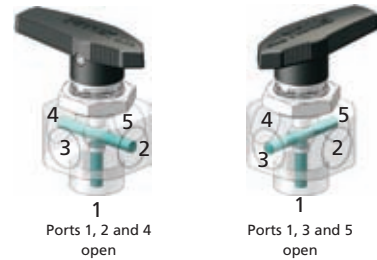
#### 5HL Flow Path

This type of valve can connect three side ports to the bottom port, and shut off the fourth side port at the same time. Switching can be done in 90° increments with 360° rotation handle.



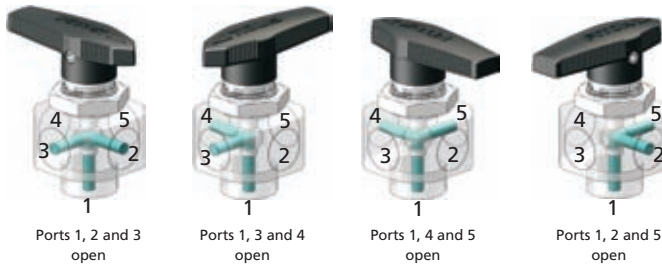
#### 5H Flow Path

This type of valve can connect the bottom port to port 2 and port 4, or connect the bottom port to port 3 and port 5. Switch between 0° and 90° positions with 90° rotation handle.



#### 5LV Flow Path

This type of valve can connect two adjacent ports to the bottom port, and shut off other two side ports at the same time. Switching can be done in 90° increments with 360° rotation handle.



Note: For Temperature vs. Pressure curve and dimensions of 5-way valves, see Switching (3-, 4-, 5-, 6- and 7-way) Valves above.

## Vent Port Options

### Vented Valves

The maximum working pressure for vented valves is 500 psig (34.4 bar).

### Straight-pattern Valves

A vent hole in the side of the valve body makes the downstream port vent to atmosphere when the valve is closed.

### Angle-pattern and 3-way Valves

A vent hole in the side of the valve body makes the bottom port vent to atmosphere when the valve is closed.

### Welded Vent Port Connections

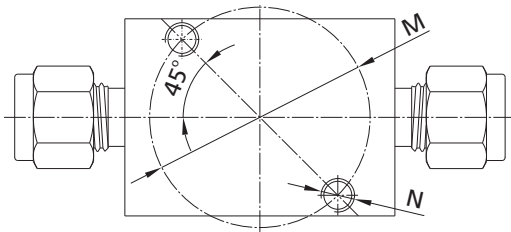
A FITOK tube fitting or a tube stub welded to the vent port is available for stainless steel vented valves.

## Bottom Screw Panel Mounting Options

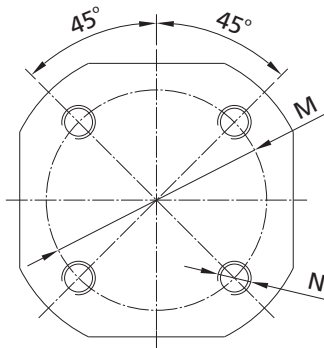
### Mounting Dimensions

The bottom screw panel mounting options are not available on angle-pattern valves, 3-way valves, 6-way valves and 7-way valves.

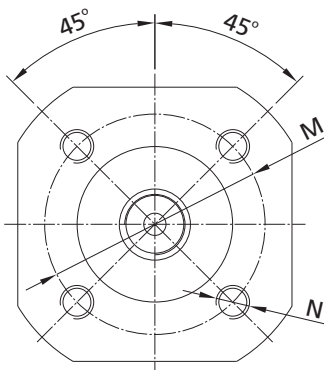
#### 2-way



#### 4-way



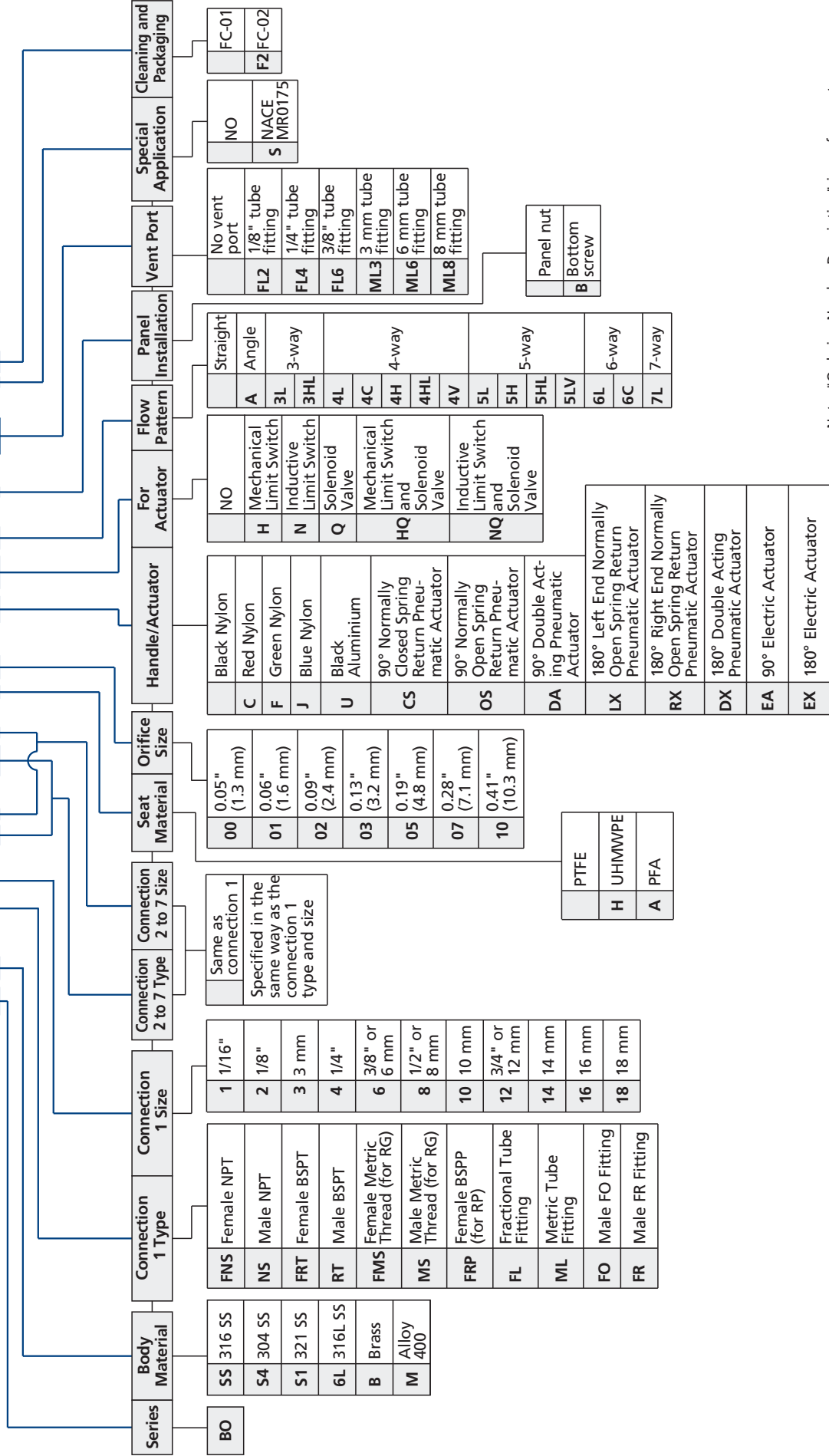
#### 5-way



	Orifice in. (mm)	Dimensions, in. (mm)	
		M	N
2-way	0.05~0.13 (1.3~3.2)	0.63 (15.88)	M2.5 x 0.45 deep 0.24" (6)
	0.19 (4.8)	0.88 (22.23)	M3 x 0.5 deep 0.24" (6)
	0.28 (7.1)	1.25 (31.75)	M5 x 0.8 deep 0.24" (6)
4-way	0.41 (10.3)	1.63 (41.28)	M5 x 0.8 deep 0.24" (6)
	0.05~0.06 (1.3~1.6)	1.25 (31.75)	M5 x 0.8 deep 0.24" (6)
5-way	0.28 (7.1)	2.00 (50.8)	M5 x 0.8 deep 0.24" (6)
	0.05~0.06 (1.3~1.6)	1.25 (31.75)	M5 x 0.8 deep 0.24" (6)
5-way	0.41 (10.3)	2.00 (50.8)	M5 x 0.8 deep 0.24" (6)
	0.05~0.06 (1.3~1.6)	1.25 (31.75)	M5 x 0.8 deep 0.24" (6)

# Ordering Number Description

## BOSS - ML6 - FL4 - ML8 - H05 - OSHQ3L - B - FL4 - SF2



Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

1. For oxygen-enriched environment or hazardous media service, contact FITOK Group or our authorized distributors.

2. Cleaning and Packaging:  
 FC-01: Standard cleaning and packaging for general industrial procedures.  
 FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.

3. For more information about pneumatic actuator ball valves, please refer to the catalog *Automatic Control Ball Valves*.



# Bar Stock Ball Valves

## BP Series

### Features

- ⦿ Working pressure up to: 10000 psig (690 bar)
- ⦿ Working temperature: -40°F to 450°F (-40°C to 232°C)
- ⦿ Bidirectional flow for 2-way valves
- ⦿ Seat wear compensation by free floating ball
- ⦿ Variety of end connections
- ⦿ Blowout proof stem with self-sealing function
- ⦿ Handle color options available
- ⦿ Optional pneumatic and electric actuator
- ⦿ Leak-tight performance testing with nitrogen or compressed air for every valve at the rated pressure (not higher than 6000 psig) to meet the requirement of no visible leak
- ⦿ Restricted flow path for BP series: only port 1 as inlet, port 2 and port 3 as outlet

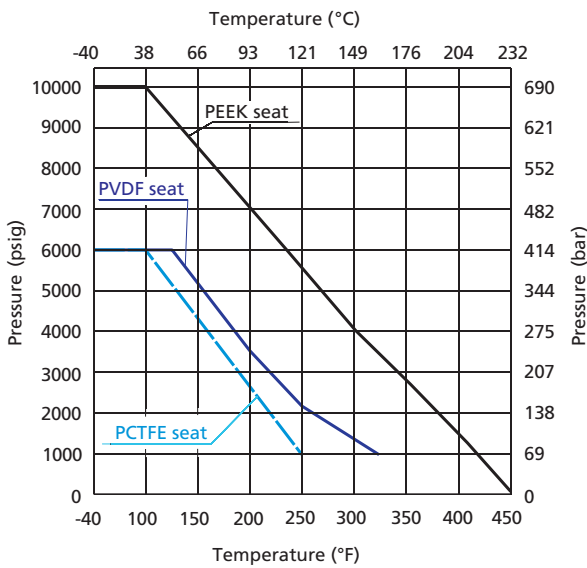


Ball Valves  
Plug Valves

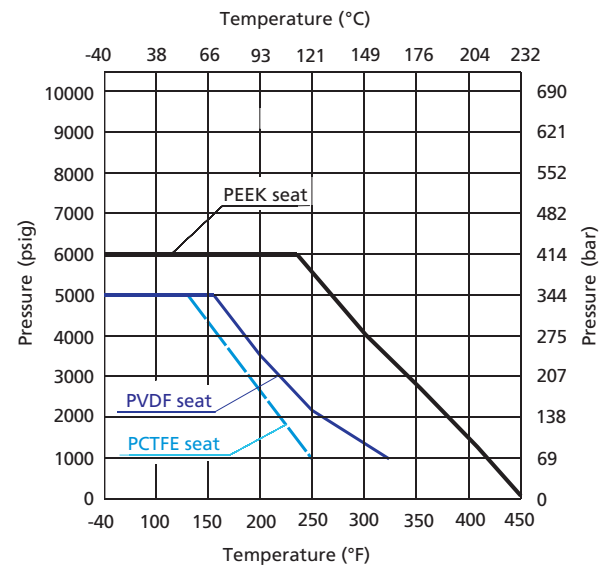
### Pressure vs. Temperature

#### 2-way Valves

Orifice: 0.39" (10.0 mm)



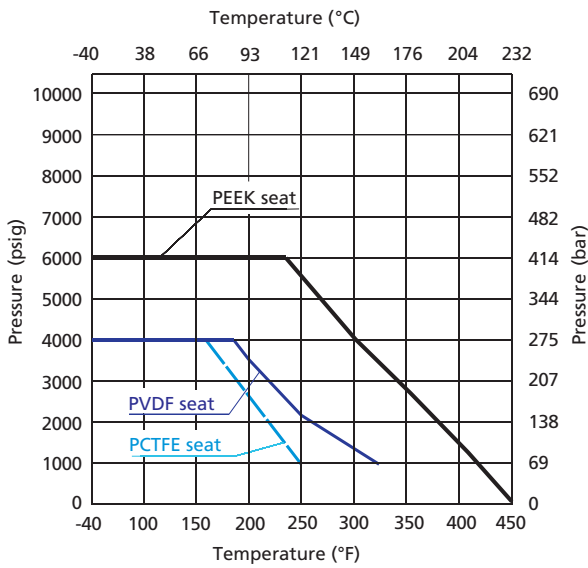
Orifice: 0.50" (12.7 mm) and 0.71" (18.0 mm)



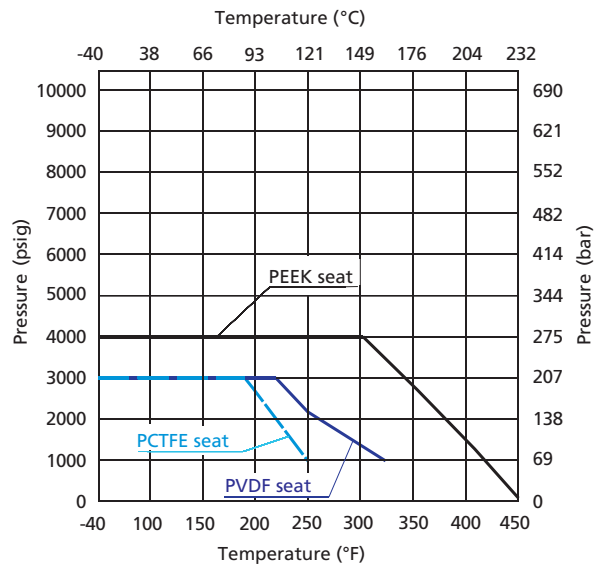
## B-36 Ball Valves

### 3-way Valves

Orifice: 0.39" (10.0 mm)



Orifice: 0.50" (12.7 mm) and 0.71" (18.0 mm)

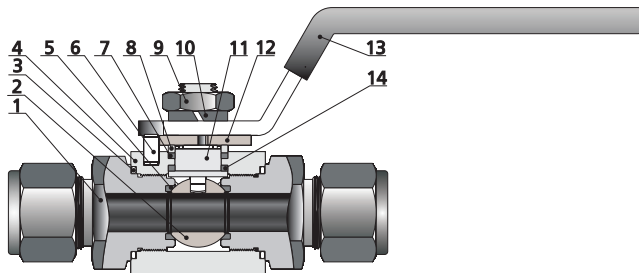


Note: 1. Graphs are with 316SS body. For information of body in other materials, please contact FITOK Group or our authorized distributors.

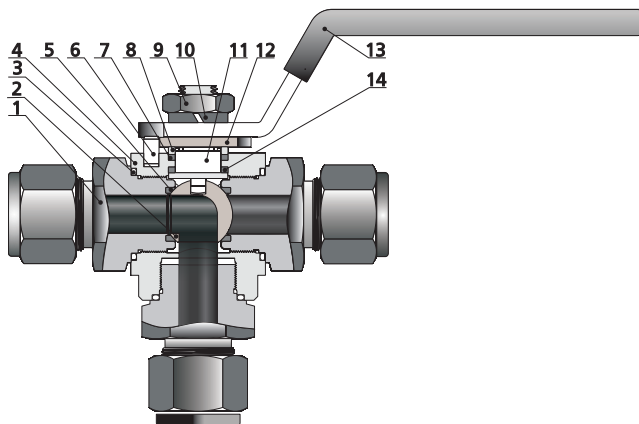
2. The working pressure of valves is restricted by materials of the valve body and seat, as well as end connections. When choosing a valve for your applications, please refer to the above Temperature vs. Pressure Curves and the pressure rating in the dimension table. The minimum value shall be the pressure rating of the valve.

## Standard Materials of Construction

### 2-way Valves



### 3-way Valves



Item	Component	Body Material
		316 SS
1	<i>End Connection</i>	<i>316 SS/A479</i>
2	<i>Ball</i>	<i>316 SS/A479</i>
3	<i>O-ring</i>	<i>FKM or Buna-N or Neoprene or EPDM</i>
4	<i>Body</i>	<i>316 SS/A479</i>
5	<i>Seat</i>	<i>PVDF or PCTFE or PEEK</i>
6	Stop Pin	SS
7	<i>Stem Packing</i>	<i>PTFE/D1710</i>
8	Stem Washer	316 SS/A479
9	Stem Nut <sup>①</sup>	SS
10	Spring Washer	SS
11	<i>Stem</i>	<i>316 SS/A479</i>
12	Stop Block	304 SS/A240
13	Handle	SS with vinyl cover
14	Lower Packing <sup>②</sup>	PEEK

Note: Wetted components are listed in italics.

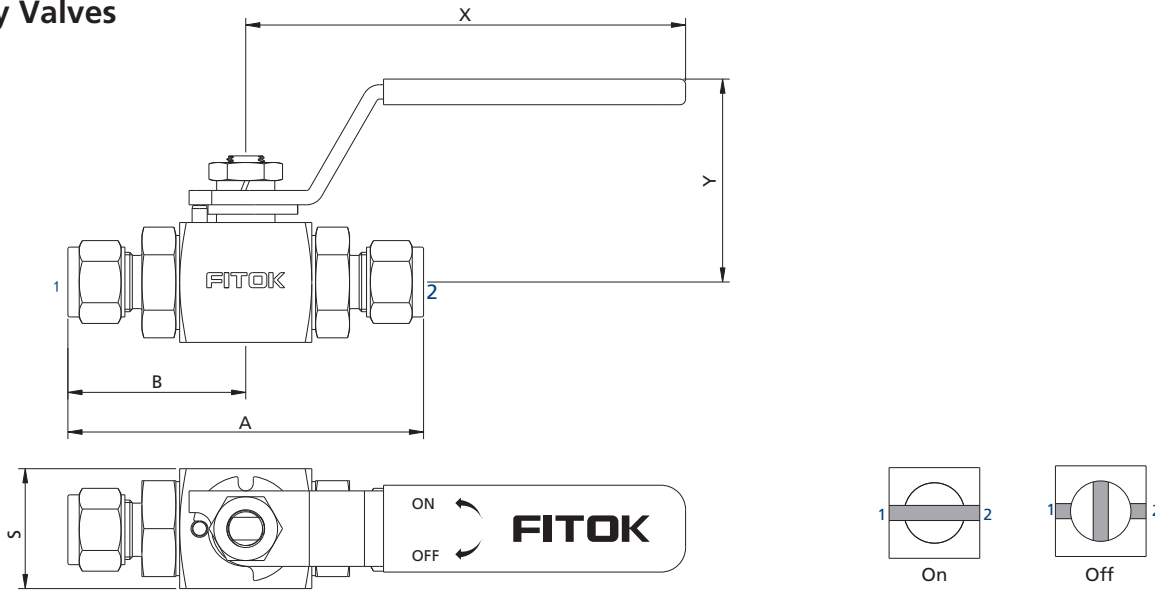
For other materials, please contact FITOK Group or our authorized distributors.

① Ball valves with orifice 0.50" (12.7 mm) and 0.71" (18.0 mm) have 2 stem nuts.

② Lower packing material of ball valves with orifice 0.71" (18.0 mm) is PTFE.

## Dimensions

### 2-way Valves

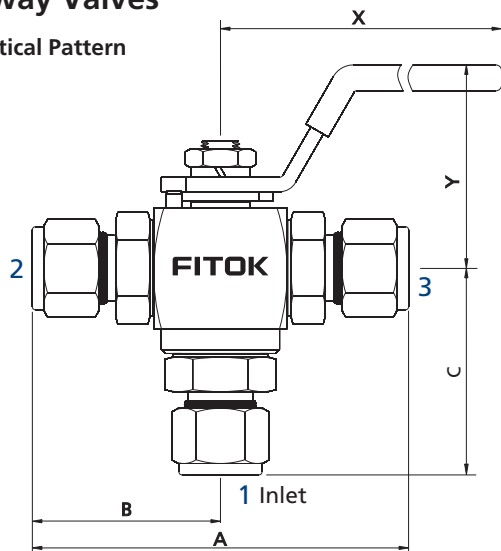


Basic Ordering Number	Connection Type and Size	Pressure Rating of End Connections @ 100°F (38°C), psig (bar)	Orifice in. (mm)	Cv	Dimensions, in. (mm)						
					A	B	X	Y	S		
BP□□-ML6-10	6 mm FITOK	10000 (690)	0.19(4.8)	1.2	3.54 (90.0)	1.77 (45.0)	4.57 (116.0)	2.10 (53.4)	1.30 (32.0)		
BP□□-ML8-10	8 mm FITOK	7500 (517)	0.25(6.4)	2.3	3.60 (91.6)	1.80 (45.8)					
BP□□-ML10-10	10 mm FITOK	8400 (579)	0.28(7.1)	3.7	3.70 (94.0)	1.85 (47.0)					
BP□□-ML12-10	12 mm FITOK	6800 (469)	0.39 (10.0)	7.5	3.94 (100.0)	1.97 (50.0)					
BP□□-ML14-10	14 mm FITOK	6200 (427)									
BP□□-FL4-10	1/4" FITOK	10000 (690)	0.19(4.8)	1.2	3.56 (90.4)	1.78 (45.2)					
BP□□-FL6-10	3/8" FITOK	6500 (448)	0.28(7.1)	3.7	3.72 (94.6)	1.86 (47.3)					
BP□□-FL8-10	1/2" FITOK	6700 (462)	0.39 (10.0)	7.5	3.92 (99.6)	1.96 (49.8)					
BP□□-FNS4-10	1/4 Female NPT	10000 (690)								3.03 (77.0)	1.52 (38.5)
BP□□-FNS6-10	3/8 Female NPT	10000 (690)								2.80 (71.0)	1.40 (35.5)
BP□□-FNS8-10	1/2 Female NPT	10000 (690)			3.27 (83.0)	1.63 (41.5)					
BP□□-NS4-10	1/4 Male NPT	10000 (690)	0.28(7.1)	3.7	3.36 (85.4)	1.68 (42.7)					
BP□□-NS6-10	3/8 Male NPT	10000 (690)	0.39 (10.0)	7.5	3.75 (95.2)	1.88 (47.6)					
BP□□-NS8-10	1/2 Male NPT	10000 (690)									
BP□□-ML16-13	16 mm FITOK	5800 (400)					0.50 (12.7)	10.0	4.42 (112.2)	2.21 (56.1)	
BP□□-ML18-13	18 mm FITOK	5400 (372)	4.12 (104.6)	2.06 (52.3)							
BP□□-ML20-13	20 mm FITOK	5500 (379)	4.43 (112.6)	2.22 (56.3)							
BP□□-ML22-13	22 mm FITOK	4900 (338)	4.29 (109.0)	2.15 (54.5)							
BP□□-FL10-13	5/8" FITOK	6000 (414)	4.36 (110.6)	2.18 (55.3)							
BP□□-FL12-13	3/4" FITOK	5800 (400)	3.54 (90.0)	1.77 (45.0)							
BP□□-FNS8-13	1/2 Female NPT	6000 (414)									
BP□□-FNS12-13	3/4 Female NPT	6000 (414)			4.09 (104.0)	2.05 (52.0)					
BP□□-NS12-13	3/4 Male NPT	6000 (414)			4.14 (105.2)	2.07 (52.6)					
BP□□-ML20-19	20 mm FITOK	5500 (379)	0.71 (18.0)	30.0	4.87 (123.8)	2.43 (61.9)					
BP□□-ML22-19	22 mm FITOK	4900 (338)									
BP□□-ML25-19	25 mm FITOK	4600 (317)					5.11 (129.8)	2.66 (64.9)			
BP□□-FL12-19	3/4" FITOK	5800 (400)					4.59 (116.6)	2.29 (58.3)			
BP□□-FL16-19	1" FITOK	4700 (324)					5.11 (129.8)	2.66 (64.9)			
BP□□-FNS12-19	3/4 Female NPT	6000 (414)					3.81 (96.8)	1.91 (48.4)			
BP□□-FNS16-19	1 Female NPT	6000 (414)					4.26 (108.2)	2.13 (54.1)			
BP□□-NS16-19	1 Male NPT	6000 (414)					4.91 (124.8)	2.45 (62.4)			
									6.46 (164.0)	2.72 (69.0)	1.96 (50.0)

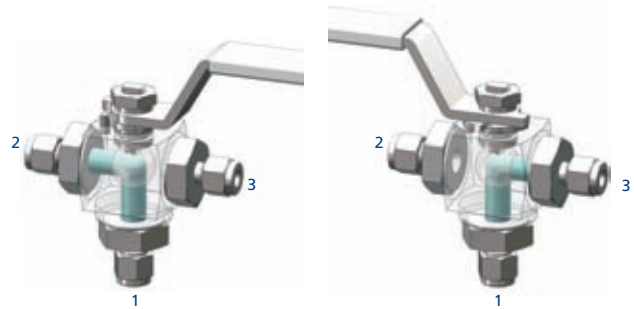
## B-38 Ball Valves

### 3-way Valves

#### Vertical Pattern



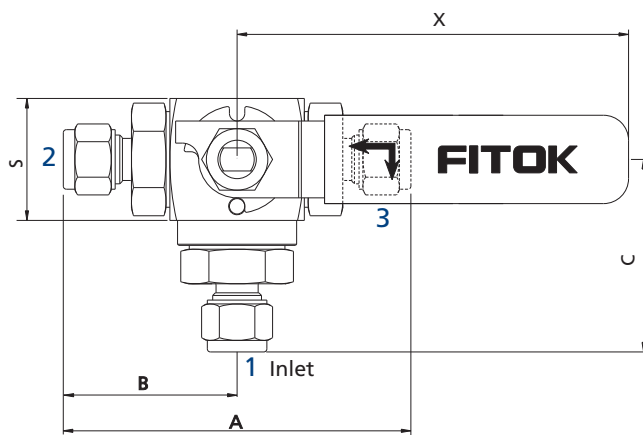
Port 1 as inlet  
180° rotation handle



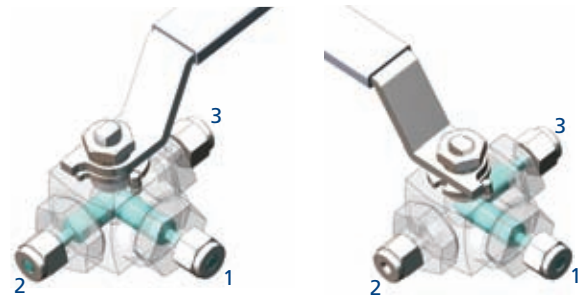
Port 1 to port 2

Port 1 to port 3

#### Horizontal Pattern



Port 1 as inlet  
90° rotation handle



Port 1 to port 2

Port 1 to port 3

Basic Ordering Number	Connection Type and Size	Pressure Rating of End Connections @ 100 °F (38 °C), psig (bar)	Orifice in. (mm)	Dimensions, in. (mm)					
				A	B	C	X	Y	S
BP□□-ML6-10-3□	6 mm FITOK	10000 (690)	0.19 (4.8)	3.54 (90.0)	1.77 (45.0)	2.00 (51.0)	4.57 (116.0)	2.10 (53.4)	1.30 (32.0)
BP□□-ML8-10-3□	8 mm FITOK	7500 (517)	0.25 (6.4)	3.60 (91.6)	1.80 (45.8)	2.02 (51.3)			
BP□□-ML10-10-3□	10 mm FITOK	8400 (579)	0.28 (7.1)	3.70 (94.0)	1.85 (47.0)	2.07 (52.5)			
BP□□-ML12-10-3□	12 mm FITOK	6800 (469)	0.39 (10.0)	3.94 (100.0)	1.97 (50.0)	2.18 (55.5)			
BP□□-ML14-10-3□	14 mm FITOK	6200 (427)		3.94 (100.0)	1.97 (50.0)	2.18 (55.5)			
BP□□-FL4-10-3□	1/4" FITOK	10000 (690)	0.19 (4.8)	3.56 (90.4)	1.78 (45.2)	1.95 (49.5)			
BP□□-FL6-10-3□	3/8" FITOK	6500 (448)	0.28 (7.1)	3.72 (94.6)	1.86 (47.3)	2.16 (54.8)			
BP□□-FL8-10-3□	1/2" FITOK	6700 (462)	0.39 (10.0)	3.92 (99.6)	1.96 (49.8)	2.13 (54.0)			
BP□□-FNS4-10-3□	1/4 Female NPT	10000 (690)		3.03 (77.0)	1.52 (38.5)	1.44 (36.5)			
BP□□-FNS6-10-3□	3/8 Female NPT	10000 (690)		2.80 (71.0)	1.40 (35.5)	1.57 (40.0)			
BP□□-FNS8-10-3□	1/2 Female NPT	10000 (690)		3.27 (83.0)	1.63 (41.5)	1.83 (46.4)			
BP□□-NS4-10-3□	1/4 Male NPT	10000 (690)	0.28 (7.1)	3.36 (85.4)	1.68 (42.7)	1.90 (48.2)			
BP□□-NS6-10-3□	3/8 Male NPT	10000 (690)	0.39 (10.0)	3.75 (95.2)	1.88 (47.6)	2.09 (53.1)			
BP□□-NS8-10-3□	1/2 Male NPT	10000 (690)		3.75 (95.2)	1.88 (47.6)	2.09 (53.1)			

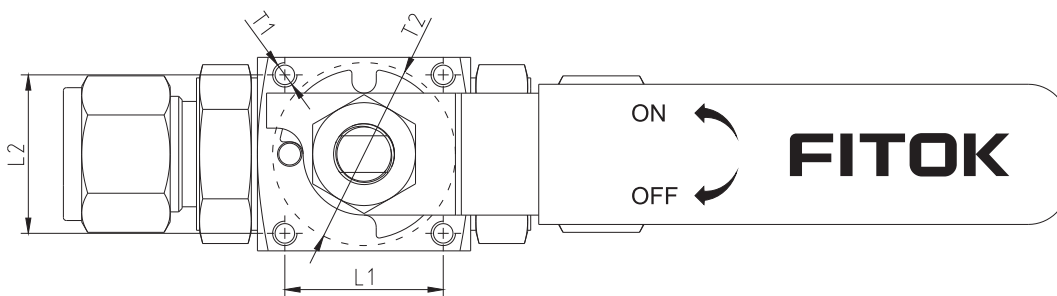
Basic Ordering Number	Connection Type and Size	Pressure Rating of End Connections @ 100°F (38°C), psig (bar)	Orifice in. (mm)	Dimensions, in. (mm)								
	Connection 1/2/3	316 SS		A	B	C	X	Y	S			
BP□□-ML16-13-3□	16 mm FITOK	5800 (400)	0.50 (12.7)	4.42 (112.2)	2.21 (56.1)	2.60 (66.1)	5.59 (142.0)	2.54 (64.4)	1.50 (38.0)			
BP□□-ML18-13-3□	18 mm FITOK	5400 (372)		4.12 (104.6)	2.06 (52.3)	2.45 (62.3)						
BP□□-ML20-13-3□	20 mm FITOK	5500 (379)		4.43 (112.6)	2.22 (56.3)	2.61 (66.3)						
BP□□-ML22-13-3□	22 mm FITOK	4900 (338)		4.29 (109.0)	2.15 (54.5)	2.54 (64.5)						
BP□□-FL10-13-3□	5/8" FITOK	6000 (414)		4.36 (110.6)	2.18 (55.3)	2.57 (65.3)						
BP□□-FL12-13-3□	3/4" FITOK	5800 (400)		3.54 (90.0)	1.77 (45.0)	2.02 (51.2)						
BP□□-FNS8-13-3□	1/2 Female NPT	6000 (414)		4.09 (104.0)	2.05 (52.0)	2.44 (62.0)						
BP□□-FNS12-13-3□	3/4 Female NPT	6000 (414)		4.14 (105.2)	2.07 (52.6)	2.46 (62.6)						
BP□□-NS12-13-3□	3/4 Male NPT	6000 (414)		4.87 (123.8)	2.43 (61.9)	2.89 (73.4)				6.46 (164.0)	2.72 (69.0)	1.96 (50.0)
BP□□-ML20-19-3□	20 mm FITOK	5500 (379)		5.11 (129.8)	2.66 (64.9)	3.00 (76.2)						
BP□□-ML22-19-3□	22 mm FITOK	4900 (338)	4.86 (123.4)	2.43 (61.7)	3.02 (76.7)							
BP□□-ML25-19-3□	25 mm FITOK	4600 (317)	5.11 (129.8)	2.66 (64.9)	2.85 (72.4)							
BP□□-FL12-19-3□	3/4" FITOK	5800 (400)	3.82 (97.0)	1.91 (48.5)	2.22 (56.5)							
BP□□-FL16-19-3□	1" FITOK	4700 (324)	4.26 (108.2)	2.13 (54.1)	2.72 (69.1)							
BP□□-FNS12-19-3□	3/4 Female NPT	6000 (414)	4.54 (115.2)	2.27 (57.6)	2.72 (69.1)							
BP□□-FNS16-19-3□	1 Female NPT	6000 (414)	4.91 (124.8)	2.45 (62.4)	2.90 (73.9)							
BP□□-NS12-19-3□	3/4 Male NPT	6000 (414)										
BP□□-NS16-19-3□	1 Male NPT	6000 (414)										

1. FITOK means FITOK double ferrule tube fittings.
2. Sizes and types listed are standard. Other sizes and types are available upon request, please contact FITOK Group or our authorized distributors.
3. Dimensions are shown with tube fitting nuts finger-tightened. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

## Panel Mounting Options

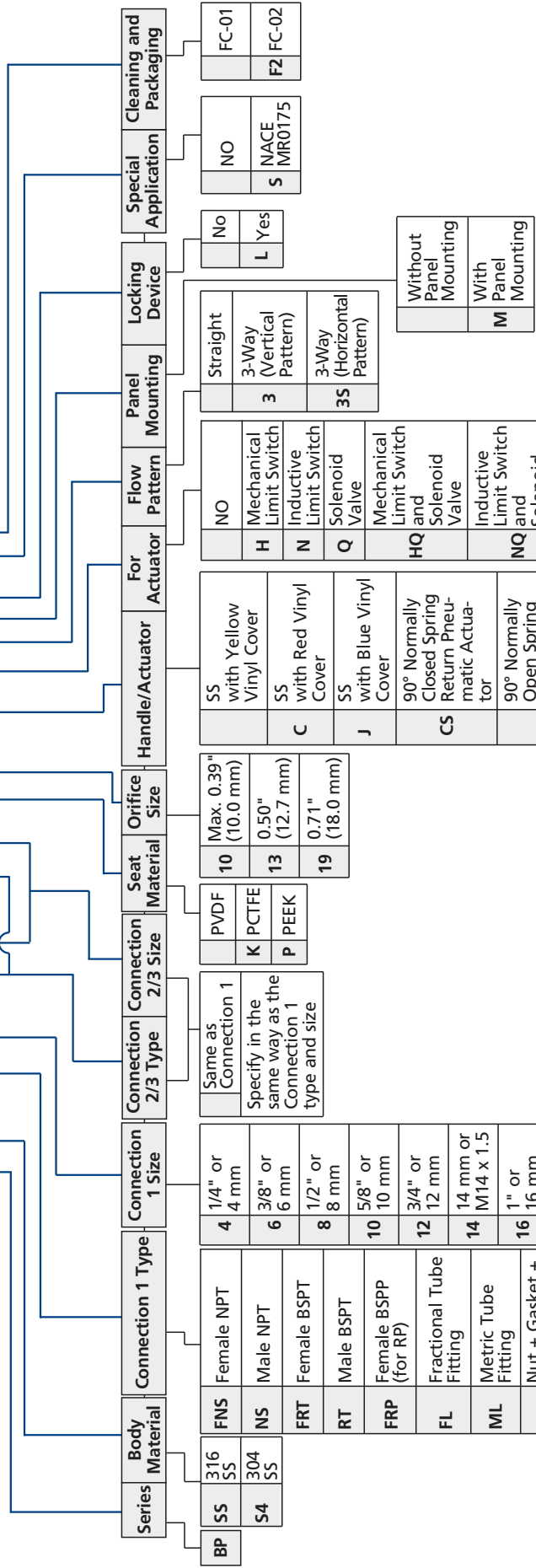
### Dimension for Panel Mounting

Orifice in. (mm)	in. (mm)			
	L1	L2	T1	T2
0.39 (10.0)	1.02 (26.0)	1.02 (26.0)	M4 × 0.7P deep 0.19 (5.0)	1.18 (30.0)
0.50 (12.7)	1.18 (30.0)	1.18 (30.0)	M5 × 0.8P deep 0.19 (5.0)	1.18 (30.0)
0.71 (18.0)	1.37 (35.0)	1.57 (40.0)	M5 × 0.8P deep 0.19 (5.0)	1.50 (38.0)



# Ordering Number Description

## BPSS - ML20 - FL12 - FNS8 - P13 - OSHQ3ML - SF2



Series	Body Material	Connection 1 Type	Connection 1 Size	Connection 2/3 Type	Connection 2/3 Size	Seat Material	Orifice Size	Handle/Actuator	For Actuator	Flow Pattern	Panel Mounting	Locking Device	Special Application	Cleaning and Packaging
BP SS S4	FNS 316 SS	Female NPT	4 1/4" or 4 mm	Same as Connection 1 Specify in the same way as the Connection 1 type and size	K PCTFE	10 PVDF	Max. 0.39" (10.0 mm)	SS with Yellow Vinyl Cover	H Mechanical Limit Switch	NO	3 Straight	L Yes	NO	FC-01
	NS 304 SS	Male NPT	6 3/8" or 6 mm											
	FRT	Female BSPT	8 1/2" or 8 mm			19 PEEK	0.71" (18.0 mm)	J SS with Blue Vinyl Cover	Q Solenoid Valve					
	RT	Male BSPT	10 5/8" or 10 mm											
	FRP	Female BSPP (for RP)	12 3/4" or 12 mm					CS 90° Normally Closed Spring Return Pneu- matic Actua- tor	HQ and Solenoid Valve					
	FL	Fractional Tube Fitting	14 14 mm or M14 x 1.5											
	ML	Metric Tube Fitting	16 1" or 16 mm					OS 90° Normally Open Spring Return Pneu- matic Actua- tor	NQ and Solenoid Valve					
	UFB	Nut + Gasket + Fractional Tube Bulged Nipple	18 18 mm											
	UMB	Nut + Gasket + Metric Tube Bulged Nipple	20 20 mm or M20 x 1.5					DA 90° Double Acting Pneumatic Actuator						
	UPB	Nut + Gasket + Pipe Bulged Nipple	22 22 mm or M22 x 1.5					LX 180° Left End Normally Open Spring Return Pneumatic Actuator						
			25 25 mm					RX 180° Right End Normally Open Spring Return Pneumatic Actuator						
			28 28 mm					DX 180° Double Acting Pneumatic Actuator						
			30 30 mm					EA 90° Electric Actuator						
			32 32 mm					EX 180° Electric Actuator						

- Standard thread pitch for metric threads are as follows:  
M10 and below: 1 mm  
M12 to M24: 1.5 mm  
M27 and above: 2 mm  
Standard thread pitch should be omitted in the ordering number, others should be specified.
- For oxygen-enriched environment or hazardous media service, contact FITOK Group or our authorized distributors.
- Cleaning and Packaging:  
FC-01: Standard cleaning and packaging for general industrial procedures.  
FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirements of ASTM G93 Level C.
- For more information about pneumatic actuator ball valves, please refer to the catalog **Automatic Control Ball Valves**.

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

# Hex Bar Stock Ball Valves

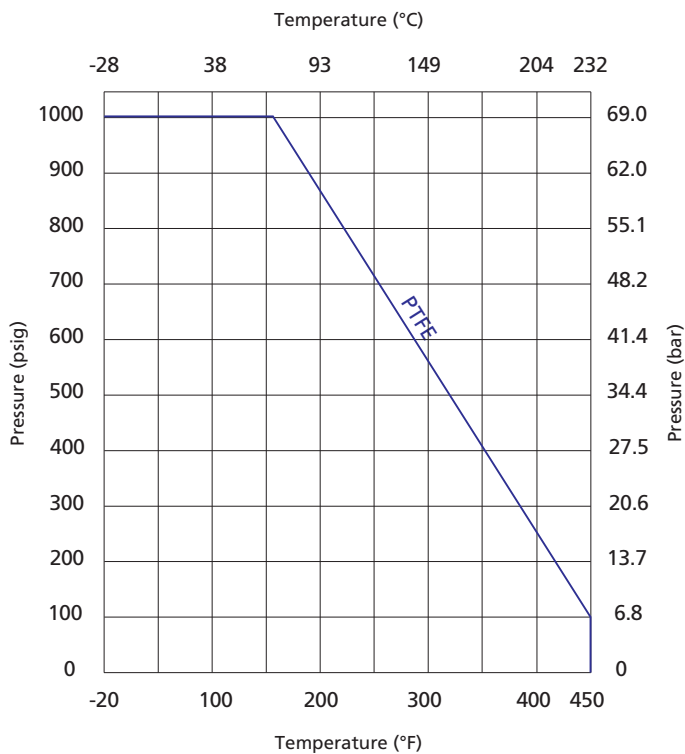
## BR Series

### Features

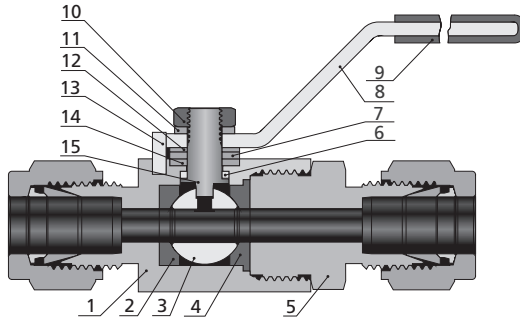
- ⦿ Working pressure up to: 1000 psig (69.0 bar)
- ⦿ Working temperature: -20°F to 450°F (-28°C to 232°C)
- ⦿ Compact and economical design
- ⦿ Free floating ball design for seat wear compensation
- ⦿ Bi-directional flow
- ⦿ Low operating torque
- ⦿ Any reasonable connections available
- ⦿ Blowout proof stem
- ⦿ Handle color options available
- ⦿ Leak-tight performance testing with nitrogen or compressed air for every valve at the rated pressure to meet the requirement of no visible leak



### Pressure vs. Temperature



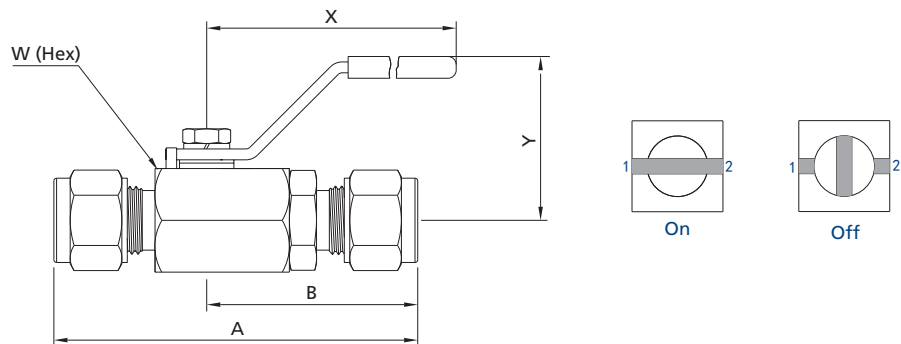
## Standard Materials of Construction



Item	Component	Valve Body Material			
		316 SS	304 SS	316L SS	Brass
1	<i>Body</i>	<i>316 SS/A479</i>	<i>304 SS/A479</i>	<i>316L SS/A479</i>	<i>Brass C36000/B16</i>
2	<i>Front Seat</i>	<i>PTFE/D1710</i>			
3	<i>Ball</i>	<i>316 SS/A479</i>	<i>304 SS/A479</i>	<i>316L SS/A479</i>	<i>316 SS/A479</i>
4	<i>Back Seat</i>	<i>PTFE/D1710</i>			
5	<i>End Connection</i>	<i>316 SS/A479</i>	<i>304 SS/A479</i>	<i>316L SS/A479</i>	<i>Brass C36000/B16</i>
6	<i>Lower Packing</i>	<i>PTFE/D1710</i>			
7	Washer	316 SS/A479			
8	Handle	304 SS/A240 or Aluminium			
9	Sleeve	Vinyl			
10	Stem Nut	SS			
11	Gasket	SS			
12	Coned-disk Spring	S17700/A693			
13	Stop Pin	SS			
14	<i>Upper Packing</i>	<i>PTFE/D1710</i>			
15	<i>Stem</i>	<i>316 SS/A479</i>	<i>304 SS/A479</i>	<i>316L SS/A479</i>	<i>316 SS/A479</i>

Note: Wetted components are listed in italics.  
For other materials, please contact FITOK Group or our authorized distributors.

## Dimensions





Basic Ordering Number	Connection Type and Size		Orifice in. (mm)	Cv	Dimensions, in. (mm)					
	Connection 1	Connection 2			A	B	W	X	Y	
BR□□-ML6-05	6 mm FITOK	6 mm FITOK	0.19 (4.8)	1.25	2.57 (65.2)	1.50 (38.1)	3/4 (19.05)	2.36 (60)	1.18 (30)	
BR□□-ML8-05	8 mm FITOK	8 mm FITOK			2.63 (66.8)	1.53 (38.8)				
BR□□-FL4-05	1/4" FITOK	1/4" FITOK			2.57 (65.2)	1.50 (38.1)				
BR□□-FL5-05	5/16" FITOK	5/16" FITOK			2.63 (66.8)	1.53 (38.8)				
BR□□-FNS2-05	1/8 Female NPT	1/8 Female NPT			1.85 (47.0)	1.08 (27.4)				
BR□□-FRP2-05	1/8 Female BSPP	1/8 Female BSPP			2.00 (50.0)	1.14 (29.0)				
BR□□-FRP4-05	1/4 Female BSPP	1/4 Female BSPP			2.00 (50.0)	1.14 (29.0)				
BR□□-FNS4-05	1/4 Female NPT	1/4 Female NPT			1.85 (47.0)	1.08 (27.4)				
BR□□-ML10-07	10 mm FITOK	10 mm FITOK	0.28 (7.1)	2.50	2.87 (72.9)	1.68 (42.7)	7/8 (22.23)	1.26 (32)		
BR□□-FL6-07	3/8" FITOK	3/8" FITOK			2.03 (51.6)	1.18 (30.0)				
BR□□-FRP6-07	3/8 Female BSPP	3/8 Female BSPP								
BR□□-FNS6-07	3/8 Female NPT	3/8 Female NPT								
BR□□-ML12-10	12 mm FITOK	12 mm FITOK	0.35 (8.9)	9.25	3.15 (80.0)	1.83 (46.5)	1 1/16 (27.0)	3.15 (80)	1.54 (39)	
BR□□-ML14-10	14 mm FITOK	14 mm FITOK			3.24 (82.2)	1.87 (47.5)				
BR□□-FL8-10	1/2" FITOK	1/2" FITOK			3.15 (80.0)	1.83 (46.5)				
BR□□-FL10-10	5/8" FITOK	5/8" FITOK			3.24 (82.2)	1.87 (47.5)				
BR□□-FRP8-10	1/2 Female BSPP	1/2 Female BSPP			2.08 (53.0)	1.12 (28.5)				15/16 (24.0)
BR□□-FNS8-10	1/2 Female NPT	1/2 Female NPT			2.08 (53.0)	1.12 (28.5)				
BR□□-ML16-13	16 mm FITOK	16 mm FITOK	0.47 (12.0)	12.65	3.50 (88.9)	2.00 (50.8)	1 1/4 (31.75)	3.94 (100)	2.03 (51.7)	
BR□□-ML18-13	18 mm FITOK	18 mm FITOK			2.48 (63.0)	1.30 (33.0)				
BR□□-FL12-13	3/4" FITOK	3/4" FITOK								
BR□□-FRP12-13	3/4 Female BSPP	3/4 Female BSPP								
BR□□-FNS12-13	3/4 Female NPT	3/4 Female NPT								
BR□□-ML22-16	22 mm FITOK	22 mm FITOK	0.63 (16.0)	17.35	3.96 (100.6)	2.24 (57.1)	1 1/2 (38.1)	2.15 (54.8)		
BR□□-ML25-16	25 mm FITOK	25 mm FITOK			4.31 (109.5)	2.42 (61.5)				
BR□□-FL16-16	1" FITOK	1" FITOK								
BR□□-FRP16-16	1 Female BSPP	1 Female BSPP								
BR□□-FNS16-16	1 Female NPT	1 Female NPT								

1. FITOK means FITOK double ferrule tube fittings.

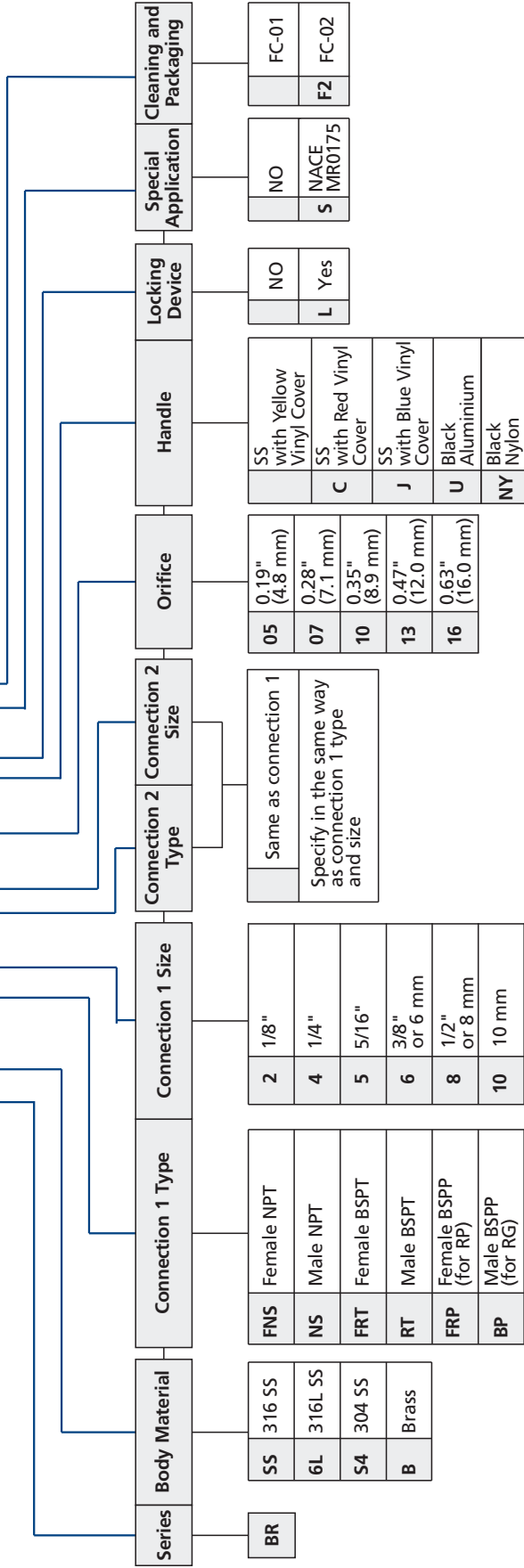
2. Sizes and types listed are standard. Other sizes and types are available upon request, please contact FITOK Group or our authorized distributors.

3. Dimensions are shown with tube fitting nuts finger-tightened. All dimensions are for reference only and are subject to change.

For dimensions not shown above, please contact FITOK Group or our authorized distributors.

# Ordering Number Description

BRSS - ML8 - FL4 - 05 - UL - SF2



Series	Body Material	Connection 1 Type	Connection 1 Size	Connection 2 Type	Connection 2 Size	Orifice	Handle	Locking Device	Special Application	Cleaning and Packaging
BR	SS 316 SS 6L 316L SS S4 304 SS B Brass	FNS Female NPT NS Male NPT FRT Female BSPT RT Male BSPT FRP Female BSPP (for RP) BP Male BSPP (for RG) FL Fractional Tube Fitting ML Metric Tube Fitting UFB Nut + Gasket + Fractional Tube Bulged Nipple UMB Nut + Gasket + Metric Tube Bulged Nipple UPB Nut + Gasket + Pipe Bulged Nipple	2 1/8" 4 1/4" 5 5/16" 6 3/8" or 6 mm 8 1/2" or 8 mm 10 10 mm 12 3/4" or 12 mm 14 14 mm or M14 x 1.5 16 1" or 16 mm 18 18 mm 20 1 1/4" or 20 mm or M20 x 1.5 22 22 mm or M22 x 1.5 25 25 mm		Same as connection 1 Specify in the same way as connection 1 type and size	05 0.19" (4.8 mm) 07 0.28" (7.1 mm) 10 0.35" (8.9 mm) 13 0.47" (12.0 mm) 16 0.63" (16.0 mm)	SS with Yellow Vinyl Cover C SS with Red Vinyl Cover SS with Blue Vinyl Cover U Black Aluminium NY Black Nylon	NO L Yes	NO S NACE MR0175	FC-01 F2 FC-02

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

- Standard thread pitch for metric threads are as follows:  
M10 and below: 1 mm  
M12 to M24: 1.5 mm  
M27 and above: 2 mm  
Standard thread pitch should be omitted in the ordering number, others should be specified. For oxygen-enriched environment or hazardous media service, contact FITOK Group or our authorized distributors.
- Cleaning and Packaging:  
FC-01: Standard cleaning and packaging for general industrial procedures.  
FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleaning requirement of ASTM G93 Level C.

# High Performance Ball Valves

## BV Series

### Features

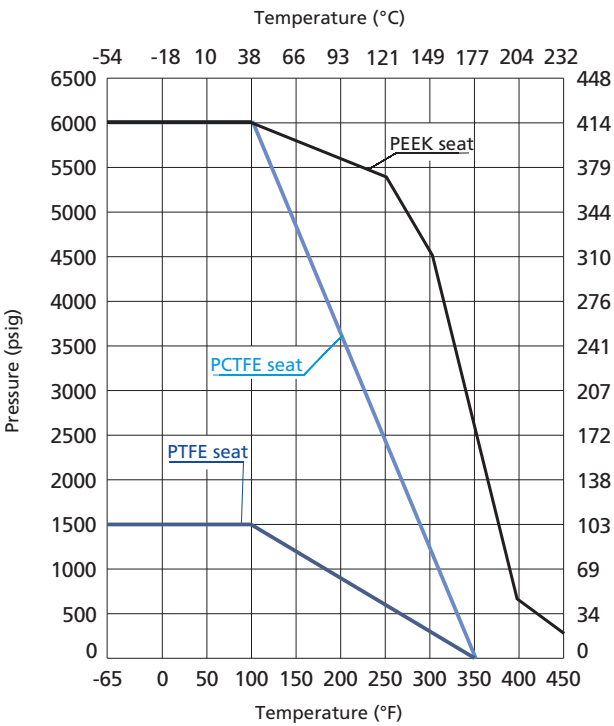
- ⦿ Working pressure up to: 6000 psig (414 bar)
- ⦿ Working temperature: -65°F to 450°F (-54°C to 232°C)
- ⦿ Low operating torque
- ⦿ Handle as indicator of flow direction
- ⦿ Positive handle stop
- ⦿ Electric and pneumatic actuator available
- ⦿ Handle color options available
- ⦿ Leak-tight performance testing with nitrogen or compressed air for every valve to meet the requirement of no visible leakage at the rated pressure
- ⦿ Bi-directional flow for straight valves
- ⦿ The inlet of 3-way valves and angle pattern valves can only be the bottom port



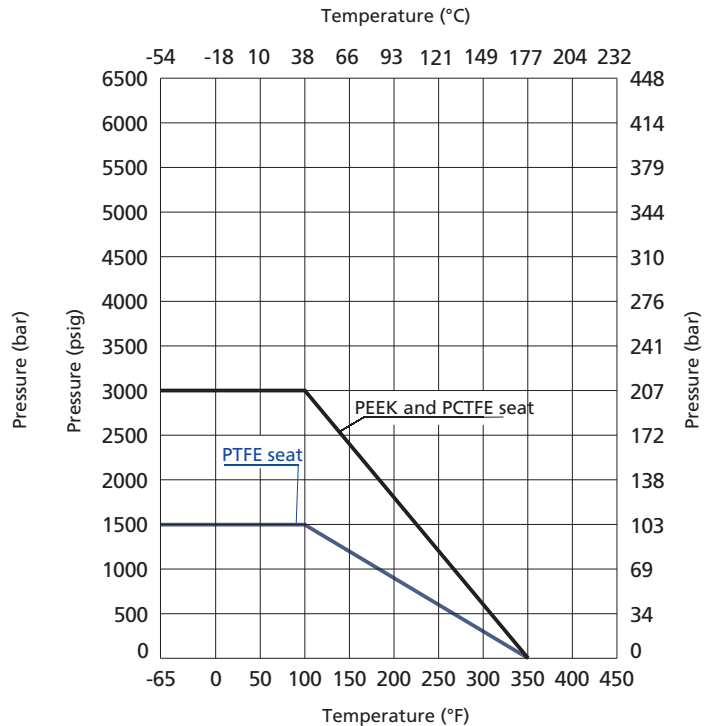
Ball Valves  
Plug Valves

### Pressure vs. Temperature

#### 316 SS Body



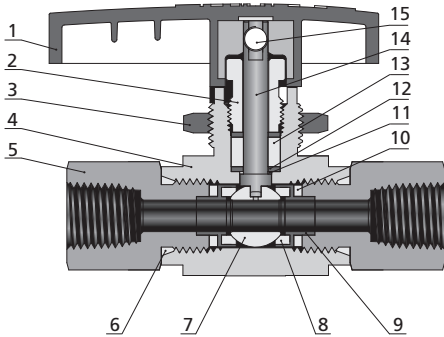
#### Brass Body



Note: The working pressure of valves is restricted by materials of the valve body and seat, as well as end connections. When choosing a valve for your applications, please refer to the above Temperature vs. Pressure Curves and the pressure rating in the dimension table. The minimum value shall be the pressure rating of the valve.

## Standard Materials of Construction

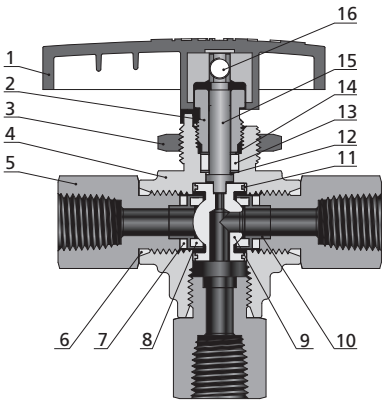
### Straight Valves



Item	Component	Valve Body Material	
		SS	Brass
1	Handle	Nylon or Aluminium	
2	Packing Nut	316 SS/A479	C36000/B16
3	Panel Nut	316 SS/A479	
4	<i>Body</i>	<i>CF8M/A351</i>	<i>C37700/B283</i>
5	<i>End Connection</i>	<i>316 SS/A479</i>	<i>C36000/B16</i>
6	<i>Connection O-ring</i>	PTFE	
7	<i>Ball</i>	316 SS/A479	
8	<i>Seat</i>	PTFE or PCTFE or PEEK	
9	<i>Seat Retainer</i>	316 SS/A479	
10	<i>Seat Packing</i>	PTFE	
11	<i>Stem Back-up Ring</i>	PEEK	
12	<i>Stem Washer</i>	316/A479	
13	<i>Stem Packing</i>	PTFE	
14	<i>Stem</i>	316 SS/A479	
15	<i>Set Screw</i>	Galvanized carbon steel	
	<i>Lubricants</i>	Fluorinated-based	

Note: Wetted components are listed in italics.  
 For other materials, please contact FITOK Group or our authorized distributors.

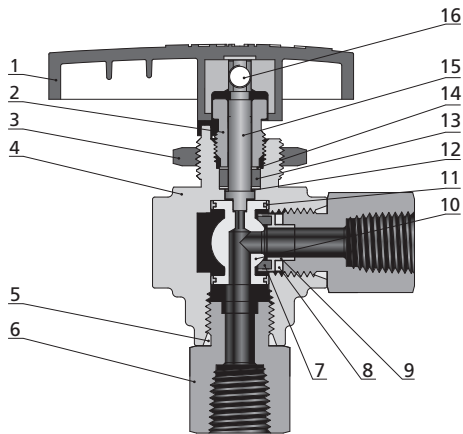
### 3-way Valves



Item	Component	Valve Body Material	
		SS	Brass
1	Handle	Nylon or Aluminium	
2	Packing Nut	316 SS/A479	C36000/B16
3	Panel Nut	316 SS/A479	
4	<i>Body</i>	<i>CF8M/A351</i>	<i>C37700/B283</i>
5	<i>End Connection</i>	<i>316 SS/A479</i>	<i>C36000/B16</i>
6	<i>Connection O-ring</i>	PTFE	
7	<i>Seat Packing</i>	PTFE	
8	<i>Seat</i>	PTFE or PCTFE or PEEK	
9	<i>Ball</i>	316 SS/A479	
10	<i>Seat Retainer</i>	316 SS/A479	
11	<i>Trunnion Bearing</i>	PEEK	
12	<i>Stem Back-up Ring</i>	PEEK	
13	<i>Stem Packing</i>	PTFE	
14	<i>Stem Washer</i>	316 SS/A479	
15	<i>Stem</i>	316 SS/A479	
16	<i>Set Screw</i>	Galvanized carbon steel	
	<i>Lubricants</i>	Fluorinated-based	

Note: Wetted components are listed in italics.  
 For other materials, please contact FITOK Group or our authorized distributors.

## Angle Pattern Valves



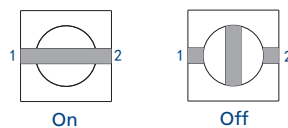
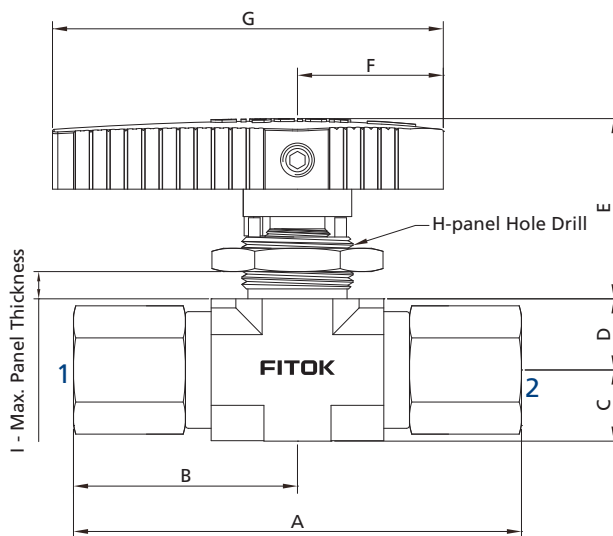
Item	Component	Valve Body Material	
		SS	Brass
1	Handle	Nylon or Aluminium	
2	Packing Nut	316 SS/A479	C36000/B16
3	Panel Nut	316 SS/A479	
4	<i>Body</i>	<i>CF8M/A351</i>	<i>C37700/B283</i>
5	<i>Connection O-ring</i>	<i>PTFE</i>	
6	<i>End Connection</i>	<i>316 SS/A479</i>	<i>C36000/B16</i>
7	<i>Seat</i>	<i>PTFE or PCTFE or PEEK</i>	
8	<i>Seat Packing</i>	<i>PTFE</i>	
9	<i>Seat Retainer</i>	<i>316 SS/A479</i>	
10	<i>Ball</i>	<i>316 SS/A479</i>	
11	<i>Trunnion Bearing</i>	<i>PEEK</i>	
12	<i>Stem Back-up Ring</i>	<i>PEEK</i>	
13	<i>Stem Packing</i>	<i>PTFE</i>	
14	<i>Stem Washer</i>	<i>316 SS/A479</i>	
15	<i>Stem</i>	<i>316 SS/A479</i>	
16	<i>Set Screw</i>	<i>Galvanized carbon Steel</i>	
	<i>Lubricants</i>	<i>Fluorinated-based</i>	

Note: Wetted components are listed in italics.  
For other materials, please contact FITOK Group or our authorized distributors.

Ball Valves  
Plug Valves

## Dimensions

### Straight Valves

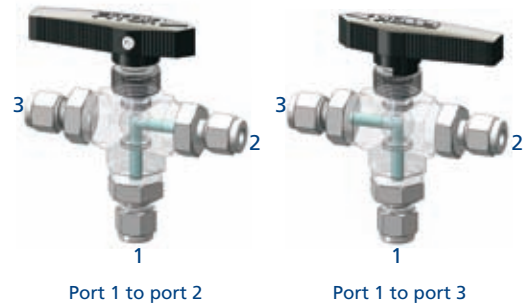
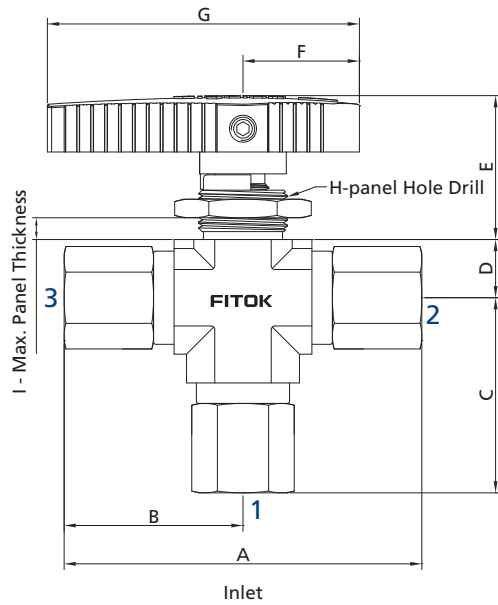


B-48 Ball Valves

Ball Valves  
Plug Valves

Basic Ordering Number	Connection Type and Size	Pressure Rating of End Connections @ 100°F (38°C) psig (bar)		Orifice in. (mm)	Cv	Dimensions, in. (mm)																						
		316 SS	Brass			A	B	C	D	E	F	G	H	I														
BV□□-FL1-01	1/16" FITOK	6000 (414)	3000 (207)	0.05 (1.3)	0.06	2.60 (66.0)	1.30 (33.0)																					
BV□□-FL2-02	1/8" FITOK	6000 (414)	3000 (207)	0.09 (2.4)	0.21	2.72 (69.0)	1.36 (34.5)																					
BV□□-ML3-02	3 mm FITOK	6000 (414)	3000 (207)			2.74 (69.6)	1.37 (34.8)																					
BV□□-FRT2-04	1/8 Female BSPT	6000 (414)	3000 (207)	0.17 (4.2)	0.93	2.14 (54.4)	1.07 (27.2)	0.36 (9.2)	0.33 (8.5)	0.94 (23.9)	0.79 (20.0)	1.97 (50.0)	0.58 (14.7)	0.18 (4.6)														
BV□□-FRP2-04	1/8 Female BSPP	6000 (414)	3000 (207)																									
BV□□-FNS2-04	1/8 Female NPT	6000 (414)	3000 (207)																									
BV□□-RT2-04	1/8 Male BSPT	6000 (414)	3000 (207)																									
BV□□-BP2-04	1/8 Male BSPP	6000 (414)	3000 (207)																									
BV□□-NS2-04	1/8 Male NPT	6000 (414)	3000 (207)																									
BV□□-RT4-04	1/4 Male BSPT	6000 (414)	3000 (207)																									
BV□□-BP4-04	1/4 Male BSPP	6000 (414)	3000 (207)												2.70 (68.6)	1.35 (34.3)												
BV□□-NS4-04	1/4 Male NPT	6000 (414)	3000 (207)																									
BV□□-FL4-05	1/4" FITOK	6000 (414)	3000 (207)			0.19 (4.7)	1.04								3.48 (88.4)	1.74 (44.2)												
BV□□-ML6-05	6 mm FITOK	6000 (414)	3000 (207)												3.50 (89.0)	1.75 (44.5)												
BV□□-FL6-06	3/8" FITOK	6000 (414)	2200 (152)	0.25 (6.4)	2.34	3.60 (91.4)	1.80 (45.7)	0.48 (12.2)	0.48 (12.2)	1.24 (31.5)	0.59 (25.0)	2.64 (67.0)	0.77 (19.6)	0.25 (6.4)														
BV□□-ML8-06	8 mm FITOK	6000 (414)	2300 (159)			3.56 (90.4)	1.78 (45.2)																					
BV□□-ML10-06	10 mm FITOK	6000 (414)	1900 (131)			3.62 (92.0)	1.81 (46.0)																					
BV□□-FRT4-06	1/4 Female BSPT	6000 (414)	3000 (207)																									
BV□□-FRP4-06	1/4 Female BSPP	6000 (414)	3000 (207)												3.02 (76.8)	1.51 (38.4)												
BV□□-FNS4-06	1/4 Female NPT	6000 (414)	3000 (207)																									
BV□□-RT4-06	1/4 Male BSPT	6000 (414)	3000 (207)																									
BV□□-BP4-06	1/4 Male BSPP	6000 (414)	3000 (207)																									
BV□□-NS4-06	1/4 Male NPT	6000 (414)	3000 (207)																									
BV□□-RT6-06	3/8 Male BSPT	6000 (414)	3000 (207)												3.24 (82.2)	1.62 (41.1)												
BV□□-BP6-06	3/8 Male BSPP	6000 (414)	3000 (207)																									
BV□□-NS6-06	3/8 Male NPT	6000 (414)	3000 (207)																									
BV□□-FL8-10	1/2" FITOK	6000 (414)	2100 (145)	0.41 (10.3)	6.42	4.68 (118.8)	2.34 (59.4)																					
BV□□-FL12-10	3/4" FITOK	5800 (400)	1800 (124)																									
BV□□-ML12-10	12 mm FITOK	6000 (414)	2000 (138)	0.37 (9.5)	5.57																							
BV□□-ML14-10	14 mm FITOK	6000 (414)	1900 (131)	0.41 (10.3)	6.42	4.66 (118.4)	2.33 (59.2)	0.75 (19.0)	0.71 (18.0)	1.54 (39.0)	1.42 (36.0)	3.78 (96.0)	0.90 (22.9)	0.38 (9.7)														
BV□□-ML16-10	16 mm FITOK	5800 (400)	1700 (117)																									
BV□□-ML18-10	18 mm FITOK	5400 (372)	1600 (110)																									
BV□□-ML20-10	20 mm FITOK	5500 (379)	1600 (110)																									
BV□□-ML22-10	22 mm FITOK	4900 (338)	1450 (100)												4.84 (123.0)	2.42 (61.5)												
BV□□-FRT6-10	3/8 Female BSPT	6000 (414)	3000 (207)																									
BV□□-FRP6-10	3/8 Female BSPP	6000 (414)	3000 (207)												3.90 (99.0)	1.95 (49.5)												
BV□□-FNS6-10	3/8 Female NPT	6000 (414)	3000 (207)																									
BV□□-FRT8-10	1/2 Female BSPT	6000 (414)	3000 (207)												4.30 (109.2)	2.15 (54.6)												
BV□□-FRP8-10	1/2 Female BSPP	6000 (414)	3000 (207)												3.97 (101.0)	1.99 (50.5)												
BV□□-FNS8-10	1/2 Female NPT	6000 (414)	3000 (207)												4.30 (109.2)	2.15 (54.6)												
BV□□-FRT12-10	3/4 Female BSPT	6000 (414)	3000 (207)																									
BV□□-FRP12-10	3/4 Female BSPP	6000 (414)	3000 (207)			4.50 (114.2)	2.25 (57.1)																					
BV□□-FNS12-10	3/4 Female NPT	6000 (414)	3000 (207)																									
BV□□-RT8-10	1/2 Male BSPT	6000 (414)	3000 (207)																									
BV□□-BP8-10	1/2 Male BSPP	6000 (414)	3000 (207)																									
BV□□-NS8-10	1/2 Male NPT	6000 (414)	3000 (207)																									
BV□□-RT12-10	3/4 Male BSPT	6000 (414)	3000 (207)			4.44 (112.8)	2.22 (56.4)																					
BV□□-BP12-10	3/4 Male BSPP	6000 (414)	3000 (207)																									
BV□□-NS12-10	3/4 Male NPT	6000 (414)	3000 (207)																									

### 3-way Valves



Ball Valves  
Plug Valves

Basic Ordering Number	Connection Type and Size	Pressure Rating of End Connections @ 100°F (38°C), psig (bar)		Orifice in. (mm)	Cv	Dimensions, in. (mm)													
		316 SS	Brass			A	B	C	D	E	F	G	H	I					
BV□□-FL1-01-3	1/16" FITOK	6000 (414)	3000 (207)	0.05 (1.3)	0.06	2.60 (66.0)	1.30 (33.0)	1.35 (34.3)											
BV□□-FL2-02-3	1/8" FITOK	6000 (414)	3000 (207)	0.09 (2.4)	0.21	2.72 (69.0)	1.36 (34.5)	1.41 (35.8)											
BV□□-ML3-02-3	3 mm FITOK	6000 (414)	3000 (207)			2.74 (69.6)	1.37 (34.8)	1.42 (36.1)											
BV□□-FRT2-04-3	1/8 Female BSPT	6000 (414)	3000 (207)	0.12 (3.0)	0.28	2.14 (54.4)	1.07 (27.2)	1.12 (28.5)											
BV□□-FRP2-04-3	1/8 Female BSPP	6000 (414)	3000 (207)																
BV□□-FNS2-04-3	1/8 Female NPT	6000 (414)	3000 (207)								0.33 (8.5)	0.94 (23.9)	0.79 (20.0)	1.97 (50.0)	0.58 (14.7)	0.18 (4.6)			
BV□□-RT2-04-3	1/8 Male BSPT	6000 (414)	3000 (207)			2.36 (60.0)	1.18 (30.0)	1.23 (31.3)											
BV□□-BP2-04-3	1/8 Male BSPP	6000 (414)	3000 (207)																
BV□□-NS2-04-3	1/8 Male NPT	6000 (414)	3000 (207)																
BV□□-RT4-04-3	1/4 Male BSPT	6000 (414)	3000 (207)																
BV□□-BP4-04-3	1/4 Male BSPP	6000 (414)	3000 (207)			2.70 (68.6)	1.35 (34.3)	1.40 (35.6)											
BV□□-NS4-04-3	1/4 Male NPT	6000 (414)	3000 (207)																
BV□□-FL4-05-3	1/4" FITOK	6000 (414)	3000 (207)			0.19 (4.7)	0.70	3.48 (88.4)	1.74 (44.2)	1.88 (47.7)									
BV□□-ML6-05-3	6 mm FITOK	6000 (414)	3000 (207)	3.50 (89.0)	1.75 (44.5)			1.89 (48.0)											
BV□□-FL6-06-3	3/8" FITOK	6000 (414)	3000 (207)	3.60 (91.4)	1.80 (45.7)			1.94 (49.2)											
BV□□-ML8-06-3	8 mm FITOK	6000 (414)	3000 (207)	3.56 (90.4)	1.78 (45.2)			1.92 (48.7)											
BV□□-ML10-06-3	10 mm FITOK	6000 (414)	3000 (207)	3.62 (92.0)	1.81 (46.0)			1.95 (49.5)											
BV□□-FRT4-06-3	1/4 Female BSPT	6000 (414)	3000 (207)																
BV□□-FRP4-06-3	1/4 Female BSPP	6000 (414)	3000 (207)	3.02 (76.8)	1.51 (38.4)			1.65 (41.9)	0.48 (12.2)	1.24 (31.5)	0.59 (25.0)	2.64 (67.0)	0.77 (19.6)	0.25 (6.4)					
BV□□-FNS4-06-3	1/4 Female NPT	6000 (414)	3000 (207)																
BV□□-RT4-06-3	1/4 Male BSPT	6000 (414)	3000 (207)																
BV□□-BP4-06-3	1/4 Male BSPP	6000 (414)	3000 (207)																
BV□□-NS4-06-3	1/4 Male NPT	6000 (414)	3000 (207)	3.24 (82.2)	1.62 (41.1)	1.76 (44.6)													
BV□□-RT6-06-3	3/8 Male BSPT	6000 (414)	3000 (207)																
BV□□-BP6-06-3	3/8 Male BSPP	6000 (414)	3000 (207)																
BV□□-NS6-06-3	3/8 Male NPT	6000 (414)	3000 (207)																

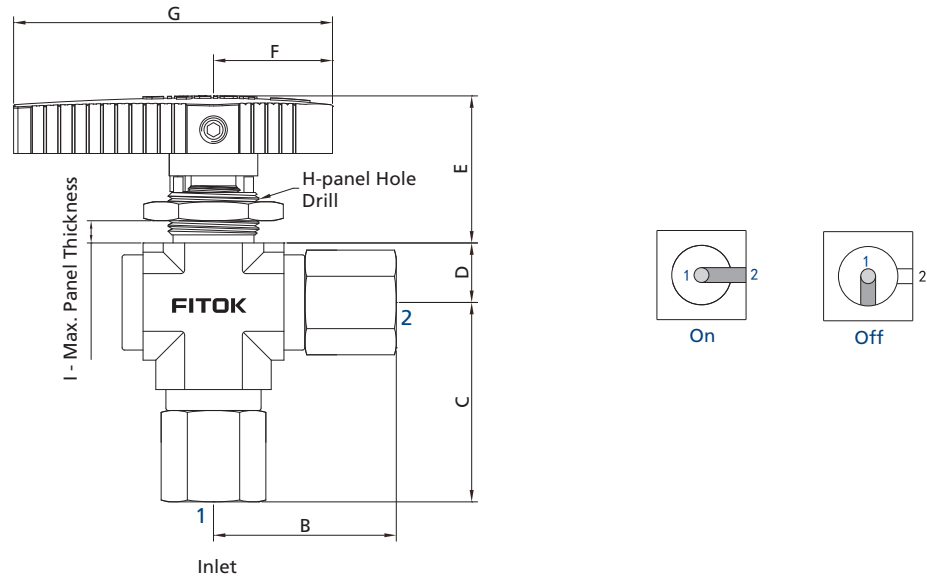
B-50 Ball Valves

Ball Valves  
Plug Valves

Basic Ordering Number	Connection Type and Size	Pressure Rating of End Connections @ 100°F (38°C), psig (bar)		Orifice in. (mm)	Cv	Dimensions, in. (mm)								
		316 SS	Brass			A	B	C	D	E	F	G	H	I
BV□□-FL8-10-3	1/2" FITOK	6000 (414)	2100 (145)	0.37 (9.5)	3.48	4.68 (118.8)	2.34 (59.4)	2.68 (68.1)	0.71 (18.0)	1.54 (39.0)	1.42 (36.0)	3.78 (96.0)	0.90 (22.9)	0.38 (9.7)
BV□□-FL12-10-3	3/4" FITOK	5800 (400)	1800 (124)			4.66 (118.4)	2.33 (59.2)	2.67 (67.9)						
BV□□-ML12-10-3	12 mm FITOK	6000 (414)	2000 (138)			4.84 (123.0)	2.42 (61.5)	2.76 (70.2)						
BV□□-ML14-10-3	14 mm FITOK	6000 (414)	1900 (131)											
BV□□-ML16-10-3	16 mm FITOK	5800 (400)	1700 (117)			3.90 (99.0)	1.95 (49.5)	2.29 (58.2)						
BV□□-ML18-10-3	18 mm FITOK	5400 (372)	1600 (110)											
BV□□-ML20-10-3	20 mm FITOK	5500 (379)	1600 (110)			4.30 (109.2)	2.15 (54.6)	2.49 (63.3)						
BV□□-ML22-10-3	22 mm FITOK	4900 (338)	1450 (100)											
BV□□-FRT6-10-3	3/8 Female BSPT	6000 (414)	3000 (207)			3.97 (101.0)	1.99 (50.5)	2.33 (59.1)						
BV□□-FRP6-10-3	3/8 Female BSPP	6000 (414)	3000 (207)											
BV□□-FNS6-10-3	3/8 Female NPT	6000 (414)	3000 (207)			4.30 (109.2)	2.15 (54.6)	2.49 (63.3)						
BV□□-FRT8-10-3	1/2 Female BSPT	6000 (414)	3000 (207)											
BV□□-FRP8-10-3	1/2 Female BSPP	6000 (414)	3000 (207)			4.50 (114.2)	2.25 (57.1)	2.59 (65.8)						
BV□□-FNS8-10-3	1/2 Female NPT	6000 (414)	3000 (207)											
BV□□-FRT12-10-3	3/4 Female BSPT	6000 (414)	3000 (207)			4.44 (112.8)	2.22 (56.4)	2.56 (65.1)						
BV□□-FRP12-10-3	3/4 Female BSPP	6000 (414)	3000 (207)											
BV□□-FNS12-10-3	3/4 Female NPT	6000 (414)	3000 (207)											
BV□□-RT8-10-3	1/2 Male BSPT	6000 (414)	3000 (207)											
BV□□-BP8-10-3	1/2 Male BSPP	6000 (414)	3000 (207)											
BV□□-NS8-10-3	1/2 Male NPT	6000 (414)	3000 (207)											
BV□□-RT12-10-3	3/4 Male BSPT	6000 (414)	3000 (207)											
BV□□-BP12-10-3	3/4 Male BSPP	6000 (414)	3000 (207)											
BV□□-NS12-10-3	3/4 Male NPT	6000 (414)	3000 (207)											



### Angle Pattern Valves



Ball Valves  
Plug Valves

Basic Ordering Number	Connection Type and Size	Pressure Rating of End Connections @ 100°F (38°C), psig (bar)		Orifice in. (mm)	Cv	Dimensions, in. (mm)										
		316 SS	Brass			B	C	D	E	F	G	H	I			
BV□□-FL1-01-A	1/16" FITOK	6000 (414)	3000 (207)	0.05 (1.3)	0.06	1.30 (33.0)	1.35 (34.3)									
BV□□-FL2-02-A	1/8" FITOK	6000 (414)	3000 (207)	0.09 (2.4)	0.21	1.36 (34.5)	1.41 (35.8)									
BV□□-ML3-02-A	3 mm FITOK	6000 (414)	3000 (207)			1.37 (34.8)	1.42 (36.1)									
BV□□-FRT2-04-A	1/8 Female BSPT	6000 (414)	3000 (207)			1.07 (27.2)	1.12 (28.5)									
BV□□-FRP2-04-A	1/8 Female BSPP	6000 (414)	3000 (207)	0.12 (3.0)	0.28			0.33 (8.5)	0.94 (23.9)	0.79 (20.0)	1.97 (50.0)	0.58 (14.7)	0.18 (4.6)			
BV□□-FNS2-04-A	1/8 Female NPT	6000 (414)	3000 (207)			1.18 (30.0)	1.23 (31.3)									
BV□□-RT2-04-A	1/8 Male BSPT	6000 (414)	3000 (207)													
BV□□-BP2-04-A	1/8 Male BSPP	6000 (414)	3000 (207)													
BV□□-NS2-04-A	1/8 Male NPT	6000 (414)	3000 (207)													
BV□□-RT4-04-A	1/4 Male BSPT	6000 (414)	3000 (207)													
BV□□-BP4-04-A	1/4 Male BSPP	6000 (414)	3000 (207)					1.35 (34.3)	1.40 (35.6)							
BV□□-NS4-04-A	1/4 Male NPT	6000 (414)	3000 (207)													
BV□□-FL4-05-A	1/4" FITOK	6000 (414)	3000 (207)			0.19 (4.7)	0.70	1.74 (44.2)	1.88 (47.7)							
BV□□-ML6-05-A	6 mm FITOK	6000 (414)	3000 (207)					1.75 (44.5)	1.89 (48.0)							
BV□□-FL6-06-A	3/8" FITOK	6000 (414)	2200 (152)	1.80 (45.7)	1.94 (49.2)											
BV□□-ML8-06-A	8 mm FITOK	6000 (414)	2300 (159)	1.78 (45.2)	1.92 (48.7)											
BV□□-ML10-06-A	10 mm FITOK	6000 (414)	1900 (131)	1.81 (46.0)	1.95 (49.5)											
BV□□-FRT4-06-A	1/4 Female BSPT	6000 (414)	3000 (207)													
BV□□-FRP4-06-A	1/4 Female BSPP	6000 (414)	3000 (207)					1.51 (38.4)	1.65 (41.9)	0.48 (12.2)	1.24 (31.5)	0.59 (25.0)	2.64 (67.0)	0.77 (19.6)	0.25 (6.4)	
BV□□-FNS4-06-A	1/4 Female NPT	6000 (414)	3000 (207)													
BV□□-RT4-06-A	1/4 Male BSPT	6000 (414)	3000 (207)													
BV□□-BP4-06-A	1/4 Male BSPP	6000 (414)	3000 (207)													
BV□□-NS4-06-A	1/4 Male NPT	6000 (414)	3000 (207)													
BV□□-RT6-06-A	3/8 Male BSPT	6000 (414)	3000 (207)					1.62 (41.1)	1.76 (44.6)							
BV□□-BP6-06-A	3/8 Male BSPP	6000 (414)	3000 (207)													
BV□□-NS6-06-A	3/8 Male NPT	6000 (414)	3000 (207)													

B-52 Ball Valves

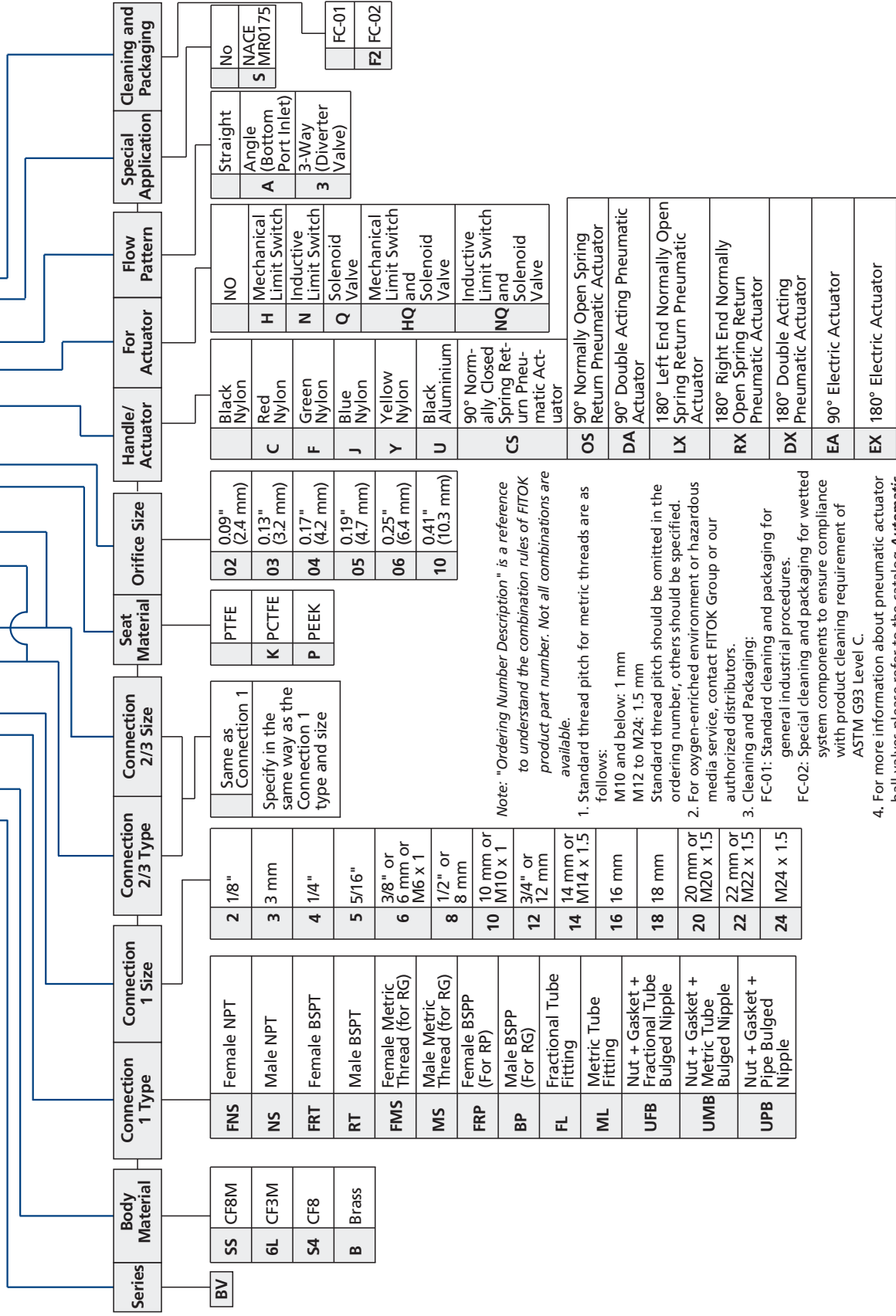
Ball Valves  
Plug Valves

Basic Ordering Number	Connection Type and Size	Pressure Rating of End Connections @ 100°F (38°C), psig (bar)		Orifice in. (mm)	Cv	Dimensions, in. (mm)							
		316 SS	Brass			B	C	D	E	F	G	H	I
BV□□-FL8-10-A	1/2" FITOK	6000 (414)	2100 (145)	0.37 (9.5)	3.48	2.34(59.4)	2.68(68.1)	0.71 (18.0)	1.54 (39.0)	1.42 (36.0)	3.78 (96.0)	0.90 (22.9)	0.38 (9.7)
BV□□-FL12-10-A	3/4" FITOK	5800 (400)	1800 (124)										
BV□□-ML12-10-A	12 mm FITOK	6000 (414)	2000 (138)										
BV□□-ML14-10-A	14 mm FITOK	6000 (414)	1900 (131)			2.33 (59.2)	2.67 (67.9)						
BV□□-ML16-10-A	16 mm FITOK	5800 (400)	1700 (117)										
BV□□-ML18-10-A	18 mm FITOK	5400 (372)	1600 (110)										
BV□□-ML20-10-A	20 mm FITOK	5500 (379)	1600 (110)			2.42 (61.5)	2.76 (70.2)						
BV□□-ML22-10-A	22 mm FITOK	4900 (338)	1450 (100)										
BV□□-FRT6-10-A	3/8 Female BSPT	6000 (414)	3000 (207)			1.95 (49.5)	2.29 (58.2)						
BV□□-FRP6-10-A	3/8 Female BSPP	6000 (414)	3000 (207)										
BV□□-FNS6-10-A	3/8 Female NPT	6000 (414)	3000 (207)										
BV□□-FRT8-10-A	1/2 Female BSPT	6000 (414)	3000 (207)			2.15 (54.6)	2.49 (63.3)						
BV□□-FRP8-10-A	1/2 Female BSPP	6000 (414)	3000 (207)			1.99 (50.5)	2.33 (59.1)						
BV□□-FNS8-10-A	1/2 Female NPT	6000 (414)	3000 (207)			2.15 (54.6)	2.49 (63.3)						
BV□□-FRT12-10-A	3/4 Female BSPT	6000 (414)	3000 (207)										
BV□□-FRP12-10-A	3/4 Female BSPP	6000 (414)	3000 (207)			2.25 (57.1)	2.59 (65.8)						
BV□□-FNS12-10-A	3/4 Female NPT	6000 (414)	3000 (207)										
BV□□-RT8-10-A	1/2 Male BSPT	6000 (414)	3000 (207)										
BV□□-BP8-10-A	1/2 Male BSPP	6000 (414)	3000 (207)										
BV□□-NS8-10-A	1/2 Male NPT	6000 (414)	3000 (207)										
BV□□-RT12-10-A	3/4 Male BSPT	6000 (414)	3000 (207)			2.22 (56.4)	2.56 (65.1)						
BV□□-BP12-10-A	3/4 Male BSPP	6000 (414)	3000 (207)										
BV□□-NS12-10-A	3/4 Male NPT	6000 (414)	3000 (207)										

1. FITOK means FITOK double ferrule tube fittings.
2. Sizes and types listed are standard. Other sizes and types are available upon request, please contact FITOK Group or our authorized distributors.
3. Dimensions are shown with tube fitting nuts finger-tightened. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

# Ordering Number Description

BVSS - FL8 - ML12 - ML10 - P06 - RXHQ3 - SF2



Series	Body Material	Connection 1 Type	Connection 1 Size	Connection 2/3 Type	Connection 2/3 Size	Seat Material	Orifice Size	Handle/Actuator	For Actuator	Flow Pattern	Special Application	Cleaning and Packaging
BV	SS CF8M	FNS Female NPT	2 1/8"	2 1/8"	02 0.09" (2.4 mm)	PTFE	C Black Nylon	H NO	NO	Straight	No	
	6L CF3M	NS Male NPT	3 3 mm	3 3 mm	03 0.13" (3.2 mm)	K PCTFE	F Red Nylon	N Inductive Limit Switch	Mechanical Limit Switch	A Angle (Bottom Port Inlet)	NACE S MRO175	
	S4 CF8	FRT Female BSPT	4 1/4"	4 1/4"	04 0.17" (4.2 mm)	P PEEK	J Green Nylon	Q Solenoid Valve	Inductive Limit Switch	3 3-Way (Diverter Valve)	FC-01	
	B Brass	RT Male BSPT	5 5/16"	5 5/16"	05 0.19" (4.7 mm)		Y Yellow Nylon	HQ and Solenoid Valve	Mechanical Limit Switch		FC-02	
		FMS Female Metric Thread (for RG)	6 3/8" or 16 mm or M6 x 1	6 3/8" or 16 mm or M6 x 1	06 0.25" (6.4 mm)		U Black Aluminium	NQ Inductive Limit Switch	Inductive Limit Switch			
		MS Male Metric Thread (for RG)	8 1/2" or 8 mm	8 1/2" or 8 mm	10 0.41" (10.3 mm)		CS 90° Normally Closed Spring Return Pneumatic Actuator					
		FRP Female BSPP (For Rp)	10 10 mm or M10 x 1	10 10 mm or M10 x 1			OS 90° Normally Open Spring Return Pneumatic Actuator					
		BP Male BSPP (For Rg)	12 3/4" or 12 mm	12 3/4" or 12 mm			DA 90° Double Acting Pneumatic Actuator					
		FL Fractional Tube Fitting	14 14 mm or M14 x 1.5	14 14 mm or M14 x 1.5			LX 180° Left End Normally Open Spring Return Pneumatic Actuator					
		ML Metric Tube Fitting	16 16 mm	16 16 mm			RX 180° Right End Normally Open Spring Return Pneumatic Actuator					
		UFB Nut + Gasket + Fractional Tube Bulged Nipple	18 18 mm	18 18 mm			DX 180° Double Acting Pneumatic Actuator					
		UMB Nut + Gasket + Metric Tube Bulged Nipple	20 20 mm or M20 x 1.5	20 20 mm or M20 x 1.5			EA 90° Electric Actuator					
		UPB Nut + Gasket + Pipe Bulged Nipple	22 22 mm or M22 x 1.5	22 22 mm or M22 x 1.5			EX 180° Electric Actuator					

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

1. Standard thread pitch for metric threads are as follows:  
 M10 and below: 1 mm  
 M12 to M24: 1.5 mm  
 Standard thread pitch should be omitted in the ordering number, others should be specified.

2. For oxygen-enriched environment or hazardous media service, contact FITOK Group or our authorized distributors.

3. Cleaning and Packaging:  
 FC-01: Standard cleaning and packaging for general industrial procedures.  
 FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleaning requirement of ASTM G93 Level C.

4. For more information about pneumatic actuator ball valves, please refer to the catalog **Automatic Control Ball Valves**.

# Plug Valves

## PV Series

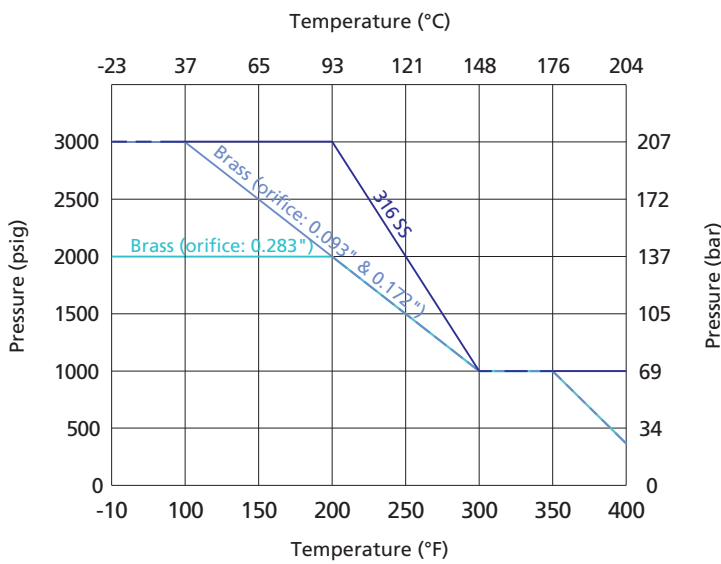
Ball Valves  
Plug Valves



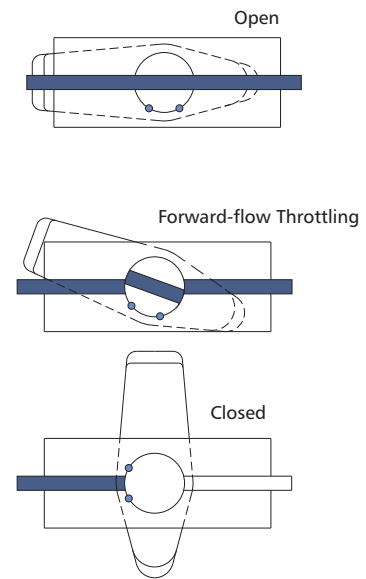
## Features

- ⊙ Working pressure up to: 3000 psig (207 bar)
- ⊙ Working temperature: -10°F to 400°F (-23°C to 204°C)
- ⊙ Sizes from 1/8" to 3/4" and 6 to 12 mm
- ⊙ Easy to maintain and clean
- ⊙ Low operating torque
- ⊙ Replaceable plug assembly
- ⊙ Handle as indicator of flow direction
- ⊙ Options for handle color
- ⊙ Positive handle shutoff
- ⊙ Bottom end connections as the only inlet port for 3-way valves
- ⊙ Leak-tight performance testing with nitrogen or compressed air for every valve at the maximum working pressure to meet the requirement of no visible leak

## Pressure vs. Temperature



## Operation (2-way)



1. Differential pressure is limited to 150 psig (10.3 bar) maximum if reverse flow occurs.
2. Reverse flow throttling may damage O-ring.

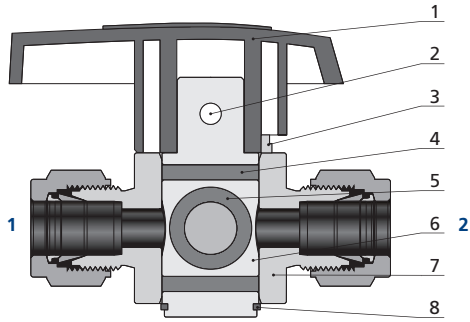
## Downstream Vents (2-way)

Plug and valve body allow pressure to be released to atmosphere when closed.  
Maximum working pressure: 150 psig (10.3 bar).



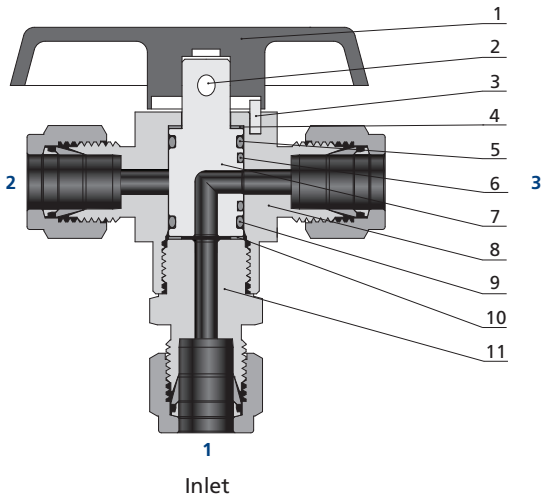
## Standard Materials of Construction

### 2-way



Item	Component	Material Grade/ASTM Specification	
		Valve Body Material	
		316 SS	Brass
1	Handle	Nylon or Aluminium	
2	Handle Pin	Stainless steel	
3	Body Pin	Stainless steel	
4	O-ring	Fluorocarbon FKM or Neoprene or EPDM or Buna N or Kalrez	
5	O-ring	Fluorocarbon FKM or Neoprene or EPDM or Buna N or Kalrez	
6	Plug	PTFE-coated 316 SS/A479	PTFE-coated brass/B453
7	Body	316 SS/A479	Brass/B453
8	Retaining Ring	Stainless steel	
Lubricant		Silicone-based	

### 3-way

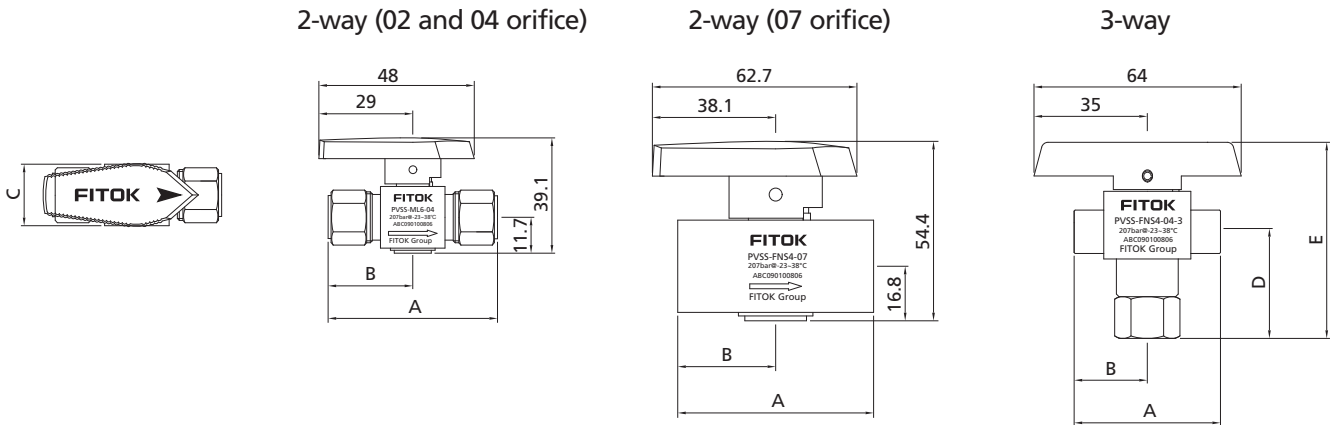


Note: The 3-way plug valve is in working state when the handle is in limit positions. There will be a short moment of interconnection for the three ports when rotating the handle.

Item	Component	Material Grade/ASTM Specifications	
		Valve Body Material	
		316 SS	Brass
1	Handle	Aluminium	
2	Handle Pin	Stainless steel	
3	Body Pin	Stainless steel	
4	Gasket	PTFE	
5	O-ring	Fluorocarbon FKM or Neoprene or EPDM or Buna N or Kalrez	
6	O-ring	Fluorocarbon FKM or Neoprene or EPDM or Buna N or Kalrez	
7	Plug	PTFE-coated 316 SS/A479	PTFE-coated brass/B453
8	Body	316 SS/A479	Brass/B453
9	O-ring	Fluorocarbon FKM or Neoprene or EPDM or Buna N or Kalrez	
10	Gasket	PTFE	
11	Fitting	316 SS/A479	Brass/B453
Lubricant		Silicone-based	

Ball Valves  
Plug Valves

# Dimensions



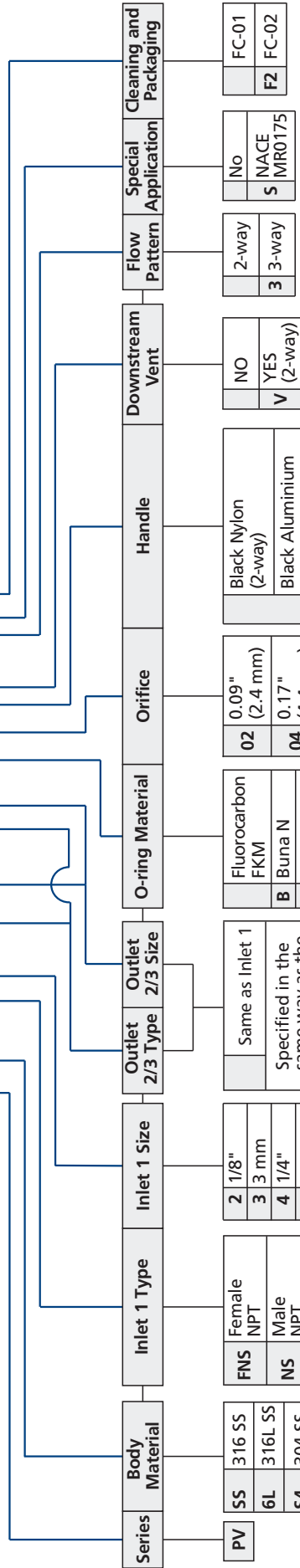
Ball Valves  
Plug Valves

Basic Ordering Number		Connection Type and Size		Orifice in. (mm)	Cv	Dimensions, in. (mm)				
2-way	3-way	Inlet 1	Outlet 2/3			A	B	C	D	E
PV□□-FL2-02	PV□□-FL2-02-3	1/8" FITOK	1/8" FITOK	0.09 (2.4)	0.10	1.99 (50.5)	0.98 (24.9)	0.75 (19.0)	1.61 (40.8)	2.69 (68.4)
PV□□-FL4-04	PV□□-FL4-04-3	1/4" FITOK	1/4" FITOK	0.17 (4.4)	1.6	2.17 (55.1)	1.08 (27.4)		1.70 (43.3)	2.79 (70.9)
PV□□-FL6-04	PV□□-FL6-04-3	3/8" FITOK	3/8" FITOK		1.1	2.29 (58.2)	1.14 (29.0)		1.76 (44.8)	2.85 (72.4)
PV□□-FL6-07	PV□□-FL6-07-3	3/8" FITOK	3/8" FITOK	0.28 (7.2)	6.4	2.66 (67.6)	1.33 (33.8)	1.12 (28.5)	2.16 (54.8)	3.43 (87.2)
PV□□-FL8-07	PV□□-FL8-07-3	1/2" FITOK	1/2" FITOK		4.4	2.88 (73.2)	1.44 (36.6)		2.26 (57.3)	3.53 (89.7)
PV□□-ML3-02	PV□□-ML3-02-3	3 mm FITOK	3 mm FITOK	0.09 (2.4)	0.10	1.99 (50.5)	0.98 (24.9)	0.75 (19.0)	1.61 (40.8)	2.69 (68.4)
PV□□-ML6-04	PV□□-ML6-04-3	6 mm FITOK	6 mm FITOK	0.17 (4.4)	1.6	2.17 (55.1)	1.08 (27.4)		1.70 (43.3)	2.79 (70.9)
PV□□-ML10-07	PV□□-ML10-07-3	10 mm FITOK	10 mm FITOK		6.4	2.68 (68.1)	1.34 (34.0)		2.17 (55.1)	3.44 (87.5)
PV□□-ML12-07	PV□□-ML12-07-3	12 mm FITOK	12 mm FITOK	0.28 (7.2)	4.8	2.96 (75.2)	1.44 (36.6)	1.12 (28.5)	2.26 (57.5)	3.54 (89.9)
PV□□-FNS2-04	PV□□-FNS2-04-3	1/8 Female NPT	1/8 Female NPT		0.17 (4.4)	1.2	1.78 (45.2)		0.89 (22.6)	0.75 (19.0)
PV□□-FNS4-04	PV□□-FNS4-04-3	1/4 Female NPT	1/4 Female NPT	0.9		2.10 (53.4)	1.05 (26.7)	1.50 (38.0)	2.58 (65.6)	
PV□□-FNS4-07	PV□□-FNS4-07-3	1/4 Female NPT	1/4 Female NPT	0.28 (7.2)	4.3	2.38 (60.5)	1.19 (30.2)	1.12 (28.5)	1.89 (48.0)	3.17 (80.4)
PV□□-FNS8-07	PV□□-FNS8-07-3	1/2 Female NPT	1/2 Female NPT		2.7	2.88 (73.2)	1.44 (36.6)		2.08 (52.8)	3.35 (85.2)
PV□□-NS2-04	PV□□-NS2-04-3	1/8 Male NPT	1/8 Male NPT	0.17 (4.4)	1.0	1.53 (38.9)	0.76 (19.3)	0.75 (19.0)	1.37 (34.9)	2.46 (62.5)
PV□□-NS4-04	PV□□-NS4-04-3	1/4 Male NPT	1/4 Male NPT		1.0	1.90 (48.3)	0.95 (24.1)		1.55 (39.4)	2.64 (67.0)
PV□□-NS8-07	PV□□-NS8-07-3	1/2 Male NPT	1/2 Male NPT	0.28 (7.2)	2.4	2.64 (67.1)	1.32 (33.5)	1.12 (28.5)	2.15 (54.5)	3.42 (86.9)
PV□□-FRT2-04	PV□□-FRT2-04-3	1/8 Female BSPT	1/8 Female BSPT	0.17 (4.4)	1.2	1.78 (45.2)	0.89 (22.6)	0.75 (19.0)	1.31 (33.4)	2.40 (61.0)
PV□□-FRT4-04	PV□□-FRT4-04-3	1/4 Female BSPT	1/4 Female BSPT		0.9	2.09 (53.1)	1.11 (28.2)		1.50 (38.0)	2.58 (65.6)
PV□□-FRT4-07	PV□□-FRT4-07-3	1/4 Female BSPT	1/4 Female BSPT	0.28 (7.2)	4.3	2.38 (60.5)	1.19 (30.2)	1.12 (28.5)	1.99 (50.5)	3.26 (82.9)
PV□□-FRT8-07	PV□□-FRT8-07-3	1/2 Female BSPT	1/2 Female BSPT		2.7	2.88 (73.2)	1.57 (39.9)		2.18 (55.3)	3.45 (87.7)

1. FITOK means FITOK double ferrule tube fittings.
2. Sizes and types listed are standard. Other sizes and types are available upon request. For details, please refer to the ordering information.
3. Dimensions are shown with FITOK tube fitting nuts finger-tightened. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

# Ordering Number Description

PVSS-FL8-ML12-FL8-B04GV-3SF2



Series	Body Material	Inlet 1 Type	Inlet 1 Size	Outlet 2/3 Type	Outlet 2/3 Size	O-ring Material	Orifice	Handle	Downstream Vent	Flow Pattern	Special Application	Cleaning and Packaging
PV	SS 316 SS 6L 316L SS S4 304 SS B Brass 904L 904L SS	FNS Female NPT NS Male NPT FRT Female BSPT RT Male BSPT FMS Female Metric Thread (for RG) MS Male Metric Thread (for RG) FRP Female BSPP (for RP) BP Male BSPP (for RG) FL Fractional Tube Fitting ML Metric Tube Fitting	2 1/8" 3 3 mm 4 1/4" 6 3/8" or 6 mm 8 1/2" or 8 mm 10 10 mm 12 3/4" or 12 mm	Same as Inlet 1 Specified in the same way as the inlet 1 type and size	02 0.09" (2.4 mm) 04 0.17" (4.4 mm) 07 0.28" (7.2 mm)	Fluorocarbon FKM B Buna N E EPDM N Neoprene Z Kalrez	Black Nylon (2-way) Black Aluminium (3-way) Red Nylon (2-way) Red Aluminium (3-way) Green Nylon (2-way) Green Aluminium (3-way) Yellow Nylon (2-way) Yellow Aluminium (3-way) Blue Nylon (2-way) Blue Aluminium (3-way) Black Aluminium (2-way)	NO YES V (2-way)	2-way 3 3-way	No NACE S MR0175	FC-01 FC-02 F2	

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

- Standard thread pitch for metric threads are as follows:  
M10 and below: 1 mm  
M12 to M24: 1.5 mm  
Standard thread pitch should be omitted in the ordering number, others should be specified.
- For oxygen-enriched environment or hazardous media service, please contact FITOK Group or our authorized distributors.
- Cleaning and Packaging:  
FC-01: Standard cleaning and packaging for general industrial procedures.  
FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.



# Needle Valves, Metering Valves

Needle Valves



B-60

Metering Valves



B-103

Needle Valves  
Metering Valves

# Needle Valves

NB, NBH, ND, NDH, NF, NFH, NG, NGH, NR, NRG,  
NT, NU, NUH and NY Series

Needle Valves  
Metering Valves



# Contents

## Bar Stock Needle Valves

NB Series and NBH Series



B-62

## Nonrotating-stem Needle Valves

ND Series and NDH Series



B-68

## Forged Needle Valves

NF Series and NFH Series



B-72

## General Purpose Needle Valves

NG Series and NGH Series



B-78

## Rising Plug Valves

NR Series and NRG Series



B-85

## Toggle Valves

NT Series



B-89

## Union Bonnet Needle Valves

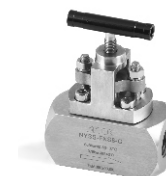
NU Series and NUH Series



B-93

## Outside Screw and Yoke (OS&Y) Needle Valves

NY Series



B-99

# Bar Stock Needle Valves

**NB Series:** Working pressure up to 6000 psig

**NBH Series:** Working pressure up to 10000 psig

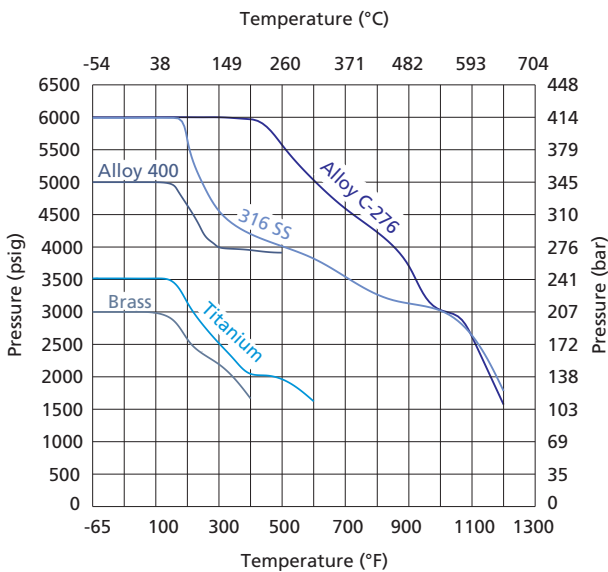


## Features

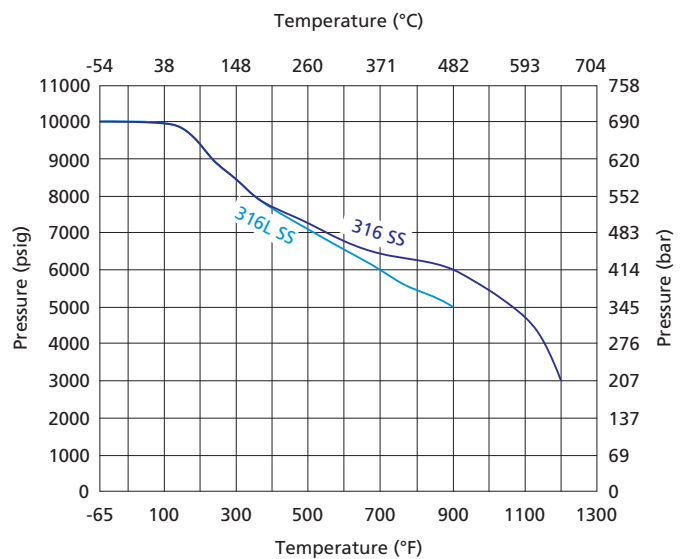
- ⦿ Cold drawn bar as body
- ⦿ Two-piece stem design: Upper stem threads cold rolled and lower stem hardened for high strength and smooth operation
- ⦿ Upper stem thread lubricant isolated from system media
- ⦿ Linear instead of rotary motion of the rising, non-rotating stem minimizes packing abrasion and reduces the friction between the seat and the tip
- ⦿ Safety back seating seal in fully open position
- ⦿ Panel mounting available
- ⦿ Steady and durable fastening of the handle by double lock-pins
- ⦿ Handles of different colors available
- ⦿ Every valve leak tested with Nitrogen or compressed air (NB Series) at the maximum allowable working pressure or with water (NBH Series) at 1.1 times maximum allowable working pressure
- ⦿ Working pressure up to:
  - NB Series—Stainless steel: 6000 psig (414 bar)
  - Alloy C-276: 6000 psig (414 bar)
  - Alloy 400: 5000 psig (345 bar)
  - Titanium: 3500 psig (241 bar)
  - Brass: 3000 psig (207 bar)
  - NBH Series—Stainless steel: 10000 psig (690 bar)
- ⦿ Working temperature:
  - PTFE: -65°F to 450°F (-54°C to 232°C)
  - PEEK: -65°F to 500°F (-54°C to 260°C)
  - Graphite: -65°F to 1200°F (-54°C to 649°C)

## Pressure vs. Temperature

NB Series



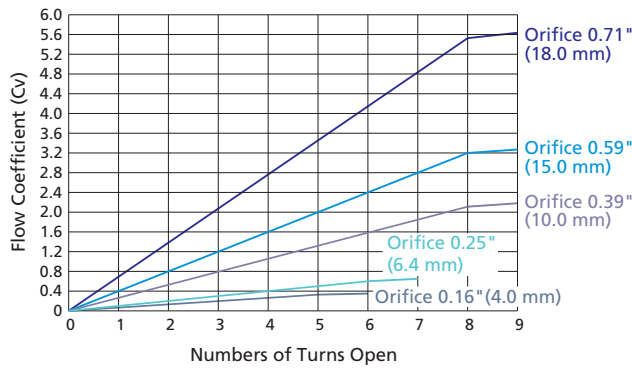
NBH Series



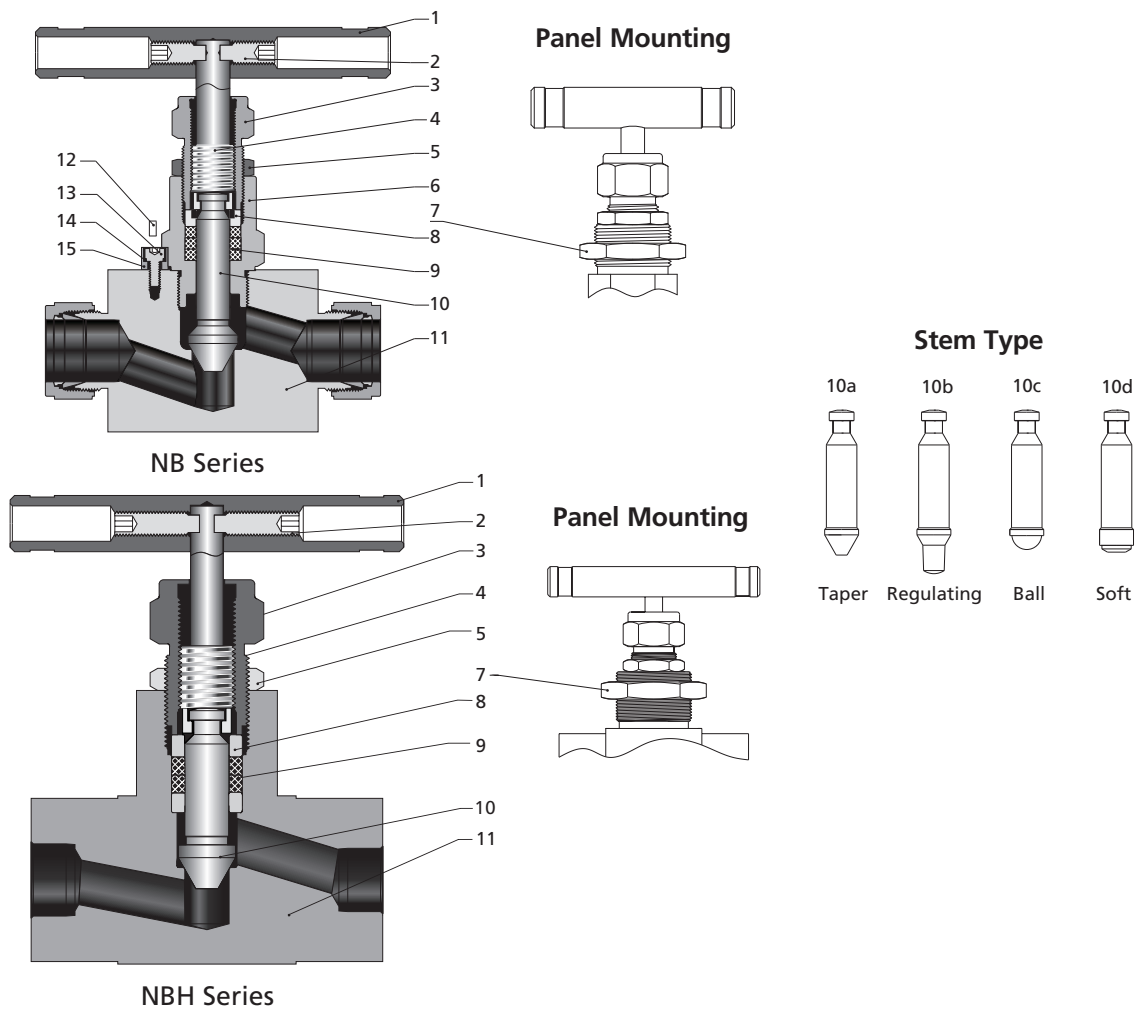
1. Graphs are based on graphite packing.  
 2. Soft tips are for NB Series only. Temperature rating is limited to 200°F (93°C) max. with PCTFE stem tip (soft tip).  
 3. Contact FITOK Group or our authorized distributors for curve graph of other materials.

# Flow Data at 100°F (38°C)

Regulating Stem



## Standard Materials of Construction



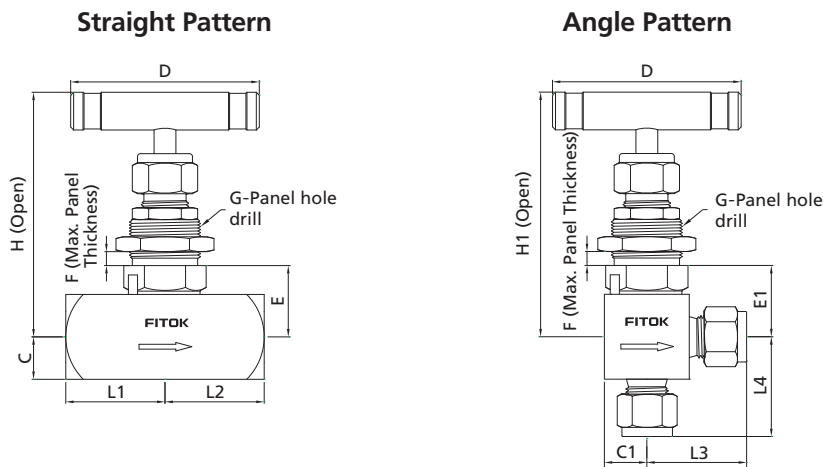
Item	Component	Valve Body Material				
		316 SS	Alloy 400	Titanium	Alloy C-276	Brass
		<b>Material Grade/ASTM Specification</b>				
1	Handle	Anodized aluminum or stainless steel or black knob				
2	Set Screw	Galvanized carbon steel				
3	Packing Bolt	304 SS/A276			Brass C36000/B16	
4	Upper Stem	316 SS/A276				
5	Lock Nut	Stainless steel				
6	Bonnet	316 SS/A479	Alloy 400/B164	Titanium Gr 4/B348	Alloy C-276/B574	Brass C36000/B16

Needle Valves  
Metering Valves

Item	Component	Valve Body Material				
		316 SS	Alloy 400	Titanium	Alloy C-276	Brass
Material Grade/ASTM Specification						
7	Panel Nut	Stainless steel				Brass C36000/B16
8	Gland	316 SS/A276				
9	Packing	PTFE or PEEK or graphite				
10a 10b 10c 10d	Lower Stem	Hardened 316 SS/A276	Alloy 400/B164	Titanium Gr 4/B348	Alloy C-276/B574	Hardened 316 SS/A276
11	Body	316 SS/A479	Alloy 400/B164	Titanium Gr 4/B348	Alloy C-276/B574	Brass C36000/B16
	Seat	Same as Body				
12	Lock Pin	Stainless steel				
13	Screw	Stainless steel				
14	Spring Washer	Stainless steel				
15	Bush	Stainless steel				
	Lubricant	Molybdenum disulfide-based				

- Item 12 is applied in valves with orifice of 4.0 and 6.0mm. For valves with orifice of 10.0, 15.0 and 18.0mm, item 13, 14 and 15 are used instead of item 12.
- Contact FITOK Group or our authorized distributors for other materials.

## Dimensions



© NB Series Needle Valves are standard without panel mounting. To order needle valves with panel mounting as illustrated, add -Y to the ordering number. Example: NBSS-FNS2-7-Y

## Dimensions of NB Series

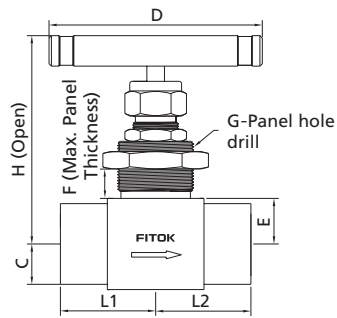
Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)												
	Inlet	Outlet			L1	L2	L3	L4	C	C1	D	E	E1	F	G	H	H1
NB□□-FNS2-7	1/8 Female NPT	1/8 Female NPT	0.16 (4.0)	0.35	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)	0.56 (14.3)	0.50 (12.7)	0.50 (12.7)	2.17 (55)	0.84 (21.4)	0.84 (21.4)	0.25 (6.4)	0.77 (19.6)	2.86 (72.7)	2.86 (72.7)
NB□□-FNS4-7	1/4 Female NPT	1/4 Female NPT			1.06 (26.9)	1.06 (26.9)											
NB□□-NS4-7	1/4 Male NPT	1/4 Male NPT			1.03 (26.2)	1.03 (26.2)	1.06 (26.9)	1.06 (26.9)									
NB□□-NS6-7	3/8 Male NPT	3/8 Male NPT			1.19 (30.2)	1.19 (30.2)											
NB□□-FL4-7	1/4" FITOK	1/4" FITOK			1.20 (30.5)	1.20 (30.5)	1.20 (30.5)	1.20 (30.5)									
NB□□-ML6-7	6 mm FITOK	6 mm FITOK															
NB□□-ML8-7	8 mm FITOK	8 mm FITOK															
NB□□-FNS4-8	1/4 Female NPT	1/4 Female NPT	0.25 (6.4)	0.85	1.12 (28.6)	1.12 (28.6)	1.12 (28.6)	0.63 (15.9)	0.56 (14.3)	0.56 (14.3)	2.50 (63.5)	0.89 (22.5)	0.89 (22.5)	0.38 (9.7)	0.96 (24.4)	3.50 (88.9)	3.50 (88.9)
NB□□-FNS6-8	3/8 Female NPT	3/8 Female NPT			1.12 (28.6)	1.12 (28.6)	1.12 (28.6)	0.63 (15.9)									
NB□□-NS6-8	3/8 Male NPT	3/8 Male NPT															
NB□□-FL6-8	3/8" FITOK	3/8" FITOK			1.41 (35.8)	1.41 (35.8)	1.32 (33.6)	1.32 (33.6)									
NB□□-FL8-8	1/2" FITOK	1/2" FITOK			1.52 (38.6)	1.52 (38.6)	1.42 (36.1)	1.42 (36.1)									

## Dimensions of NB Series

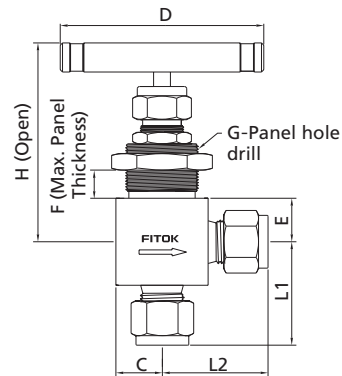
Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)																							
	Inlet	Outlet			L1	L2	L3	L4	C	C1	D	E	E1	F	G	H	H1											
NB□□-ML10-8	10 mm FITOK	10 mm FITOK	0.25 (6.4)	0.85	1.42 (36.1)	1.42 (36.1)	1.33 (33.8)	1.33 (33.8)	0.56 (14.3)	0.56 (14.3)	2.50 (63.5)	0.89 (22.5)	0.89 (22.5)	0.38 (9.7)	0.96 (24.4)	3.50 (88.9)	3.50 (88.9)											
NB□□-ML12-8	12 mm FITOK	12 mm FITOK			1.52 (38.6)	1.52 (38.6)	1.42 (36.1)	1.42 (36.1)																				
NB□□-ML14-8	14 mm FITOK	14 mm FITOK			1.56 (39.7)	1.56 (39.7)																						
NB□□-TS6-8-G	3/8" TS	3/8" TS																										
NB□□-TS8-8-G	1/2" TS	1/2" TS																										
NB□□-MTS12-8-G	12 mm MTS	12 mm MTS			1.13 (28.6)	1.13 (28.6)	1.13 (28.6)	1.13 (28.6)																				
NB□□-MTS14-8-G	14 mm MTS	14 mm MTS																										
NB□□-MTS16-8-G	16 mm MTS	16 mm MTS																										
NB□□-MTB14-8-G	14 mm MTB	14 mm MTB			1.50 (38.1)	1.50 (38.1)	1.50 (38.1)	1.50 (38.1)																				
NB□□-MTB16-8-G	16 mm MTB	16 mm MTB																										
NB□□-UMB14-8	14 mm UMB	14 mm UMB			2.92 (74.1)	2.92 (74.1)																						
NB□□-UMB16-8	16 mm UMB	16 mm UMB																										
NB□□-MS20-8	M20 x 1.5 Male Metric	M20 x 1.5 Male Metric			1.50 (38.1)	1.50 (38.1)																						
NB□□-MS22-8	M22 x 1.5 Male Metric	M22 x 1.5 Male Metric																										
NB□□-FNS8-9	1/2 Female NPT	1/2 Female NPT	0.39 (10.0)	2.18	1.75 (44.5)	1.75 (44.5)	1.63 (41.3)	1.50 (38.1)	0.88 (22.2)	0.75 (19.05)	3.50 (88.9)	1.38 (34.9)	1.25 (31.75)	0.38 (9.7)	1.08 (27.5)	4.11 (104.5)	4.11 (104.5)											
NB□□-FNS12-9	3/4 Female NPT	3/4 Female NPT																										
NB□□-NS12-9	3/4 Male NPT	3/4 Male NPT			1.50 (38.1)																							
NB□□-FL12-9	3/4" FITOK	3/4" FITOK																										
NB□□-ML14-9	14 mm FITOK	14 mm FITOK			1.97 (50.0)	1.97 (50.0)	1.61 (41.0)	1.61 (41.0)																				
NB□□-ML16-9	16 mm FITOK	16 mm FITOK																										
NB□□-ML18-9	18 mm FITOK	18 mm FITOK																										
NB□□-MTS14-9-G	14 mm MTS	14 mm MTS			1.75 (44.5)	1.75 (44.5)																						
NB□□-MTS16-9-G	16 mm MTS	16 mm MTS																										
NB□□-TS12-9-G	3/4" TS	3/4" TS																										
NB□□-UMB14-9	14 mm UMB	14 mm UMB			2.98 (75.7)	2.98 (75.7)																						
NB□□-MS27-9	M27 x 2 Male Metric	M27 x 2 Male Metric			1.56 (39.7)	1.56 (39.7)																						
NB□□-FNS12-6	3/4 Female NPT	3/4 Female NPT			0.59 (15.0)	3.27	1.75 (44.5)	1.75 (44.5)										1.75 (44.5)	1.14 (29.0)	1.14 (29.0)	0.88 (22.2)	5.00 (127)	1.70 (43.2)	1.43 (36.4)	0.38 (9.7)	1.28 (32.5)	5.00 (127)	4.72 (120)
NB□□-TS16-6-G	1" TS	1" TS																										
NB□□-MTS25-6-G	25 mm MTS	25 mm MTS	1.75 (44.5)	1.75 (44.5)			1.75 (44.5)	1.75 (44.5)																				
NB□□-MTS28-6-G	28 mm MTS	28 mm MTS																										
NB□□-PS12-6-G	3/4 PS	3/4 PS																										
NB□□-FNS16-0	1 Female NPT	1 Female NPT	0.71 (18.0)	5.65	1.97 (50.0)	1.97 (50.0)			1.24 (31.5)		5.00 (127)					5.25 (133.3)												
NB□□-MTS25-0-G	25 mm MTS	25 mm MTS																										
NB□□-TS16-0-G	1" TS	1" TS																										
NB□□-MTS28-0-G	28 mm MTS	28 mm MTS																										
NB□□-PS12-0-G	3/4 PS	3/4 PS																										
NB□□-PS16-0-G	1 PS	1 PS																										

1. Connection type of "FITOK" means FITOK double ferrule tube fittings. When the connection type of valves is FITOK double ferrule tube fitting, the working pressures of the valves are related to the wall thickness of tubing applied. For specific working pressure of the valves, please refer to the allowable working pressures in FITOK Catalog Tubing.
2. Connection type of "TS" means fractional tube socket weld. "MTS" means metric tube socket weld. "MTB" means metric tube butt weld. "UMB" means rotatable metric tube butt weld. "PS" means pipe socket weld.
3. Sizes and types listed are standard. Other sizes and types are available upon request. For details, please contact FITOK Group or our authorized distributors.
4. Dimensions are shown with FITOK tube fitting nuts finger-tight. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

**Straight Pattern**



**Angle Pattern**



© NBH Series Needle Valves are standard without panel mounting. To order needle valves with panel mounting as illustrated, add -Y to the ordering number. Example: NBHSS-FNS2-7-Y

**Dimensions of NBH Series**

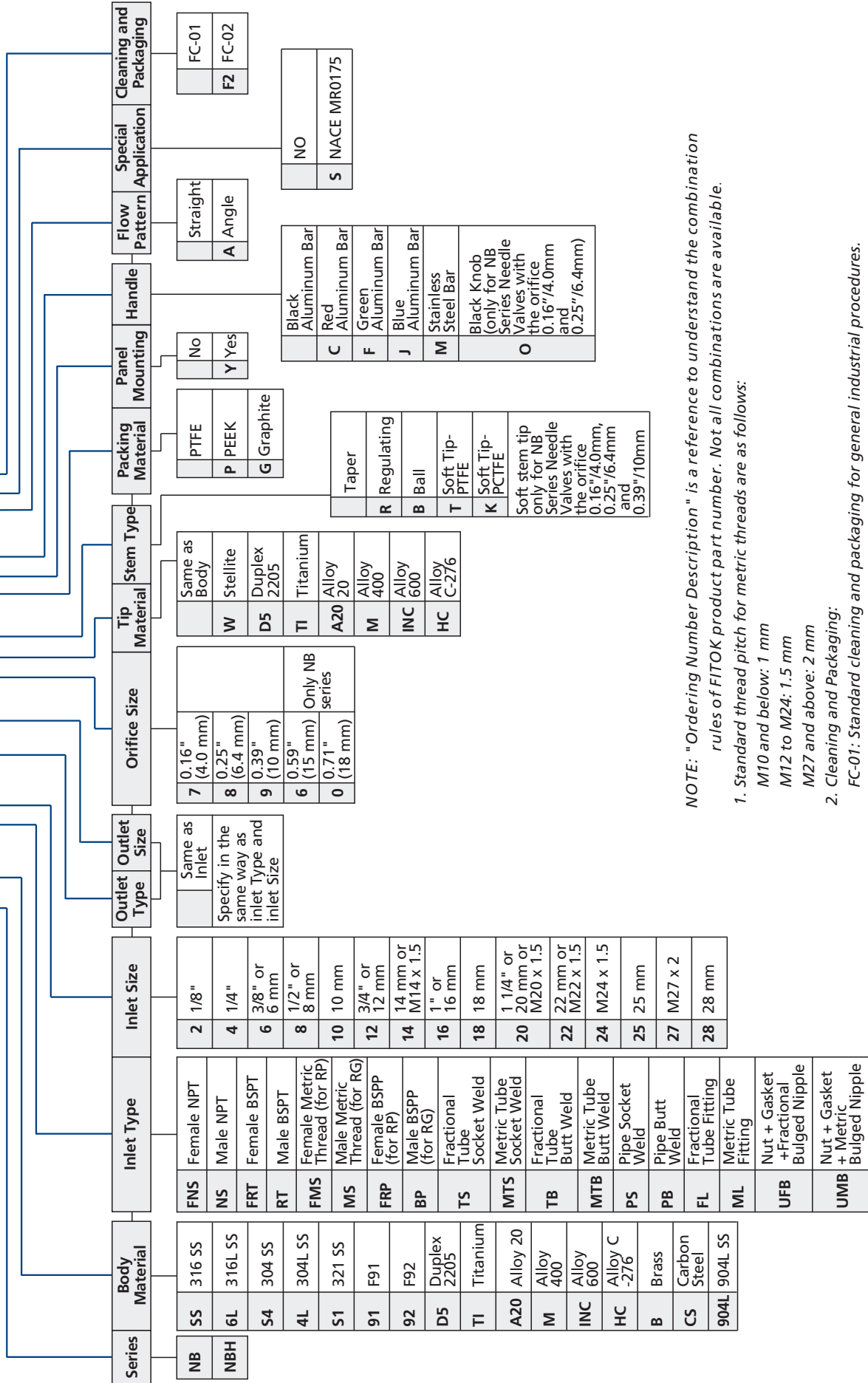
Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)							
	Inlet	Outlet			L1	L2	C	D	E	F	G	H
NBH□□-FNS2-7	1/8 Female NPT	1/8 Female NPT	0.157 (4.0)	0.35	1.13 (28.6)	1.13 (28.6)	0.50 (12.7)	2.50 (63.5)	0.50 (12.7)	0.25 (6.4)	0.96 (24.4)	2.87 (73)
NBH□□-FNS4-7	1/4 Female NPT	1/4 Female NPT										
NBH□□-FNS4-NS4-7	1/4 Female NPT	1/4 Male NPT										
NBH□□-NS4-7	1/4 Male NPT	1/4 Male NPT										
NBH□□-TS4-7-G	1/4" TS	1/4" TS			1.13 (28.6)	1.13 (28.6)						
NBH□□-FNS4-8	1/4 Female NPT	1/4 Female NPT	0.236 (6.4)	0.85	1.31 (33.4)	1.31 (33.4)	0.625 (15.88)	3.50 (88.9)	0.625 (15.88)	0.38 (9.7)	1.09 (27.7)	3.56 (90.3)
NBH□□-FNS6-8	3/8 Female NPT	3/8 Female NPT										
NBH□□-NS6-8	3/8 Male NPT	3/8 Male NPT										
NBH□□-FNS8-9	1/2 Female NPT	1/2 Female NPT	0.39 (10.0)	2.18	1.56 (39.6)	1.56 (39.6)	0.875 (22.2)	3.50 (88.9)	0.875 (22.2)	0.38 (9.7)	1.45 (36.8)	4.17 (106)

1. Connection type of "TS" means fractional tube socket weld.
2. Sizes and types listed are standard. Other sizes and types are available upon request. For details, please contact FITOK Group or our authorized distributors.
3. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.



# Ordering Number Description

NBSS - FL8 - ML12 - 8WB - GYM - ASF2



NOTE: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

- Standard thread pitch for metric threads are as follows:
  - M10 and below: 1 mm
  - M12 to M24: 1.5 mm
  - M27 and above: 2 mm
- Cleaning and Packaging:
  - FC-01: Standard cleaning and packaging for general industrial procedures.
  - FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.

# Nonrotating-stem Needle Valves

**ND Series:** Working pressure up to 3000 psig

**NDH Series:** Working pressure up to 5000 psig

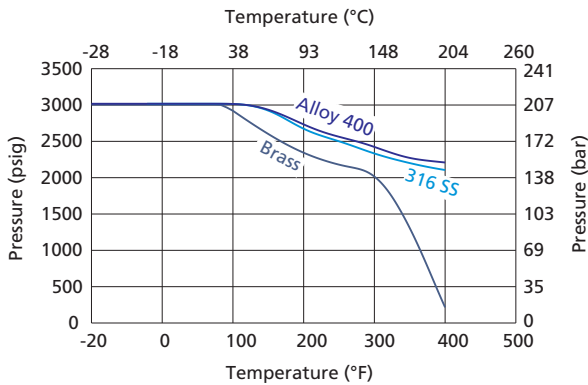
## Features

- ⦿ One-piece forged body
- ⦿ Straight and angle pattern
- ⦿ Compact design
- ⦿ Non-rotating stem
- ⦿ Specially designed handle to stop contamination from entering into the valve
- ⦿ Every valve leak tested with Nitrogen or compressed air at the maximum allowable working pressure
- ⦿ Working pressure up to:
  - ND Series—Stainless steel: 3000 psig (207 bar)
  - Brass: 3000 psig (207 bar)
  - NDH Series—Stainless steel: 5000 psig (345 bar)
- ⦿ Working temperature with stem tip:
  - PCTFE stem tip: -20°F to 200°F (-28°C to 93°C)
  - PEEK stem tip: -20°F to 400°F (-28°C to 204°C)
- ⦿ Working temperature with O-ring:
  - Fluorocarbon Rubber (FKM) : -20°F to 400°F (-28°C to 204°C)
  - Nitrile Butadiene Rubber (NBR) : -20°F to 212°F (-28°C to 100°C)
  - Ethylene Propylene Diene Rubber (EPDM): -20°F to 300°F (-28°C to 148°C)

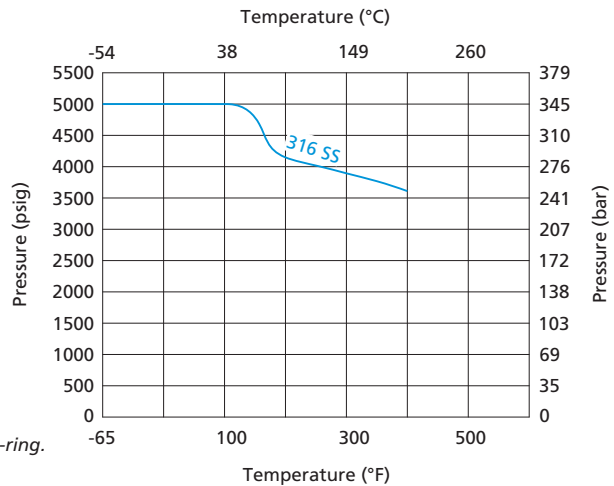


## Pressure vs. Temperature

ND Series

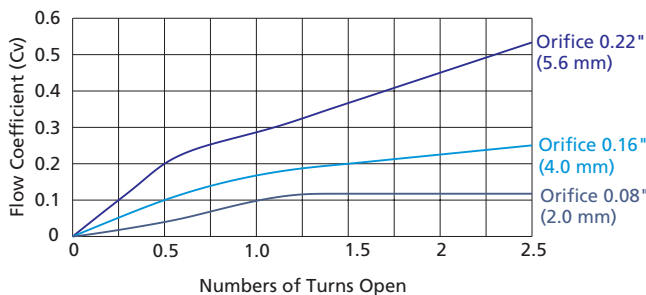


NDH Series

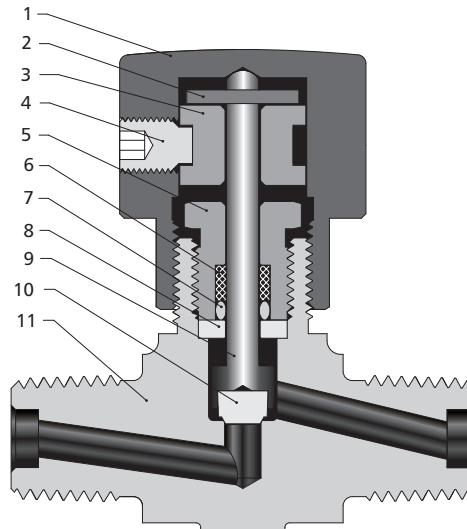


1. The graphs are based on PEEK stem tip and Fluorocarbon rubber (FKM) O-ring.
2. Contact FITOK Group or our authorized distributors for curve graph of other materials.

## Flow Data at 100°F (38°C)



## Standard Materials of Construction

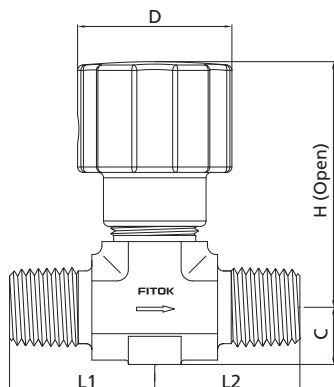


Item	Component	Valve Body Material				
		316 SS	304 SS	321 SS	Brass	Alloy 400
		Material Grade/ASTM Specification				
1	Handle	Anodized aluminum				
2	Stop Pin	Stainless steel				
3	Spool	Aluminum				
4	Set Screw	Stainless steel				
5	Packing Bolt	316 SS/A276	304 SS/A276	321 SS/A276	Brass C36000/B16	Alloy 400/B164
6	Backup Ring	PTFE/D1710				
7	O-ring	Fluorocarbon Rubber (FKM), Nitrile Butadiene Rubber (NBR) or Ethylene Propylene Diene Rubber (EPDM)				
8	Washer	316 SS/A276				Alloy 400/B164
9	Stem	316 SS/A276				Alloy 400/B164
10	Stem Tip	PCTFE or PEEK				
11	Body	316 SS/A182	304 SS/A182	321 SS/A182	Brass C37700/B283	Alloy 400/B564
	Lubricant	Molybdenum disulfide-based				

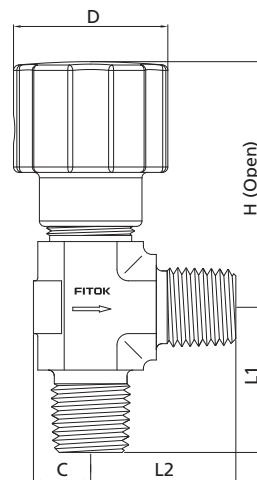
Note: Contact FITOK Group or our authorized distributors for other materials.

## Dimensions

**Straight Pattern**



**Angle Pattern**



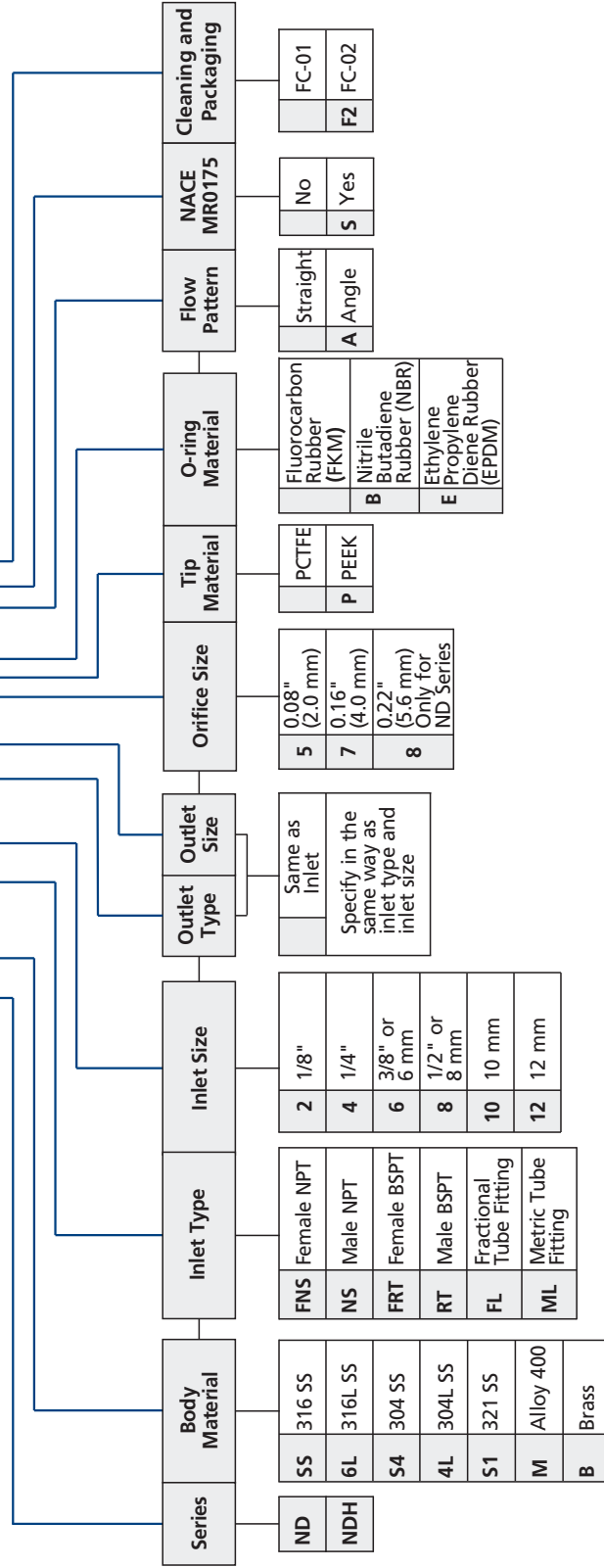
### ND and NDH Series

Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)				
	Inlet	Outlet			L1	L2	C	D	H
ND□□-NS2-5	1/8 Male NPT	1/8 Male NPT	0.08 (2.0)	0.12	0.81 (20.6)	0.81 (20.6)	0.32 (8.1)	1.06 (26.9)	1.86 (47.2)
ND□□-NS2-FL2-5	1/8" Male NPT	1/8" Male NPT							
ND□□-FL2-5	1/8" FITOK	1/8" FITOK			1.10 (27.9)	1.10 (27.9)			
ND□□-ML3-5	3 mm FITOK	3 mm FITOK							
ND□□-NS4-7	1/4 Male NPT	1/4 Male NPT	0.16 (4.0)	0.27	0.98 (25.0)	0.98 (25.0)	0.39 (10.0)	1.06 (26.9)	1.86 (47.2)
ND□□-NS4-FL4-7	1/4" Male NPT	1/4" FITOK							
ND□□-FL4-7	1/4" FITOK	1/4" FITOK			1.13 (28.7)	1.13 (28.7)			
ND□□-ML6-7	6 mm FITOK	6 mm FITOK			1.18 (30.0)	1.18 (30.0)			
ND□□-ML8-7	8 mm FITOK	8 mm FITOK							
ND□□-FNS4-8	1/4 Female NPT	1/4 Female NPT	0.22 (5.6)	0.53	1.06 (26.9)	1.06 (26.9)	0.53 (13.5)	1.12 (28.4)	2.02 (51.3)
ND□□-NS6-8	3/8 Male NPT	3/8 Male NPT							
ND□□-FL6-8	3/8" FITOK	3/8" FITOK			1.12 (28.6)	1.12 (28.6)			
ND□□-FL8-8	1/2" FITOK	1/2" FITOK			1.29 (32.8)	1.29 (32.8)			
ND□□-ML10-8	10 mm FITOK	10 mm FITOK			1.40 (35.6)	1.40 (35.6)			
					1.30 (33.0)	1.30 (33.0)			
ND□□-ML12-8	12 mm FITOK	12 mm FITOK							
NDH□□-NS2-5	1/8 Male NPT	1/8 Male NPT	0.08 (2.0)	0.12	0.81 (20.6)	0.81 (20.6)	0.32 (8.1)	1.06 (26.9)	1.86 (47.2)
NDH□□-FL2-5	1/8" FITOK	1/8" FITOK							
NDH□□-ML3-5	3 mm FITOK	3 mm FITOK			1.10 (27.9)	1.10 (27.9)			
NDH□□-NS4-7	1/4" Male NPT	1/4" Male NPT	0.16 (4.0)	0.27	0.98 (25.0)	0.95 (25.0)	0.39 (10.0)	1.06 (26.9)	1.98 (50.2)
NDH□□-FL4-7	1/4" FITOK	1/4" FITOK							
NDH□□-ML6-7	6 mm FITOK	6 mm FITOK			1.13 (28.7)	1.13 (28.7)			

1. Connection type of "FITOK" means FITOK double ferrule tube fittings. When the connection type of valves is FITOK double ferrule tube fitting, the working pressures of the valves are related to the wall thickness of used applied. For specific working pressure of the valves, please refer to the allowable working pressures in FITOK Catalog Tubing.
2. Sizes and types listed are standard. Other sizes and types are available upon request. For details, please contact FITOK Group or our authorized distributors.
3. Dimensions are shown with FITOK tube fitting nuts finger-tight. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

# Ordering Number Description

NDSS - FNS4 - ML8 - 7PE - ASF2



NOTE: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

### Cleaning and Packaging:

FC-01: Standard cleaning and packaging for general industrial procedures.

FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.

# Forged Needle Valves

**NF Series:** Working pressure up to 6000 psig

**NFH Series:** Working pressure up to 10000 psig

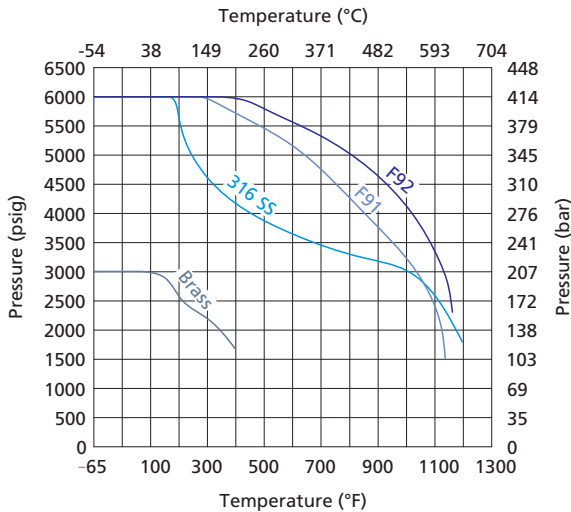
## Features

- ⦿ One-piece forged body
- ⦿ Two-piece stem design: Upper stem threads cold rolled and lower stem hardened for high strength and smooth operation
- ⦿ Upper stem thread lubricant isolated from system media
- ⦿ Linear instead of rotary motion of the rising, non-rotating stem minimizes packing abrasion and reduces the friction between the seat and the tip
- ⦿ Panel mounting available
- ⦿ Steady and durable fastening of the handle by double lock-pins
- ⦿ Handles of different colors available
- ⦿ Every valve leak tested with Nitrogen or compressed air (NF Series) at the maximum allowable working pressure or with water (NFH Series) at 1.1 times the maximum allowable working pressure
- ⦿ Working pressure up to:
  - NF Series—Stainless steel: 6000 psig (414 bar)
  - Alloy C-276: 6000 psig (414 bar)
  - Alloy 400: 5000 psig (345 bar)
  - Titanium: 3500 psig (241 bar)
  - Brass: 3000 psig (207 bar)
- ⦿ Working temperature:
  - PTFE: -65°F to 450°F (-54°C to 232°C)
  - PEEK: -65°F to 500°F (-54°C to 260°C)
  - Graphite: -65°F to 1200°F (-54°C to 649°C)

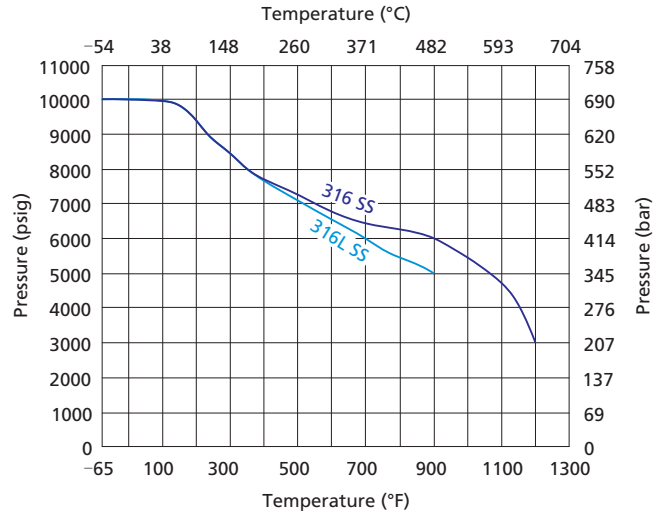


## Pressure vs. Temperature

NF Series



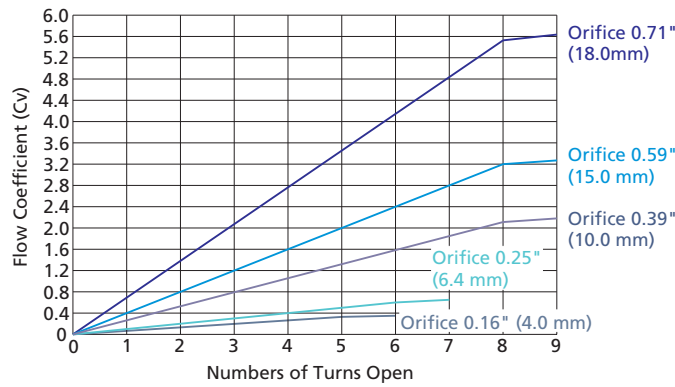
NFH Series



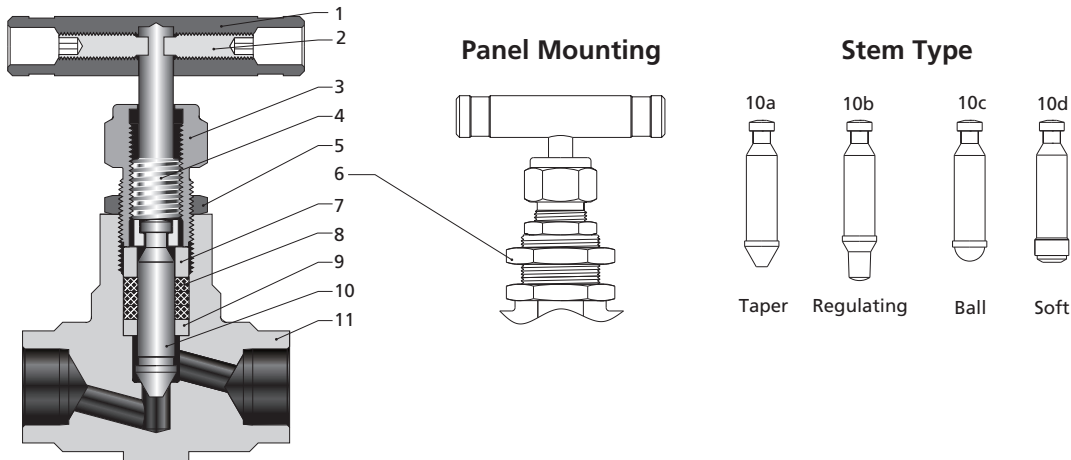
1. Graphs are based on graphite packing.
2. Soft tips are for NF Series only. Temperature rating is limited to 200°F (93°C) max. with PCTFE stem tip (soft tip).
3. Contact FITOK Group or our authorized distributors for curve graph of other materials.

## Flow Data at 100°F (38°C)

Regulating Stem



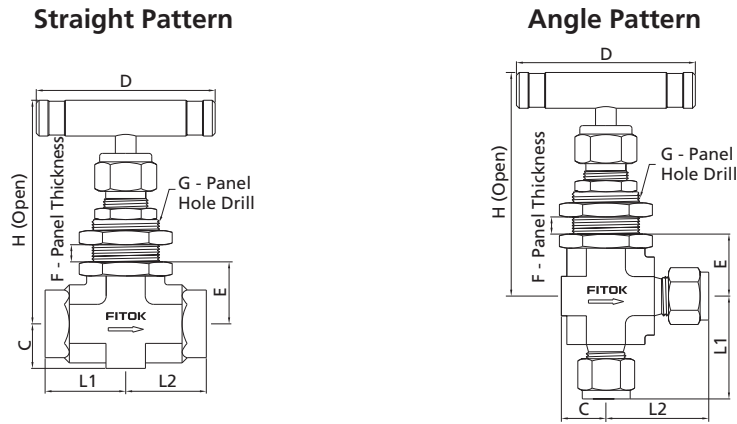
## Standard Materials of Construction



Item	Component	Valve Body Material		
		316 SS	F91	Brass
		<b>Material Grade/ASTM Specification</b>		
1	Handle	Anodized aluminum or stainless steel or black knob		
2	Set Screw	Galvanized carbon steel		
3	Packing Bolt	304 SS/A276	F91/A182	Brass C36000/B16
4	Upper Stem	316 SS/A276		
5	Lock Nut	Stainless steel	1020/A108	Brass C36000/B16
6	Panel Nut	Stainless steel	1020/A108	Brass C36000/B16
7	Gland	316 SS/A276		Brass C36000/B16
8	Packing	PTFE or PEEK or graphite		
9	Packing Washer	316 SS/A276		Brass C36000/B16
10a 10b 10c 10d	Lower Stem	Hardened 316 SS/A276		
11	Body	316 SS/A182	F91/A182	Brass C37700/B283
	Seat	Same as Body		
	Lubricant	Molybdenum disulfide-based		

Note: Contact FITOK Group or our authorized distributors for other materials.

## Dimensions



© NF Series Needle Valves are standard without panel mounting. To order needle valves with panel mounting as illustrated, add -Y to the ordering number. Example: NFSS-FNS2-7-Y

### Dimensions of NF Series

Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)							
	Inlet	Outlet			L1	L2	H	D	C	E	F	G
NF□□-FNS2-7	1/8 Female NPT	1/8 Female NPT	0.16 (4.0)	0.35	1.00 (25.4)	1.00 (25.4)	2.85 (72.5)	2.17 (55)	0.53 (13.5)	0.71 (18.0)	0.25 (6.4)	0.77 (19.6)
NF□□-FNS4-7	1/4 Female NPT	1/4 Female NPT			1.03 (26.2)	1.03 (26.2)						
NF□□-FL4-7	1/4" FITOK	1/4" FITOK			1.22 (30.9)	1.22 (30.9)						
NF□□-ML6-7	6 mm FITOK	6 mm FITOK			1.25 (31.75)	1.25 (31.75)						
NF□□-ML8-7	8 mm FITOK	8 mm FITOK			1.03 (26.2)	1.03 (26.2)						
NF□□-NS4-7	1/4 Male NPT	1/4 Male NPT			1.13 (28.6)	1.13 (28.6)						
NF□□-NS6-7	3/8 Male NPT	3/8 Male NPT										
NF□□-FO4-7	1/4" Male FO	1/4" Male FO										
NF□□-FR4-7	1/4" Male FR	1/4" Male FR										
NF□□-FNS4-8	1/4 Female NPT	1/4 Female NPT	0.25 (6.4)	0.85	1.13 (28.6)	1.13 (28.6)	3.38 (85.8)	2.50 (63.5)	0.62 (15.8)	0.87 (22.0)	0.38 (9.7)	0.96 (24.4)
NF□□-FNS6-8	3/8 Female NPT	3/8 Female NPT			1.42 (36.1)	1.42 (36.1)						
NF□□-NS6-8	3/8 Male NPT	3/8 Male NPT			1.44 (36.5)	1.44 (36.5)						
NF□□-FL6-8	3/8" FITOK	3/8" FITOK			1.53 (38.9)	1.53 (38.9)						
NF□□-ML10-8	10 mm FITOK	10 mm FITOK			1.56 (39.7)	1.56 (39.7)						
NF□□-ML12-8	12 mm FITOK	12 mm FITOK			1.26 (32.0)	1.26 (32.0)						
NF□□-ML14-8	14 mm FITOK	14 mm FITOK			1.50 (38.1)	1.50 (38.1)						
NF□□-FNS8-8	1/2 Female NPT	1/2 Female NPT			1.53 (38.9)	1.53 (38.9)						
NF□□-NS8-8	1/2 Male NPT	1/2 Male NPT			1.13 (28.6)	1.13 (28.6)						
NF□□-FL8-8	1/2" FITOK	1/2" FITOK			1.50 (38.1)	1.50 (38.1)						
NF□□-TS6-8-G	3/8" TS	3/8" TS			1.53 (38.9)	1.53 (38.9)						
NF□□-TS8-8-G	1/2" TS	1/2" TS			1.13 (28.6)	1.13 (28.6)						
NF□□-MTS12-8-G	12 mm MTS	12 mm MTS			1.50 (38.1)	1.50 (38.1)						
NF□□-MTS14-8-G	14 mm MTS	14 mm MTS			1.50 (38.1)	1.50 (38.1)						
NF□□-MTS16-8-G	16 mm MTS	16 mm MTS			1.50 (38.1)	1.50 (38.1)						
NF□□-MTB14-8-G	14 mm MTB	14 mm MTB			1.50 (38.1)	1.50 (38.1)						
NF□□-MTB16-8-G	16 mm MTB	16 mm MTB			2.92 (74.1)	2.92 (74.1)						
NF□□-UMB14-8	14 mm UMB	14 mm UMB			1.13 (28.6)	1.13 (28.6)						
NF□□-UMB16-8	16 mm UMB	16 mm UMB	1.56 (39.7)	1.56 (39.7)								
NF□□-FO8-8	1/2" Male FO	1/2" Male FO	1.50 (38.1)	1.50 (38.1)								
NF□□-FR8-8	1/2" Male FR	1/2" Male FR										
NF□□-MS20-8	M20 x 1.5 Male Metric	M20 x 1.5 Male Metric										

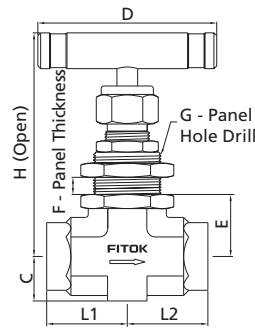


## Dimensions of NF Series

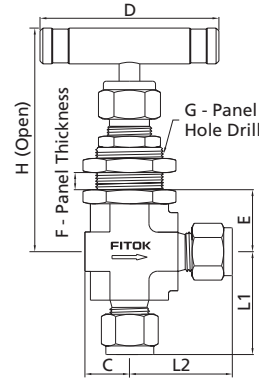
Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)								
	Inlet	Outlet			L1	L2	H	D	C	E	F	G	
NF□□-MS22-8	M22 x 1.5 Male Metric	M22 x 1.5 Male Metric	0.25 (6.4)	0.85	1.50 (38.1)	1.50 (38.1)	3.38 (85.8)	2.50 (63.5)	0.62 (15.8)	0.87 (22.0)	0.38 (9.7)	0.96 (24.4)	
NF□□-FNS8-9	1/2 Female NPT	1/2 Female NPT	0.39 (10.0)	2.18	1.56 (39.7)	1.56 (39.7)	3.86 (98.0)	3.50 (88.9)	0.89 (22.5)	1.10 (28.3)	0.38 (9.7)	1.08 (27.5)	
NF□□-NS8-9	1/2 Male NPT	1/2 Male NPT											
NF□□-NS12-9	3/4 Male NPT	3/4 Male NPT											
NF□□-FL12-9	3/4" FITOK	3/4" FITOK											
NF□□-ML14-9	14 mm FITOK	14 mm FITOK											
NF□□-ML16-9	16 mm FITOK	16 mm FITOK			1.97 (50.0)	1.97 (50.0)			0.76 (19.4)				
NF□□-ML18-9	18 mm FITOK	18 mm FITOK											
NF□□-ML20-9	20 mm FITOK	20 mm FITOK											
NF□□-MTS14-9-G	14 mm MTS	14 mm MTS											
NF□□-MTS16-9-G	16 mm MTS	16 mm MTS											
NF□□-MTS18-9-G	18 mm MTS	18 mm MTS			1.56 (39.7)	1.56 (39.7)			0.76 (19.4)				
NF□□-TS12-9-G	3/4" TS	3/4" TS											
NF□□-PS8-9-G	1/2 PS	1/2 PS											
NF□□-MTB16-9-G	16 mm MTB	16 mm MTB											
NF□□-UMB14-9	14 mm UMB	14 mm UMB			2.98 (75.7)	2.98 (75.7)							
NF□□-UMB16-9	16 mm UMB	16 mm UMB	1.56 (39.7)	1.56 (39.7)	0.89 (22.5)								
NF□□-MS27-9	M27 x 2 Male Metric	M27 x 2 Male Metric											
NF□□-FNS12-6	3/4 Female NPT	3/4 Female NPT	0.59 (15.0)	3.27		1.97 (50.0)	1.97 (50.0)	5.00 (127)	5.00 (127)	1.08 (27.5)	1.61 (41.0)	0.38 (9.7)	1.45 (36.8)
NF□□-TS16-6-G	1" TS	1" TS											
NF□□-MTS25-6-G	25 mm MTS	25 mm MTS											
NF□□-MTS28-6-G	28 mm MTS	28 mm MTS											
NF□□-PS12-6-G	3/4 PS	3/4 PS											
NF□□-PB12-6-G	3/4 PB	3/4 PB											
NF□□-FL12-6	3/4" FITOK	3/4" FITOK				2.35 (59.7)	2.35 (59.7)						
NF□□-ML20-6	20 mm FITOK	20 mm FITOK	0.71 (18.0)	5.65		1.97 (50.0)	1.97 (50.0)	5.33 (135.4)	5.00 (127)	1.08 (27.5)	1.61 (41.0)	0.38 (9.7)	1.45 (36.8)
NF□□-TS16-0-G	1" TS	1" TS											
NF□□-MTS25-0-G	25 mm MTS	25 mm MTS											
NF□□-MTS28-0-G	28 mm MTS	28 mm MTS											
NF□□-PS12-0-G	3/4 PS	3/4 PS											
NF□□-PB16-0-G	1 PB	1 PB											

1. Connection type of "FITOK" means FITOK double ferrule tube fittings. When the connection type of valves is FITOK double ferrule tube fitting, the working pressures of the valves are related to the wall thickness of tubing applied. For specific working pressure of the valves, please refer to the allowable working pressures in FITOK Catalog Tubing.
2. Connection type of "FO" means O-ring face seal fittings. "FR" means metal gasket face seal fittings. "TS" means fractional tube socket weld. "MTS" means metric tube socket weld. "MTB" means metric tube butt weld. "UMB" means rotatable metric tube butt weld. "PS" means pipe socket weld. "PB" means pipe butt weld.
3. Sizes and types listed are standard. Other sizes and types are available upon request. For details, please contact FITOK Group or our authorized distributors.
4. Dimensions are shown with FITOK tube fitting nuts finger-tight. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

**Straight Pattern**



**Angle Pattern**



© NFH Series Needle Valves are standard without panel mounting. To order needle valves with panel mounting as illustrated, add -Y to the ordering number. Example: NFHSS-FNS2-7-Y

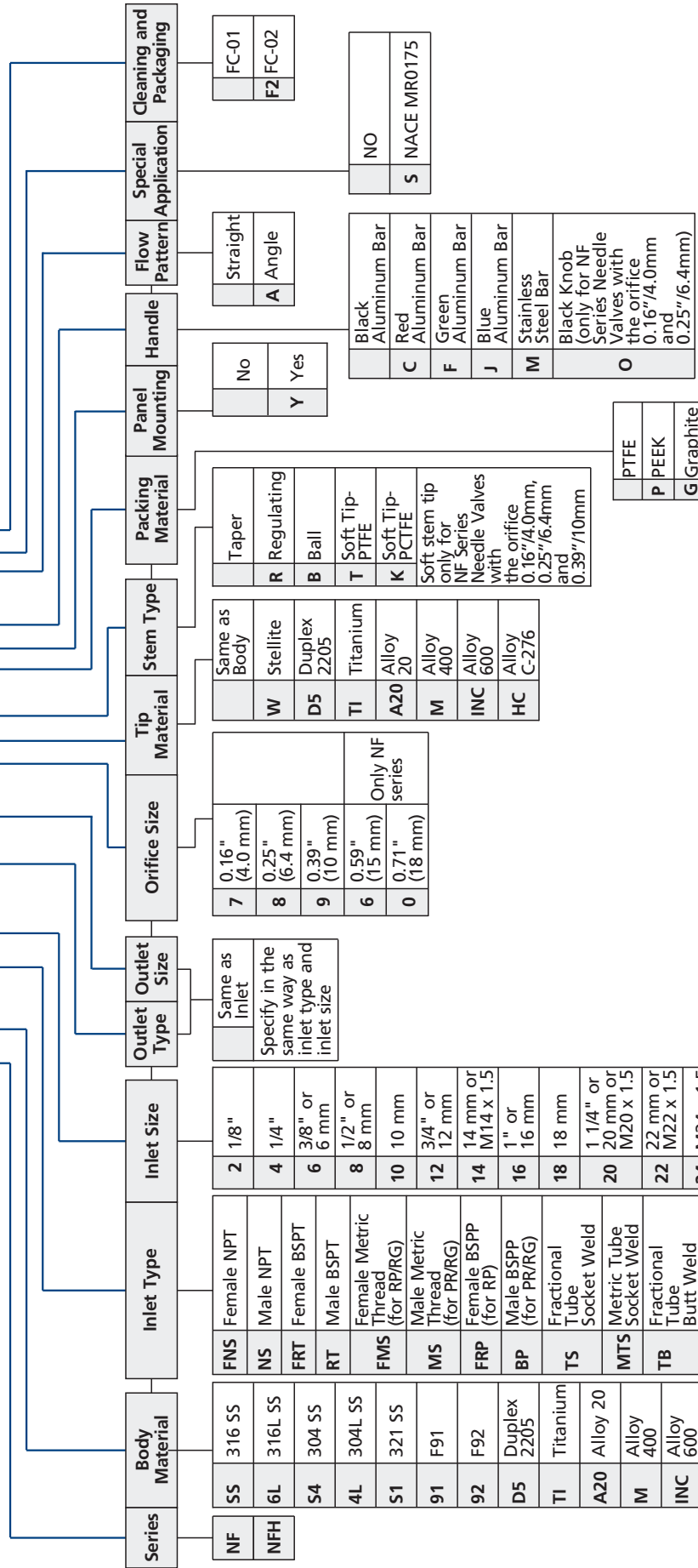
**Dimensions of NFH Series**

Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)							
	Inlet	Outlet			L1	L2	H	D	C	E	F	G
NFH□□-FNS2-7	1/8 Female NPT	1/8 Female NPT	0.16 (4.0)	0.35	1.00 (25.4)	1.00 (25.4)	2.85 (72.5)	2.17 (55.0)	0.62 (15.8)	0.76 (19.4)	0.25 (6.4)	0.77 (19.6)
NFH□□-FNS4-7	1/4 Female NPT	1/4 Female NPT			1.06 (26.2)	1.06 (26.2)						
NFH□□-NS4-7	1/4 Male NPT	1/4 Male NPT			1.22 (30.9)	1.22 (30.9)						
NFH□□-FNS4-NS4-7	1/4 Female NPT	1/4 Male NPT			1.06 (26.2)	1.22 (30.9)						
NFH□□-TS4-7-G	1/4" TS	1/4" TS			1.06 (26.2)	1.06 (26.2)						
NFH□□-FNS4-8	1/4 Female NPT	1/4 Female NPT	0.25 (6.4)	0.85	1.12 (28.6)	1.12 (28.6)	3.38 (85.8)	2.50 (63.5)	0.76 (19.4)	0.87 (22.0)	0.38 (9.7)	0.96 (24.4)
NFH□□-FNS6-8	3/8 Female NPT	3/8 Female NPT			1.50 (38.1)	1.50 (38.1)						
NFH□□-NS6-8	3/8 Male NPT	3/8 Female NPT			1.56 (39.7)	1.56 (39.7)						
NFH□□-TS8-9-G	1/2" TS	1/2" TS	0.39 (10.0)	2.18	1.56 (39.7)	1.56 (39.7)	3.86 (98.0)	3.50 (88.9)	0.76 (19.4)	1.10 (28.3)	0.38 (9.7)	1.08 (27.5)

1. Connection type of "TS" means tube socket weld.
2. Sizes and types listed are standard. Other sizes and types are available upon request. For details, please contact FITOK Group or our authorized distributors.
3. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

# Ordering Number Description

NFS4 - TS16 - MTS25 - 6WR - GYM - ASF2



Series	Body Material	Inlet Type	Inlet Size	Outlet Type	Outlet Size	Orifice Size	Tip Material	Stem Type	Packing Material	Panel Mounting	Handle	Flow Pattern/Application	Special Application	Cleaning and Packaging
NF	316 SS	Female NPT	2 1/8"	Same as Inlet	7 0.16" (4.0 mm)	W	Same as Body	Taper	No	Y	NO	FC-01		
NFH	316L SS	Male NPT	4 1/4"	Specify in the same way as inlet type and inlet size	8 0.25" (6.4 mm)	R	Stellite	Regulating	Y		NO	F2 FC-02		
S4	304 SS	Female BSPT	3/8" or 6 mm		9 0.39" (10 mm)	B	Duplex 2205	Ball			NO			
4L	304L SS	Male BSPT	1/2" or 8 mm		6 0.59" (15 mm)	T	Titanium	Soft Tip-PTFE			NO			
S1	321 SS	Female Metric Thread (for RPRG)	10 mm		0 0.71" (18 mm)	K	Alloy 20	Soft Tip-PCTFE			NO			
91	F91	Male Metric Thread (for PR/RG)	3/4" or 12 mm				Alloy 400	Soft stem tip only for NF Series Needle Valves with the orifice 0.16"/4.0mm, 0.25"/6.4mm and 0.39"/10mm			S	NACE MR0175		
92	F92	Female BSPP (for RP)	14 mm or M14 x 1.5				Alloy 600							
D5	Duplex 2205	Male BSPP (for PR/RG)	1" or 16 mm				Alloy C-276							
TI	Titanium	Fractional Tube Socket Weld	18 mm											
A20	Alloy 20	Metric Tube Socket Weld	1 1/4" or 20 mm or M20 x 1.5											
M	Alloy 400	Metric Tube Socket Weld	20 mm or M20 x 1.5											
INC	Alloy 600	Fractional Tube Butt Weld	22 mm or M22 x 1.5											
HC	Alloy C-276	Metric Tube Butt Weld	M24 x 1.5											
B	Brass	Pipe Socket Weld	25 mm											
CS	Carbon Steel	Pipe Butt Weld	M27 x 2											
904L	904L SS	Fractional Tube Fitting	28 mm											
		Metric Tube Fitting												
		Nut + Gasket + Fractional Bulged Nipple												
		Nut + Gasket + Metric Bulged Nipple												
		Male FO Fitting												
		Male FR Fitting												

NOTE: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

- Standard thread pitch for metric threads are as follows:  
 M10 and below: 1 mm  
 M12 to M24: 1.5 mm  
 M27 and above: 2 mm
- FO means FITOK O-ring face seal fittings.
- FR means FITOK metal gasket face seal fittings.
- Cleaning and Packaging:  
 FC-01: Standard cleaning and packaging for general industrial procedures.  
 FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.

# General Purpose Needle Valves

**NG Series:** Working pressure up to 3000 psig

**NGH Series:** Working pressure up to 5000 psig

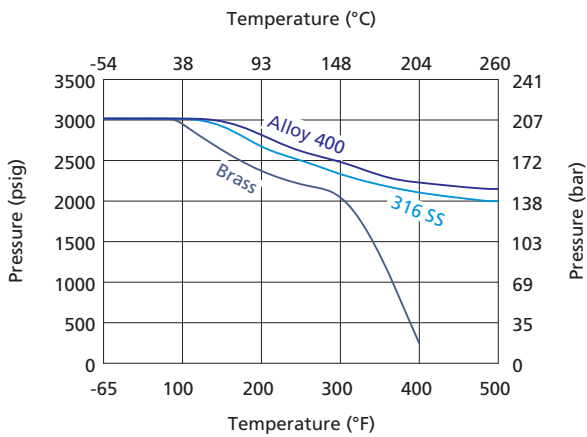
## Features

- ⦿ One-piece forged body
- ⦿ Easy external adjustments by packing nut
- ⦿ Live-loaded packing system
- ⦿ Handles of different colors available
- ⦿ Compact design
- ⦿ Panel mounting available
- ⦿ Every valve leak tested with Nitrogen or compressed air at the maximum allowable working pressure
- ⦿ Working pressure up to:
  - NG Series—Stainless steel, Brass, Alloy 400: 3000 psig (207 bar)
  - NGH Series—Stainless steel: 5000 psig (345 bar)
- ⦿ Working temperature:
  - PTFE: -65°F to 450°F (-54°C to 232°C)
  - PEEK: -65°F to 500°F (-54°C to 260°C)

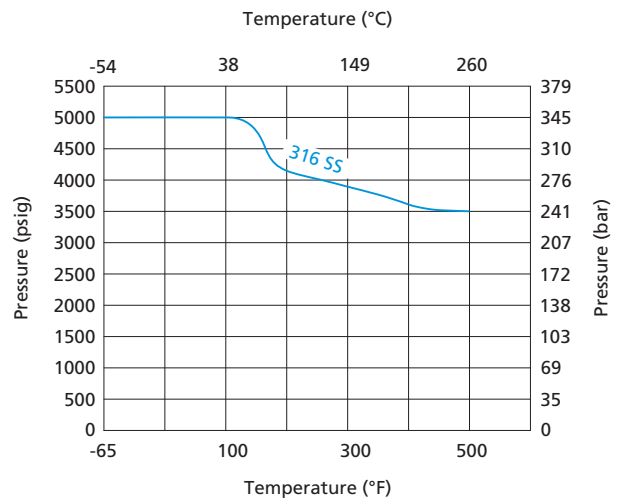


## Pressure vs. Temperature

NG Series



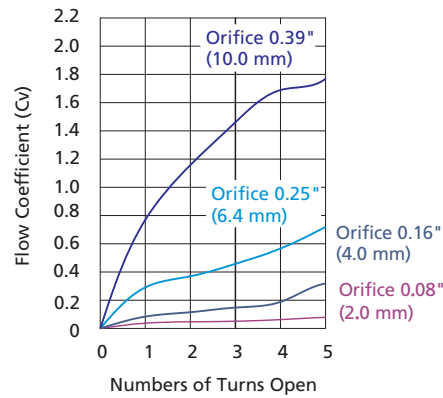
NGH Series



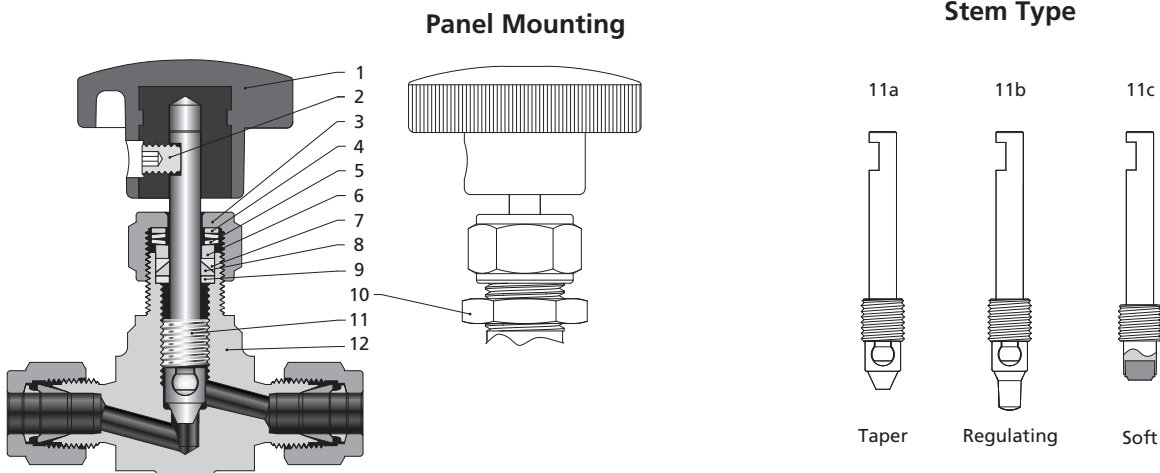
1. Graphs are based on PEEK packing.
2. Temperature rating is limited to 200°F (93°C) max with PCTFE stem tip (soft tip).
3. Contact FITOK Group or our authorized distributors for curve graph of other materials.

## Flow Data at 100°F (38°C)

Regulating Stem



## Standard Materials of Construction

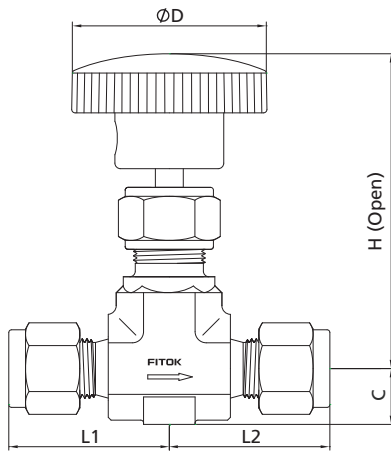


Item	Component	Valve Body Material		
		316 SS	Brass	Alloy
		Material Grade/ASTM Specification		
1	Handle	Black knob (aluminum or nylon with copper insert), aluminum alloy or stainless steel bar handle		
2	Set Screw	Galvanized carbon steel		
3	Packing Bolt	304 SS/A276	Brass C36000/B16	304 SS/A276
4	Washer	316 SS/A276		
5	Packing Spring	S17700/A693		
6	Washer	316 SS/A276		
7	Upper Packing	PTFE/PEEK		
8	Lower Packing			
9	Packing Washer	316 SS/A276	Alloy 400/B164	
10	Panel Nut	Stainless steel	Brass C36000/B16	Stainless steel
11a	Taper Stem/Stem Tip	Hardened 316 SS/A276		Alloy 400/B164
11b	Regulating Stem/Stem Tip	Hardened 316 SS/A276		Alloy 400/B164
11c	Soft Stem	316 SS/A276		Alloy 400/B164
	Stem Tip	PCTFE/D1430 or PEEK		
12	Body	316 SS/A182	Brass C37700/B283	Alloy 400/B564
Lubricant		Molybdenum disulfide-based		

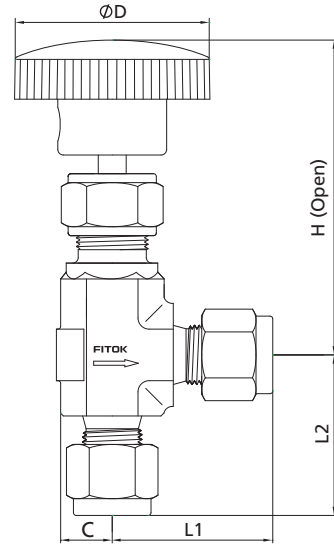
Note: Contact FITOK Group or our authorized distributors for other materials.

## Dimensions

**Straight Pattern**



**Angle Pattern**



**Dimensions of NG Series**

Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)				
	Inlet	Outlet			L1	L2	C	D	H
NG□□-NS2-5	1/8 Male NPT	1/8 Male NPT	0.08 (2.0)	0.09	0.75 (19.05)	0.75 (19.05)	0.31 (7.9)	1.00 (25.4)	2.30 (58.4)
NG□□-FNS2-5	1/8 Female NPT	1/8 Female NPT			0.81 (20.6)	0.81 (20.6)			
NG□□-FL2-5	1/8" FITOK	1/8" FITOK			0.98 (25.0)	0.98 (25.0)			
NG□□-ML3-5	3 mm FITOK	3 mm FITOK							
NG□□-FNS2-7	1/8 Female NPT	1/8 Female NPT	0.16 (4.0)	0.35	0.81 (20.6)	0.81 (20.6)	0.39 (9.9)	1.38 (35.0)	2.46 (62.5)
NG□□-NS4-7	1/4 Male NPT	1/4 Male NPT			0.98 (25.0)	0.98 (25.0)			
NG□□-FL4-7	1/4" FITOK	1/4" FITOK			1.13 (28.7)	1.13 (28.7)			
NG□□-ML6-7	6 mm FITOK	6 mm FITOK			1.17 (29.7)	1.17 (29.7)			
NG□□-ML8-7	8 mm FITOK	8 mm FITOK			2.24 (57.0)	2.24 (57.0)			
NG□□-UMB6-7	6 mm UMB	6 mm UMB							
NG□□-FNS4-8	1/4 Female NPT	1/4 Female NPT	0.25 (6.4)	0.70	1.06 (26.9)	1.06 (26.9)	0.53 (13.5)	1.88 (47.8)	2.85 (72.4)
NG□□-FNS6-8	3/8 Female NPT	3/8 Female NPT					0.62 (15.8)		2.90 (73.7)
NG□□-NS6-8	3/8 Male NPT	3/8 Male NPT			1.12 (28.4)	1.12 (28.4)	0.53 (13.5)		2.85 (72.4)
NG□□-NS8-8	1/2 Male NPT	1/2 Male NPT			1.50 (38.1)	1.50 (38.1)	0.62 (15.8)		2.90 (73.7)
NG□□-FL6-8	3/8" FITOK	3/8" FITOK			1.29 (32.8)	1.29 (32.8)			
NG□□-FL8-8	1/2" FITOK	1/2" FITOK			1.40 (35.6)	1.40 (35.6)			
NG□□-ML10-8	10 mm FITOK	10 mm FITOK			1.30 (33.0)	1.30 (33.0)	0.53 (13.5)		2.85 (72.4)
NG□□-ML12-8	12 mm FITOK	12 mm FITOK			1.40 (35.6)	1.40 (35.6)			
NG□□-ML14-8	14 mm FITOK	14 mm FITOK			1.56 (39.7)	1.56 (39.7)			
NG□□-MS20-8	M20 x 1.5 Male Metric	M20 x 1.5 Male Metric			1.50 (38.1)	1.50 (38.1)	0.62 (15.8)		2.90 (73.7)
NG□□-UMB10-8	10 mm UMB	10 mm UMB							
NG□□-UMB14-8	14 mm UMB	14 mm UMB			2.60 (66.0)	2.60 (66.0)	0.53 (13.5)		2.85 (72.4)

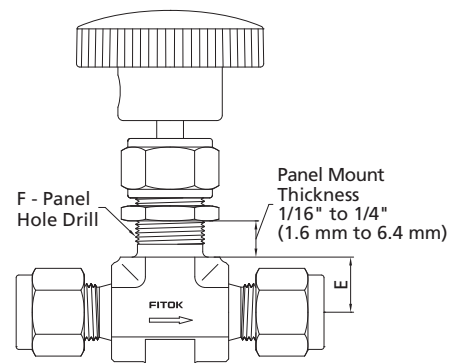
## Dimensions of NG Series

Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)				
	Inlet	Outlet			L1	L2	C	D	H
NG□□-FNS8-9-L	1/2 Female NPT	1/2 Female NPT	0.39 (10.0)	1.80	1.56 (39.7)	1.56 (39.7)	0.76 (19.4)	3.50 (88.9)	3.37 (85.7)
NG□□-FNS12-9-L	3/4 Female NPT	3/4 Female NPT			1.63 (41.3)	1.63 (41.3)	0.89 (22.5)		
NG□□-NS12-9-L	3/4 Male NPT	3/4 Male NPT			1.90 (48.3)	1.90 (48.3)	0.76 (19.4)		
NG□□-FL8-9-L	1/2" FITOK	1/2" FITOK							
NG□□-FL12-9-L	3/4" FITOK	3/4" FITOK							
NG□□-ML14-9-L	14 mm FITOK	14 mm FITOK							

1. Connection type of "FITOK" means FITOK double ferrule tube fittings. When the connection type of valves is FITOK double ferrule tube fitting, the working pressures of the valves are related to the wall thickness of used tubing. For specific working pressure of the valves, please refer to the allowable working pressures in FITOK Catalog Tubing.
2. Connection type of "UMB" means rotatable metric tube butt weld.
3. Sizes and types listed are standard. Other sizes and types are available upon request. For details, please contact FITOK Group or our authorized distributors.
4. Dimensions are shown with FITOK tube fitting nuts finger-tight. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

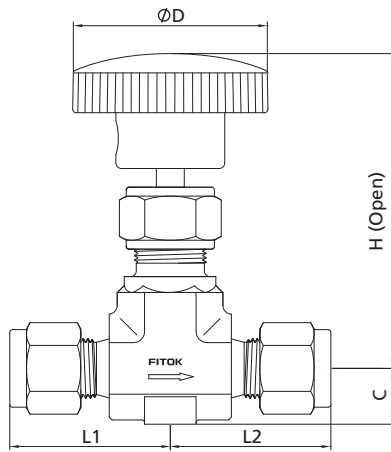
## Panel Mount Dimensions of NG Series

Orifice in.(mm)	Dimensions, in.(mm)	
	E	F
0.08 (2.0)	0.44 (11.2)	0.47 (11.9)
0.16 (4.0)	0.44 (11.2)	0.53 (13.5)
0.25 (6.4)	0.50 (12.7)	0.78 (19.8)
0.39 (10.0)	0.75 (19.1)	1.03 (26.2)

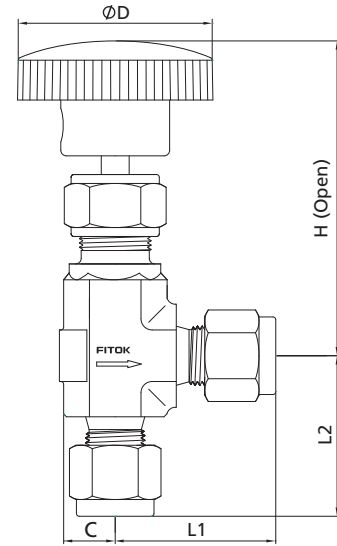


1. NG Series Needle Valves are standard without panel mounting.
2. To order needle valves with panel mounting as illustrated, add -Y to the ordering number. Example: NGSS-NS2-5-Y

**Straight Pattern**



**Angle Pattern**



**Dimensions of NGH Series**

Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)					
	Inlet	Outlet			L1	L2	C	D	H	
NGH□□-NS2-5	1/8 Male NPT	1/8 Male NPT	0.08 (2.0)	0.09	0.75 (19.0)	0.75 (19.0)	0.31 (7.9)	1.00 (25.4)	2.30 (58.4)	
NGH□□-FNS2-5	1/8 Female NPT	1/8 Female NPT			0.81 (20.6)	0.81 (20.6)				
NGH□□-FL2-5	1/8" FITOK	1/8" FITOK			0.98 (25.0)	0.98 (25.0)				
NGH□□-ML3-5	3 mm FITOK	3 mm FITOK	0.16 (4.0)	0.35	0.81 (20.6)	0.81 (20.6)	0.39 (9.9)	1.38 (35.0)	2.46 (62.5)	
NGH□□-FNS2-7	1/8 Female NPT	1/8 Female NPT			0.98 (25.0)	0.98 (25.0)				
NGH□□-NS4-7	1/4 Male NPT	1/4 Male NPT			1.13 (28.7)	1.13 (28.7)				
NGH□□-FL4-7	1/4" FITOK	1/4" FITOK			1.17 (29.7)	1.17 (29.7)				
NGH□□-ML6-7	6 mm FITOK	6 mm FITOK			2.24 (57.0)	2.24 (57.0)				
NGH□□-ML8-7	8 mm FITOK	8 mm FITOK	0.25 (6.4)	0.70	1.06 (26.9)	1.06 (26.9)	0.53 (13.5)	1.88 (47.8)	2.85 (72.4)	
NGH□□-UMB6-7	6 mm UMB	6 mm UMB			0.62 (15.8)	2.90 (73.7)				
NGH□□-FNS4-8	1/4 Female NPT	1/4 Female NPT			1.12 (28.4)	1.12 (28.4)	0.53 (13.5)		2.85 (72.4)	
NGH□□-FNS6-8	3/8" Female NPT	3/8" Female NPT			1.50 (38.1)	1.50 (38.1)	0.62 (15.8)		2.90 (73.7)	
NGH□□-NS6-8	3/8 Male NPT	3/8 Male NPT			1.29 (32.8)	1.29 (32.8)	0.53 (13.5)		1.88 (47.8)	2.85 (72.4)
NGH□□-NS8-8	1/2 Male NPT	1/2 Male NPT			1.40 (35.6)	1.40 (35.6)				
NGH□□-FL6-8	3/8" FITOK	3/8" FITOK			1.30 (33.0)	1.30 (33.0)				
NGH□□-FL8-8	1/2" FITOK	1/2" FITOK			1.40 (35.6)	1.40 (35.6)	0.62 (15.8)		1.88 (47.8)	2.90 (73.7)
NGH□□-ML10-8	10 mm FITOK	10 mm FITOK			1.56 (39.7)	1.56 (39.7)				
NGH□□-ML12-8	12 mm FITOK	12 mm FITOK			1.50 (38.1)	1.50 (38.1)	0.53 (13.5)		1.88 (47.8)	2.85 (72.4)
NGH□□-ML14-8	14 mm FITOK	14 mm FITOK	2.60 (66.0)	2.60 (66.0)						
NGH□□-MS20-8	M20 x 1.5 Male Metric	M20 x 1.5 Male Metric	0.62 (15.8)	2.90 (73.7)						
NGH□□-UMB10-8	10 mm UMB	10 mm UMB	0.25 (6.4)	0.70	2.60 (66.0)	2.60 (66.0)	0.53 (13.5)	1.88 (47.8)	2.85 (72.4)	
NGH□□-UMB14-8	14 mm UMB	14 mm UMB			0.62 (15.8)	2.90 (73.7)				



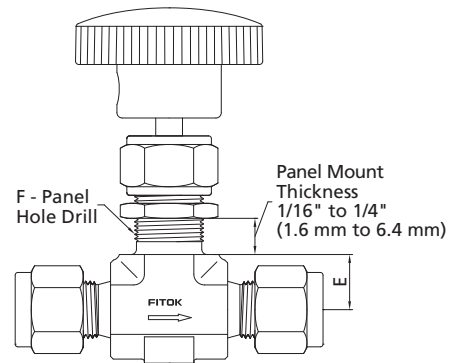
## Dimensions of NGH Series

Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)				
	Inlet	Outlet			L1	L2	C	D	H
NGH□□-FNS8-9-L	1/2 Female NPT	1/2 Female NPT	0.39 (10.0)	1.80	1.56 (39.7)	1.56 (39.7)	0.76 (19.4)	3.50 (88.9)	3.37 (85.7)
NGH□□-NS12-9-L	3/4 Male NPT	3/4 Male NPT			1.63 (41.3)	1.63 (41.3)	0.89 (22.5)		
NGH□□-FL8-9-L	1/2" FITOK	1/2" FITOK			1.90 (48.3)	1.90 (48.3)	0.76 (19.4)		
NGH□□-FL12-9-L	3/4" FITOK	3/4" FITOK							
NGH□□-ML14-9-L	14 mm FITOK	14 mm FITOK							

1. Connection type of "FITOK" means FITOK double ferrule tube fittings. When the connection type of valves is FITOK double ferrule tube fitting, the working pressures of the valves are related to the wall thickness of tubing applied. For specific working pressure of the valves, please refer to the allowable working pressures in FITOK Catalog Tubing.
2. Connection type of "UMB" means rotatable metric tube butt weld.
3. Sizes and types listed are standard. Other sizes and types are available upon request. For details, please contact FITOK Group or our authorized distributors.
4. Dimensions are shown with FITOK tube fitting nuts finger-tight. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

## Panel Mount Dimensions of NGH Series

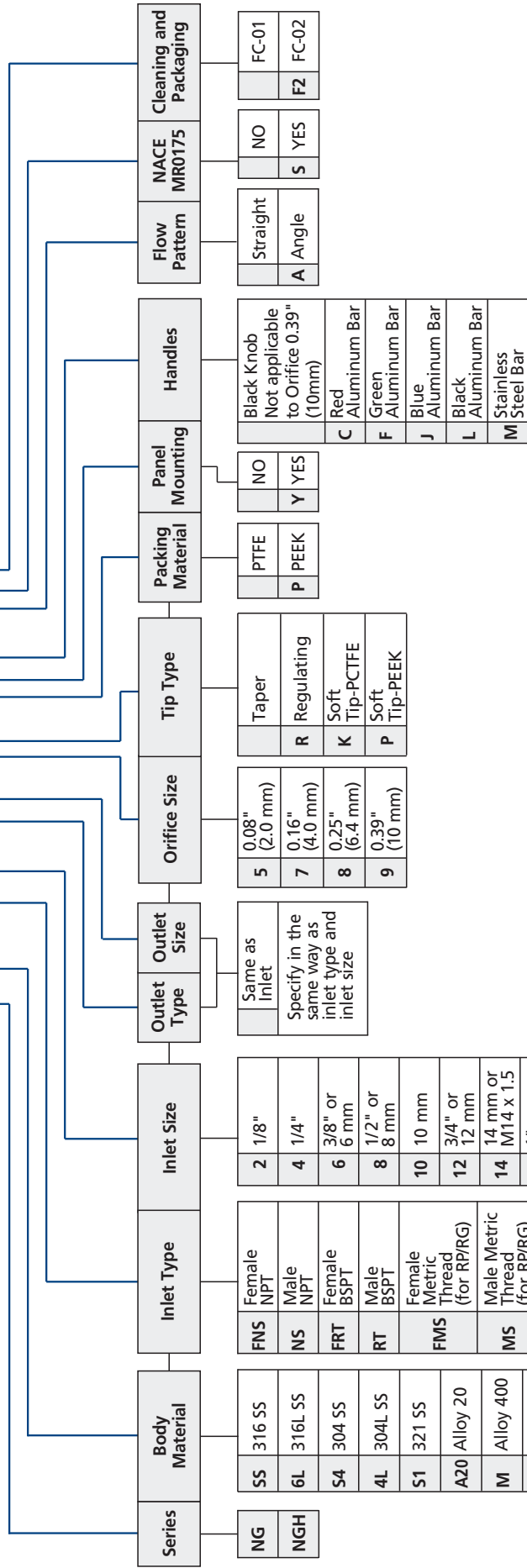
Orifice in.(mm)	Dimensions, in.(mm)	
	E	F
0.08 (2.0)	0.44 (11.2)	0.47 (11.9)
0.16 (4.0)	0.44 (11.2)	0.53 (13.5)
0.25 (6.4)	0.50 (12.7)	0.78 (19.8)
0.39 (10.0)	0.75 (19.1)	1.03 (26.2)



1. NGH Series Needle Valves are standard without panel mounting.
2. To order needle valves with panel mounting as illustrated, add -Y to the ordering number. Example: NGHSS-NS2-5-Y

# Ordering Number Description

NGS4 - FNS8 - FL8 - 9P - PYM - ASF2



NOTE: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

- Standard thread pitch for metric threads are as follows:  
 M10 and below: 1 mm  
 M12 to M24: 1.5 mm  
 M27 and above: 2 mm  
 Standard thread pitch should be omitted in the ordering number, others should be specified.  
 For Orifice 0.39" (10 mm) needle valves, the option of black knob handle is unavailable.  
 If handle designator is void, a black anodized Aluminum bar handle should be equipped.
- Cleaning and Packaging:  
 FC-01: Standard cleaning and packaging for general industrial procedures.  
 FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.

# Rising Plug Valves

## NR Series

## NRG (with gauge port) Series

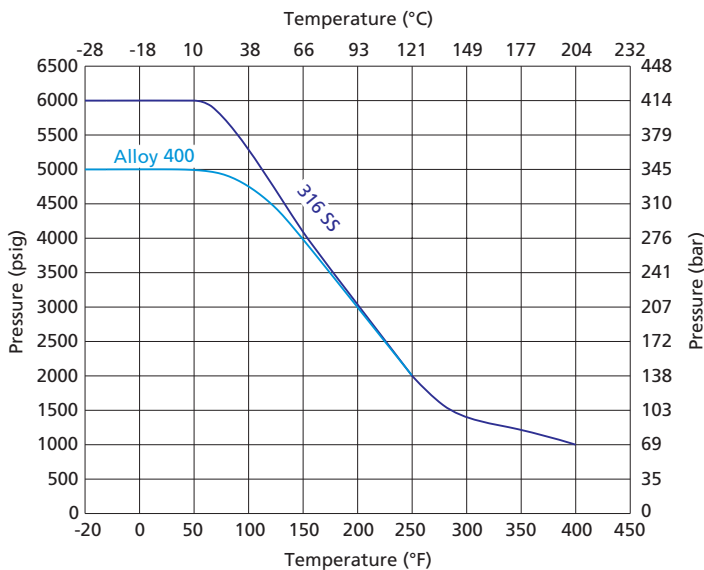
### Features

- ⦿ Cold drawn square bar as body material
- ⦿ Nonrotating stem for longer seat life
- ⦿ Roddable, straight through flow path for maximum flow with minimum pressure drop
- ⦿ Stem thread lubricant isolated from system media
- ⦿ Replaceable seat and stem tip design
- ⦿ Stem thread protected from outside contamination by PTFE ring in the gland
- ⦿ Panel mounting available
- ⦿ Handles of different colors available
- ⦿ Every valve leak tested with Nitrogen or compressed air at the maximum allowable working pressure
- ⦿ Working pressure up to:
  - Stainless steel: 6000 psig (414 bar)
  - Alloy 400: 5000 psig (345 bar)
- ⦿ Working temperature with seat:
  - Acetal: -20°F to 250°F (-28°C to 121°C)
  - PEEK: -20°F to 450°F (-28°C to 232°C)
- ⦿ Working temperature with O-ring:
  - Fluorocarbon Rubber (FKM): -20°F to 400°F (-28°C to 204°C)
  - Nitrile Butadiene Rubber (NBR): -20°F to 212°F (-28°C to 100°C)
  - Ethylene Propylene Diene Rubber (EPDM): -20°F to 300°F (-28°C to 148°C)

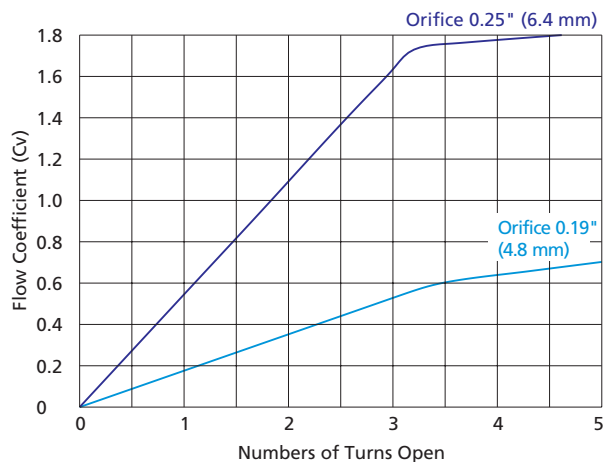


Needle Valves  
Metering Valves

### Pressure vs. Temperature

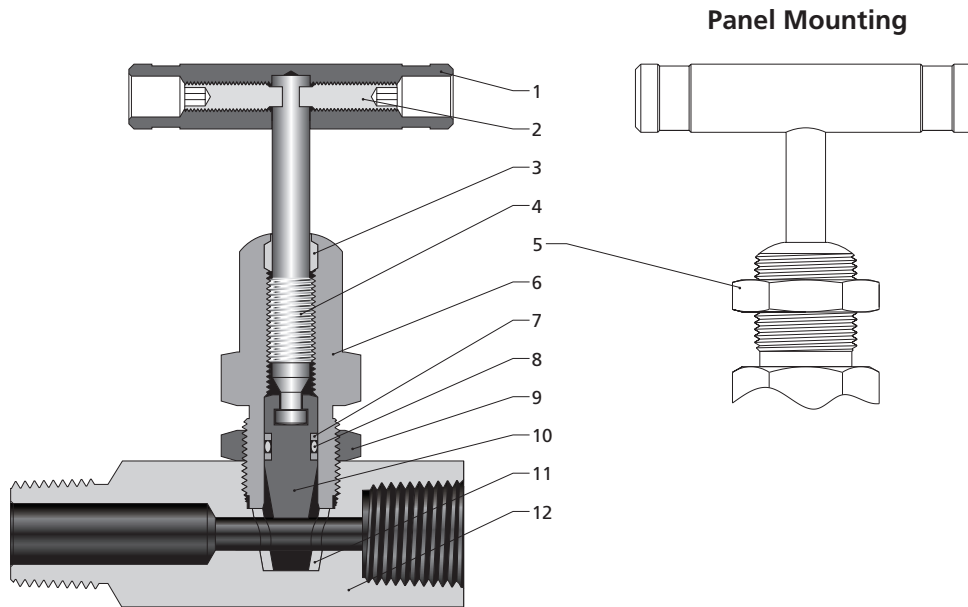


### Flow Data at 100°F (38°C)



1. Graphs are based on PEEK seat and Fluorocarbon(FKM) O-ring.
2. Contact FITOK Group or our authorized distributors for curve graph of other materials.

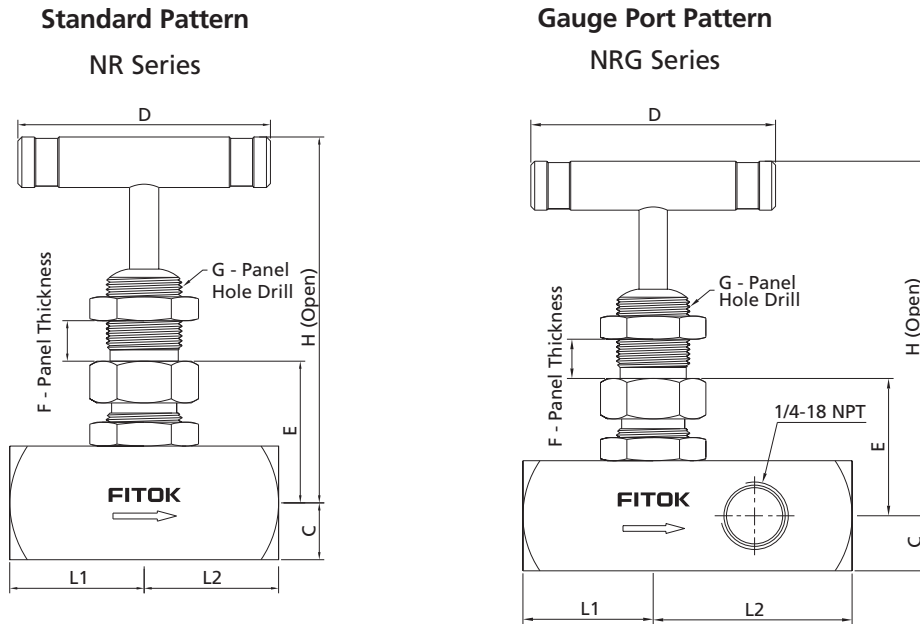
## Standard Materials of Construction



Item	Component	Valve Body Material			
		316 SS	304 SS	321 SS	Alloy 400
		Material Grade/ASTM Specification			
1	Handle	Anodized aluminum or stainless steel or black knob			
2	Set Screw	Galvanized carbon steel			
3	Wiper Ring	PTFE/D1710			
4	Upper Stem	316 SS/A479			Alloy 400/B164
5	Panel Nut	Stainless steel			
6	Bonnet	316 SS/A479	304 SS/A479	321 SS/A479	Alloy 400/B164
7	Backup Ring	PTFE/D1710			
8	O-ring	Fluorocarbon Rubber (FKM), Nitrile Butadiene Rubber (NBR) or Ethylene Propylene Diene Rubber (EPDM)			
9	Lock Nut	Stainless steel			
10	Stem Tip	316 SS/A276	304 SS/A276	321 SS/A276	Alloy 400/B164
11	Seat	Acetal or PEEK			
12	Body	316 SS/A479	304 SS/A479	321 SS/A479	Alloy 400/B164
	Lubricant	Molybdenum disulfide-based			

Note: Contact FITOK Group or our authorized distributors for other materials.

## Dimensions



© NR Series Needle Valves are standard without panel mounting. To order needle valves with panel mounting as illustrated, add -Y to the ordering number. Example: NRSS-FNS4-7-Y

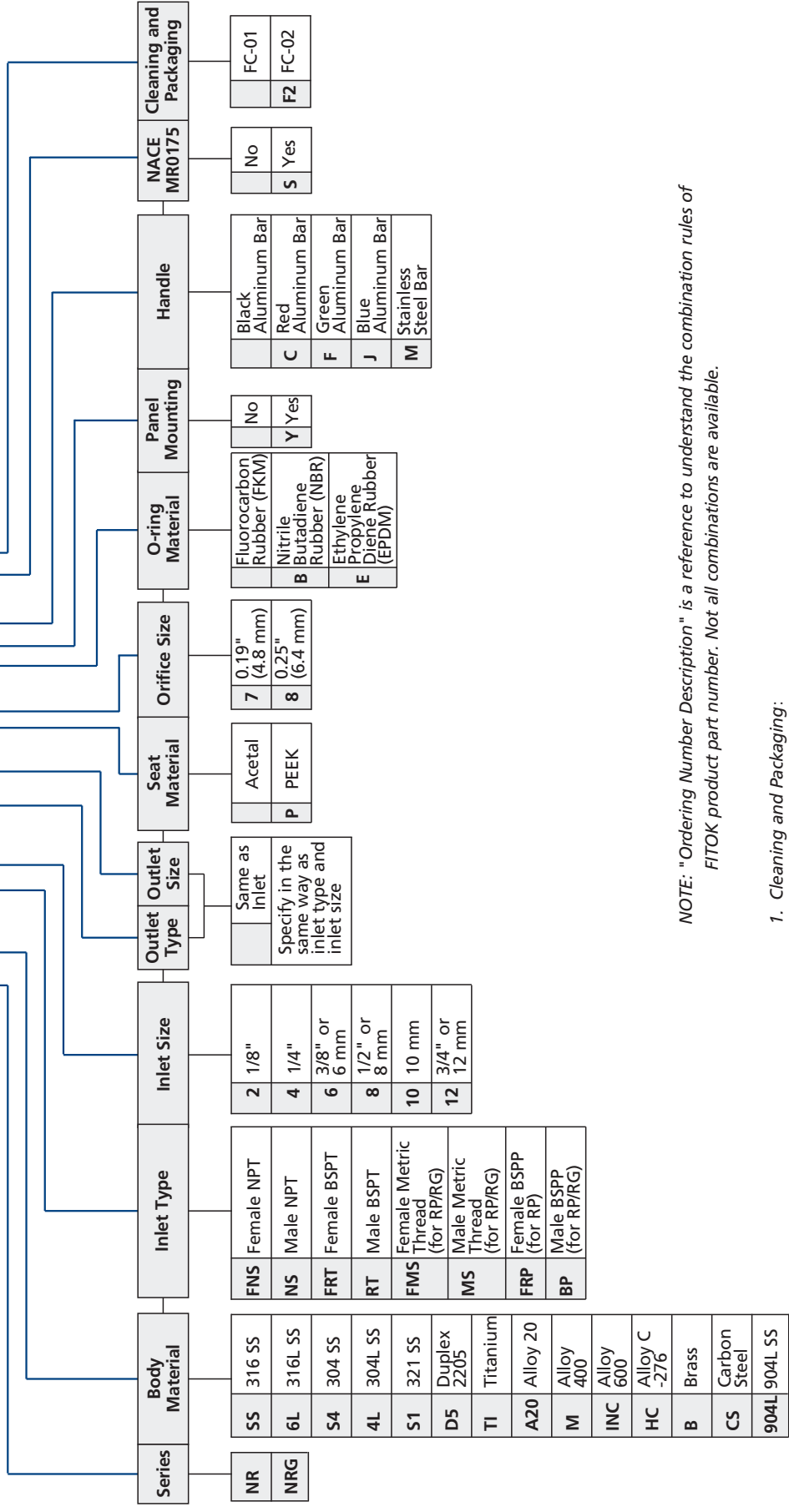
### Dimensions of NR and NRG Series

Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)							
	Inlet	Outlet			L1	L2	C	D	E	F	G	H
NR □□-FNS4-7	1/4 Female NPT	1/4 Female NPT	0.19 (4.8)	0.63	1.12 (28.4)	1.12 (28.4)	0.44 (11.1)	2.17 (55.0)	1.28 (32.5)	0.38 (9.7)	0.77 (19.6)	3.77 (95.8)
NR □□-NS4-FNS4-7	1/4 Male NPT	1/4 Female NPT			1.78 (45.2)		0.50 (12.7)					
NR □□-NS8-FNS4-7	1/2 Male NPT	1/4 Female NPT			1.89 (48.0)							
NRG □□-FNS4-7	1/4 Female NPT	1/4 Female NPT			1.12 (28.4)	1.75 (44.4)						
NRG □□-NS8-FNS4-7	1/2 Male NPT	1/4 Female NPT			3.12 (79.2)							
NR □□-FNS8-8	1/2 Female NPT	1/2 Female NPT	0.25 (6.4)	1.80	1.33 (33.8)	1.33 (33.8)	0.56 (14.3)	2.50 (63.5)	1.40 (35.5)	0.38 (9.7)	0.77 (19.6)	3.83 (97.3)
NR □□-NS8-FNS8-8	1/2 Male NPT	1/2 Female NPT			2.16 (54.9)							
NR □□-NS12-FNS8-8	3/4 Male NPT	1/2 Female NPT			3.33 (84.6)							
NRG □□-FNS8-8	1/2 Female NPT	1/2 Female NPT			2.25 (57.2)							
NRG □□-NS12-FNS8-8	3/4 Male NPT	1/2 Female NPT										

1. Sizes and types listed are standard. Other sizes and types are available upon request.
2. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

# Ordering Number Description

NRSS - NS8 - FNS8 - P8 - BYM - SF2



NOTE: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

1. Cleaning and Packaging:  
 FC-01: Standard cleaning and packaging for general industrial procedures.  
 FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.

# Toggle Valves

## NT Series

### Features

- ⦿ One piece forged body
- ⦿ Straight and angle patterns
- ⦿ Compact design
- ⦿ Quick opening or closing
- ⦿ Nonrotating stem
- ⦿ Panel mounting available
- ⦿ Every valve leak tested with Nitrogen or compressed air at the maximum allowable working pressure
- ⦿ Working pressure up to: 300 psig (20.7 bar)

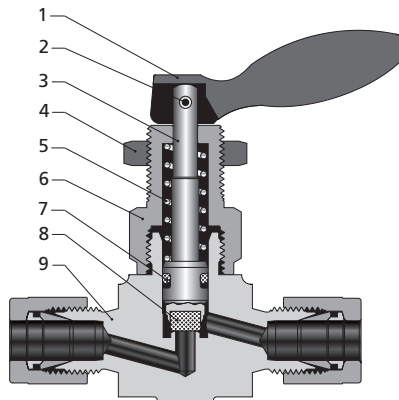


### Technical Data

Orifice in. (mm)	Working Pressure at 100°F (38°C) psig (bar)
0.08 (2.0)	300 (20.7)
0.125 (3.2)	
0.25 (6.4)	200 (13.8)

O-ring Material	Temperature Rating
Fluorocarbon Rubber (FKM)	-20°F to 400°F (-28°C to 204°C)
Nitrile Butadiene Rubber (NBR)	-20°F to 212°F (-28°C to 100°C)
Ethylene Propylene Diene Rubber (EPDM)	-20°F to 300°F (-28°C to 148°C)

### Standard Materials of Construction

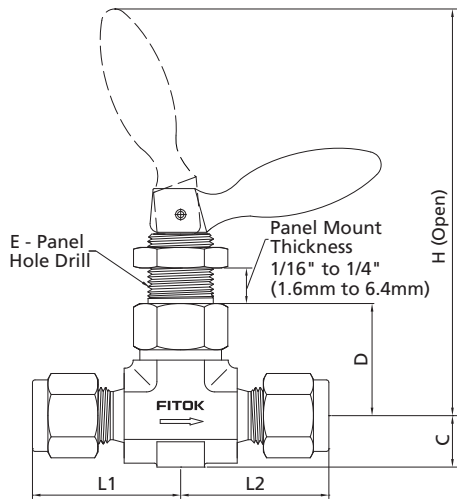


Item	Component	Valve Body Material			
		316 SS	304 SS	321 SS	Brass
		<b>Material Grade/ASTM Specification</b>			
1	Handle	Stainless steel			
2	Pin	Stainless steel			
3	Stem	316 SS/A276	304 SS/A276		316 SS/A276
4	Panel Nut	Stainless steel			Brass C36000/B16
5	Spring	S17700/A313			
6	Bonnet	304 SS/A276			Brass C36000/B16
7	O-ring	Fluorocarbon Rubber (FKM), Nitrile Butadiene Rubber (NBR) or Ethylene Propylene Diene Rubber (EPDM)			
8	Stem Tip	PTFE/D1710			
9	Body	316 SS/A182	304 SS/A182	321 SS/A182	Brass C37700/B283
	Lubricant	Molybdenum disulfide-based			

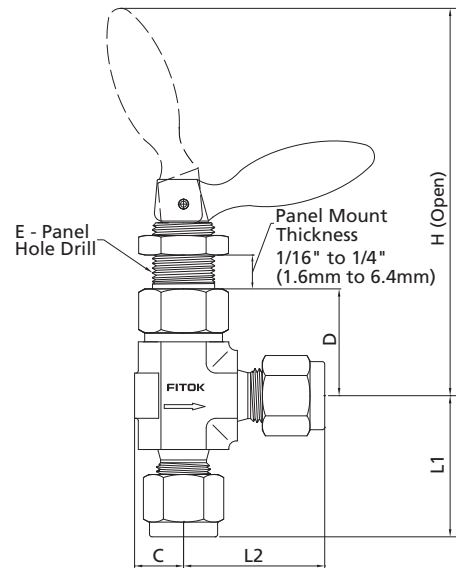
Note: Contact FITOK Group or our authorized distributors for other materials.

## Dimensions

Straight Pattern



Angle Pattern



### Dimensions of NT series

Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)					
	Inlet	Outlet			L1	L2	C	D	E	H
NT□□-NS2-5	1/8 Male NPT	1/8 Male NPT	0.08 (2.0)	0.11	0.75 (19.05)	0.75 (19.05)	0.32 (8.2)	0.85 (21.7)	0.53 (13.5)	2.83 (71.9)
NT□□-NS2-FL2-5	1/8 Male NPT	1/8" FITOK			0.75 (19.05)	0.98 (25.0)				
NT□□-FL2-5	1/8" FITOK	1/8" FITOK			0.98 (25.0)	0.98 (25.0)				
NT□□-ML3-5	3 mm FITOK	3 mm FITOK								
NT□□-FNS2-7	1/8 Female NPT	1/8 Female NPT	0.125 (3.2)	0.20	0.81 (20.6)	0.81 (20.6)	0.39 (10.0)	0.85 (21.7)	0.53 (13.5)	2.83 (71.9)
NT□□-NS2-7	1/8 Male NPT	1/8 Male NPT			0.86 (21.8)	0.86 (21.8)				
NT□□-NS4-7	1/4 Male NPT	1/4 Male NPT			0.98 (25.0)	0.98 (25.0)				
NT□□-NS4-FL4-7	1/4 Male NPT	1/4" FITOK			0.98 (25.0)	1.13 (28.7)				
NT□□-FL4-7	1/4" FITOK	1/4" FITOK			1.13 (28.7)					
NT□□-ML6-7	6 mm FITOK	6 mm FITOK								
NT□□-ML8-7	8 mm FITOK	8 mm FITOK								
NT□□-FNS4-8	1/4 Female NPT	1/4 Female NPT			0.25 (6.4)	0.70				
NT□□-FNS6-8	3/8 Female NPT	3/8 Female NPT	1.12 (28.4)	1.12 (28.4)						
NT□□-NS6-8	3/8 Male NPT	3/8 Male NPT	1.29 (32.8)	1.29 (32.8)						
NT□□-FL6-8	3/8" FITOK	3/8" FITOK	1.40 (35.6)	1.40 (35.6)						
NT□□-FL8-8	1/2" FITOK	1/2" FITOK	1.36 (34.5)	1.36 (34.5)						
NT□□-ML10-8	10 mm FITOK	10 mm FITOK	1.46 (37.1)	1.46 (37.1)						
NT□□-ML12-8	12 mm FITOK	12 mm FITOK								

1. Connection type of "FITOK" means FITOK double ferrule tube fittings.
2. Sizes and types listed are standard. Other sizes and types are available upon request. For details, please contact FITOK Group or our authorized distributors.
3. Dimensions are shown with FITOK tube fitting nuts finger-tight. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.



# Pneumatic Actuators

## Features

- Valve and actuator are fully assembled and every valve leak tested with Nitrogen or compressed air at the maximum allowable working pressure
- Opens and closes quickly and reliably
- Rotatable actuator port allows easy installation

## Actuation Modes

- Normally closed—air opens, spring closes
- Normally open—air closes, spring opens
- Double acting—air opens and closes

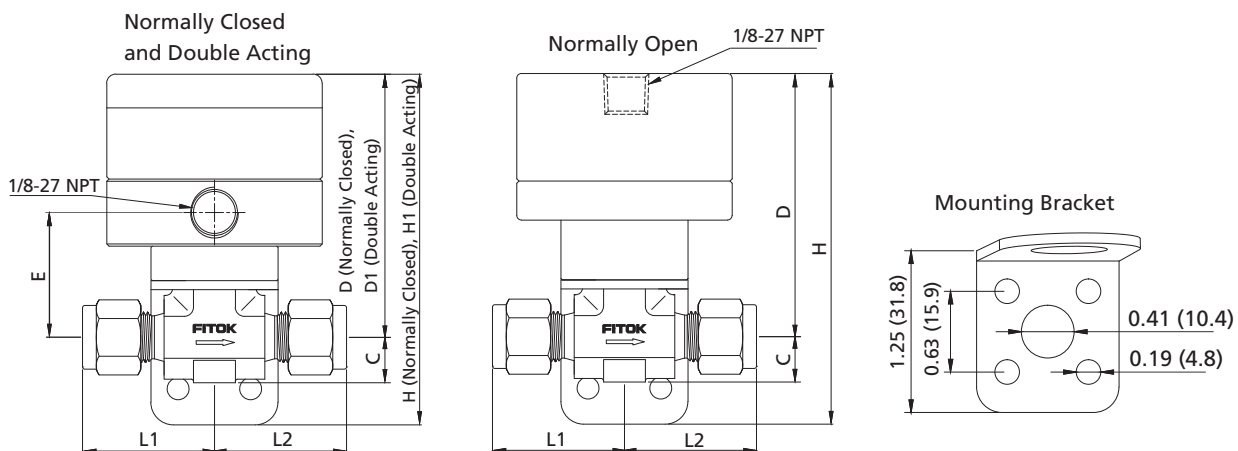
## Technical Data

Actuator Type	Working Pressure at 100°F (38°C) psig (bar)	Actuator Pressure Rating psig (bar)
Normally closed	300 (20.7)	87 (6)
Normally open	450 (31.0)	
Double acting		

Component	Material
	Material Grade/ASTM Specification
Housing	Anodized aluminum
Spring	S17700/A313
Mounting Bracket	304SS/A240
Stem Tip	Normally open, normally closed—PTFE/D1710, double acting—PCTFE/D1430

Please refer to NT Series "Standard Materials of Construction" for other materials.

## Dimensions



Normally Closed and  
Double Acting



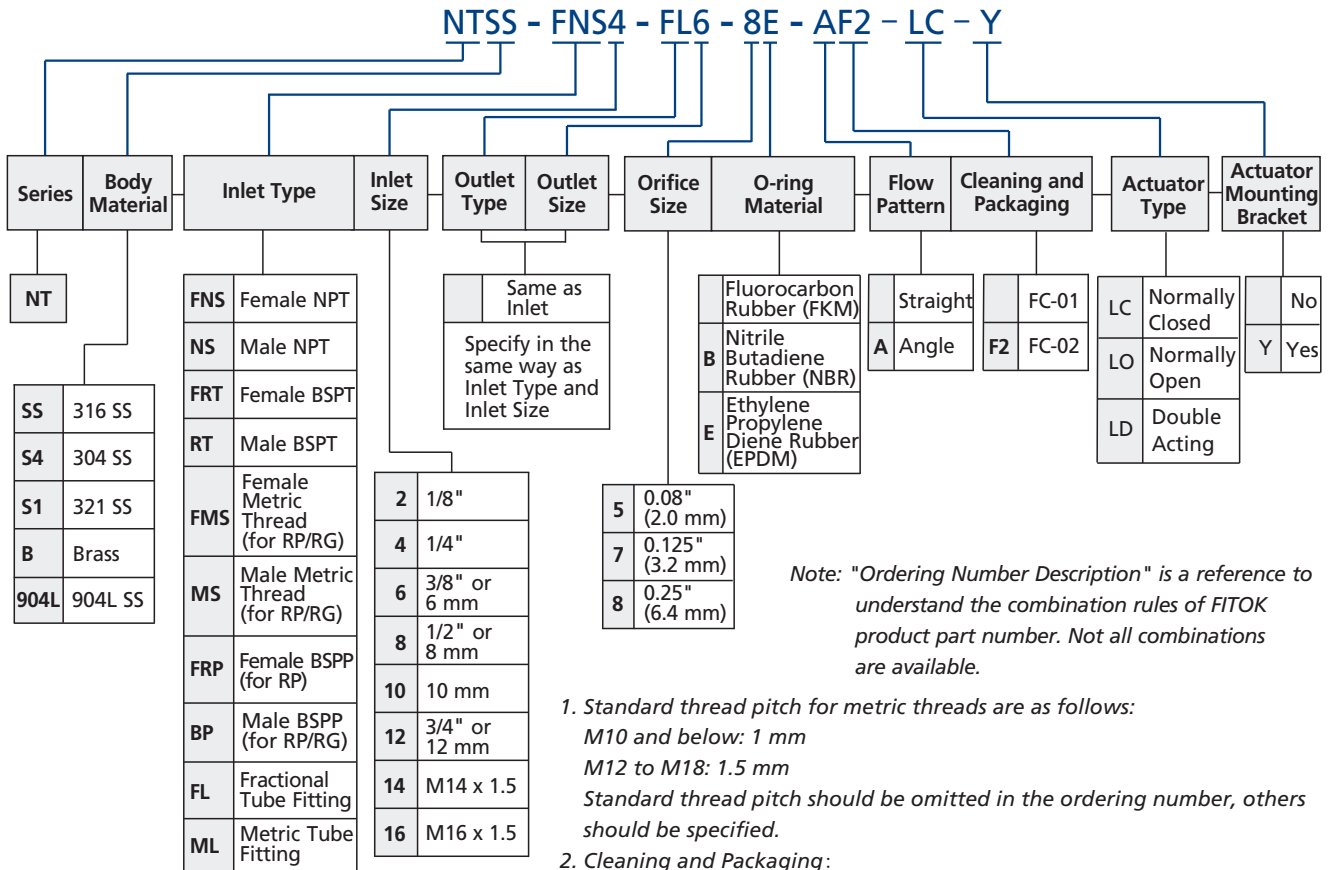
Normally Open



Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)							
	Inlet	Outlet			L1	L2	C	D	D1	H	H1	E
NT□□-NS2-5-LC-Y	1/8 Male NPT	1/8 Male NPT	0.08 (2.0)	0.11	0.86 (21.8)	0.86 (21.8)						
NT□□-NS2-FL2-5-LC-Y	1/8 Male NPT	1/8" FITOK			0.86 (21.8)	1.03 (26.2)						
NT□□-FL2-5-LC-Y	1/8" FITOK	1/8" FITOK			1.03 (26.2)	1.03 (26.2)						
NT□□-ML3-5-LC-Y	3 mm FITOK	3 mm FITOK	0.125 (3.2)	0.20	0.81 (20.6)	0.81 (20.6)	0.39 (10.0)	2.28 (58)	2.46 (62.5)	3.04 (77.3)	3.22 (81.8)	1.08 (27.5)
NT□□-FNS2-7-LC-Y	1/8 Female NPT	1/8 Female NPT			0.86 (21.8)	0.86 (21.8)						
NT□□-NS2-7-LC-Y	1/8 Male NPT	1/8 Male NPT			0.98 (25.0)	0.98 (25.0)						
NT□□-NS4-7-LC-Y	1/4 Male NPT	1/4 Male NPT			0.98 (25.0)	1.13 (28.7)						
NT□□-NS4-FL4-7-LC-Y	1/4 Male NPT	1/4" FITOK			1.13 (28.7)							
NT□□-FL4-7-LC-Y	1/4" FITOK	1/4" FITOK										
NT□□-ML6-7-LC-Y	6 mm FITOK	6 mm FITOK										
NT□□-ML8-7-LC-Y	8 mm FITOK	8 mm FITOK										

1. Connection type of "FITOK" means FITOK double ferrule tube fittings.
2. Sizes and types listed are standard. Other sizes and types are available upon request. For details, please contact FITOK Group or our authorized distributors.
3. Dimensions are shown with FITOK tube fitting nuts finger-tight. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

## Ordering Number Description



1. Standard thread pitch for metric threads are as follows:  
 M10 and below: 1 mm  
 M12 to M18: 1.5 mm  
 Standard thread pitch should be omitted in the ordering number, others should be specified.
2. Cleaning and Packaging:  
 FC-01: Standard cleaning and packaging for general industrial procedures.  
 FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.

# Union Bonnet Needle Valves

**NU Series: Working pressure up to 6000 psig**

**NUH Series: Working pressure up to 10000 psig**

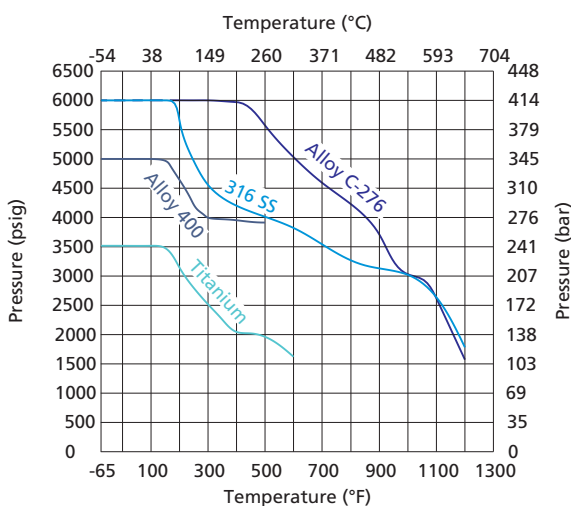
## Features

- ⦿ One-piece forged body
- ⦿ Two-piece stem design: Upper stem threads cold rolled and lower stem hardened for high strength and smooth operation
- ⦿ Accidental valve disassembly disabled by union bonnet construction
- ⦿ Upper stem thread lubricant isolated from system media
- ⦿ Linear instead of rotary movement of the rising, non-rotating stem minimizes packing abrasion and reduces the friction between the seat and the tip
- ⦿ Safety back seating seal in fully open position
- ⦿ Panel mounting available
- ⦿ Steady and durable fastening of the handle by double lock-pins
- ⦿ Handles of different colors available
- ⦿ Every valve leak tested with Nitrogen or compressed air (NU Series) at the maximum allowable working pressure or with water (NUH Series) at 1.1 times the maximum allowable pressure
- ⦿ Working pressure up to:
  - NU Series—Stainless steel: 6000 psig (414 bar)
  - Alloy C-276: 6000 psig (414 bar)
  - Alloy 400: 5000 psig (345 bar)
  - Titanium: 3500 psig (241 bar)
  - NUH Series—Stainless steel: 10000 psig (690 bar)
- ⦿ Working temperature:
  - PTFE: -65°F to 450°F (-54°C to 232°C)
  - PEEK: -65°F to 500°F (-54°C to 260°C)
  - Graphite: -65°F to 1200°F (-54°C to 649°C)

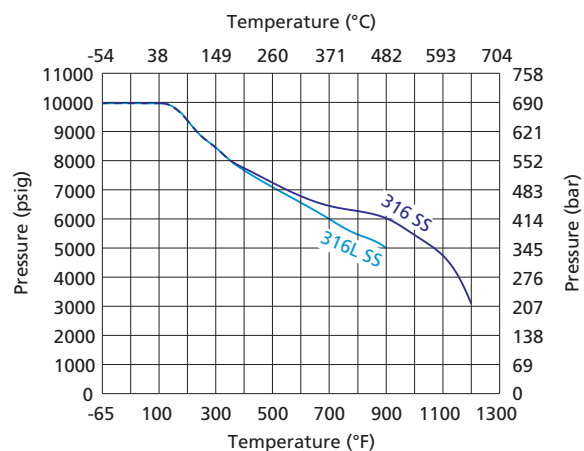


## Pressure vs. Temperature

### NU Series



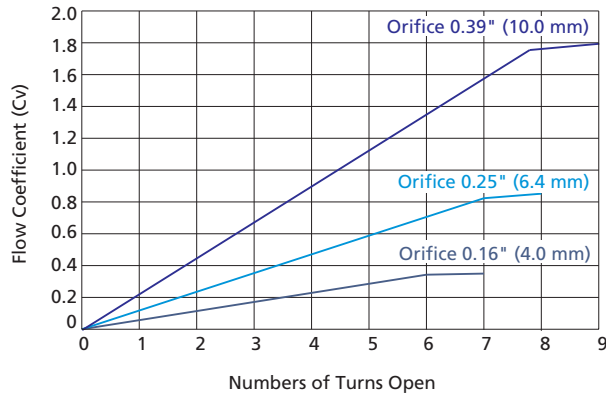
### NUH Series



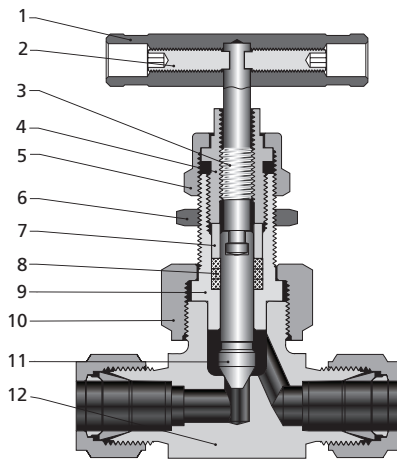
1. Graphs are based on graphite packing.
2. Soft tips are for NU Series only. Temperature rating is limited to 200°F (93°C) max. with PCTFE stem tip (soft tip).
3. Contact FITOK Group or our authorized distributors for curve graph of other materials.

## Flow Data at 100°F (37°C)

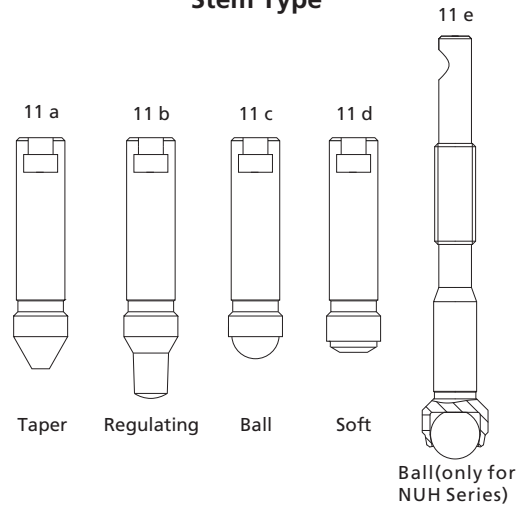
Regulating Stem



## Standard Materials of Construction



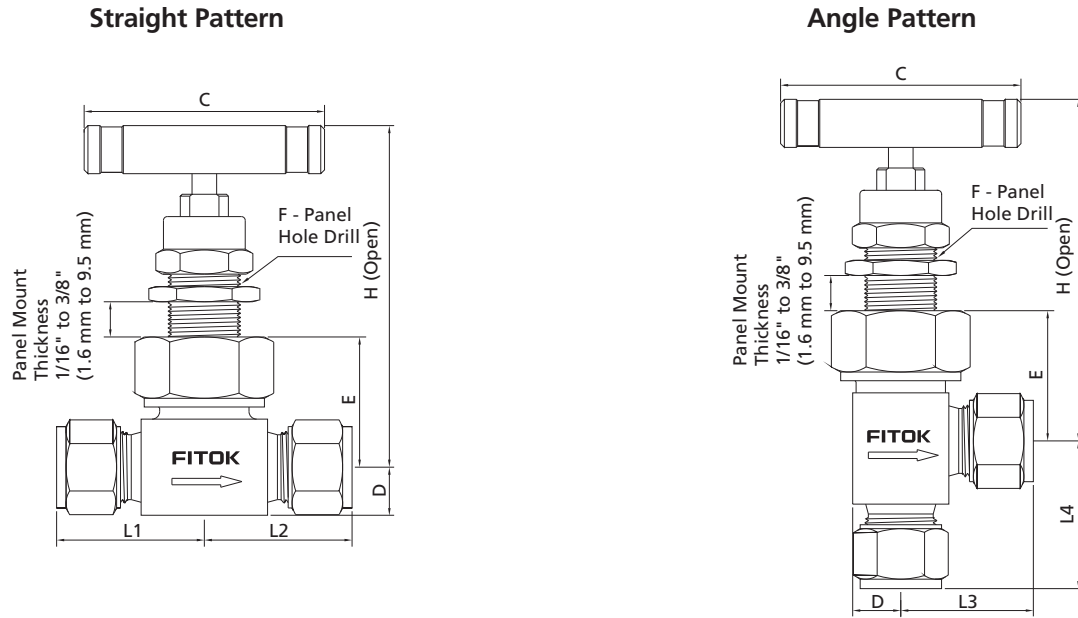
### Stem Type



Item	Component	Valve Body Material			
		316 SS	Alloy 400	Titanium	Alloy C-276
Material Grade/ASTM Specification					
1	Handle	Anodized aluminium or stainless steel or black knob			
2	Set Screw	Galvanized carbon steel			
3	Upper Stem	316 SS/A276			
4	Packing Bolt	304 SS/A276			
5	Lock Nut	316 SS/A276			
6	Panel Nut	Stainless steel			
7	Gland	316 SS/A276			
8	Packing	PTFE or PEEK or graphite			
9	Bonnet	316 SS/A479	Alloy 400/B164	Titanium Gr 4/B348	Alloy C-276/B574
10	Union Nut	316 SS/A276			
11a 11b 11c 11d 11e	Lower Stem	Hardened 316 SS/A276	Alloy 400/B164	Titanium Gr 4/B348	Alloy C-276/B574
12	Body	316 SS/A182	Alloy 400/B164, B127, B564	Titanium Gr 4/B348 or titanium Gr 4/B381	Alloy C-276/B564
	Seat	Same as Body			
	Lubricant	Molybdenum disulfide-based			

Note: Contact FITOK Group or our authorized distributors for other materials.

## Dimensions



### Dimensions of NU Series

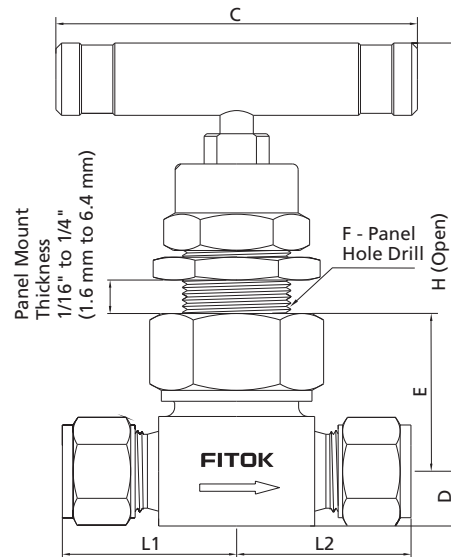
Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)																
	Inlet	Outlet			L1	L2	L3	L4	C	D	E	F	H								
NU□□-FNS2-7	1/8 Female NPT	1/8 Female NPT	0.16 (4.0)	0.35	1.00 (25.4)	1.00 (25.4)	0.89 (22.6)	1.00 (25.4)	1.75 (44.5)	0.39 (9.9)	1.09 (27.7)	0.59 (15.0)	3.06 (77.7)								
NU□□-FNS4-7	1/4 Female NPT	1/4 Female NPT			1.03 (26.2)	1.03 (26.2)															
NU□□-NS4-FNS4-7	1/4 Male NPT	1/4 Female NPT			1.00 (25.4)	1.03 (26.2)															
NU□□-NS4-7	1/4 Male NPT	1/4 Male NPT			1.00 (25.4)	1.00 (25.4)	1.00 (25.4)														
NU□□-NS6-7	3/8 Male NPT	3/8 Male NPT			1.03 (26.2)	1.03 (26.2)	0.89 (22.6)							1.22 (30.9)							
NU□□-FRP4-7	1/4 Female BSPP	1/4 Female BSPP			1.00 (25.4)	1.22 (30.9)															
NU□□-NS4-FL4-7	1/4 Male NPT	1/4" FITOK			1.03 (26.2)	1.22 (30.9)	1.14 (29.0)							1.22 (30.9)							
NU□□-FNS4-FL4-7	1/4 Female NPT	1/4" FITOK			1.03 (26.2)	1.22 (30.9)	1.14 (29.0)														
NU□□-FL4-7	1/4" FITOK	1/4" FITOK			1.22 (30.9)	1.22 (30.9)	1.15 (29.2)							1.22 (30.9)							
NU□□-ML6-7	6 mm FITOK	6 mm FITOK			1.00 (25.4)	1.00 (25.4)	0.85 (21.6)							1.00 (25.4)							
NU□□-ML8-7	8 mm FITOK	8 mm FITOK			1.03 (26.2)	1.03 (26.2)	1.10 (28.0)							1.10 (28.0)							
NU□□-TS4-7-G	1/4" TS	1/4" TS			0.25 (6.4)	0.8	1.13 (28.6)							1.13 (28.6)	1.00 (25.4)	2.50 (63.5)	0.50 (12.7)	1.34 (34.0)	0.78 (19.8)	3.78 (96.0)	
NU□□-FNS4-8	1/4 Female NPT	1/4 Female NPT													1.13 (28.6)						1.13 (28.6)
NU□□-FNS6-8	3/8 Female NPT	3/8 Female NPT													1.06 (26.9)						1.13 (28.6)
NU□□-NS6-8	3/8 Male NPT	3/8 Male NPT	1.41 (35.9)	1.41 (35.9)			1.28 (32.5)	1.47 (37.3)													
NU□□-FL6-8	3/8" FITOK	3/8" FITOK	1.52 (38.6)	1.52 (38.6)			1.40 (35.6)	1.58 (40.1)													
NU□□-FL8-8	1/2" FITOK	1/2" FITOK	1.42 (36.1)	1.42 (36.1)			1.30 (33.0)	1.48 (37.6)													
NU□□-ML10-8	10 mm FITOK	10 mm FITOK																			

Dimensions of NU Series

Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)											
	Inlet	Outlet			L1	L2	L3	L4	C	D	E	F	H			
NU □□-ML12-8	12 mm FITOK	12 mm FITOK	0.25 (6.4)	0.86	1.52 (38.6)	1.52 (38.6)	1.40 (35.6)	1.58 (40.1)	2.50 (63.5)	0.50 (12.7)	1.34 (34.0)	0.78 (19.8)	3.78 (96.0)			
NU □□-ML14-8	14 mm FITOK	14 mm FITOK														
NU □□-ML16-8	16 mm FITOK	16 mm FITOK														
NU □□-TS6-8-G	3/8" TS	3/8" TS														
NU □□-TS8-8-G	1/2" TS	1/2" TS														
NU □□-PS4-8-G	1/4 PS	1/4 PS														
NU □□-MTS12-8-G	12 mm MTS	12 mm MTS			1.13 (28.6)	1.13 (28.6)	1.00 (25.4)	1.13 (28.6)	2.50 (63.5)	0.50 (12.7)	1.34 (34.0)	0.78 (19.8)	3.78 (96.0)			
NU □□-MTS14-8-G	14 mm MTS	14 mm MTS														
NU □□-MTS16-8-G	16 mm MTS	16 mm MTS														
NU □□-MTB14-8-G	14 mm MTB	14 mm MTB														
NU □□-MTB16-8-G	16 mm MTB	16 mm MTB														
NU □□-UMB14-8	14 mm UMB	14 mm UMB														
NU □□-FO8-8	1/2" Male FO	1/2" Male FO			2.92 (74.1)	2.92 (74.1)	2.55 (64.7)	2.92 (74.1)	2.50 (63.5)	0.50 (12.7)	1.34 (34.0)	0.78 (19.8)	3.78 (96.0)			
NU □□-FR8-8	1/2" Male FR	1/2" Male FR			1.13 (28.6)	1.13 (28.6)	—	—								
NU □□-MS20-8	M20 x 1.5 Male Metric	M20 x 1.5 Male Metric			1.56 (39.6)	1.56 (39.6)	—	—						0.63 (16.0)	1.46 (37.1)	3.90 (99.0)
NU □□-MS22-8	M22 x 1.5 Male Metric	M22 x 1.5 Male Metric			1.50 (38.1)	1.50 (38.1)	1.13 (28.6)	1.50 (38.1)	3.50 (88.9)	0.63 (16.0)	1.82 (46.2)	1.03 (26.2)	4.76 (121)			
NU □□-NS8-9	1/2 Male NPT	1/2 Male NPT														
NU □□-FNS8-9	1/2 Female NPT	1/2 Female NPT			1.56 (39.6)	1.56 (39.6)	1.56 (39.6)	1.56 (39.6)								
NU □□-FNS12-9	3/4 Female NPT	3/4 Female NPT			1.63 (41.3)	1.63 (41.3)	—	—						0.87 (22.2)	2.07 (52.6)	5.00 (127)
NU □□-NS12-9	3/4 Male NPT	3/4 Male NPT			1.97 (50.0)	1.97 (50.0)	1.68 (42.7)	2.08 (52.8)								
NU □□-FL8-9	1/2" FITOK	1/2" FITOK														
NU □□-FL12-9	3/4" FITOK	3/4" FITOK														
NU □□-ML14-9	14 mm FITOK	14 mm FITOK														
NU □□-ML16-9	16 mm FITOK	16 mm FITOK														
NU □□-ML18-9	18 mm FITOK	18 mm FITOK														
NU □□-ML20-9	20 mm FITOK	20 mm FITOK	1.56 (39.7)	1.56 (39.7)	1.31 (33.3)	1.69 (42.9)										
NU □□-MTS14-9-G	14 mm MTS	14 mm MTS														
NU □□-MTS16-9-G	16 mm MTS	16 mm MTS														
NU □□-TS8-9-G	1/2" TS	1/2" TS														
NU □□-TS12-9-G	3/4" TS	3/4" TS														
NU □□-MTB16-9-G	16 mm MTB	16 mm MTB														
NU □□-UMB14-9	14 mm UMB	14 mm UMB	2.98 (75.7)	2.98 (75.7)	—	—										
NU □□-FR8-9	1/2" Male FR	1/2" Male FR	1.56 (39.7)	1.56 (39.7)	—	—	3.50 (88.9)	0.63 (16.0)						1.82 (46.2)	1.03 (26.2)	4.76 (121)
NU □□-MS27-9	M27 x 2 Male Metric	M27 x 2 Male Metric														

1. Connection type of "FITOK" means FITOK double ferrule tube fittings. When the connection type of valves is FITOK double ferrule tube fitting, the working pressures of the valves are related to the wall thickness of tubing applied. For specific working pressure of the valves, please refer to the allowable working pressures in FITOK Catalog Tubing.
2. Connection type of "TS" means fractional tube socket weld. "MTS" means metric tube socket weld. "MTB" means metric tube butt weld. "UMB" means rotatable metric tube butt weld. "PS" means pipe socket weld.
4. Sizes and types listed are standard. Other sizes and types are available upon request. For details, please contact FITOK Group or our authorized distributors.
5. Dimensions are shown with FITOK tube fitting nuts finger-tight. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

Needle Valves  
Metering Valves



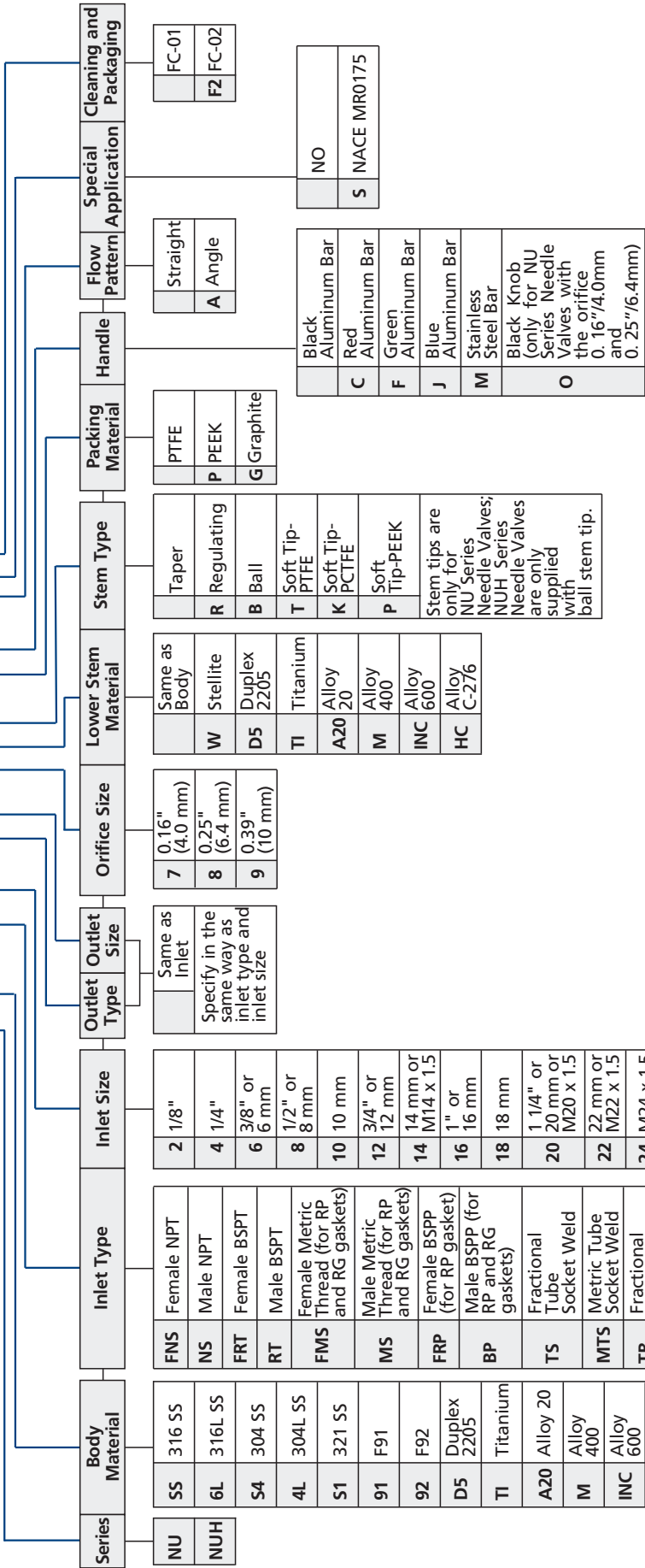
### Dimensions of NUH Series

Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)						
	Inlet	Outlet			L1	L2	C	D	E	F	H
NUH□□-FNS2-7	1/8 Female NPT	1/8 Female NPT	0.16 (4.0)	0.35	1.13 (28.6)	1.13 (28.6)	2.50 (63.5)	0.50 (12.7)	1.34 (34.1)	0.78 (19.8)	3.42 (86.9)
NUH□□-FNS4-7	1/4 Female NPT	1/4 Female NPT									
NUH□□-NS4-FNS4-7	1/4 Male NPT	1/4 Female NPT									
NUH□□-NS4-7	1/4 Male NPT	1/4 Male NPT									
NUH□□-TS4-7-G	1/4" TS	1/4" TS			1.13 (28.6)	1.13 (28.6)					
NUH□□-FNS4-8	1/4 Female NPT	1/4 Female NPT	0.25 (6.4)	0.86	1.56 (39.6)	1.56 (39.6)	3.50 (88.9)	0.63 (16.0)	1.77 (45.0)	1.03 (26.2)	4.09 (104)
NUH□□-NS8-8	1/2 Male NPT	1/2 Male NPT									
NUH□□-TS8-8-G	1/2" TS	1/2" TS									
NUH□□-MTS12-8-G	12 mm MTS	12 mm MTS									

1. Connection type of "TS" means tube socket weld. "MTS" means metric tube socket weld.
2. Sizes and types listed are standard. Other sizes and types are available upon request. For details, please contact FITOK Group or our authorized distributors.
3. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

# Ordering Number Description

## NUSS - FNS6 - FL6 - 8WB - GM - ASF2



Series	Body Material	Inlet Type	Inlet Size	Outlet Type	Outlet Size	Orifice Size	Lower Stem Material	Stem Type	Packing Material	Handle	Flow Pattern	Special Application	Cleaning and Packaging
NU	SS	FNS	2 1/8"	Same as Inlet	7 0.16" (4.0 mm)	Same as Body	Taper	PTFE	Black Aluminum Bar	Straight		FC-01	
NUH	6L	NS	4 1/4"	Specify in the same way as inlet type and inlet size	8 0.25" (6.4 mm)	Stellite	R Regulating	P PEEK	Red Aluminum Bar	A Angle		F2 FC-02	
	S4	FRT	3/8" or 6 mm		9 0.39" (10 mm)	D5 Duplex 2205	B Ball	G Graphite	Green Aluminum Bar				
	4L	RT	1/2" or 8 mm			TI Titanium	T Soft Tip-PTFE		Blue Aluminum Bar				
	S1	FMS	10 10 mm			A20 Alloy 20	K Soft Tip-PTFE		Stainless Steel Bar			NO	
	91	MS	3/4" or 12 mm			M Alloy 400	P Soft Tip-PEEK		Black Knob Series Needle Valves with the orifice 0.16"/4.0mm and 0.25"/6.4mm			S NACE MR0175	
	92	MS	14 mm or 14 mm x 1.5			INC Alloy 600							
	D5	FRP	1" or 16 mm			HC Alloy C-276							
	TI	BP	18 18 mm										
	A20	TS	1 1/4" or 20 mm or M20 x 1.5										
	M	TS	20 mm or M20 x 1.5										
	INC	MTS	22 mm or M22 x 1.5										
	HC	TB	24 M24 x 1.5										
	B	MTB	25 25 mm										
	CS	PS	27 M27 x 2										
	904L	PB	28 28 mm										
		FL											
		ML											
		UFB											
		UMB											
		FO											
		FR											

NOTE: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

- Standard thread pitch for metric threads are as follows:  
M10 and below: 1 mm  
M12 to M24: 1.5 mm  
M27 and above: 2 mm  
Standard thread pitch should be omitted in the ordering number, others should be specified.
- FO means FITOK O-ring face seal fittings.
- FR means FITOK metal gasket face seal fittings.
- Cleaning and Packaging:  
FC-01: Standard cleaning and packaging for general industrial procedures.  
FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.



# Outside Screw and Yoke (OS&Y) Needle Valves

## NY Series: Working pressure up to 6000 psig

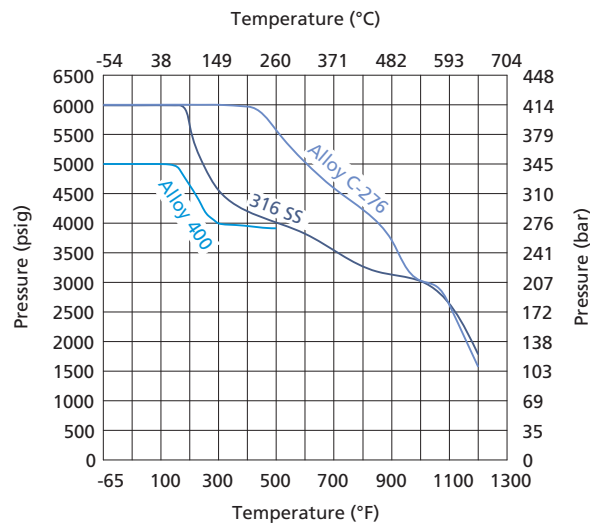
### Features

- ⦿ Cold drawn bar as body
- ⦿ Standard seat diameter 0.16" (4mm). Cv: 0.35 standard
- ⦿ Hardened stem threads prevent galling
- ⦿ Stem threads completely isolated from system media
- ⦿ Linear instead of rotary motion of the rising, non-rotating stem minimizes packing abrasion and reduces the friction between the seat and the tip
- ⦿ Externally adjustable gland, independent of spindle thread
- ⦿ Steady and durable fastening of the handle by double lock-pins
- ⦿ Bottom mounting available
- ⦿ Every valve leak tested with Nitrogen or compressed air at maximum allowable working pressure
- ⦿ Working pressure up to:
  - NY Series—Stainless steel: 6000 psig (414 bar)
  - Alloy C-276: 6000 psig (414 bar)
  - Alloy 400: 5000 psig (345 bar)
- ⦿ Working temperature:
  - PTFE: -65°F to 450°F (-54°C to 232°C)
  - PEEK: -65°F to 500°F (-54°C to 260°C)
  - Graphite: -65°F to 1200°F (-54°C to 649°C)



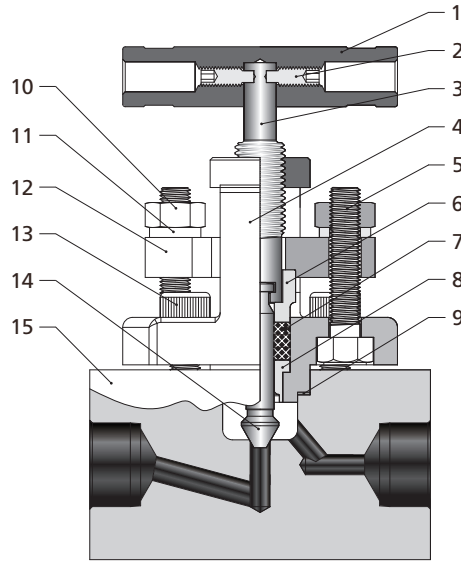
## Pressure vs. Temperature

### NY Series



1. Graphs are based on graphite packing.
2. Contact FITOK Group or our authorized distributors for curve graph of other materials.

## Standard Materials of Construction

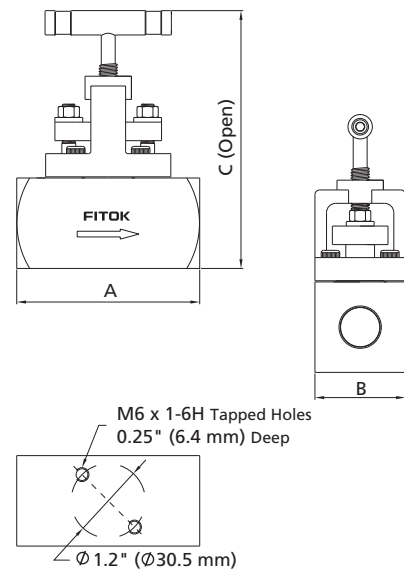


Item	Component	Valve Body Material
		316 SS
		Material Grade/ASTM Specification
1	Handle	Anodized aluminum or stainless steel
2	Set Screw	Galvanized carbon steel
3	Upper Stem	316 SS/A276
4	Yoke	316 SS/A182
5	Bolts	Stainless steel
6	Packing Washer	316 SS/A276
7	Packing	PTFE or PEEK or graphite
8	Packing Washer	316 SS/A276
9	Joint Seal	316 SS/A276
10	Nuts	Stainless steel
11	Gaskets	Stainless steel
12	Gland bridge	316 SS/A182
13	Bolts	Stainless steel
14	Lower Stem	Hardened 316 SS/A276
15	Body	316 SS/A479
	Lubricant	Molybdenum disulfide-based

Note: Contact FITOK Group or our authorized distributors for other materials.

## Dimensions of NY Series

Basic Ordering Number	Connection Type and Size		Orifice in.(mm)	Cv	Dimensions, in.(mm)		
	Inlet	Outlet			A	B	C
NY□□-FNS4	1/4 Female NPT	1/4 Female NPT	0.16 (4.0)	0.35	2.69 (68.2)	1.50 (38.1)	4.04 (102.7)
NY□□-NS4	1/4 Male NPT	1/4 Male NPT			2.95 (75.0)		
NY□□-NS4-FNS4	1/4 Male NPT	1/4 Female NPT			2.72 (69.2)		
NY□□-FNS6	3/8 Female NPT	3/8 Female NPT			2.93 (75.0)		
NY□□-NS6	3/8 Male NPT	3/8 Male NPT			3.00 (76.2)		
NY□□-FNS8	1/2 Female NPT	1/2 Female NPT			3.27 (82.0)		
NY□□-NS8	1/2 Male NPT	1/2 Male NPT			3.00 (76.2)		
NY□□-NS8-FNS8	1/2 Male NPT	1/2 Female NPT			3.00 (76.2)		
NY□□-PS8-G	1/2 PS	1/2 PS			3.54 (89.8)		
NY□□-PB8-G	1/2 PB	1/2 PB			3.44 (87.4)		
NY□□-FL4	1/4" FITOK	1/4" FITOK			3.50 (88.9)		
NY□□-FL6	3/8" FITOK	3/8" FITOK			3.78 (96.0)		
NY□□-FL8	1/2" FITOK	1/2" FITOK			3.44 (87.4)		
NY□□-ML6	6 mm FITOK	6 mm FITOK			3.78 (96.0)		
NY□□-ML8	8 mm FITOK	8 mm FITOK			3.78 (96.0)		
NY□□-ML12	12 mm FITOK	12 mm FITOK					

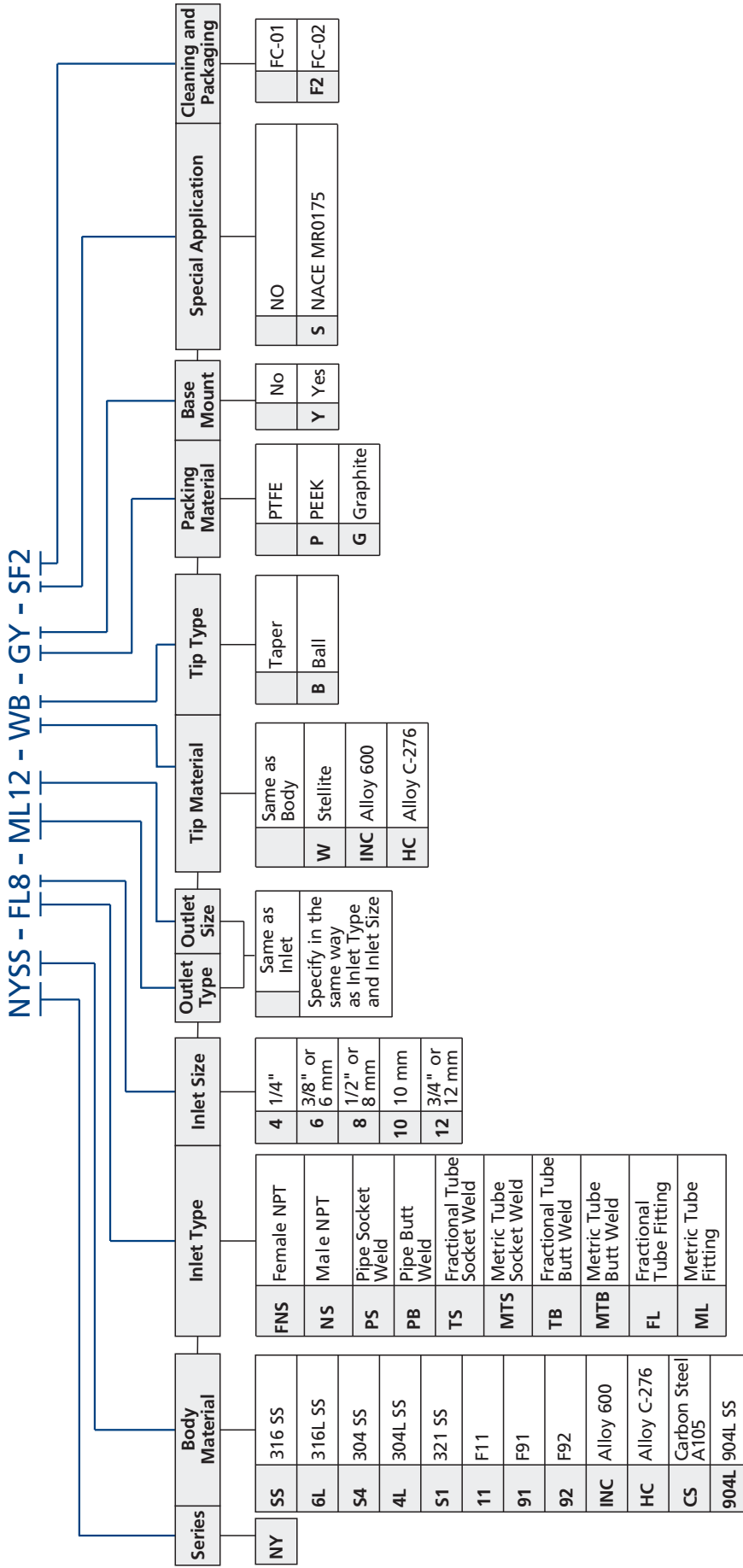


1. Connection type of "FITOK" means FITOK double ferrule tube fittings. When the connection type of valves is FITOK double ferrule tube fitting, the working pressures of the valves are related to the wall thickness of tubing applied. For specific working pressure of the valves, please refer to the allowable working pressures in FITOK Catalog Tubing.
2. Connection type of "PS" means pipe socket weld. "PB" means pipe butt weld.
3. Sizes and types listed are standard. Other sizes and types are available upon request. For details, please contact FITOK Group or our authorized distributors.
4. Dimensions are shown with FITOK tube fitting nuts finger-tight. All dimensions not shown above, please contact FITOK Group or our authorized distributors.

# Ordering Number Description



Needle Valves  
Metering Valves



NOTE: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number.  
Not all combinations are available.

**Cleaning and Packaging:**

FC-01: Standard cleaning and packaging for general industrial procedures.

FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.

# Metering Valves

MS, MV, ML and MH Series



## Features

### MS Series

- ⊙ Working pressure up to: 2000 psig (138 bar)
- ⊙ Working temperature: -10°F to 400°F (-23°C to 204°C)
- ⊙ Orifice size: 0.032" (0.81 mm)
- ⊙ Max. flow coefficient (Cv): 0.004
- ⊙ Stem taper: 1°
- ⊙ Turns to open: 9 to 12
- ⊙ Shutoff service: not available
- ⊙ Variety of end connections
- ⊙ Panel mountable
- ⊙ Flow pattern: straight, angle, cross and double
- ⊙ Handle type: knurled, vernier and slotted
- ⊙ Variety of materials available for valve body



### MV and ML Series

- ⊙ Working pressure up to: 1000 psig (69 bar)
- ⊙ Working temperature: -10°F to 400°F (-23°C to 204°C)
- ⊙ Max. flow coefficients (Cv):
  - MV series: 0.03
  - ML series: 0.15
- ⊙ Orifice sizes:
  - MV series: 0.056" (1.42 mm)
  - ML series: 0.128" (3.25 mm)
- ⊙ Stem taper:
  - MV series: 3°
  - ML series: 6.5°
- ⊙ Turns to open:
  - MV series: 8 to 10
  - ML series: 10 to 11
- ⊙ Shutoff service:
  - MV series: not available
  - ML series: available
- ⊙ Variety of end connections
- ⊙ Panel mountable
- ⊙ Flow pattern: straight, angle, cross (MV Series) and double (MV Series)
- ⊙ Handle type:
  - MV series: knurled, vernier and slotted
  - ML series: round and vernier
- ⊙ Variety of materials available for valve body

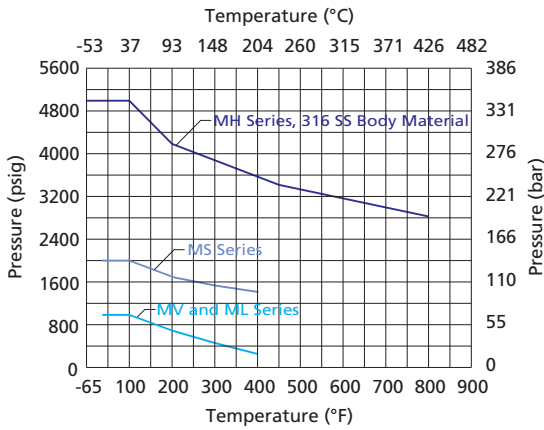


### MH Series

- ⊙ Working pressure up to: 5000 psig (345 bar)
- ⊙ Working temperature: -65°F to 850°F (-54°C to 454°C)
- ⊙ Orifice size: 0.062" (1.6 mm)
- ⊙ Max. flow coefficient (Cv): 0.04
- ⊙ Stem taper: 2°
- ⊙ Shutoff service: available
- ⊙ Variety of end connections
- ⊙ Turns to open: 9 to 10
- ⊙ Panel mountable
- ⊙ Flow pattern: straight and angle
- ⊙ Handle type: round circular and vernier
- ⊙ Variety of materials available for valve body



## Pressure vs. Temperature



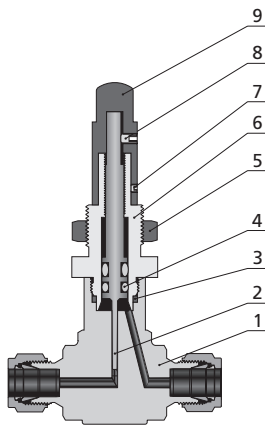
1. Graphs are based on Fluorocarbon and Graphite (for MH Series).
2. Contact FITOK Group or our authorized distributors for curve graph of other materials.

### Temperature Ranges for Different seal Materials

Seal Material	Temperature Range °F (°C)
<b>O-Ring (for MS, MV, ML Series)</b>	
Buna N (NBR)	-10 to 212 (-23 to 100)
Ethylene Propylene (EPDM)	-10 to 300 (-23 to 148)
Fluorocarbon (FKM)	-10 to 400 (-23 to 204)
Kalrez (FFKM)	-10 to 527 (-23 to 275)
Neoprene (CR)	-10 to 250 (-23 to 121)
<b>Stem Packing (for MH Series)</b>	
PTFE	-65 to 450 (-54 to 232)
Graphite	-65 to 850 (-54 to 454)

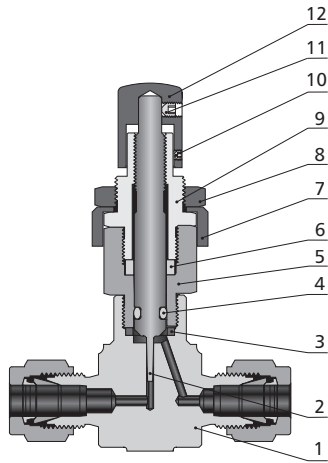
## Standard Materials of Construction

### MS Series



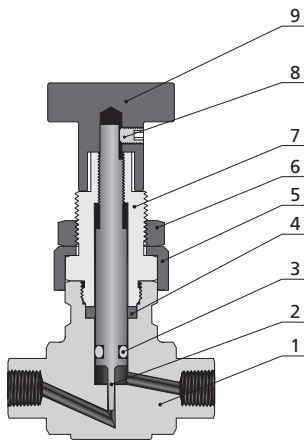
Component		Valve Body Material Grade/ASTM Specification	
		316 SS	Brass
1	Body	316 SS/A182	Silver-mist chrome-plated C37700/B283
2	Stem	316 SS/A479	
3	Body Seal	Fluorocarbon FKM	
4	O-ring	Fluorocarbon FKM	
5	Panel Mount Nut	Stainless steel	Silver-mist chrome-plated C36000/B16
6	Bonnet	316 SS/A479	Silver-mist chrome-plated C36000/B16
7	Lock Screw	Stainless steel	
8	Handle Screw	Stainless steel	
9	Handle	316 SS/A276	Silver-mist chrome-plated C36000/B16

MV Series



Component		Valve Body Material Grade/ASTM Specification	
		316 SS	Brass
1	Body	316 SS/A182	Silver-mist chrome-plated C37700/B283
2	Stem	316 SS/A479	
3	Body Seal	Fluorocarbon FKM	
4	O-ring	Fluorocarbon FKM	
5	Body Extension	316 SS/A479	Silver-mist chrome-plated C36000/B16
6	Stem Guide Ring	PTFE/D1710	
7	Bonnet Sleeve	Stainless steel	
8	Panel Mount Nut	316 SS/A276	Silver-mist chrome-plated C36000/B16
9	Bonnet	316 SS/A479	Silver-mist chrome-plated C36000/B16
10	Lock Screw	Stainless steel	
11	Handle Screw	Stainless steel	
12	Handle	316 SS/A276	Silver-mist chrome-plated C36000/B16

ML Series



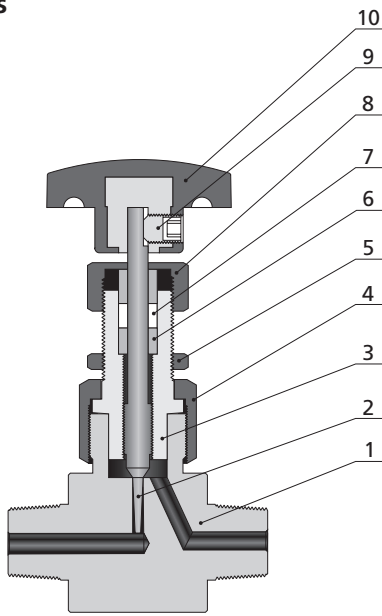
Component		Valve Body Material Grade/ASTM Specification	
		316 SS	Brass
1	Body	316 SS/A182	Silver-mist chrome-plated C37700/B283
2	Stem	Hardened 316 SS/A479	
3	O-ring	Fluorocarbon FKM	
4	Stem Guide Ring	PTFE/D1710	
5	Bonnet Sleeve	Stainless steel	
6	Panel Mount Nut	316 SS/A276	Silver-mist chrome-plated C36000/B16
7	Bonnet	316 SS/A479	Silver-mist chrome-plated C36000/B16
8	Handle Screw	Stainless steel	
9	Handle	Anodized aluminium	

1. Lubricants: Silicone-based

2. Contact FITOK Group or our authorized distributors for other materials.



MH Series



Component		Material Grade/ASTM Specification
1	Body	316 SS/A479
2	Stem	440C SS/A276
3	Bonnet	316 SS/A479
4	Union Nut	316 SS/A276
5	Panel Mount Nut	Stainless steel
6	Packing Gland	316 SS/A276
7	Packing	PTFE/D1710
8	Union Nut	316 SS/A276
9	Handle Screw	Stainless steel
10	Handle	Nylon

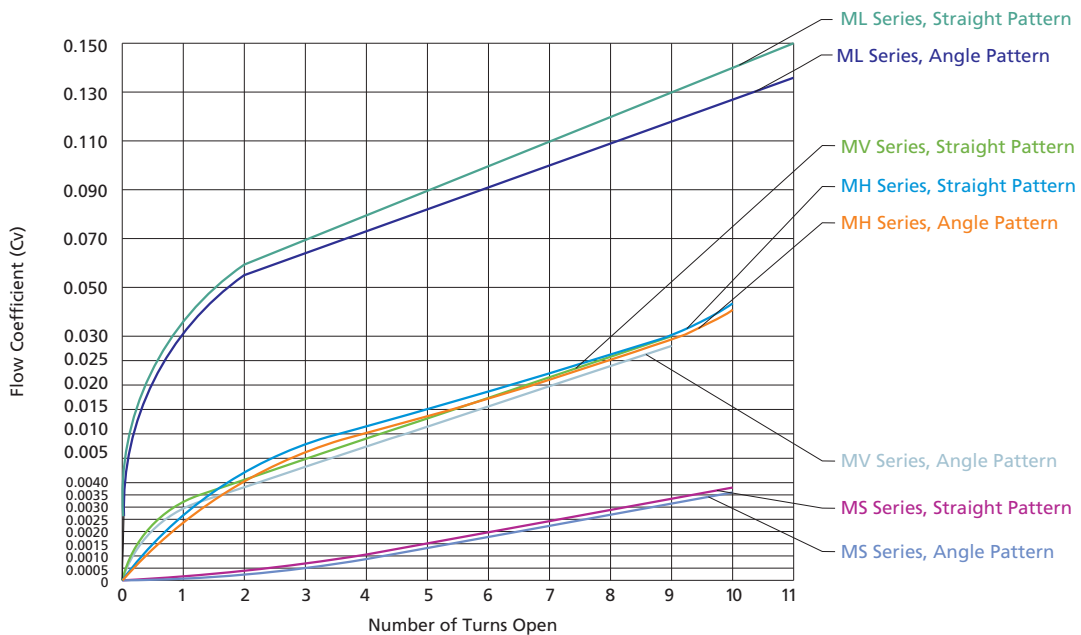
Lubricant: Silicone-based

Needle Valves  
Metering Valves

Flow Data in full open position at 70°F (20°C)

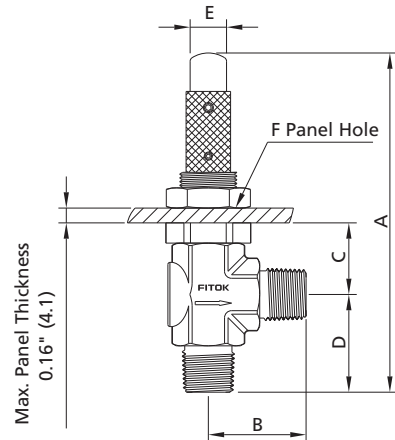
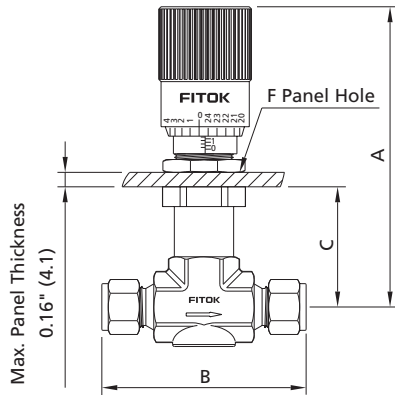
Pressure Drop to Atmosphere psig (bar)	MS Series (CV: 0.004)		MV Series (CV: 0.03)		ML Series (CV: 0.15)		MH Series (CV: 0.04)	
	Air Flow std ft <sup>3</sup> /min (std L/min)	Water Flow U.S. gal/min (L/min)	Air Flow std ft <sup>3</sup> /min (std L/min)	Water Flow U.S. gal/min (L/min)	Air Flow std ft <sup>3</sup> /min (std L/min)	Water Flow U.S. gal/min (L/min)	Air Flow std ft <sup>3</sup> /min (std L/min)	Water Flow U.S. gal/min (L/min)
10 (0.69)	0.04 (1.1)	0.01 (0.03)	0.33 (9.3)	0.09 (0.34)	2.00 (56.6)	0.51 (1.90)	0.45 (12.7)	0.12 (0.45)
50 (3.45)	0.10 (2.8)	0.02 (0.07)	0.90 (25.4)	0.21 (0.79)	6.40 (181)	1.20 (4.50)	1.20 (33.9)	0.28 (1.00)
100 (6.90)	0.20 (5.6)	0.04 (0.15)	1.50 (42.4)	0.30 (1.10)	11.40 (323)	1.70 (6.40)	2.10 (59.4)	0.40 (1.50)

Flow Coefficient at Turns to Open



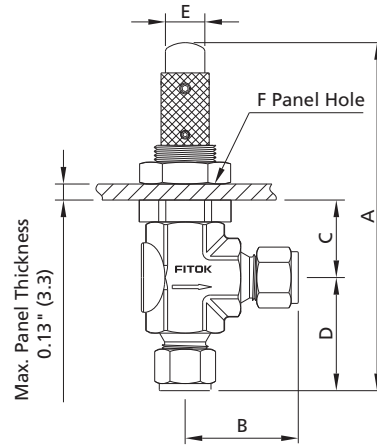
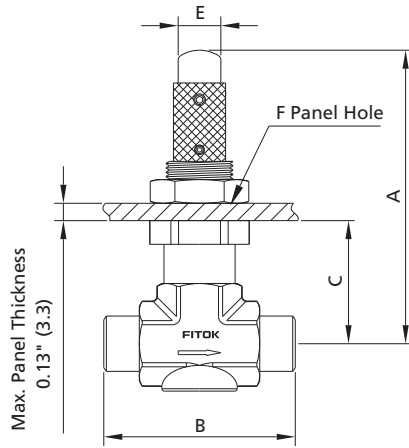
## Dimensions

### MS Series



Basic Ordering Number	Connection Type and Size		Dimensions, in. (mm)					
	Inlet	Outlet	A	B	C	D	E	F
<b>Straight Pattern</b>								
MS□□-FL1-	1/16" FITOK	1/16" FITOK	2.34 (59.4)	1.56 (39.6)	0.92 (23.4)	—	0.38 (9.6)	0.45 (11.4)
MS□□-FL2-	1/8" FITOK	1/8" FITOK		2.04 (51.8)				
MS□□-FL4-	1/4" FITOK	1/4" FITOK						
MS□□-ML3-	3 mm FITOK	3 mm FITOK						
MS□□-ML6-	6 mm FITOK	6 mm FITOK						
MS□□-FR4-	1/4 Male FR	1/4 Male FR	2.06 (52.3)					
<b>Angle Pattern</b>								
MS□□-FL1-	1/16" FITOK	1/16" FITOK	2.96 (75.2)	0.81 (20.6)	0.92 (23.4)	0.81 (20.6)	0.38 (9.6)	0.45 (11.4)
MS□□-FL2-	1/8" FITOK	1/8" FITOK	3.07 (78.0)	0.98 (24.9)		0.98 (24.9)		
MS□□-FL4-	1/4" FITOK	1/4" FITOK	3.11 (79.0)	1.02 (25.9)		1.02 (25.9)		
MS□□-ML3-	3 mm FITOK	3 mm FITOK	3.07 (78.0)	0.98 (24.9)		0.98 (24.9)		
MS□□-FNS2-	1/8 Female NPT	1/8 Female NPT						

MV and ML Series



Basic Ordering Number	Connection Type and Size		Dimensions, in. (mm)					
	Inlet	Outlet	A	B	C	D	E	F

**Straight Pattern**

MV□□-FL2-	1/8" FITOK	1/8" FITOK	2.64 (67.1)	2.02 (51.3)	1.52 (38.5)	—	0.50 (12.7)	0.58 (14.7)
MV□□-FL4-	1/4" FITOK	1/4" FITOK		2.20 (55.9)				
MV□□-ML3-	3 mm FITOK	3 mm FITOK		2.02 (51.3)				
MV□□-ML6-	6 mm FITOK	6 mm FITOK		2.20 (55.9)				
MV□□-NS2-	1/8 Male NPT	1/8 Male NPT		1.60 (40.6)				
MV□□-NS4-	1/4 Male NPT	1/4 Male NPT		1.96 (49.8)				
MV□□-FNS2-	1/8 Female NPT	1/8 Female NPT		1.94 (49.3)				
MV□□-FR4-	1/4 Male FR	1/4 Male FR		2.06 (52.3)				

**Angle Pattern**

MV□□-FL2-	1/8" FITOK	1/8" FITOK	3.65 (92.8)	1.01 (25.7)	1.07 (27.2)	1.01 (25.7)	0.50 (12.7)	0.58 (14.7)
MV□□-FL4-	1/4" FITOK	1/4" FITOK	3.74 (95.0)	1.10 (27.9)		1.10 (27.9)		
MV□□-ML3-	3 mm FITOK	3 mm FITOK	3.65 (92.8)	1.01 (25.7)		1.01 (25.7)		
MV□□-ML6-	6 mm FITOK	6 mm FITOK	3.74 (95.0)	1.10 (27.9)		1.10 (27.9)		
MV□□-NS2-	1/8 Male NPT	1/8 Male NPT	3.44 (87.4)	0.80 (20.3)		0.80 (20.3)		
MV□□-NS4-	1/4 Male NPT	1/4 Male NPT	3.62 (92.0)	0.98 (24.9)		0.98 (24.9)		
MV□□-FNS2-	1/8 Female NPT	1/8 Female NPT	3.61 (91.7)	0.97 (24.6)		0.97 (24.6)		
MV□□-FR4-	1/4 Male FR	1/4 Male FR						

Basic Ordering Number	Connection Type and Size		Dimensions, in. (mm)					
	Inlet	Outlet	A	B	C	D	E	F

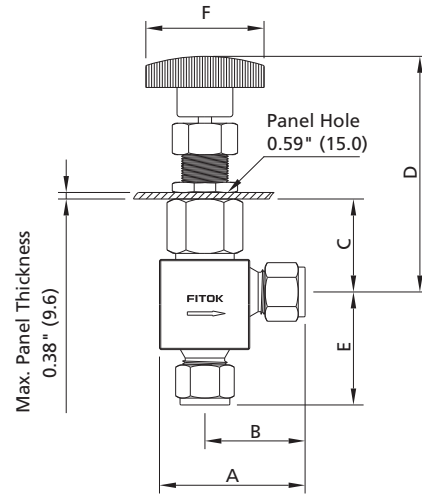
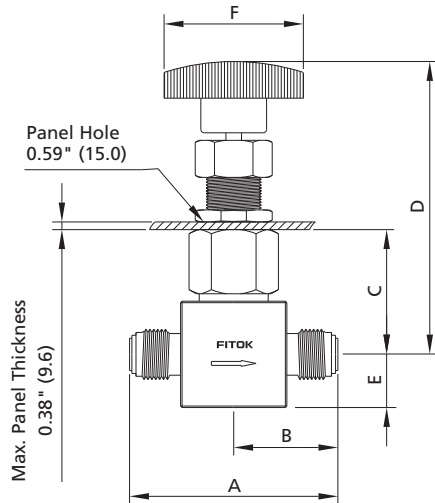
**Straight Pattern**

ML□□-FL4-	1/4" FITOK	1/4" FITOK	2.72 (69.1)	2.34 (59.4)	1.26 (32.0)	—	1.13 (28.7)	0.58 (14.7)
ML□□-FL6-	3/8" FITOK	3/8" FITOK		2.46 (62.5)				
ML□□-ML6-	6 mm FITOK	6 mm FITOK		2.34 (59.4)				
ML□□-NS4-	1/4 Male NPT	1/4 Male NPT		2.00 (50.8)				

**Angle Pattern**

ML□□-FL4-	1/4" FITOK	1/4" FITOK	3.89 (98.8)	1.17 (29.7)	1.26 (32.0)	1.17 (29.7)	1.13 (28.7)	0.58 (14.7)
ML□□-ML6-	6 mm FITOK	6 mm FITOK						

MH Series

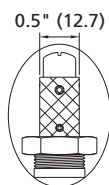


Basic Ordering Number	Connection Type and Size		Dimensions, in. (mm)					
	Inlet	Outlet	A	B	C	D	E	F
<b>Straight Pattern</b>								
MH□□-FL4-	1/4" FITOK	1/4" FITOK	2.40 (61.0)	1.20 (30.5)	1.09 (27.7)	3.86 (98.0)	0.38 (9.6)	1.38 (35.1)
MH□□-ML6-	6 mm FITOK	6 mm FITOK						
MH□□-FNS2-	1/8 Female NPT	1/8 Female NPT	2.00 (50.8)	1.00 (25.4)			0.40 (10.1)	
MH□□-FNS4-	1/4 Female NPT	1/4 Female NPT	2.06 (52.3)	1.03 (26.2)				
<b>Angle Pattern</b>								
MH□□-FL4-	1/4" FITOK	1/4" FITOK	1.54 (39.1)	1.16 (29.5)	1.09 (27.7)	3.86 (98.0)	1.48 (37.6)	1.38 (35.1)
MH□□-ML6-	6 mm FITOK	6 mm FITOK						
MH□□-FNS2-	1/8 Female NPT	1/8 Female NPT	1.28 (32.5)	0.91 (23.1)			1.00 (25.4)	
MH□□-FNS4-	1/4 Female NPT	1/4 Female NPT						

Optional Handles

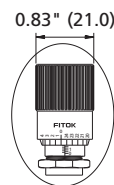
Slotted Handle

- ⦿ Flow setting adjustment is available with a screwdriver
- ⦿ Ideal for installation where handle is difficult to access
- ⦿ Available for MS and MV series



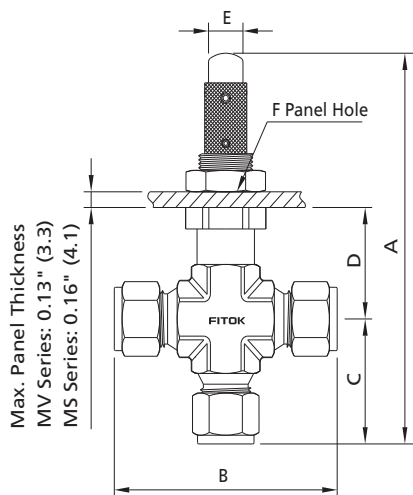
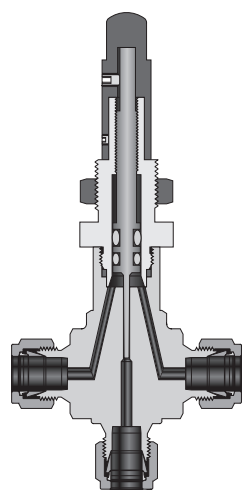
Vernier Handle

- ⦿ Precise graduated aluminum alloy handle
- ⦿ Repeatable flow setting
- ⦿ Adjustment accurate to 1/25 turn (1/1000 of an inch)
- ⦿ Available for all series

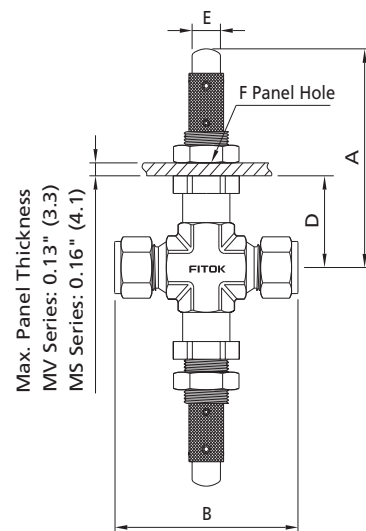
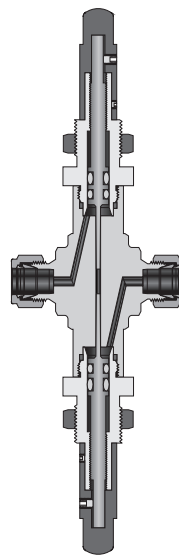


## Optional Patterns

### Cross Pattern



### Double Pattern



1. Fluid flows between side ports around stem in any stem position.
2. Fluid flows through branch port can be metered in both directions.

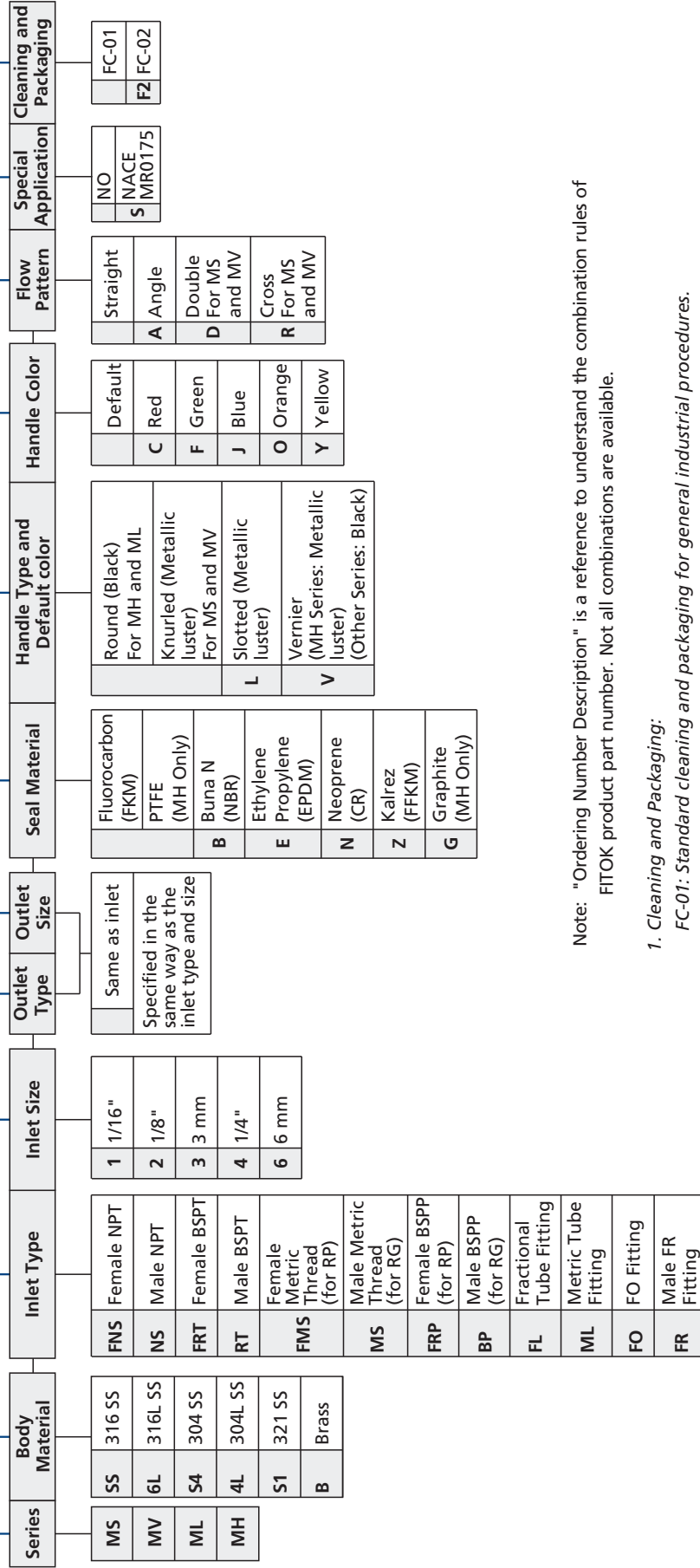
Inlet valve handle can be set and locked at desired maximum flow, outlet valve handle can be used for fine flow control up to the preset maximum of the inlet valve.

Basic Ordering Number	Connection Type and Size		Dimensions, in. (mm)					
	Inlet	Outlet	A	B	C	D	E	F
<b>Cross Pattern</b>								
MS□□-FL2-	1/8" FITOK	1/8" FITOK	3.32 (84.3)	1.96 (49.8)	0.98 (24.9)	0.92 (23.4)	0.38 (9.6)	0.45 (11.4)
MS□□-ML3-	3 mm FITOK	3 mm FITOK						
<b>Double Pattern</b>								
MS□□-FL2-	1/8" FITOK	1/8" FITOK	2.41 (61.2)	1.90 (48.3)	—	0.99 (25.2)	0.38 (9.6)	0.45 (11.4)
MS□□-ML3-	3 mm FITOK	3 mm FITOK						
<b>Cross Pattern</b>								
MV□□-FL4-	1/4" FITOK	1/4" FITOK	3.74 (95.0)	2.20 (55.9)	1.10 (27.9)	1.52 (38.5)	0.50 (12.7)	0.58 (14.7)
MV□□-ML6-	6 mm FITOK	6 mm FITOK						
<b>Double Pattern</b>								
MV□□-FL4-	1/4" FITOK	1/4" FITOK	2.62 (67.1)	2.20 (55.9)	—	1.52 (38.5)	0.50 (12.7)	0.58 (14.7)
MV□□-ML6-	6 mm FITOK	6 mm FITOK						

1. FITOK means FITOK double ferrule tube fittings, FR means metal gasket seal fittings.
2. Sizes and types listed are standard. Other sizes and types are available upon request. For special sizes and types, refer to the ordering information.
3. Dimensions are shown with FITOK nuts finger-tightened. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

# Ordering Number Description

MVSS – FL4 – ML6 – EVJ – ASF2



Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

1. *Cleaning and Packaging:*

FC-01: *Standard cleaning and packaging for general industrial procedures.*

FC-02: *Special cleaning and packaging for wetted system components to ensure compliance with product cleaning requirement of ASTM G93 Level C.*

# Bellows-sealed Valves

Bellows-sealed Valves



B-114

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# Bellows-sealed Valves

SW and SU Series

Bellows-sealed  
Valves





# Contents

Bellows-sealed Valves  
SW Series



B-116

Bellows-sealed Valves  
SU Series



B-120

# Bellows-sealed Valves

## SW Series

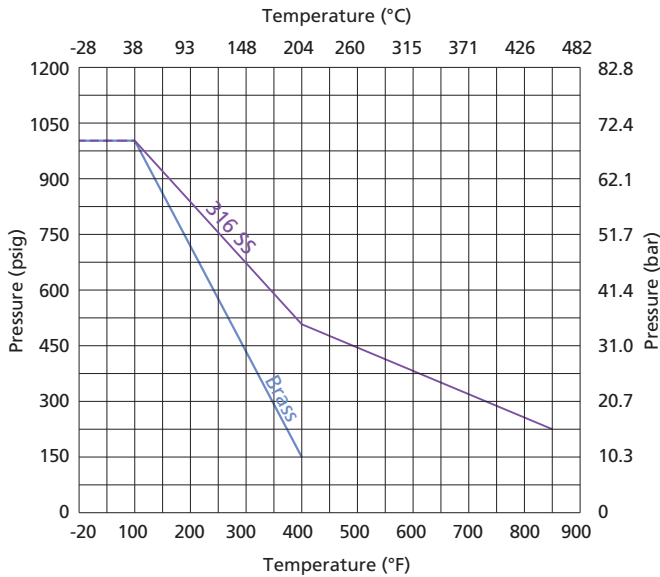
### Features

- ⦿ Working pressure up to: 1000 psig (69.0 bar)
- ⦿ Working temperature: -20°F to 842°F (-28°C to 450°C)
- ⦿ Variety of end connections
- ⦿ Body material: 316 SS, brass
- ⦿ Hydraulic-formed multilayer bellows for longer cycle life
- ⦿ Nonrotating stem tip eliminates galling within the seat area
- ⦿ Externally pressurized bellows design for maximum strength
- ⦿ Strictly controlled bellows stroke to improve safety and cycle life
- ⦿ Replaceable bellows and stem assembly
- ⦿ Regulating, conical and spherical stem tips available
- ⦿ Handle color options are available
- ⦿ Panel and bottom mounting available
- ⦿ Every FITOK bellows-sealed valve leak tested with helium at pressure  $\geq 87$  psig (6 bar) at the seat, envelope and all seals (maximum allowable leak rate:  $4 \times 10^{-9}$  std cm<sup>3</sup>/s)



Bellows-sealed Valves

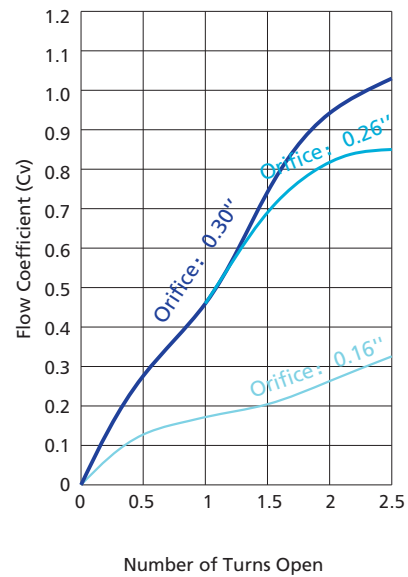
### Pressure vs. Temperature



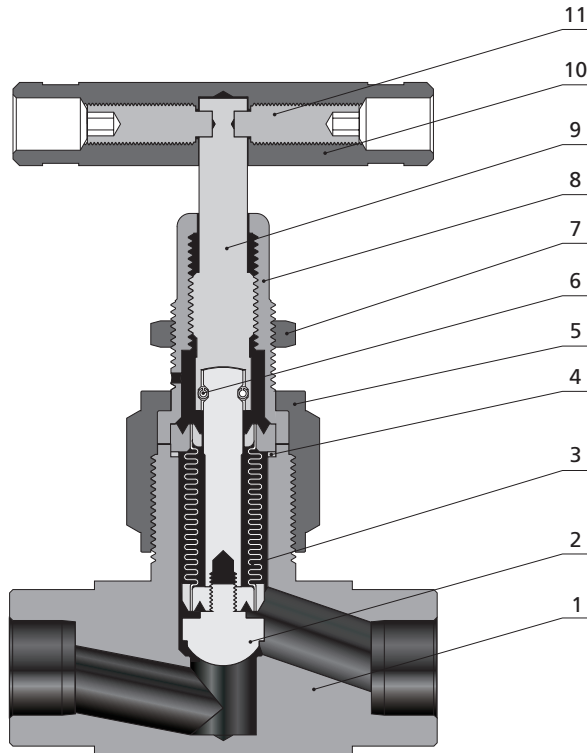
200°F (93°C) max. with PCTFE stem tip (soft tip).

### Flow Coefficient vs. Turns Open

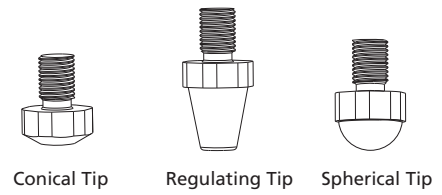
#### Regulating Stem



### Standard Materials of Construction



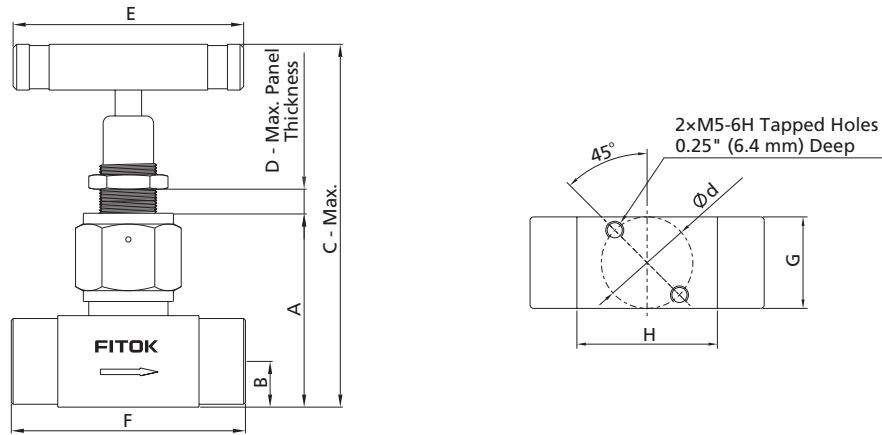
Tip Types



Component		Valve Body Material Grade/ASTM Specification	
		316 SS	Brass
1	Body	316 SS/A182	Brass/B283
2	Stem Tip	316 SS/A479 (regulating)	
		PCTFE/D1430 (conical)	
		Stellite (spherical)	
3	Bellow	316L SS/A240	
	Stem	316 SS/A479	
	Weld Ring	316 SS/A479	
4	Gasket	Silver-plated 316 SS/A269	
5	Bonnet Nut	316 SS/A479	Brass/B16
6	Pin	Stainless steel	
7	Panel Mount Nut	Stainless steel	Brass/B16
8	Bonnet	316 SS/A479	Brass/B16
9	Actuator	304 SS/A479	304 SS/A479
10	Handle	6061/B210 /stainless steel	
11	Set Screws	Galvanized carbon steel	
Wetted Lubricant		Fluorinated-based	
Non-wetted Lubricant		Molybdenum disulfide	

Contact FITOK Group or our authorized distributors for valves of other materials.

## Dimensions



Basic Ordering Number	Connection Type and Size		Orifice in. (mm)	Cv	Dimensions, in. (mm)								
	Inlet	Outlet			A	B	C	D	E	F	G	H	Ød
SW□□-FL4-2-	1/4" FITOK	1/4" FITOK	0.16 (4.1)	0.36	2.16 (54.8)	0.54 (13.7)	4.05 (102.8)	0.39 (10.0)	2.50 (63.5)	2.46 (62.5)	1.00 (25.4)	1.06 (26.9)	1.00 (25.4)
SW□□-FL6-3-	3/8" FITOK	3/8" FITOK	0.26 (6.6)	0.85	2.20 (55.8)	0.54 (13.7)	4.09 (103.8)	0.39 (10.0)	2.50 (63.5)	3.09 (78.5)	1.10 (25.4)	1.57 (39.9)	1.00 (25.4)
SW□□-FL8-5-	1/2" FITOK	1/2" FITOK	0.30 (7.6)	1.20	2.16 (54.8)	0.54 (13.7)	4.05 (102.8)	0.39 (10.0)	2.50 (63.5)	3.30 (83.8)	1.13 (25.4)	1.57 (40.0)	1.00 (25.4)
SW□□-ML6-2-	6 mm FITOK	6 mm FITOK	0.16 (4.1)	0.36	2.16 (54.8)	0.54 (13.7)	4.05 (102.8)	0.39 (10.0)	2.50 (63.5)	2.46 (62.5)	1.00 (25.4)	1.07 (27.1)	1.00 (25.4)
SW□□-ML10-4-	10 mm FITOK	10 mm FITOK	0.28 (7.1)	1.00	2.20 (55.8)	0.54 (13.7)	4.09 (103.8)	0.39 (10.0)	2.50 (63.5)	3.11 (79.0)	1.00 (25.4)	1.57 (39.8)	1.00 (25.4)
SW□□-ML12-5-	12 mm FITOK	12 mm FITOK	0.30 (7.6)	1.20	2.20 (55.8)	0.54 (13.7)	4.09 (103.8)	0.39 (10.0)	2.50 (63.5)	3.30 (83.8)	1.00 (25.4)	1.57 (39.8)	1.00 (25.4)
SW□□-TS4-2-	1/4" TS	1/4" TS	0.16 (4.1)	0.36	2.20 (55.8)	0.54 (13.7)	4.09 (103.8)	0.39 (10.0)	2.50 (63.5)	1.68 (42.7)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)
SW□□-TS6-4-	3/8" TS	3/8" TS	0.28 (7.1)	1.00	2.20 (55.8)	0.54 (13.7)	4.09 (103.8)	0.39 (10.0)	2.50 (63.5)	2.27 (57.7)	1.00 (25.4)	1.51 (38.4)	1.00 (25.4)
SW□□-TS8-5-	1/2" TS	1/2" TS	0.30 (7.6)	1.20	2.20 (55.8)	0.54 (13.7)	4.09 (103.8)	0.39 (10.0)	2.50 (63.5)	2.27 (57.7)	1.00 (25.4)	1.25 (31.7)	1.00 (25.4)
SW□□-TB8-4-	1/2" TB	1/2" TB	0.28 (7.1)	1.00	2.20 (55.8)	0.54 (13.7)	4.09 (103.8)	0.39 (10.0)	2.50 (63.5)	2.27 (57.7)	1.00 (25.4)	1.51 (38.4)	1.00 (25.4)
SW□□-FFR4-2-	1/4" Female FR	1/4" Female FR	0.16 (4.1)	0.36	2.16 (54.8)	0.54 (13.7)	4.05 (102.8)	0.39 (10.0)	2.50 (63.5)	2.76 (70.1)	1.00 (25.4)	1.02 (25.8)	1.00 (25.4)
SW□□-FFR8-5-	1/2" Female FR	1/2" Female FR	0.30 (7.6)	1.20	2.20 (55.8)	0.54 (13.7)	4.09 (103.8)	0.39 (10.0)	2.50 (63.5)	3.12 (79.2)	1.00 (25.4)	1.25 (31.75)	1.00 (25.4)
SW□□-FR4-2-	1/4" Male FR	1/4" Male FR	0.16 (4.1)	0.36	2.16 (54.8)	0.54 (13.7)	4.05 (102.8)	0.39 (10.0)	2.50 (63.5)	2.24 (56.9)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)
SW□□-FR8-5-	1/2" Male FR	1/2" Male FR	0.30 (7.6)	1.20	2.20 (55.8)	0.54 (13.7)	4.09 (103.8)	0.39 (10.0)	2.50 (63.5)	3.00 (76.2)	1.13 (28.7)	1.50 (38.1)	1.00 (25.4)

1. FITOK means FITOK double ferrule tube fittings, FR means metal gasket seal fittings, TS means fractional tube socket weld, TB means fractional tube butt weld.
2. Dimensions are shown with FITOK nuts finger-tightened. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.
3. Sizes and types listed are standard. Other sizes and types are available upon request. For special sizes and types, please contact FITOK Group or our authorized distributors.

# Ordering Number Description

SWSS – FL8 – ML10 – 5 – WR – B – SF2

Series	Body Material	Inlet Type	Inlet Size	Outlet Type	Outlet Size	Orifice Size	Stem Tip Material and Type	Handle	Special Application	Cleaning and Packaging
SW	SS	TS	2 1/8"		Same as Inlet	2 0.16" (4.1 mm)	Stellite Spherical	Green Aluminum Bar	NO	FC-01
	6L	MTS	4 1/4"	Specified in the same way as Inlet type and size		3 0.26" (6.6 mm)	Stainless Steel Regulating	Black Aluminum Bar	S NACE MR0175	F2 FC-02
	S4	TB	6 3/8" or 6 mm			4 0.28" (7.1 mm)	PCTFE Conical	Red Aluminum Bar		
	4L	MTB	8 1/2" or 8 mm			5 0.30" (7.6 mm)	Stellite Regulating	Blue Aluminum Bar		
	B		10 10 mm				Stainless Steel Conical	Stainless Steel Bar		
		PS	12 3/4" or 12 mm				Stellite Conical	Black nylon Knob		Only applicable to valves with orifice size of 0.16" (4.1mm)
		PB	14 14 mm or M14					Toggle handle		Only applicable to valves with orifice size of 0.16" (4.1mm), PCTFE conical tip and max. working pressure up to 100 psig (6.9 bar).
		FL	16 1" or 16 mm							
		ML	18 18 mm							
		UFB	20 20 mm							
		UMB								
		FFR								
		FR								

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

### 1. Cleaning and Packaging:

FC-01: Standard cleaning and packaging for general industrial procedures.

FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.

# Bellows-sealed Valves

## SU Series

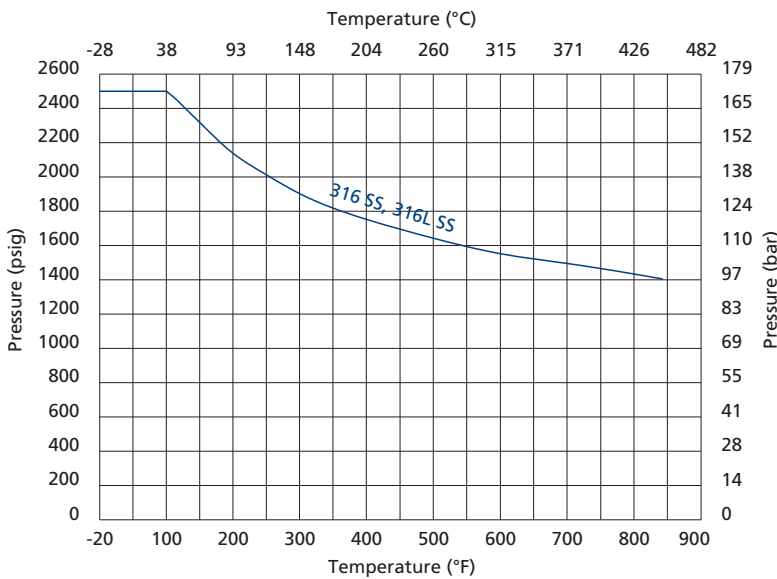
### Features

- ⦿ Working pressure up to: 2500 psig (172 bar)
- ⦿ Working temperature: -20°F to 842°F (-28°C to 450°C)
- ⦿ Variety of end connections
- ⦿ 316 SS body material
- ⦿ Upper packing provides secondary containment system above the bellows
- ⦿ Hydraulic-formed multilayer bellows for longer cycle life
- ⦿ Nonrotating stem tip eliminates galling within the seat area
- ⦿ Strictly controlled bellows stroke to improve safety and cycle life
- ⦿ Replaceable bellows and stem assembly
- ⦿ Regulating, conical, and spherical stem tips available
- ⦿ Panel and bottom mounting available
- ⦿ Double lock-pins enable steady and durable fastening of the handle
- ⦿ Handle color options are available
- ⦿ Every FITOK bellows-sealed valve leak tested with helium at pressure  $\geq 87$  psig (6 bar) at the seat, envelope and all seals (maximum allowable leak rate :  $4 \times 10^{-9}$  std cm<sup>3</sup>/s)



Bellows-sealed Valves

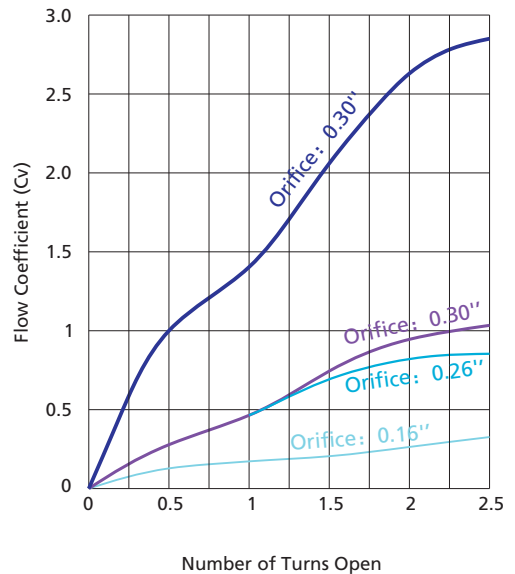
### Pressure vs. Temperature



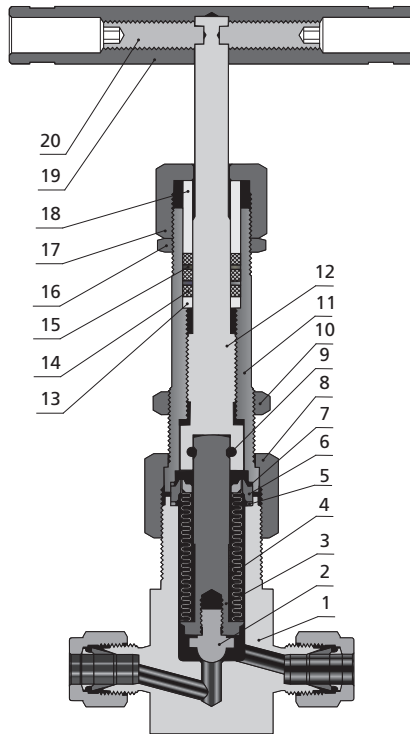
200°F (93°C) max. with PCTFE stem tip (soft tip).

### Flow Coefficient vs. Turns Open

Regulating Stem



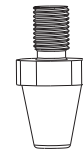
## Standard Materials of Construction



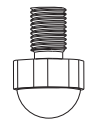
### Tip Types



Conical Tip



Regulating Tip



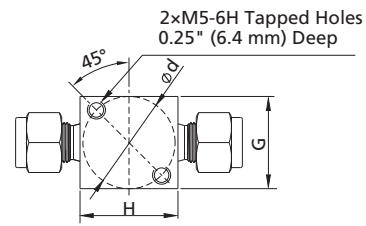
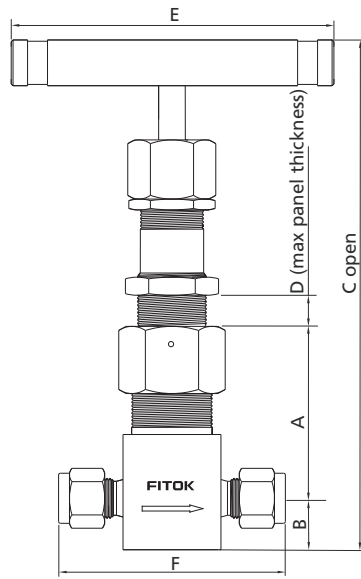
Spherical Tip

Component		Valve Body Material Grade/ASTM Specification
		<b>316 SS</b>
1	Body	316 SS/A182 or A479
2	Stem Tip	316 SS/A479 (regulating)
		PCTFE/D1430 (conical)
		Stellite (spherical)
3	Stem	316 SS/A479
4	Bellows	316L SS/A240
5	Gasket	Sliver-plated 316L SS/A269
6	Weld Ring	316 SS/A479
7	Gasket	Sliver-plated 316L SS/A269
8	Bonnet Nut	316 SS/A479
9	Pin	Stainless steel
10	Panel Mount Nut	Stainless steel
11	Bonnet	316 SS/A479
12	Actuator	440C SS/A276
13	Packing washer	316 SS/A479
14	Packing	Graphite
15	Packing washer	316 SS/A479
16	Luck Nut	Stainless steel
17	Packing Nut	316 SS/A479
18	Gland	316 SS/A479
19	Handle	6061/B210 /Stainless steel
20	Set Screws	Galvanized carbon steel

Contact FITOK Group or our authorized distributors for valves of other materials.

## Dimensions

Orifice:  $\leq 0.30$ "



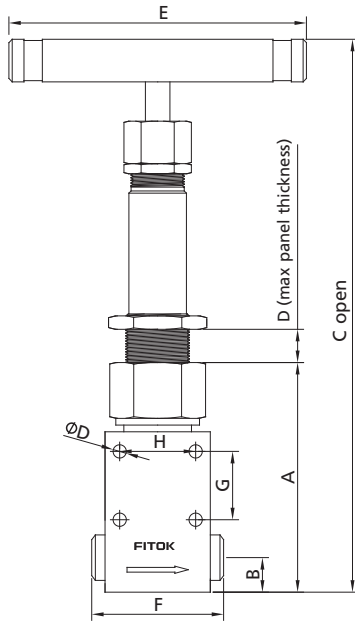
Basic Ordering Number	End Connections		Orifice in. (mm)	Cv	Dimensions, in. (mm)								
	Inlet Size	Outlet Size			A	B	C	D	E	F	G	H	Ød
SU□□-FL4-2-	1/4" FITOK	1/4" FITOK	0.16 (4.10)	0.36	1.86 (47.3)	0.54 (14.2)	6.34 (161.0)	0.38 (9.7)	3.50 (88.9)	2.46 (62.5)	1.00 (25.4)	1.07 (27.2)	1.00 (25.4)
SU□□-FL6-3-	3/8" FITOK	3/8" FITOK	0.26 (6.60)	0.85	1.94 (49.3)	0.50 (12.7)	6.36 (161.5)	0.38 (9.7)	3.50 (88.9)	3.09 (78.5)	1.13 (28.7)	1.57 (40.0)	1.13 (28.7)
SU□□-FL8-5-	1/2" FITOK	1/2" FITOK	0.30 (7.60)	1.20	1.98 (50.3)	0.50 (12.7)	6.40 (162.5)	0.38 (9.7)	3.50 (88.9)	3.30 (83.8)	1.13 (28.7)	1.57 (40.0)	1.13 (28.7)
SU□□-ML6-2-	6 mm FITOK	6 mm FITOK	0.16 (4.10)	0.36	1.86 (47.3)	0.56 (14.2)	6.34 (161.0)	0.38 (9.7)	3.50 (88.9)	2.46 (62.5)	1.00 (25.4)	1.05 (26.6)	1.00 (25.4)
SU□□-ML10-4-	10 mm FITOK	10 mm FITOK	0.28 (7.10)	1.00	1.97 (50.1)	0.50 (12.7)	6.39 (162.3)	0.38 (9.7)	3.50 (88.9)	3.11 (79.0)	1.13 (28.7)	1.57 (40.0)	1.13 (28.7)
SU□□-ML12-4-	12 mm FITOK	12 mm FITOK	0.28 (7.10)	1.00	1.97 (50.1)	0.50 (12.7)	6.39 (162.3)	0.38 (9.7)	3.50 (88.9)	3.30 (83.8)	1.13 (28.7)	1.57 (40.0)	1.13 (28.7)
SU□□-TS4-2-	1/4" TS	1/4" TS	0.16 (4.10)	0.36	1.86 (47.3)	0.56 (14.2)	6.34 (161.0)	0.38 (9.7)	3.50 (88.9)	1.68 (42.7)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)
SU□□-TS6-4-	3/8" TS	3/8" TS	0.28 (7.10)	1.00	1.97 (50.1)	0.50 (12.7)	6.39 (162.3)	0.38 (9.7)	3.50 (88.9)	2.27 (57.7)	1.13 (28.7)	1.52 (38.6)	1.13 (28.7)
SU□□-TS8-5-	1/2" TS	1/2" TS	0.30 (7.60)	1.20	1.98 (50.3)	0.50 (12.7)	6.40 (162.5)	0.38 (9.7)	3.50 (88.9)	2.27 (57.7)	1.13 (28.7)	1.52 (38.6)	1.13 (28.7)
SU□□-FFR4-2-	1/4" Female FR	1/4" Female FR	0.16 (4.10)	0.36	1.86 (47.3)	0.56 (14.2)	6.34 (161.0)	0.38 (9.7)	3.50 (88.9)	2.76 (70.1)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)
SU□□-FFR8-5-	1/2" Female FR	1/2" Female FR	0.30 (7.60)	1.20	1.98 (50.3)	0.50 (12.7)	6.40 (162.5)	0.38 (9.7)	3.50 (88.9)	3.12 (79.2)	1.13 (28.7)	1.52 (38.6)	1.13 (28.7)
SU□□-FR4-2-	1/4" Male FR	1/4" Male FR	0.16 (4.10)	0.36	1.86 (47.3)	0.56 (14.2)	6.34 (161.0)	0.38 (9.7)	3.50 (88.9)	2.24 (56.9)	1.00 (25.4)	1.00 (25.4)	1.00 (25.4)
SU□□-FR8-5-	1/2" Male FR	1/2" Male FR	0.30 (7.60)	1.20	1.98 (50.3)	0.50 (12.7)	6.40 (162.5)	0.38 (9.7)	3.50 (88.9)	3.00 (76.2)	1.13 (28.7)	1.52 (38.6)	1.13 (28.7)

1. FITOK means FITOK double ferrule tube fittings, FR means metal gasket seal fittings. TS means fractional tube socket weld. TB means tube butt weld.
2. Dimensions are shown with FITOK nuts finger-tightened. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors..
3. The sizes and types listed are standard. Other sizes and types are available upon request. For special sizes and types, refer to ordering information.

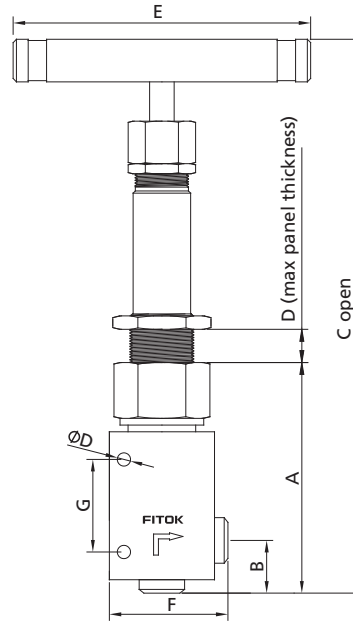


## Dimensions

Orifice: 0.50"



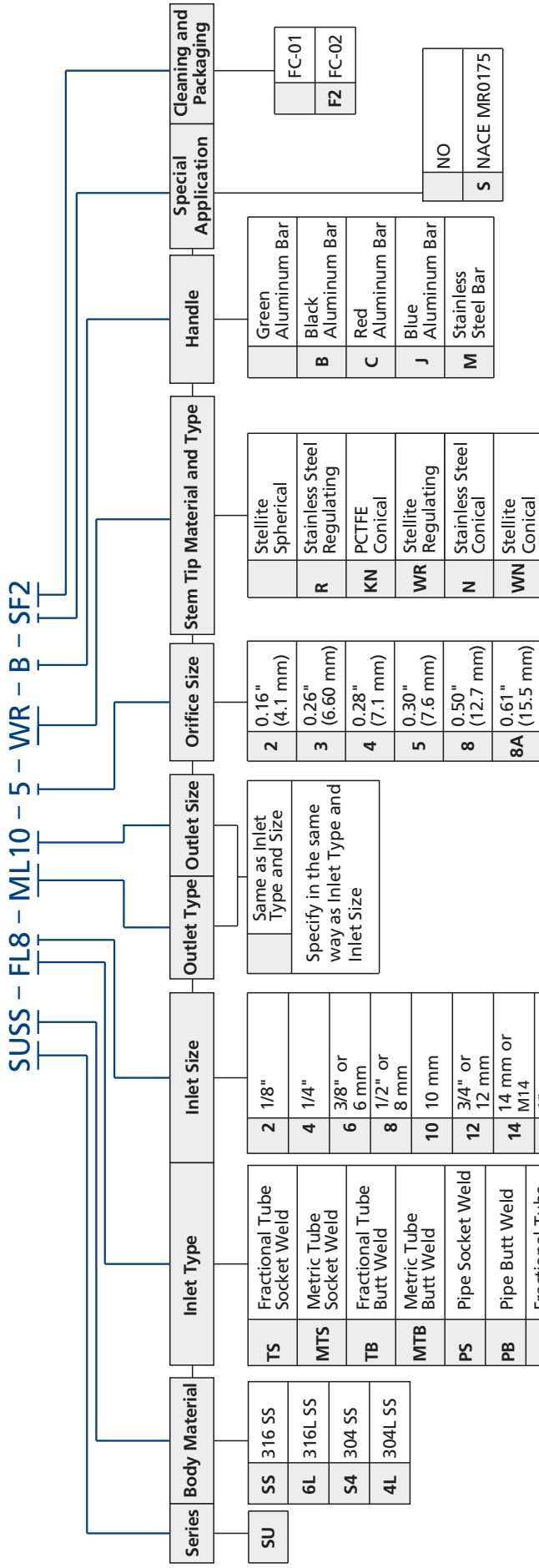
Orifice: 0.61"



Bellows-sealed  
Valves

Basic Ordering Number	End Connections		Orifice in. (mm)	CV	Dimensions, in. (mm)								
	Inlet Size	Outlet Size			A	B	C	D	E	F	G	H	Ød
SU□□-TS12-8-	3/4" TS	3/4" TS	0.50 (12.7)	3.10	5.45 (138.5)	1.00 (25.4)	11.60 (295)	0.59 (14.9)	5.00 (127)	2.44 (62.0)	1.25 (31.8)	1.46 (37.0)	0.27 (6.9)
SU□□-PB12-8-	3/4" PB	3/4" PB	0.50 (12.7)	3.10	5.45 (138.5)	1.00 (25.4)	11.60 (295)	0.59 (14.9)	5.00 (127)	2.44 (62.0)	1.25 (31.8)	1.46 (37.0)	0.27 (6.9)
SU□□-TS12-8A-	3/4" TS	3/4" TS	0.61 (15.5)	5.30	5.45 (138.5)	1.44 (36.6)	11.60 (295)	0.59 (14.9)	5.00 (127)	2.49 (63.2)	1.60 (40.6)	—	0.27 (6.9)
Su□□-PB12-8A-	3/4" PB	3/4" PB	0.61 (15.5)	5.30	5.45 (138.5)	1.44 (36.6)	11.60 (295)	0.59 (14.9)	5.00 (127)	2.49 (63.2)	1.60 (40.6)	—	0.27 (6.9)
SU□□-TB16-8A-	1" TB	1" TB	0.61 (15.5)	5.30	5.45 (138.5)	1.44 (36.6)	11.60 (295)	0.59 (14.9)	5.00 (127)	2.49 (63.2)	1.60 (40.6)	—	0.27 (6.9)

# Ordering Number Description



Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

**1. Cleaning and Packaging:**

FC-01: Standard cleaning and packaging for general industrial procedures.

FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.

# Check Valves, Relief Valves

Check Valves



B-126

Proportional Relief Valves



B-142

# Check Valves

CV, CH, CO, CA, COA, CL and CW Series



# Check Valves

## CV, CH, CO, CA, COA, CL and CW Series



### Features

#### CV Series

- ⦿ Resilient O-ring seat design for leak free sealing
- ⦿ Working pressure up to: 3000 psig (207 bar)
- ⦿ Working temperature: -10°F to 375°F (-23°C to 190°C)
- ⦿ Cracking pressure: 1/3 to 25 psig (0.02 to 1.7 bar)
- ⦿ Variety of end connections and materials available
- ⦿ Fixed cracking pressure, mountable in any directions

#### CH Series

- ⦿ Seat ring continuously cleaned by media, avoiding secondary pollution
- ⦿ Working pressure up to: 6000 psig (414 bar)
- ⦿ Working temperature: -10°F to 400°F (-23°C to 204°C)
- ⦿ Cracking pressure: 1/3 to 25 psig (0.02 to 1.7 bar)
- ⦿ Variety of end connections and materials available
- ⦿ Fixed cracking pressure, mountable in any directions

#### CO Series

- ⦿ Compact design, one piece body
- ⦿ Working pressure up to: 3000 psig (207 bar)
- ⦿ Working temperature: -10°F to 375°F (-23°C to 190°C)
- ⦿ Cracking pressure: 1/3 to 25 psig (0.02 to 1.7 bar)
- ⦿ Variety of end connections and materials available
- ⦿ Fixed cracking pressure, mountable in any directions

#### CA Series

- ⦿ Working pressure up to: 3000 psig (207 bar)
- ⦿ Working temperature: -10°F to 375°F (-23°C to 190°C)
- ⦿ Cracking pressure: 3 to 600 psig (0.2 to 41.4 bar)
- ⦿ Variety of end connections and materials available
- ⦿ Various springs available
- ⦿ Adjustable cracking pressure, mountable in any directions

#### COA Series

- ⦿ Compact design, one-piece body
- ⦿ Working pressure up to: 3000 psig (207 bar)
- ⦿ Working temperature: -10°F to 375°F (-23°C to 190°C)
- ⦿ Cracking pressure: 3 to 600 psig (0.2 to 41.4 bar)
- ⦿ Variety of end connections and materials available
- ⦿ Various springs available
- ⦿ Adjustable cracking pressure, mountable in any directions

#### CL Series

- ⦿ Working pressure up to: 6000 psig (414 bar)
- ⦿ Working temperature: -65°F to 900°F (-53°C to 482°C)
- ⦿ Rugged, all-stainless steel construction
- ⦿ Union bonnet design, all-stainless steel structure, horizontal installation with bonnet nut on top
- ⦿ Reverse flow coefficient less than 0.1% of forward flow coefficient

#### CW Series

- ⦿ Working pressure up to: 3000 psig (207 bar)
- ⦿ Working temperature: -10°F to 400°F (-23°C to 204°C)
- ⦿ Cracking pressure: less than 2 psig (0.14 bar)
- ⦿ Variety of end connections and materials available
- ⦿ All-welded design for safety
- ⦿ Standard or fine polished wetted surfaces optional

1. Besides CL series, other check valves are all coated with lubricants like silicone base and molybdenum disulfide base.
2. Please contact FITOK Group or our authorized distributors for other materials.
3. PTFE-coated spring is an option for CV, CO, CA, and COA series check valves. For more details, please contact FITOK Group or our authorized distributors.
4. Every valve is tested with nitrogen for leak-tight performance at its maximum working pressure.

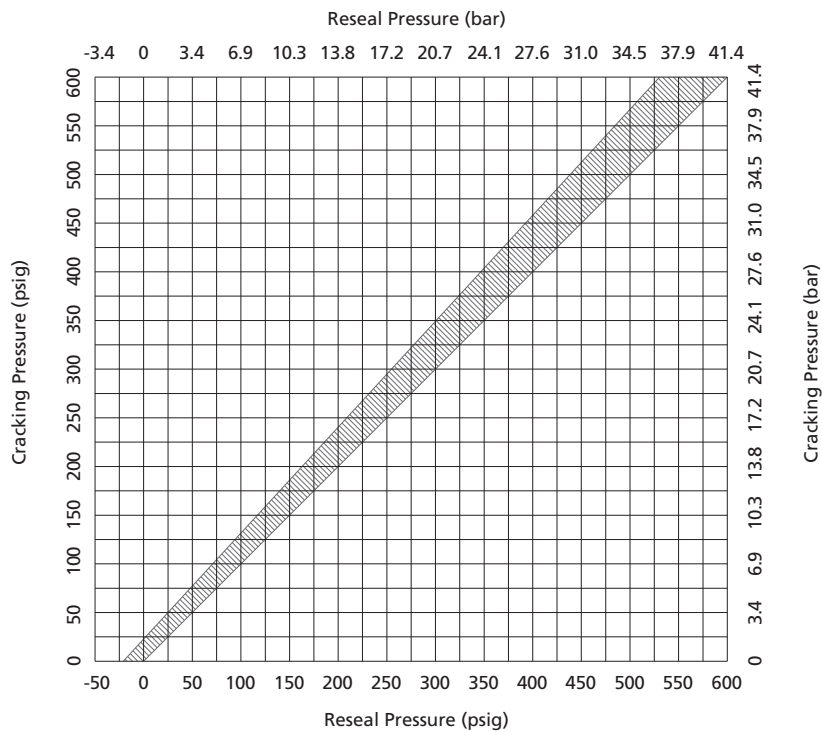
## Cracking Pressure and Reseal Pressure

**Cracking pressure** - the upstream pressure at which the first indication of flow occurs.

**Reseal pressure** - the pressure at which there is no indication of flow.

Series	Nominal Cracking Pressure psig (bar)	Cracking Pressure Range psig (bar)	Reseal Pressure Range psig (bar)
CV	1/3 (0.02) 1 (0.06) 3 (0.21) 10 (0.68) 25 (1.7)	0 to 3 (0 to 0.21) 0 to 4 (0 to 0.28) 1 to 5 (0.06 to 0.34) 7 to 15 (0.49 to 1.1) 20 to 30 (1.4 to 2.1)	Up to 6 (0.42) downstream pressure Up to 6 (0.42) downstream pressure Up to 6 (0.42) downstream pressure 3 (0.21) or higher upstream pressure 17 (1.2) or higher upstream pressure
CH	1/3 (0.02) 1 (0.06) 3 (0.21) 10 (0.68) 25 (1.7)	0 to 3 (0 to 0.21) 0 to 4 (0 to 0.28) 1 to 5 (0.06 to 0.34) 7 to 15 (0.49 to 1.1) 20 to 30 (1.4 to 2.1)	Up to 6 (0.42) downstream pressure Up to 5 (0.35) downstream pressure Up to 2 (0.14) downstream pressure 3 (0.21) or higher upstream pressure 17 (1.2) or higher upstream pressure
CO	1/3 (0.02) 1 (0.06) 3 (0.21) 10 (0.68) 25 (1.7)	0 to 3 (0 to 0.21) 0 to 4 (0 to 0.28) 1 to 5 (0.06 to 0.34) 7 to 15 (0.49 to 1.1) 20 to 30 (1.4 to 2.1)	6 to 20 (0.42 to 1.4) downstream pressure 5 to 20 (0.35 to 1.4) downstream pressure 3 to 20 (0.21 to 1.4) downstream pressure 3 to 10 (0.21 to 0.68) downstream pressure 5 (0.35) or higher upstream pressure
CA	3 to 50 (0.21 to 3.4) 50 to 150 (3.4 to 10.3)	—————	Refer to the chart below
COA	150 to 350 (10.3 to 24.1) 350 to 600 (24.1 to 41.3)		
CW	1/3 (0.02)	0 to 2 (0 to 0.14)	Up to 2 (0.14) downstream pressure

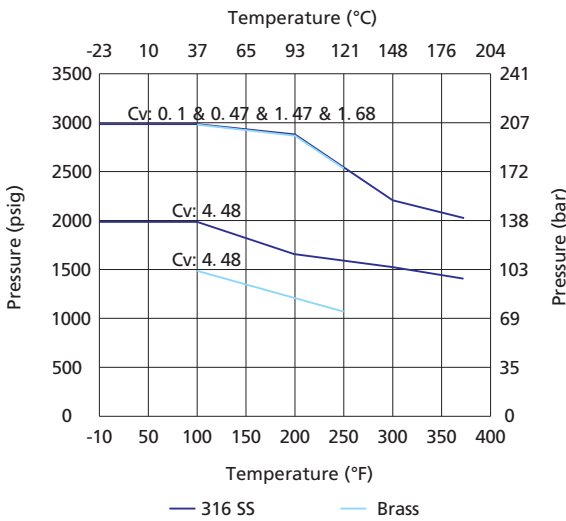
Check Valves  
Relief Valves



## Pressure vs. Temperature

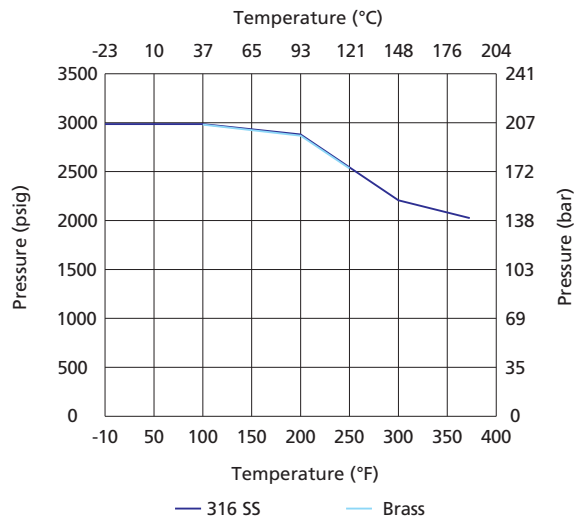
### CV Series

FKM O-ring in 316 SS Body and Buna N in Brass Body

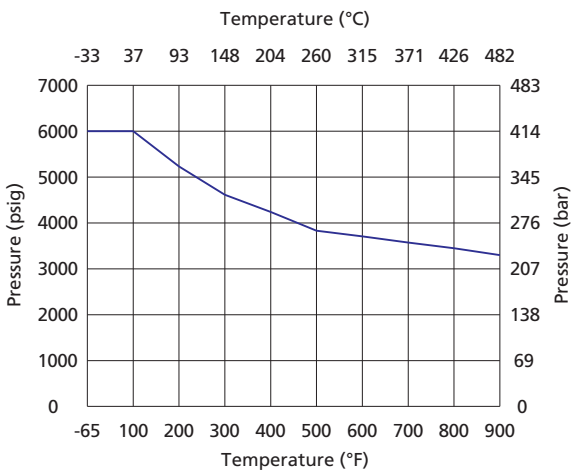


### CO, CA and COA Series

FKM O-ring in 316 SS Body and Buna N in Brass Body

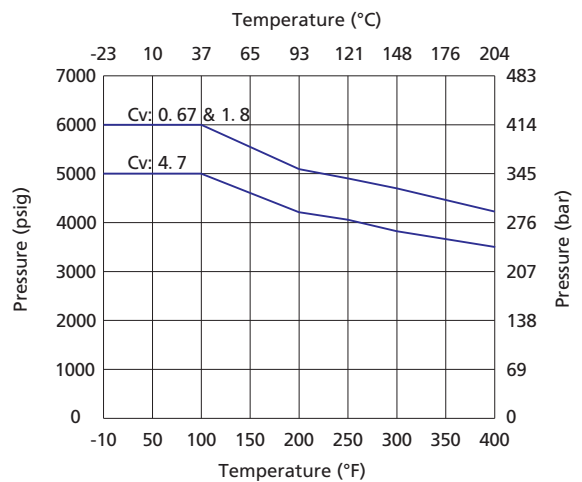


### CL Series



### CH Series

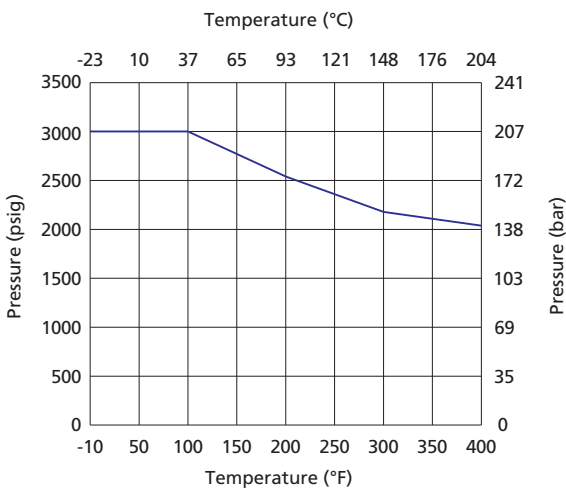
FKM O-ring in 316 SS Body



Check Valves  
Relief Valves

### CW Series

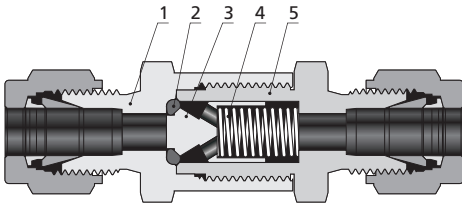
FKM O-ring in 316 SS Body



The temperature rating of CH Series check valve is restricted by the connection types. For details please refer to B-134.

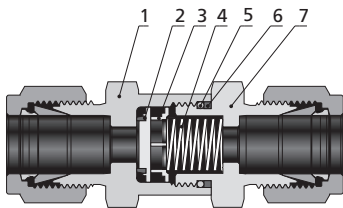
## Standard Materials of Construction

### CV Series



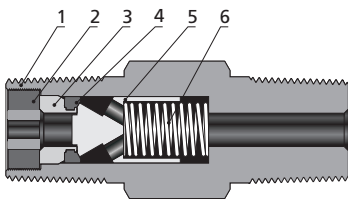
Component	Material Grade/ASTM Specification	
	316 SS	Brass
1 Inlet Body	316 SS/A479	Brass C36000/B16
2 O-ring	Fluorocarbon FKM	Buna N
3 Poppet	316 SS/A479	Brass C36000/B16
4 Spring	302 SS/A313	302 SS/A313
5 Outlet Body	316 SS/A479	Brass C36000/B16

### CH Series



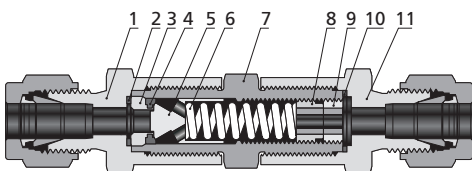
Component	Material Grade/ASTM Specification	
	316 SS	Brass
1 Inlet Body	316 SS/A479	
2 Poppet	Fluorocarbon-FKM-bonded 316 SS/A479	
3 Poppet Stop	316 SS/A240	
4 Spring	302 SS/A313	
5 O-ring	Fluorocarbon FKM	
6 Backup Ring	PTFE/D1710	
7 Outlet Body	316 SS/A479	

### CO Series



Component	Material Grade/ASTM Specification	
	316 SS	Brass
1 Body	316 SS/A479	Brass C36000/B16
2 Insert Locking Screw	316 SS/A276 or A479	Brass C36000/B16
3 Insert	316 SS/A479	Brass C36000/B16
4 O-ring	Fluorocarbon FKM	Buna N
5 Poppet	316 SS/A479	Brass C36000/B16
6 Spring	302 SS/A313	302 SS/A313

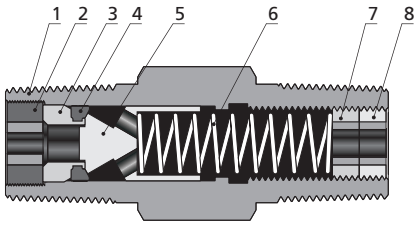
### CA Series



Component	Material Grade/ASTM Specification	
	316 SS	Brass
1 Inlet Body	316 SS/A479	Brass C36000/B16
2 Inlet Gasket	PTFE-coated 316 SS/A240	PTFE-coated 316 SS/A240
3 Insert	316 SS/A479	Brass C36000/B16
4 O-ring	Fluorocarbon FKM	Buna N
5 Poppet	316 SS/A479	Brass C36000/B16
6 Spring	302 SS/A313	302 SS/A313
7 Center Body	316 SS/A479	Brass C36000/B16
8 Adjusting Screw	316 SS/A276	316 SS/A276
9 Locking Screw	316 SS/A276	316 SS/A276
10 Outlet Gasket	PTFE-coated 316 SS/A276	PTFE-coated 316 SS/A276
11 Outlet Body	316 SS/A479	Brass C36000/B16

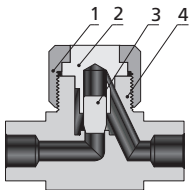


**COA Series**



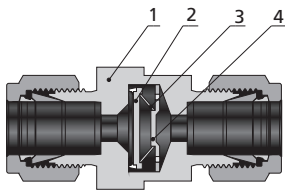
Component		Material Grade/ASTM Specification	
		316 SS	Brass
1	Body	316 SS/A479	Brass C36000/B16
2	Insert Locking Screw	316 SS/A479	Brass C36000/B16
3	Insert	316 SS/A479	Brass C36000/B16
4	O-ring	Fluorocarbon FKM	Buna N
5	Poppet	316 SS/A479	Brass C36000/B16
6	Spring	302 SS/A313	302 SS/A313
7	Adjusting Screw	316 SS/A276	316 SS/A276
8	Locking Screw	316 SS/A276	316 SS/A276

**CL Series**



Component		Material Grade/ASTM Specification
1	Bonnet Nut	316 SS/A479
2	Bonnet	316 SS/A479
3	Poppet	S17400/A564
4	Body	316 SS/A479

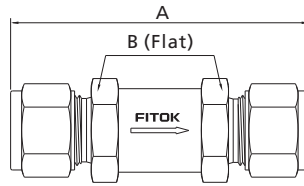
**CW Series**



Component		Material Grade/ASTM Specification
1	Body	316L SS/A479
2	Poppet	Fluorocarbon FKM-bonded 316 SS/A479
3	Belleville Spring	Alloy X - 750/B637
4	Poppet Stop	316L SS/A240

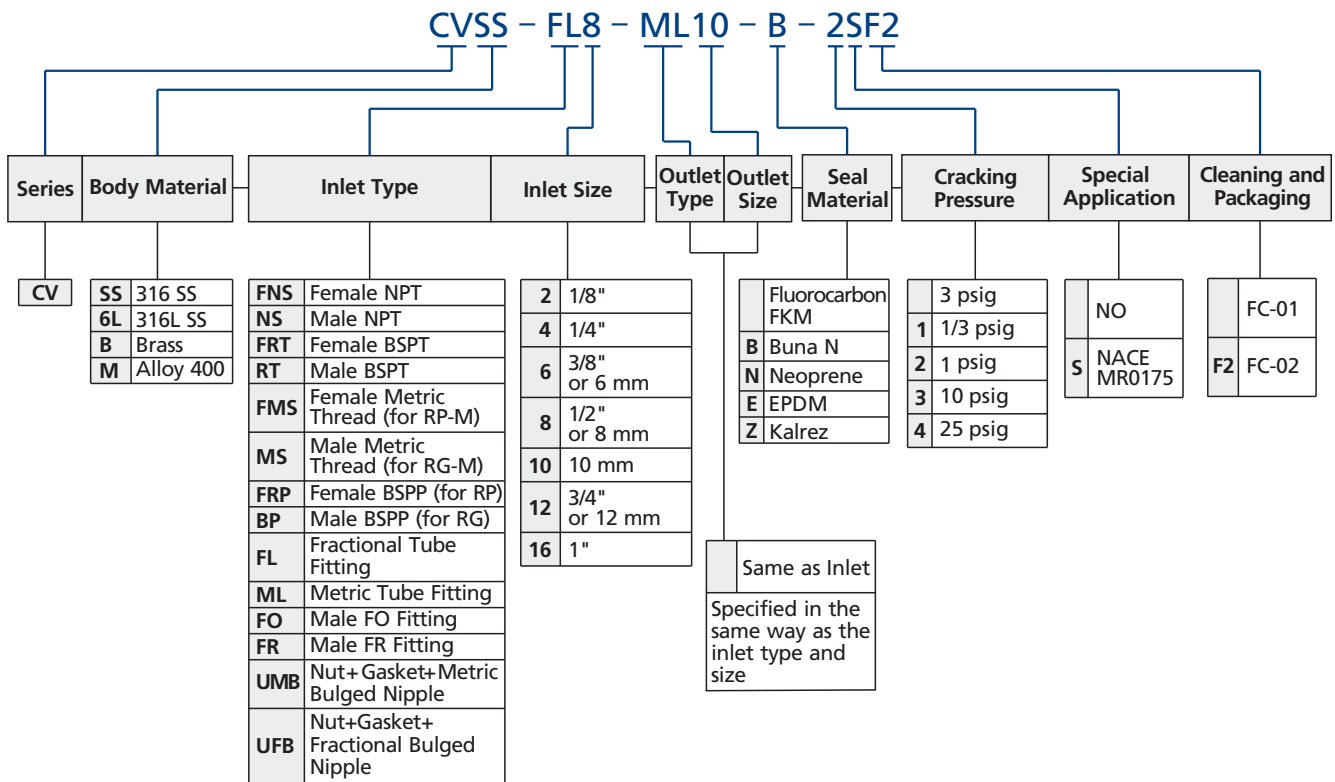
## Dimensions

### CV Series



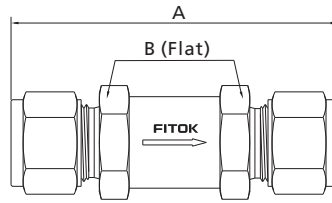
Basic Ordering Number	Connection Type and Size		Cv	Dimensions, in. (mm)	
	Inlet	Outlet		A	B
CV□□-FL2-	1/8" FITOK	1/8" FITOK	0.10	2.14 (54.3)	5/8 (15.9)
CV□□-FL4-	1/4" FITOK	1/4" FITOK	0.47	2.35 (59.7)	
CV□□-FL6-	3/8" FITOK	3/8" FITOK	1.47	3.17 (80.5)	7/8 (22.2)
CV□□-FL8-	1/2" FITOK	1/2" FITOK	1.68	3.42 (86.9)	
CV□□-FL12-	3/4" FITOK	3/4" FITOK	4.48	4.32 (110.0)	1 1/4 (31.8)
CV□□-FL16-	1" FITOK	1" FITOK		4.74 (120.0)	1 3/8 (34.9)
CV□□-ML6-	6 mm FITOK	6 mm FITOK	0.47	2.36 (59.9)	5/8 (15.9)
CV□□-ML10-	10 mm FITOK	10 mm FITOK	1.68	3.32 (84.3)	7/8 (22.2)
CV□□-ML12-	12 mm FITOK	12 mm FITOK		3.42 (86.9)	
CV□□-FNS2-	1/8 Female NPT	1/8 Female NPT	0.10	1.89 (48.0)	5/8 (15.9)
CV□□-FNS4-	1/4 Female NPT	1/4 Female NPT	0.47	2.15 (54.6)	3/4 (19.1)
CV□□-FNS6-	3/8 Female NPT	3/8 Female NPT	1.47	2.98 (75.7)	7/8 (22.2)
CV□□-FNS8-	1/2 Female NPT	1/2 Female NPT	1.68	3.58 (90.9)	1 1/16 (27.0)
CV□□-FNS12-	3/4 Female NPT	3/4 Female NPT	4.48	4.08 (104.0)	1 1/4 (31.8)
CV□□-FNS16-	1 Female NPT	1 Female NPT		4.84 (123.0)	1 5/8 (41.3)
CV□□-NS2-	1/8 Male NPT	1/8 Male NPT	0.10	1.71 (43.4)	5/8 (15.9)
CV□□-NS4-	1/4 Male NPT	1/4 Male NPT	0.47	2.09 (53.1)	
CV□□-NS6-	3/8 Male NPT	3/8 Male NPT	1.47	2.78 (70.6)	7/8 (22.2)
CV□□-NS8-	1/2 Male NPT	1/2 Male NPT	1.68	3.16 (80.3)	
CV□□-NS12-	3/4 Male NPT	3/4 Male NPT	4.48	4.08 (104.0)	1 1/4 (31.8)
CV□□-NS16-	1 Male NPT	1 Male NPT		4.52 (115.0)	1 5/8 (41.3)
CV□□-FR4-	1/4" Male FR	1/4" Male FR	0.47	2.21 (56.1)	5/8 (15.9)
CV□□-FR8-	1/2" Male FR	1/2" Male FR	1.68	3.56 (90.4)	15/16 (23.8)
CV□□-FR12-	3/4" Male FR	3/4" Male FR	4.48	4.64 (118.0)	1 5/8 (41.3)
CV□□-FR16-	1" Male FR	1" Male FR		4.76 (121.0)	

## Ordering Number Description



- Standard thread pitch for metric threads are as follows:  
M10 and below: 1 mm  
M12 to M24: 1.5 mm  
M27 and above: 2 mm  
Standard thread pitch should be omitted in the ordering number, others should be specified.
- For oxygen-enriched environment or hazardous media service, please contact FITOK Group or our authorized distributors.
- Cleaning and Packaging:  
FC-01: Standard cleaning and packaging for general industrial procedures.  
FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.
- The materials, connection types and sizes listed in the "Ordering Number Description" are standard. For other materials and end connections, please contact FITOK Group or our authorized distributors.
- PTFE-coated gasket can be chosen to reduce the possibility of O-ring's moving in system caused by the pressure fluctuations, vibration or pulsating. For more details, please contact FITOK Group or our authorized distributors.
- Check valve is designed with unidirectional flow path, it can't be used as safety relief valve.
- If the check valve is not opened for a period of time, its initial cracking pressure may be higher than set cracking pressure.

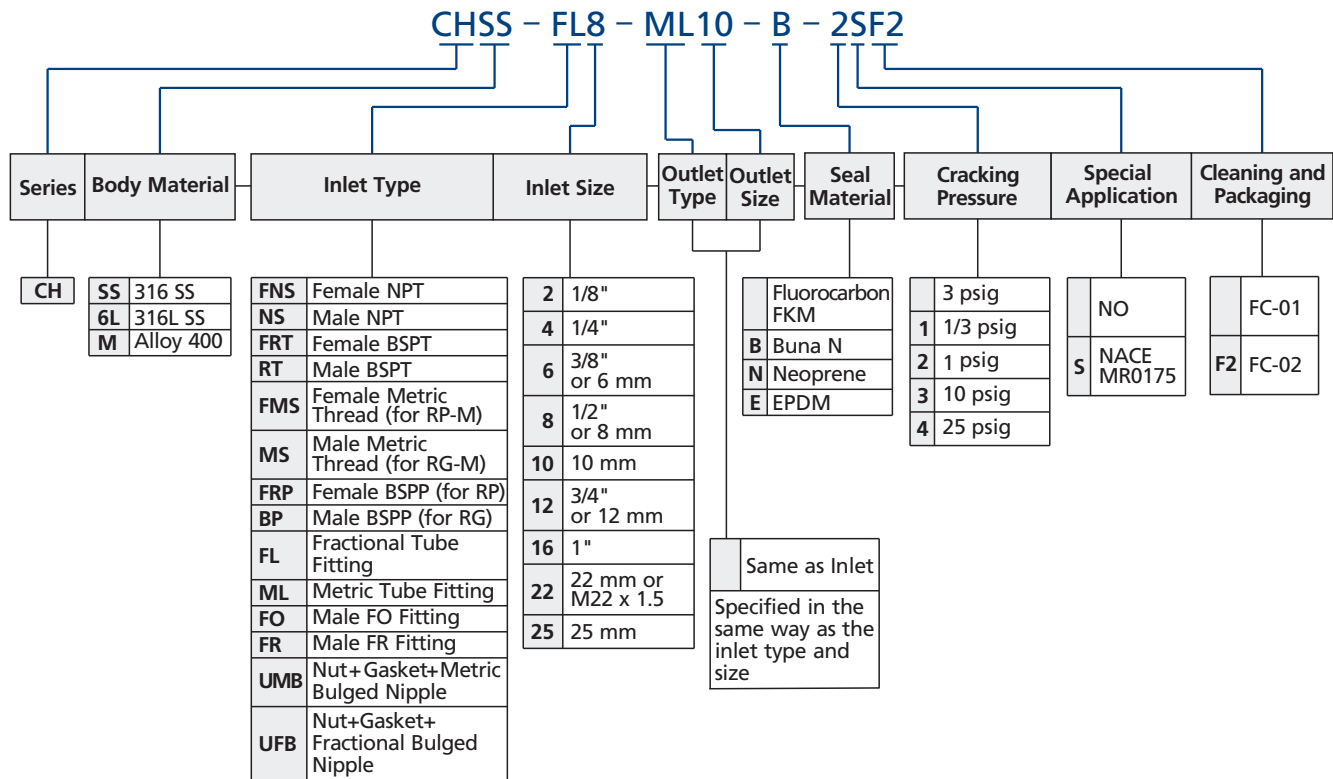
CH Series



Basic Ordering Number	Connection Type and Size		Pressure Rating at 100° F (37° C) bar (psig)	Cv	Dimensions, in. (mm)	
	Inlet	Outlet			A	B
CH□□-FL2-	1/8" FITOK	1/8" FITOK	414 (6000)	0.67	2.27 (57.7)	11/16 (17.5)
CH□□-FL4-	1/4" FITOK	1/4" FITOK			2.43 (61.7)	
CH□□-FL6-	3/8" FITOK	3/8" FITOK		1.8	2.75 (69.9)	1 (25.4)
CH□□-FL8-	1/2" FITOK	1/2" FITOK			2.96 (75.2)	
CH□□-FL12-	3/4" FITOK	3/4" FITOK	344 (5000)	4.7	3.52 (89.4)	1 5/8 (41.3)
CH□□-FL16-	1" FITOK	1" FITOK	323 (4700)		3.88 (98.6)	
CH□□-ML6-	6 mm FITOK	6 mm FITOK	414 (6000)	0.67	2.43 (61.7)	11/16 (17.5)
CH□□-ML8-	8 mm FITOK	8 mm FITOK			2.70 (68.6)	
CH□□-ML10-	10 mm FITOK	10 mm FITOK		1.8	2.80 (71.1)	1 (25.4)
CH□□-ML12-	12 mm FITOK	12 mm FITOK			2.96 (75.2)	
CH□□-ML22-	22 mm FITOK	22 mm FITOK	337 (4900)	4.7	3.48 (88.4)	1 5/8 (41.3)
CH□□-ML25-	25 mm FITOK	25 mm FITOK	316 (4600)		3.88 (98.6)	
CH□□-FNS4-	1/4 Female NPT	1/4 Female NPT	414 (6000)	0.67	2.13 (54.1)	11/16 (17.5)
CH□□-FNS6-	3/8 Female NPT	3/8 Female NPT	365 (5300)	1.8	2.55 (64.8)	1 (25.4)
CH□□-FNS8-	1/2 Female NPT	1/2 Female NPT	337 (4900)		3.03 (77.0)	1 1/16 (27.0)
CH□□-FNS12-	3/4 Female NPT	3/4 Female NPT	316 (4600)	4.7	3.23 (82.0)	1 5/8 (41.3)
CH□□-FNS16-	1 Female NPT	1 Female NPT	303 (4400)		3.83 (97.3)	
CH□□-NS2-	1/8 Male NPT	1/8 Male NPT	414 (6000)	0.67	1.79 (45.4)	11/16 (17.5)
CH□□-NS4-	1/4 Male NPT	1/4 Male NPT			2.17 (55.1)	
CH□□-NS6-	3/8 Male NPT	3/8 Male NPT		1.8	2.36 (59.9)	1 (25.4)
CH□□-NS8-	1/2 Male NPT	1/2 Male NPT			2.73 (69.3)	
CH□□-NS12-	3/4 Male NPT	3/4 Male NPT	344 (5000)	4.7	3.29 (83.6)	1 5/8 (41.3)
CH□□-NS16-	1 Male NPT	1 Male NPT	303 (4400)		3.67 (93.2)	
CH□□-FRT4-	1/4 Female BSPT	1/4 Female BSPT	414 (6000)	0.67	2.28 (57.9)	11/16 (17.5)
CH□□-FRT8-	1/2 Female BSPT	1/2 Female BSPT	351 (5100)	1.8	3.29 (83.6)	1 1/16 (27.0)
CH□□-FRT12-	3/4 Female BSPT	3/4 Female BSPT	330 (4800)	4.7	3.55 (90.2)	1 5/8 (41.3)
CH□□-FRT16-	1 Female BSPT	1 Female BSPT	303 (4400)		3.83 (97.3)	
CH□□-RT4-	1/4 Male BSPT	1/4 Male BSPT	414 (6000)	0.67	2.17 (55.1)	11/16 (17.5)
CH□□-RT8-	1/2 Male BSPT	1/2 Male BSPT		1.8	2.73 (69.3)	1 (25.4)
CH□□-RT12-	3/4 Male BSPT	3/4 Male BSPT	344 (5000)	4.7	3.35 (85.1)	1 5/8 (41.3)
CH□□-RT16-	1 Male BSPT	1 Male BSPT			3.67 (93.2)	
CH□□-FR4-	1/4" Male FR	1/4" Male FR	414 (6000)	0.67	2.28 (57.9)	11/16 (17.5)
CH□□-FR8-	1/2" Male FR	1/2" Male FR	296 (4300)	1.8	2.73 (69.3)	1 (25.4)
CH□□-FR12-	3/4" Male FR	3/4" Male FR	254 (3700)	4.7	3.78 (96.0)	1 5/8 (41.3)
CH□□-FO4-	1/4" Male FO	1/4" Male FO	414 (6000)	0.67	1.98 (50.3)	11/16 (17.5)
CH□□-FO8-	1/2" Male FO	1/2" Male FO		1.8	2.35 (59.7)	1 (25.4)
CH□□-FO12-	3/4" Male FO	3/4" Male FO	344 (5000)	4.7	2.90 (73.7)	1 5/8 (41.3)
CH□□-FO16-	1" Male FO	1" Male FO				

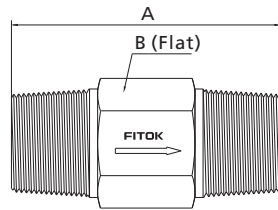
Check Valves  
Relief Valves

## Ordering Number Description



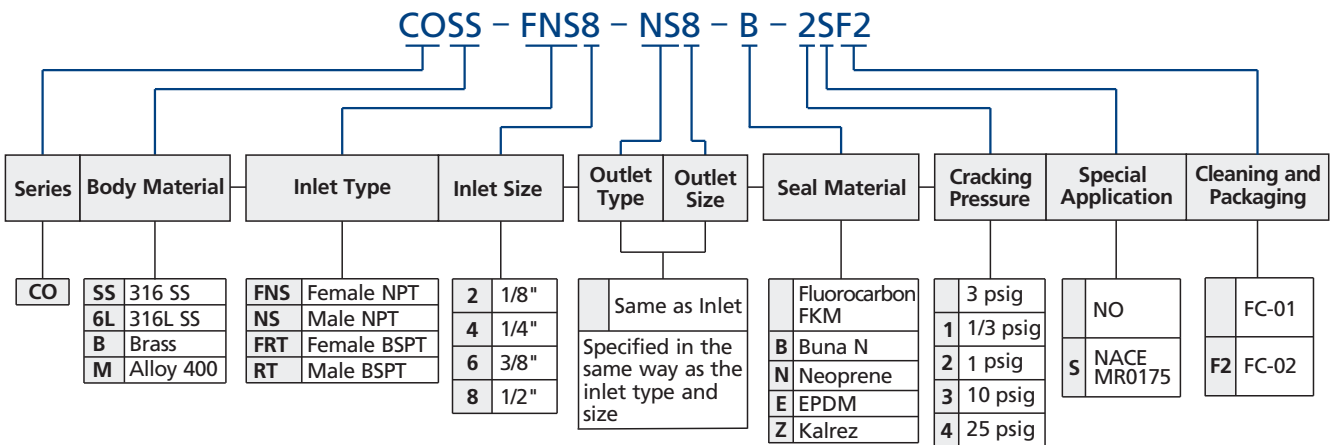
- Standard thread pitch for metric threads are as follows:  
M10 and below: 1 mm  
M12 to M24: 1.5 mm  
M27 and above: 2 mm  
Standard thread pitch should be omitted in the ordering number, others should be specified.
- For oxygen-enriched environment or hazardous media service, please contact FITOK Group or our authorized distributors.
- Cleaning and Packaging:  
FC-01: Standard cleaning and packaging for general industrial procedures.  
FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.
- The materials, connection types and sizes listed in the "Ordering Number Description" are standard. For other materials and end connections, please contact FITOK Group or our authorized distributors.
- Check valve is designed with unidirectional flow path, it can't be used as safety relief valve.
- If the check valve is not opened for a period of time, its initial cracking pressure may be higher than set cracking pressure.

CO Series



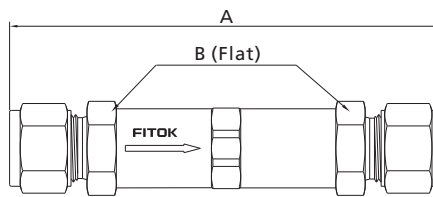
Basic Ordering Number	Connection Type and Size		CV	Dimensions, in. (mm)	
	Inlet	Outlet		A	B
CO□□-FNS4-	1/4 Female NPT	1/4 Female NPT	0.35	2.41 (61.2)	3/4 (19.1)
CO□□-FNS8-	1/2 Female NPT	1/2 Female NPT	1.20	3.71 (94.2)	1 1/16 (27.0)
CO□□-NS4-	1/4 Male NPT	1/4 Male NPT	0.35	1.62 (41.1)	9/16 (14.3)
CO□□-NS8-	1/2 Male NPT	1/2 Male NPT	1.20	2.28 (57.9)	7/8 (22.2)
CO□□-FRT4-	1/4 Female BSPT	1/4 Female BSPT	0.35	2.54 (64.5)	3/4 (19.1)
CO□□-RT4-	1/4 Male BSPT	1/4 Male BSPT		1.62 (41.1)	9/16 (14.3)

Ordering Number Description



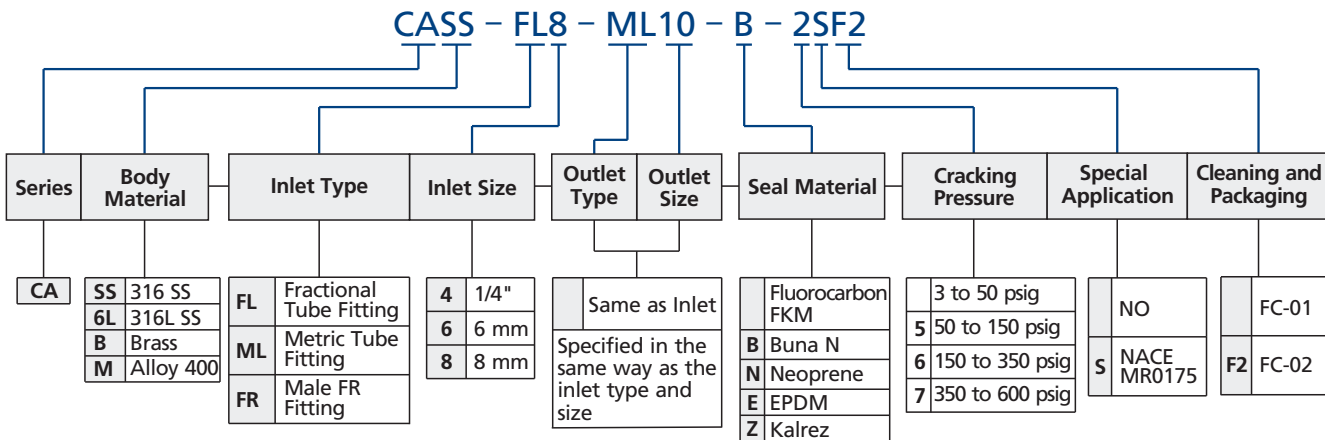
- For oxygen-enriched environment or hazardous media service, please contact FITOK Group or our authorized distributors.
- Cleaning and Packaging:  
FC-01: Standard cleaning and packaging for general industrial procedures.  
FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.
- The materials, connection types and sizes listed in the "Ordering Number Description" are standard. For other materials and end connections, please contact FITOK Group or our authorized distributors.
- Check valve is designed with unidirectional flow path, it can't be used as safety relief valve.
- If the check valve is not opened for a period of time, its initial cracking pressure may be higher than set cracking pressure.

CA Series



Basic Ordering Number	Connection Type and Size		Cv	Dimensions, in. (mm)	
	Inlet	Outlet		A	B
CA □□ -FL4-	1/4" FITOK	1/4" FITOK	0.37	3.23 (82.0)	5/8 (15.9)
CA □□ -ML6-	6 mm FITOK	6 mm FITOK		3.32 (84.3)	
CA □□ -ML8-	8 mm FITOK	8 mm FITOK		3.09 (78.5)	
CA □□ -FR4-	1/4" Male FR	1/4" Male FR			

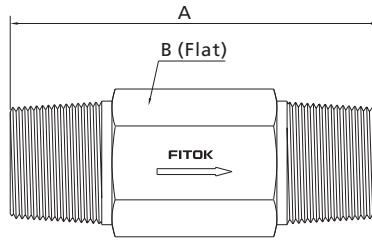
Ordering Number Description



Check Valves  
Relief Valves

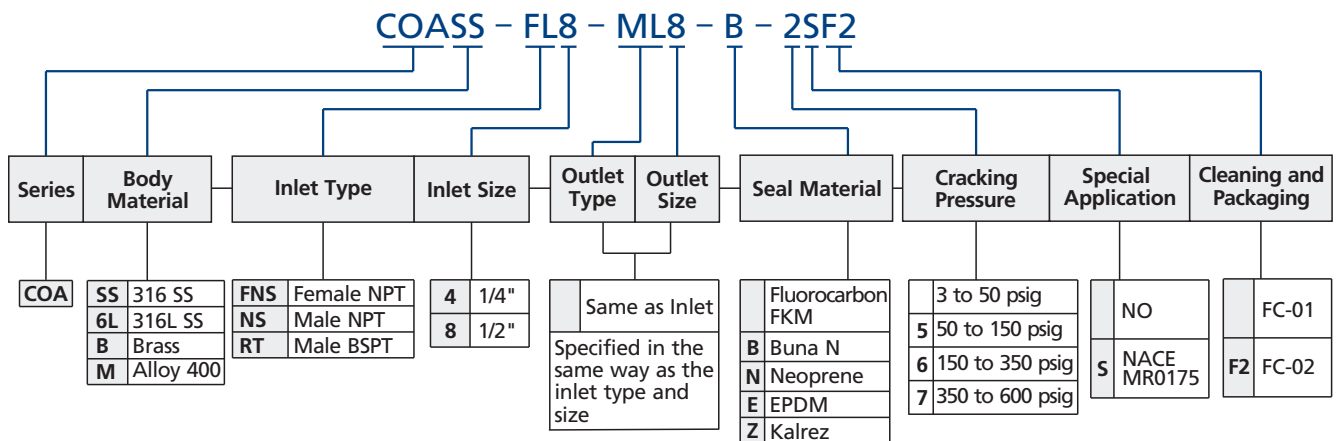
- For oxygen-enriched environment or hazardous media service, please contact FITOK Group or our authorized distributors.
- Cleaning and Packaging:  
 FC-01: Standard cleaning and packaging for general industrial procedures.  
 FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.
- The materials, connection types and sizes listed in the "Ordering Number Description" are standard. For other materials and end connections, please contact FITOK Group or our authorized distributors.
- Check valve is designed with unidirectional flow path, it can't be used as safety relief valve.
- If the check valve is not opened for a period of time, its initial cracking pressure may be higher than set cracking pressure.

COA Series



Basic Ordering Number	Connection Type and Size		Cv	Dimensions, in. (mm)	
	Inlet	Outlet		A	B
COA □□ -FNS4-	1/4 Female NPT	1/4 Female NPT	0.35	2.98 (75.7)	3/4 (19.1)
COA □□ -NS4-	1/4 Male NPT	1/4 Male NPT	0.35	1.62 (41.1)	9/16 (14.3)
COA □□ -NS8-	1/2 Male NPT	1/2 Male NPT	1.20	2.56 (65.0)	7/8 (22.2)
COA □□ -RT4-	1/4 Male BSPT	1/4 Male BSPT	0.35	1.62 (41.1)	9/16 (14.3)
COA □□ -RT8-	1/2 Male BSPT	1/2 Male BSPT	1.20	2.56 (65.0)	7/8 (22.2)

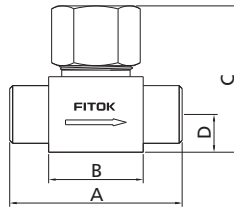
Ordering Number Description



- For oxygen-enriched environment or hazardous media service, please contact FITOK Group or our authorized distributors.
- Cleaning and Packaging:  
 FC-01: Standard cleaning and packaging for general industrial procedures.  
 FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.
- The materials, connection types and sizes listed in the "Ordering Number Description" are standard. For other materials and end connections, please contact FITOK Group or our authorized distributors.
- Check valve is designed with unidirectional flow path, it can't be used as safety relief valve.
- If the check valve is not opened for a period of time, its initial cracking pressure may be higher than set cracking pressure.

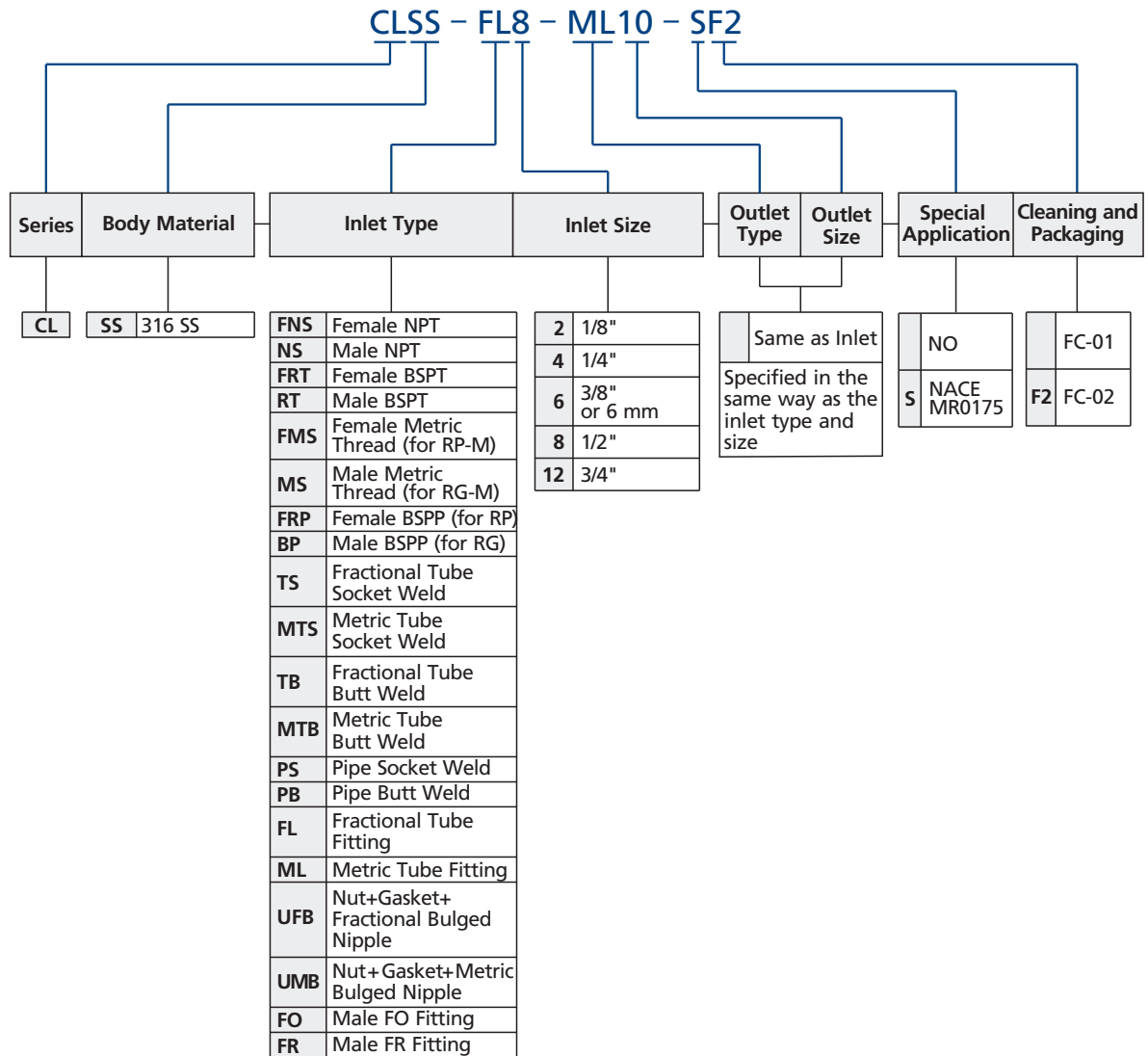


## CL Series



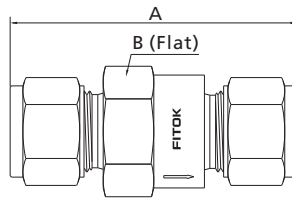
Basic Ordering Number	Connection Type and Size		CV	Dimensions, in. (mm)			
	Inlet	Outlet		A	B	C	D
CL□□-FL4	1/4" FITOK	1/4" FITOK	0.30	2.40 (61.0)	1.01 (25.7)	1.47 (37.3)	0.39 (9.9)
CL□□-FL6	3/8" FITOK	3/8" FITOK	0.64	2.83 (71.9)	1.31 (33.3)	1.85 (47.0)	0.50 (12.7)
CL□□-FL8	1/2" FITOK	1/2" FITOK	2.20	3.92 (99.6)	2.19 (55.6)	2.44 (62.0)	0.62 (15.7)
CL□□-FL12	3/4" FITOK	3/4" FITOK					
CL□□-ML6	6 mm FITOK	6 mm FITOK	0.30	2.40 (61.0)	1.01 (25.7)	1.47 (37.3)	0.39 (9.9)
CL□□-FNS2	1/8 Female NPT	1/8 Female NPT					
CL□□-FNS4	1/4 Female NPT	1/4 Female NPT	0.64	2.25 (57.2)	1.25 (31.8)	1.85 (47.0)	0.50 (12.7)
CL□□-FNS6	3/8 Female NPT	3/8 Female NPT	2.20	3.12 (79.2)	1.86 (47.2)	2.44 (62.0)	0.62 (15.7)
CL□□-FNS8	1/2 Female NPT	1/2 Female NPT					
CL□□-TS4	1/4" TS	1/4" TS	0.30	1.81 (46.0)	0.90 (22.9)	1.47 (37.3)	0.39 (9.9)
CL□□-TS6	3/8" TS	3/8" TS	0.64	2.25 (57.2)	1.25 (31.8)	1.85 (47.0)	0.50 (12.7)
CL□□-TS8	1/2" TS	1/2" TS	2.20	3.13 (79.5)	1.88 (47.8)	2.44 (47.0)	0.62 (15.7)
CL□□-PB4	1/4 PB	1/4 PB	0.30	1.81 (46.0)	0.90 (22.9)	1.47 (37.3)	0.39 (9.9)
CL□□-PB6	3/8 PB	3/8 PB	0.64	2.25 (57.2)	1.25 (31.8)	1.85 (47.0)	0.50 (12.7)
CL□□-PB8	1/2 PB	1/2 PB	2.20	3.13 (79.5)	1.88 (47.8)	2.44 (62.0)	0.62 (15.7)

## Ordering Number Description



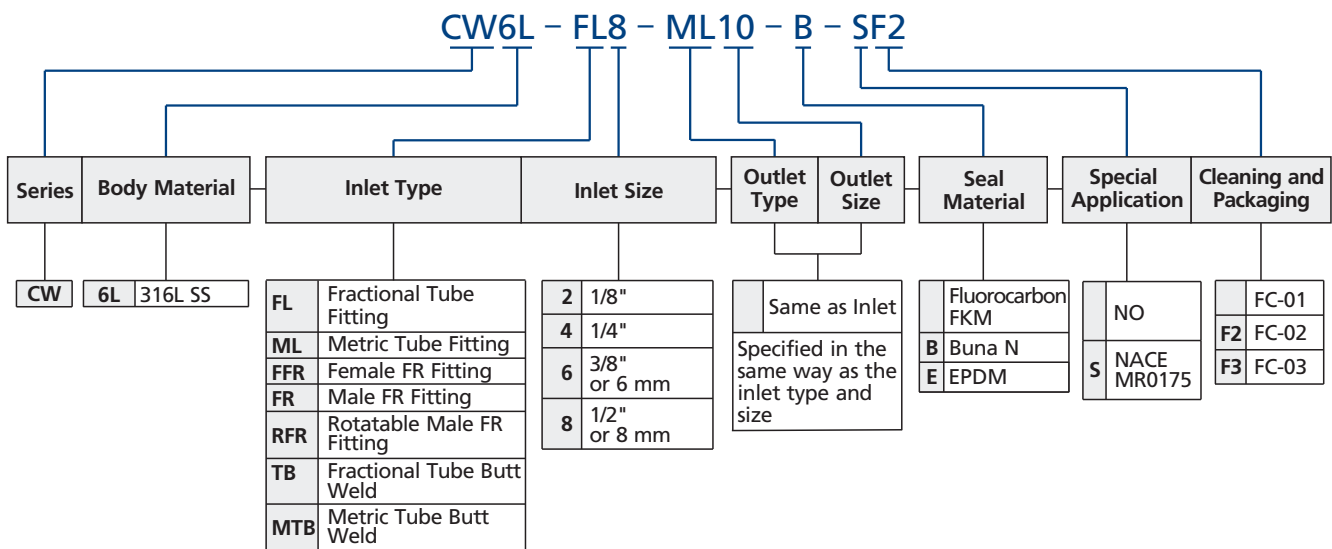
1. Standard thread pitch for metric threads are as follows:  
 M10 and below: 1 mm  
 M12 to M24: 1.5 mm  
 M27 and above: 2 mm  
 Standard thread pitch should be omitted in the ordering number, others should be specified.
2. For oxygen-enriched environment or hazardous media service, please contact FITOK Group or our authorized distributors.
3. Cleaning and Packaging:  
 FC-01: Standard cleaning and packaging for general industrial procedures.  
 FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.
4. The materials, connection types and sizes listed in the "Ordering Number Description" are standard. For other materials and end connections, please contact FITOK Group or our authorized distributors.

CW Series



Basic Ordering Number	Connection Type and Size		Cv	Dimensions, in. (mm)	
	Inlet	Outlet		A	B
CW□□-TB4	1/4" TB	1/4" TB	0.55	1.24 (31.5)	7/8 (22.22)
CW□□-TB6	3/8" TB	3/8" TB	0.70		
CW□□-TB8	1/2" TB	1/2" TB	0.55		
CW□□-MTB6	6 mm MTB	6 mm MTB	0.55	1.80 (45.7)	1 (25.4)
CW□□-FR4	1/4" Male FR	1/4" Male FR	0.70		
CW□□-FR8	1/2" Male FR	1/2" Male FR	0.55	2.06 (52.3)	7/8 (22.22)
CW□□-FL4	1/4" FITOK	1/4" FITOK	0.55	1.96 (49.8)	7/8 (22.22)
CW□□-ML6	6 mm FITOK	6 mm FITOK			

Ordering Number Description



Check Valves Relief Valves

- For oxygen-enriched environment or hazardous media service, please contact FITOK Group or our authorized distributors.
- Cleaning and Packaging:
  - FC-01: Standard cleaning and packaging for general industrial procedures.
  - FC-02: Special Cleaning and packaging is applied to wetted system assembly with its surface roughness finished to an average of Ra 0.5 µm after machine polishing to meet the requirement of ASTM G93 Level C.
  - FC-03: Ultrahigh-purity Cleaning and Packaging is applied to wetted system assembly with its surface roughness finished to an average of Ra 0.2 µm after machine polishing and electropolishing.
- The materials, connection types and sizes listed in the "Ordering Number Description" are standard. For other materials and end connections, please contact FITOK Group or our authorized distributors.
- Check valve is designed with unidirectional flow path, it can't be used as safety relief valve.
- If the check valve is not opened for a period of time, its initial cracking pressure may be higher than set cracking pressure.

# Proportional Relief Valves

RV, RL and RM Series

Check Valves  
Relief Valves



# Proportional Relief Valves

## RV, RL and RM Series

### Introduction

FITOK relief valves OPEN when system pressure reaches the set pressure and CLOSE when system pressure falls below the set pressure.



### Features

- ⦿ Set pressure:
  - RV series: 7 color-coded springs available for a wide range of set pressure, 50 to 6000 psig @ 70°F (3.4 to 414 bar @ 20°C)
  - RL series: 10 to 225 psig @ 70°F (0.68 to 15.5 bar @ 20°C)
  - RM series: 3 color-coded springs available for a wide range of set pressure, 50 to 1500 psig @ 70°F (3.4 to 103 bar @ 20°C)
- ⦿ Maximum outlet pressure:
  - RV series: 1500 psig (103 bar)
  - RL series: 225 psig (15.5 bar)
  - RM series: 1500 psig (103 bar)
- ⦿ Orifice size:
  - RV series: 0.14" (3.6 mm)
  - RL series: 0.19" (4.8 mm) and 0.25" (6.4 mm)
  - RM series: 0.25" (6.4 mm)
- ⦿ Back pressure
  - Back pressure is the pressure of the outlet of valves. It increases the set pressure of proportional relief valves.
  - RV and RM series: Balanced stem design to eliminate the effect of system back pressure
  - RL series: Pre-set pressure = Desired pressure - 0.8 × Back pressure
- ⦿ Working temperature: -10°F to 300°F (-23°C to 148°C)
- ⦿ Variety of end connections
- ⦿ Liquid or gas service
- ⦿ Adjustable bonnet cap and adjustable set pressure
- ⦿ Lead seal through lock wire holes to lock proportional relief valve so as to secure a set pressure effectively
- ⦿ Variety of seal materials
- ⦿ Label identifies the set pressure range

### Applications

Relief valves are proportional relief valves that open gradually as the pressure increases. Consequently, they do not have a capacity rating at a given pressure rise (accumulation), and they are not certified to ASME or any other codes.

⚠ **Some system applications require relief valves to meet specific safety codes. The system designer and user must determine when such codes apply and whether these relief valves conform to them.**

⚠ **FITOK proportional relief valves should never be used as ASME Boiler and Pressure Vessel Code safety relief devices.**

⚠ **FITOK proportional relief valves are not "Safety Accessories" as defined in the Pressure Equipment Directive 2014/68/EU.**

## Temperature Range of Sealing Materials

O-ring Material	Temperature Ranges °F (°C)
Fluorocarbon Rubber	25 to 250 (-4 to 121)
Buna-N Rubber	0 to 250 (-17 to 121)
Neoprene Rubber	-10 to 300 (-23 to 148)
EPDM	30 to 250 (-1 to 121)

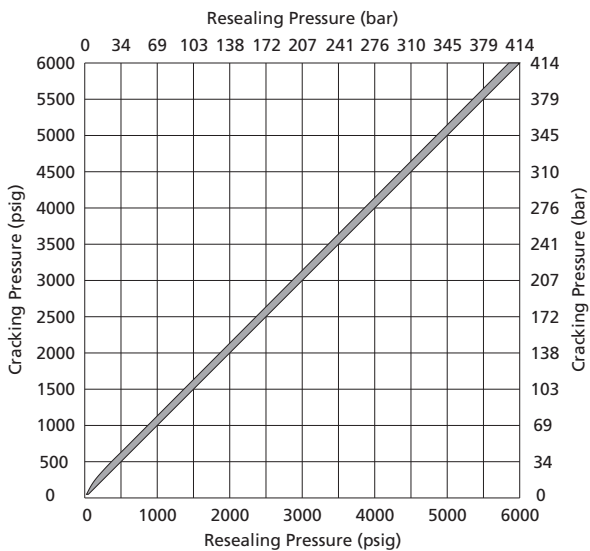
## Set Pressure and Resealing Pressure

**Set pressure:** The set pressure is the upstream pressure at which the first indication of flow occurs. The repeatability of set pressure of each valve after initial relief is  $\pm 5\%$  at room temperature.

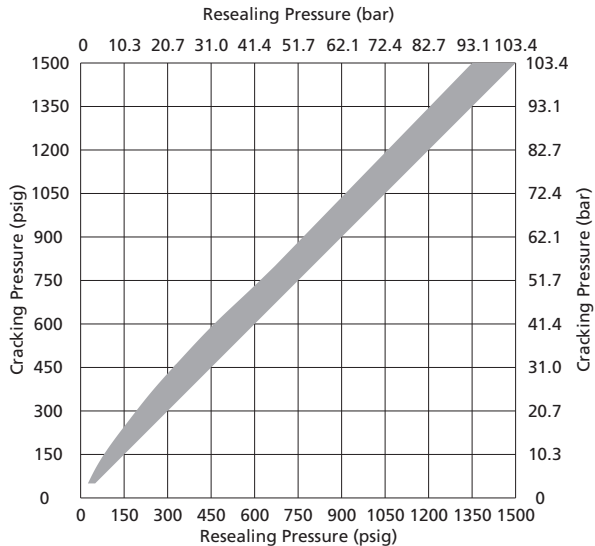
**Resealing pressure:** The resealing pressure is the upstream pressure at which there is no indication of flow. Resealing pressure is always lower than set pressure.

*Note: For valves not acutated for a period of time, the initial relief pressure may be higher than the set pressure.*

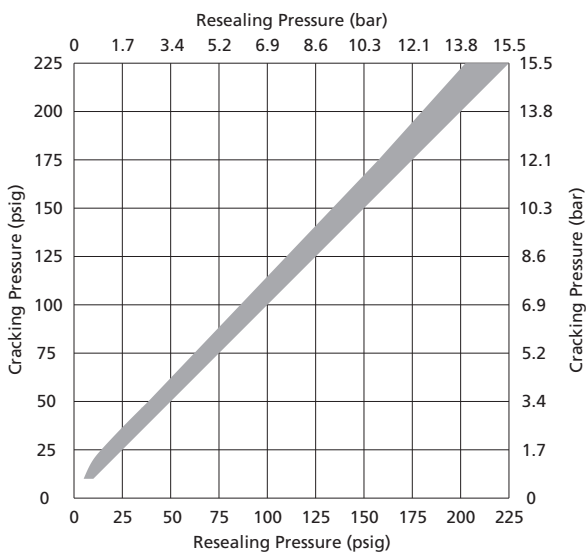
### RV Series



### RM Series

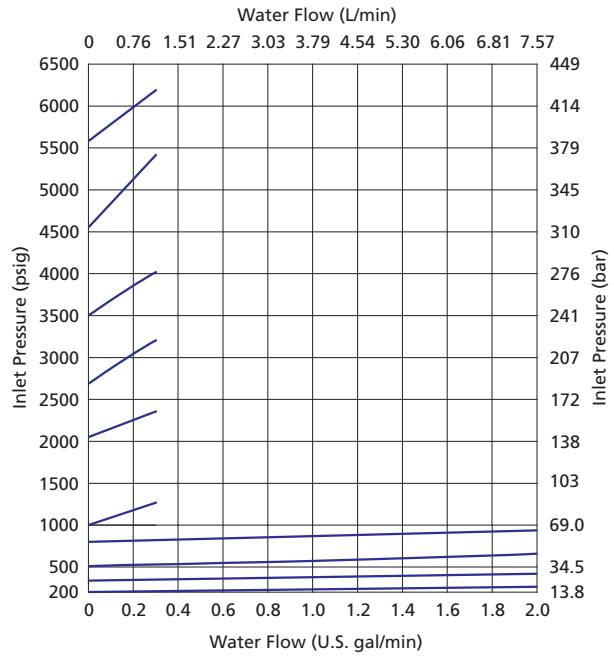
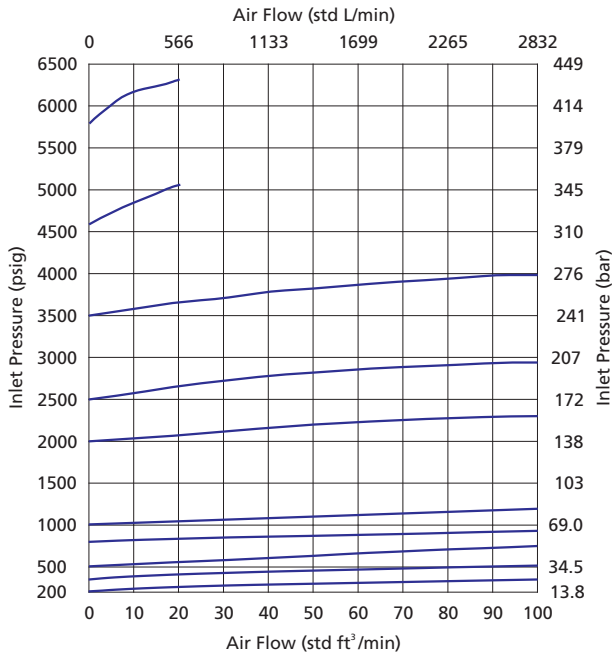


### RL Series

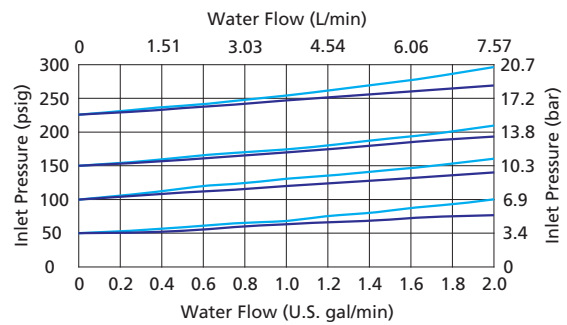
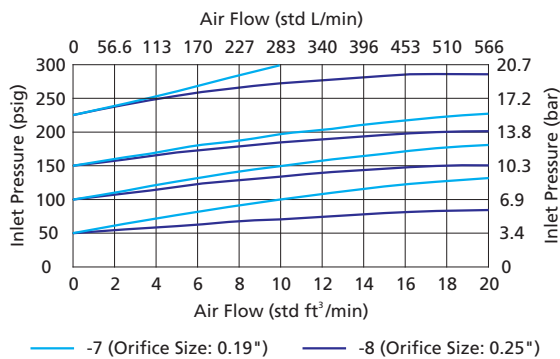


## Flow Data at 70°F (20°C)

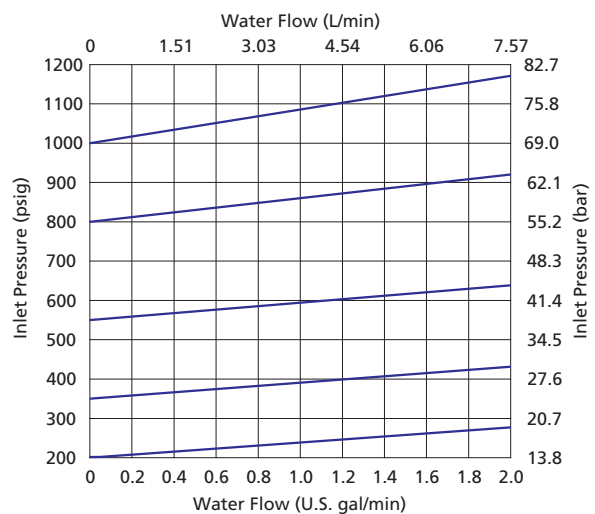
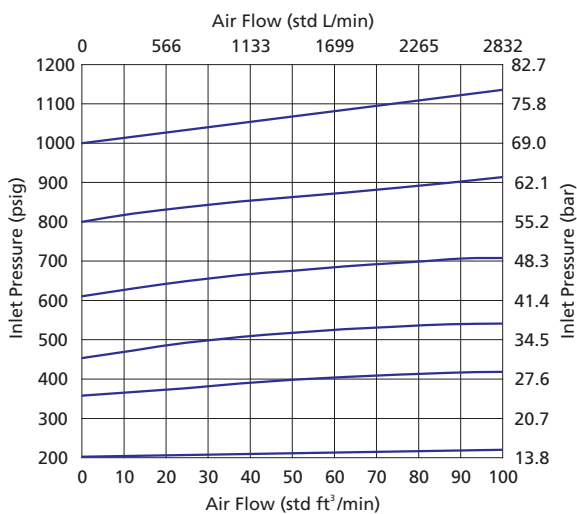
### RV Series



### RL Series



### RM Series

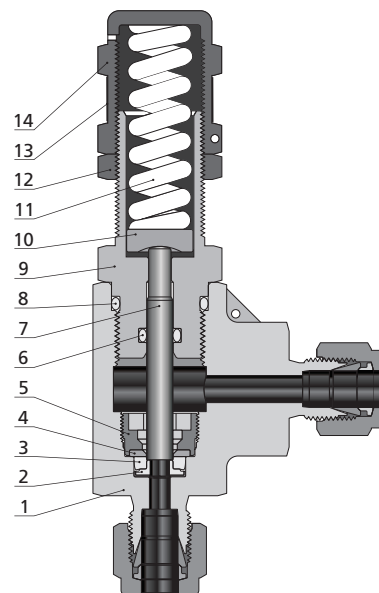


Check Valves  
Relief Valves

## Standard Materials of Construction

### RV Series

Component		Material Grade/ASTM Specification
1	<i>Body</i>	316 SS/A182
2	<i>Seat</i>	316 SS/A479
3	<i>O-ring</i>	Fluorocarbon FKM
4	<i>Gasket</i>	PEEK
5	<i>Seat Retainer</i>	316 SS/A479
6	<i>O-ring</i>	Fluorocarbon FKM
7	<i>Stem</i>	316 SS/A479
8	<i>O-ring</i>	Fluorocarbon FKM
9	<i>Bonnet</i>	316 SS/A479
10	<i>Spring Support</i>	316 SS/A479
11	<i>Spring</i>	S17700 SS/AMS 5678
12	<i>Lock Nut</i>	17-4PH powdered metal
13	<i>Label</i>	Polyester
14	<i>Bonnet Cap</i>	316 SS/A479



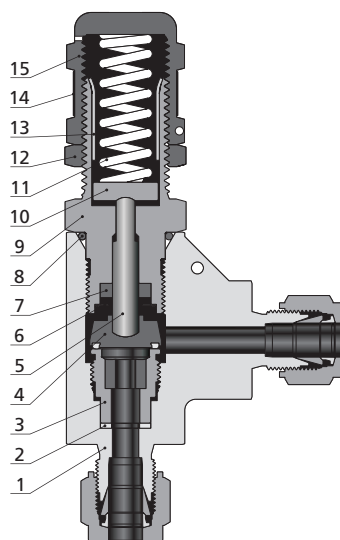
Note: Wetted components are listed in italics.

1. Lubricant: Silicone-based

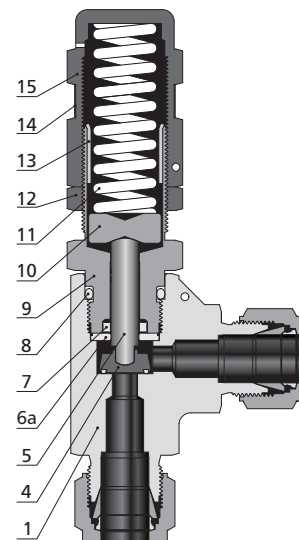
2. Contact FITOK Group or our authorized distributors for other materials

### RL Series

Component		Material Grade/ASTM Specification
1	<i>Body</i>	316 SS/A182
2	<i>Gasket</i>	316 SS/A479
3	<i>Seat</i>	316 SS/A479
4	<i>Bonded disc</i>	316 SS/A479+Fluorocarbon FKM
5	<i>Stem</i>	316 SS/A479
6	<i>Retainer</i>	316 SS/A479
6a	<i>Ring</i>	316 SS/A479
7	<i>Quad Seal</i>	Fluorocarbon FKM
8	<i>O-ring</i>	Fluorocarbon FKM
9	<i>Bonnet</i>	316 SS/A479
10	<i>Spring Support</i>	316 SS/A479
11	<i>Spring</i>	S17700 SS/AMS 5678
12	<i>Lock Nut</i>	17-4PH powdered metal
13	<i>Sleeve</i>	304SS/A240
14	<i>Label</i>	Polyester
15	<i>Bonnet Cap</i>	316 SS/A479



Orifice 7  
0.19 in. (4.8 mm)



Orifice 8  
0.25 in. (6.4 mm)

Note: Wetted components are listed in italics.

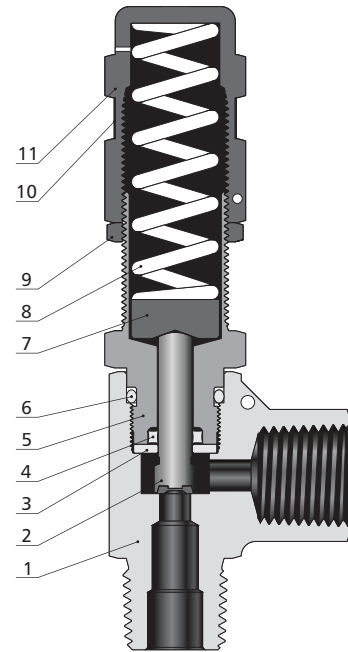
1. Lubricant: Silicone-based

2. Contact FITOK Group or our authorized distributors for other materials



**RM Series**

Component		Material Grade/ASTM Specification
1	Body	316 SS/A182
2	Stem	316 SS/A479+Fluorocarbon FKM
3	Retainer	316 SS/A479
4	Seal	Fluorocarbon FKM
5	Bonnet	316 SS/A479
6	O-ring	Fluorocarbon FKM
7	Spring Support	316 SS/A479
8	Spring	S17700 SS/AMS 5678
9	Lock Nut	17-4PH powdered metal
10	Label	Polyester
11	Bonnet Cap	316 SS/A479



Note: Wetted components are listed in italics.

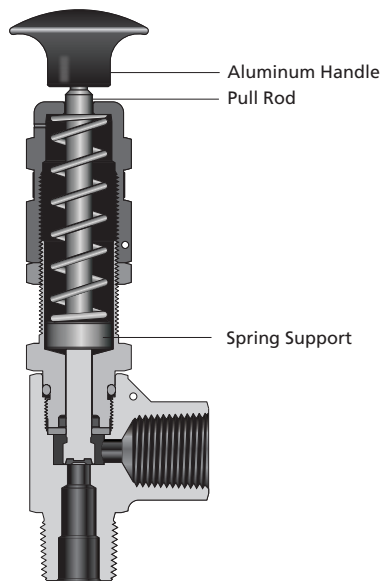
1. Lubricant: Silicone-based

2. Contact FITOK Group or our authorized distributors for other materials

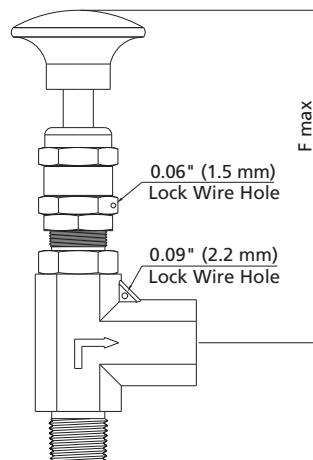
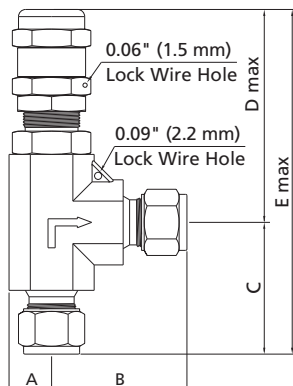
**Manual Override Handles**

Lift the aluminum handle with hand to open the proportional relief valve without changing the set pressure. For use with following valves :

- RV Series — set pressure range 50~1500 psig
- RL Series — set pressure range 10~225 psig
- RM Series— set pressure range 50~300 psig



**Dimensions**



Check Valves  
Relief Valves

**RV Series**

Basic Ordering Number	Connection Type and Size		Orifice in. (mm)	Dimensions, in. (mm)					
	Inlet	Outlet		A	B	C	Dmax	Emax	Fmax
RV□□-FL4-6-□	1/4" FITOK	1/4" FITOK	0.14 (3.6)	0.46 (11.9)	1.60 (40.6)	1.44 (36.6)	2.70 (68.6)	4.14 (105.2)	4.09 (103.9)
RV□□-FL6-6-□	3/8" FITOK	3/8" FITOK							
RV□□-FL8-6-□	1/2" FITOK	1/2" FITOK							
RV□□-ML6-6-□	6 mm FITOK	6 mm FITOK		0.46 (11.9)	1.60 (40.6)	1.44 (36.6)	2.70 (68.6)	4.14 (105.2)	4.09 (104.9)
RV□□-ML8-6-□	8 mm FITOK	8 mm FITOK							
RV□□-ML12-6-□	12 mm FITOK	12 mm FITOK							
RV□□-FNS4-6-□	1/4 Female NPT	1/4 Female NPT		0.46 (11.9)	1.17 (29.7)	1.38 (34.9)	2.70 (68.6)	4.08 (103.5)	4.28 (108.7)
RV□□-NS4-6-□	1/4 Male NPT	1/4 Male NPT							
RV□□-FRT4-6-□	1/4 Female BSPT	1/4 Female BSPT							

**RL Series**

Basic Ordering Number	Connection Type and Size		Orifice in. (mm)	Dimensions, in. (mm)					
	Inlet Size	Outlet Size		A	B	C	D	E	F
RL□□-FL4-7	1/4" FITOK	1/4" FITOK	0.19 (4.8)	0.46 (11.9)	1.60 (40.6)	1.44 (36.6)		4.14 (105.0)	4.09 (104.0)
RL□□-ML6-7	6 mm FITOK	6 mm FITOK							
RL□□-NS4-7	1/4 Male NPT	1/4 Male NPT							
RL□□-RT4-7	1/4 Male BSPT	1/4 Male BSPT			1.17 (29.7)	1.38 (34.9)		4.08 (103.5)	
RL□□-FNS4-7	1/4 Female NPT	1/4 Female NPT							
RL□□-FRT4-7	1/4 Female BSPT	1/4 Female BSPT							
RL□□-FL8-8	1/2" FITOK	1/2" FITOK	0.25 (6.4)	0.54 (13.7)	1.83 (46.5)	1.83 (46.5)	4.09 (104.0)	5.92 (150.0)	5.37 (136.0)
RL□□-ML12-8	12 mm FITOK	12 mm FITOK							
RL□□-NS8-8	1/2 Male NPT	1/2 Male NPT							
RL□□-RT8-8	1/2 Male BSPT	1/2 Male BSPT							
RL□□-FNS8-8	1/2 Female NPT	1/2 Female NPT							
RL□□-FRT8-8	1/2 Female BSPT	1/2 Female BSPT							

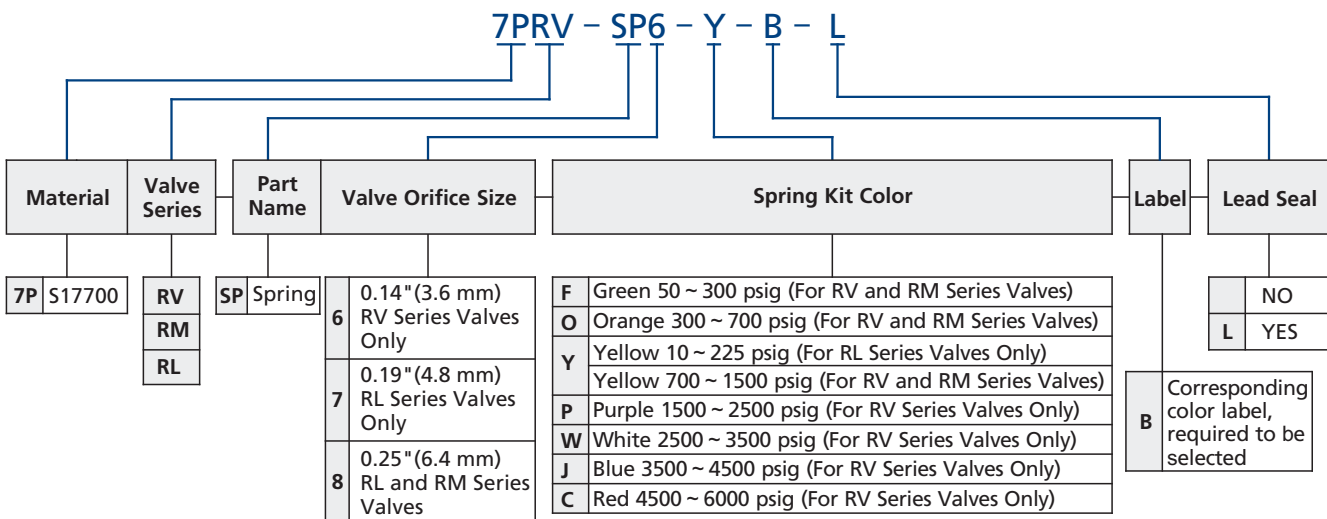
Check Valves  
Relief Valves

RM Series

Basic Ordering Number	Connection Type and Size		Orifice in. (mm)	Dimensions, in. (mm)					
	Inlet Size	Outlet Size		A	B	C	D	E	F
RM□□-FL8-8-□	1/2" FITOK	1/2" FITOK	0.25 (6.4)	0.54 (13.7)	1.83 (46.5)	1.83 (46.5)	4.09 (104.0)	5.92 (150.0)	5.37 (136.0)
RM□□-ML12-8-□	12 mm FITOK	12 mm FITOK							
RM□□-NS8-8-□	1/2 Male NPT	1/2 Male NPT			1.44 (36.6)	1.44 (36.6)	5.52 (140.0)		
RM□□-RT8-8-□	1/2 Male BSPT	1/2 Male BSPT							
RM□□-FNS8-8-□	1/2 Female NPT	1/2 Female NPT							
RM□□-FRT8-8-□	1/2 Female BSPT	1/2 Female BSPT							

1. FITOK means FITOK double ferrule tube fittings.
2. Dimensions are shown with FITOK nuts finger-tightened. All dimensions are for reference only and are subject to change.
3. Sizes and types listed are standard. For other connection types and sizes, please contact FITOK Group or our authorized distributors.

Spring Kit Ordering Number Description



Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

© Every spring kit includes a spring, a label and a lead seal (optional).

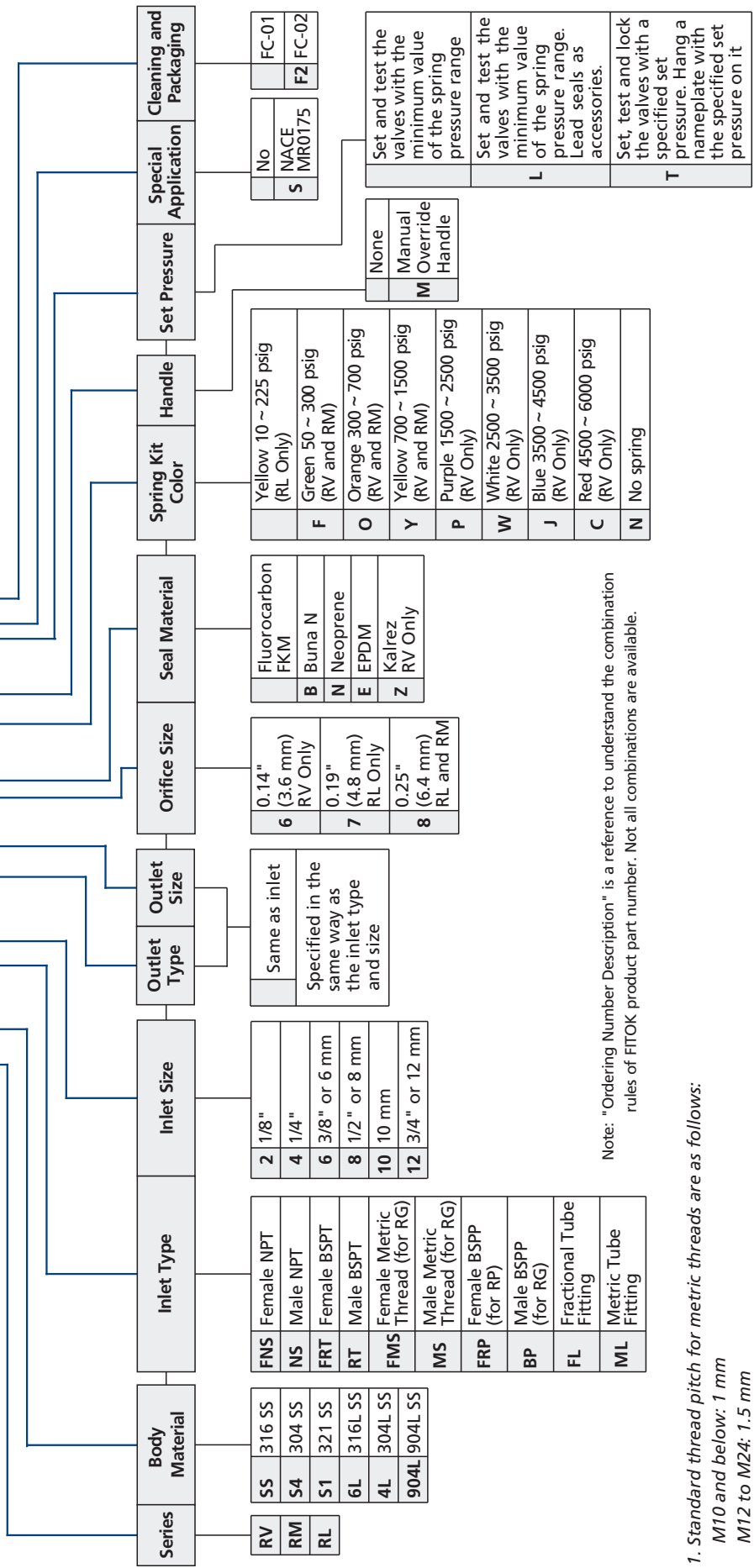
Check Valves  
Relief Valves

# Ordering Number Description

## Valves

RVSS – FL6 – ML8 – 6Z – WM – TSF2

Check Valves  
Relief Valves



Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

- Standard thread pitch for metric threads are as follows:  
 M10 and below: 1 mm  
 M12 to M24: 1.5 mm  
 M27 and above: 2 mm  
 Standard thread pitch should be ignored in the ordering number, others should be specified.
- Cleaning and Packaging:  
 FC-01: Standard cleaning and packaging for general industrial procedures.  
 FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleaning requirement of ASTM G93 Level C.  
 3. The color of the manual override handle is black. For other colors, please contact FITOK Group or our authorized distributors.  
 4. For Proportional Relief Valves with specified set pressure on the nameplate, add the set pressure value (unit: psig) as a suffix to the ordering number.  
 Example: RVSS-ML6-6-F-T-116PSIG.

# Bleed Valves, Purge Valves

Bleed Valves



B-152

Purge Valves



B-157

# Bleed Valves

## RB Series



Bleed Valves  
Purge Valves

# Bleed Valves

## RB Series

### Introduction

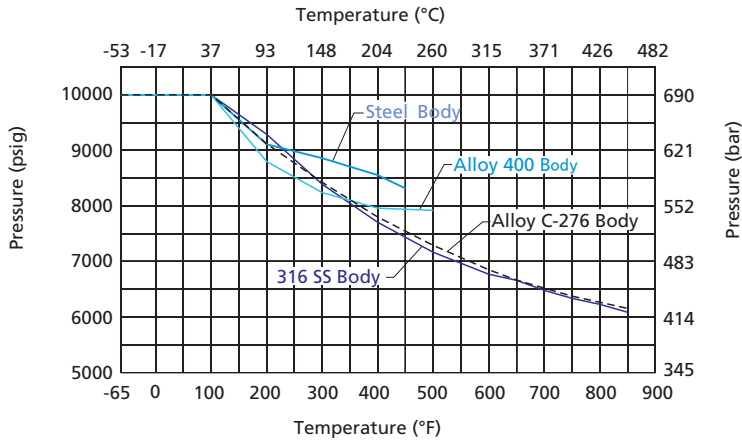
Bleed valves can be used on instrument devices such as multi-valve manifolds or gauge valves to vent signal line pressure to atmosphere before removal of an instrument or to assist in calibration.

### Features

- ⦿ Compact design for easy installation
- ⦿ Hardened stem and tip to extend cycle life
- ⦿ Working pressure up to: 10000 psig (690 bar)
- ⦿ Working temperature: -65°F to 850°F (-54°C to 454°C)
- ⦿ Variety of end connections
- ⦿ Leak-tight performance testing with Nitrogen or compressed air for every valve at the rated pressure (not higher than 6000 psig) to meet the requirement of no visible leak

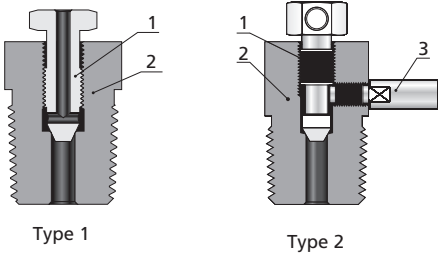


## Pressure vs. Temperature



Note: Ratings based on all metal seals. Ratings limited to:  
 ■ -20°F (-28°C) min with steel.  
 ■ 450°F (232°C) max with SAE end connections using fluorocarbon FKM O-rings.  
 ■ 4500 psig (310 bar) max with SAE end connections.

## Standard Materials of Construction



Component	Valve Body Material Grade/ASTM Specification			
	316 SS	Carbon Steel	Alloy 400	Alloy C-276
1 Stem	<i>Hardened 316 SS/A479</i>			
2 Body	316 SS/A479	1018/A108	<i>Alloy 400/B164</i>	<i>C-276/B574</i>
3 Vent tube	316 SS/A479			

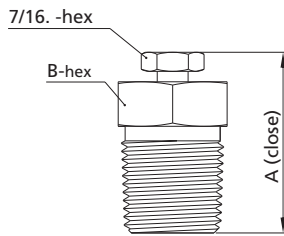
Note: Wetted components are listed in italics.  
 1. Hydrocarbon carrier.  
 2. Contact FITOK Group or our authorized distributors for other materials.



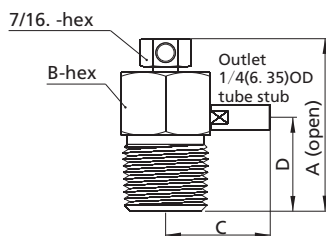
## Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

### Type 1



### Type 2



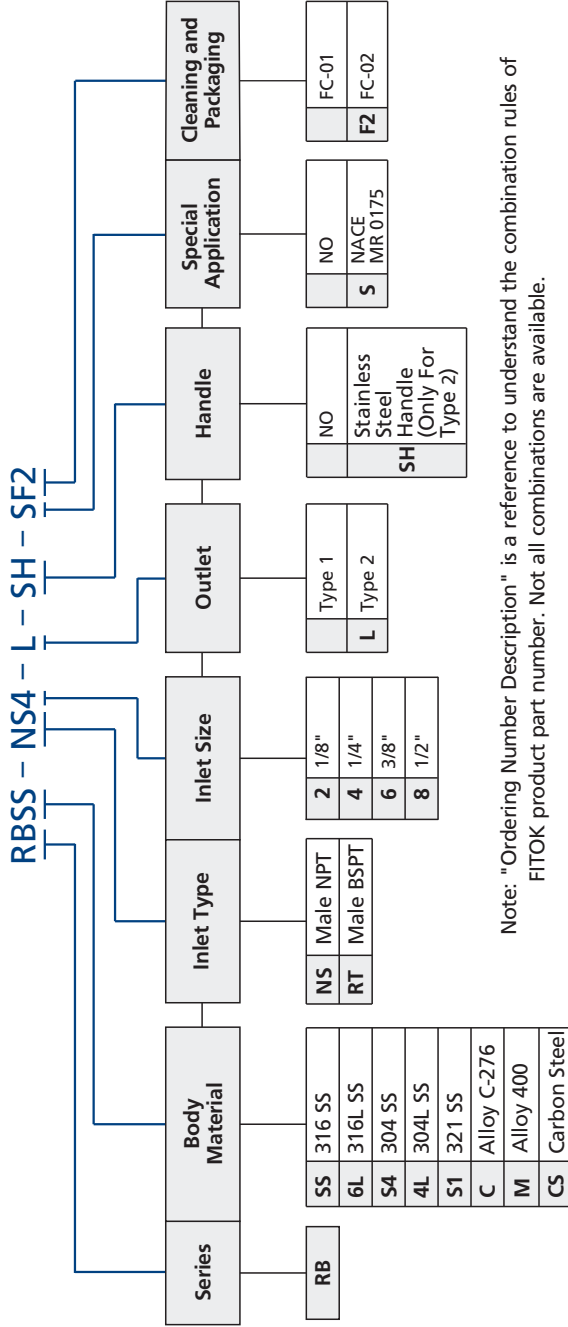
Type	Basic Ordering Number	Inlet Type and Size	Dimensions, in. (mm)			
			A	B	C	D
Type 1	RB□□-NS4	1/4 Male NPT	1.31 (33.4)	5/8 (15.9)	—	—
	RB□□-NS6	3/8 Male NPT	1.46 (37.1)	7/8 (22.2)		
	RB□□-NS8	1/2 Male NPT				
	RB□□-RT4	1/4 Male BSPT	1.31 (33.4)	5/8 (15.9)		
	RB□□-RT6	3/8 Male BSPT	1.46 (37.1)	7/8 (22.2)		
	RB□□-RT8	1/2 Male BSPT				
Type 2	RB□□-NS4-L	1/4 Male NPT	1.65 (41.8)	5/8 (15.9)	0.94 (24)	0.78 (19.7)
	RB□□-NS6-L	3/8 Male NPT	1.78 (45.1)	7/8 (22.2)	1.03 (26.2)	0.91 (23)
	RB□□-NS8-L	1/2 Male NPT			1.04 (26.3)	
	RB□□-RT4-L	1/4 Male BSPT	1.65 (41.8)	5/8 (15.9)	0.94 (24)	0.78 (19.7)
	RB□□-RT6-L	3/8 Male BSPT	1.78 (45.1)	7/8 (22.2)	1.03 (26.2)	0.91 (23)
	RB□□-RT8-L	1/2 Male BSPT			1.04 (26.3)	

Sizes and types listed are standard. Other sizes and types are available upon request.

## Caution

When installing a bleed valve, position the vent tube to direct system fluid away from operating personnel. Always open bleed valves slowly. These valves contain no packing, so some fluid weepage will occur when the valves are opened. Operating personnel must protect themselves from exposure to system fluids.

# Ordering Number Description



Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

**Cleaning and Packaging :**

- FC-01: Standard cleaning and packaging for general industrial procedures.
- FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.

# Purge Valves

RP Series



Bleed Valves  
Purge Valves

# Purge Valves

## RP Series

### Introduction

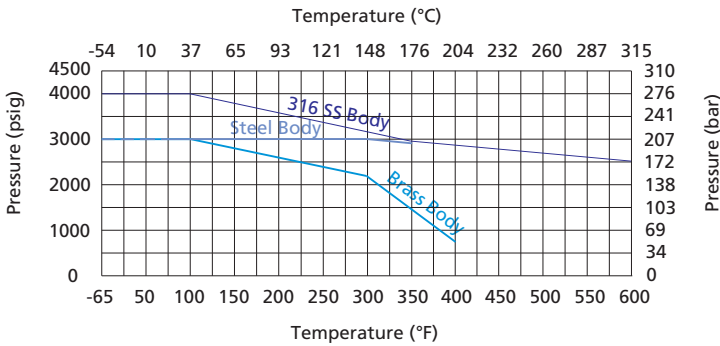
Purge valves are manual bleed, vent or drain valves. The knurled cap is permanently assembled to the valve body for safety. One-quarter turn with a wrench from finger-tight obtains leaktight closure during initial installation. Tightening with a wrench ensures closure to the rated pressure with subsequent installations.

### Features

- Compact design for easy installation
- Bonnet crimped to valve body to prevent accidental disassembly
- Working pressure up to: 4000 psig (276 bar)
- Working temperature: -65°F to 600°F (-54°C to 315°C)
- Leak-tight performance testing with Nitrogen or compressed air for every valve at the maximum working pressure to meet the requirement of no visible leak.



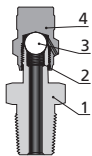
### Pressure vs. Temperature



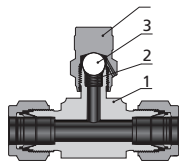
Note: Ratings based on all metal seals. Ratings limited to:  
 ■ -20°F (-28°C) min with steel.  
 ■ 450°F (232°C) max with SAE end connections using fluorocarbon FKM O-rings.

### Standard Materials of Construction

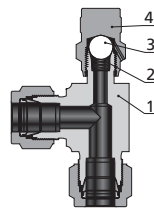
Type L



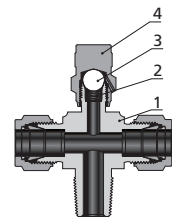
Type TL



Type TA



Type C



Component		Material Grade/ASTM Specification		
		316 SS	Brass	Carbon Steel
1	<i>Body</i>	<i>316 SS/A182 316 SS/A479</i>	<i>Brass C36000/B16 Brass C37700/B283</i>	<i>12L4/A108 Chromium-plated</i>
2	<i>Spring</i>	<i>302 SS/A313</i>		
3	<i>Poppeet (Ball)</i>	<i>316 SS/A479</i>		
4	<i>Cap</i>	<i>316 SS/A479</i>	<i>Brass C36000/B16</i>	<i>12L4/A108 Chromium-plated</i>

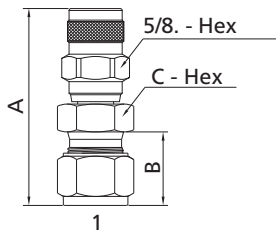
Note: Wetted components are listed in italics.

1. Lubricant: molybdenum disulfide-based and silicone-based.

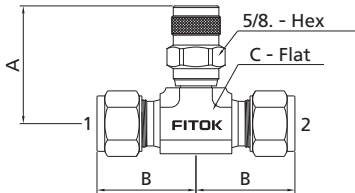
2. Contact FITOK Group or our authorized distributors for other materials.

# Dimensions

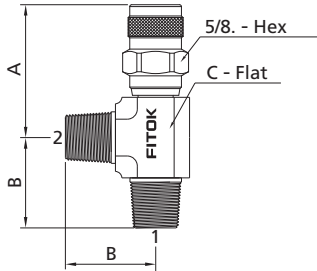
## Type L



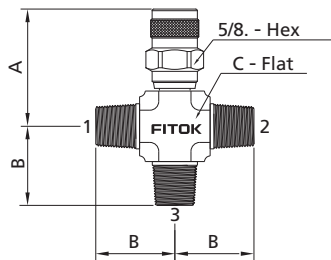
## Type TL



## Type TA



## Type C



## Caution:

When installing a purge valve, position the vent hole to direct system fluid away from operating personnel. Always open purge valves slowly. These valves contain no packing, so some fluid weepage will occur when the valves are opened. Operating personnel must protect themselves from exposure to system fluids.

Basic Ordering Number	Connection Type and Size		Dimensions, in. (mm)			
			A <sub>max</sub>	B	C	D
RP□□-L	-FL4	1/4" FITOK	1.96 (49.8)	0.69 (17.5)	1/2 (12.7)	5/8 (15.9)
	-FL6	3/8" FITOK	2.05 (52.1)	0.75 (19.1)	5/8 (15.9)	
	-FL8	1/2" FITOK	2.20 (56.0)	0.88 (22.4)	13/16 (20.6)	
	-ML6	6 mm FITOK	1.96 (49.8)	0.69 (17.5)	0.55 (14.0)	
	-ML8	8 mm FITOK	2.02 (51.3)	0.73 (18.6)	0.59 (15.0)	
	-ML10	10 mm FITOK	2.10 (53.4)	0.77 (19.6)	0.71 (18.0)	
	-ML12	12 mm FITOK	2.20 (55.9)	0.87 (22.0)	0.87 (22.0)	
	-FNS4	1/4 Female NPT	1.76 (44.7)	0.72 (18.3)	3/4 (19.1)	
	-FNS6	3/8 Female NPT	1.83 (46.5)	0.78 (19.8)	7/8 (22.2)	
	-FNS8	1/2 Female NPT	2.02 (51.3)	0.97 (24.6)	1 1/16 (26.9)	
	-NS4	1/4 Male NPT	1.84 (46.8)	0.56 (14.2)	9/16 (14.3)	
	-NS6	3/8 Male NPT	1.89 (48.0)	0.56 (14.2)	11/16 (17.5)	
	-NS8	1/2 Male NPT	2.11 (53.6)	0.75 (19.1)	7/8 (22.2)	
	RP□□-TL RP□□-TA RP□□-C	-FL4	1/4" FITOK	1.41 (35.8)	1.06 (26.9)	
-FL6		3/8" FITOK	1.49 (37.8)	1.20 (30.5)	5/8 (15.9)	
-FL8		1/2" FITOK	1.61 (40.9)	1.42 (36.1)	13/16 (20.6)	
-ML6		6 mm FITOK	1.41 (35.8)	1.06 (27.0)	1/2 (12.7)	
-ML8		8 mm FITOK	1.48 (37.7)	1.495 (29.9)	5/8 (15.9)	
-ML10		10 mm FITOK	1.52 (38.6)	1.24 (31.6)	11/16 (17.5)	
-ML12		12 mm FITOK	1.60 (40.6)	1.41 (36.0)	13/16 (20.6)	
-FNS4		1/4 Female NPT	1.66 (42.2)	1.17 (29.7)	11/16 (17.5)	
-FNS6		3/8 Female NPT	1.75 (44.4)	1.42 (36.1)	13/16 (20.6)	
-FNS8		1/2 Female NPT	1.75 (44.4)	1.56 (39.6)	1 (25.4)	
-NS4		1/4 Male NPT	1.54 (39.2)	1.05 (26.7)	1/2 (12.7)	
-NS6		3/8 Male NPT	1.68 (42.6)	1.17 (29.7)	11/16 (17.5)	
-NS8		1/2 Male NPT	1.75 (44.4)	1.45 (36.8)	13/16 (20.6)	

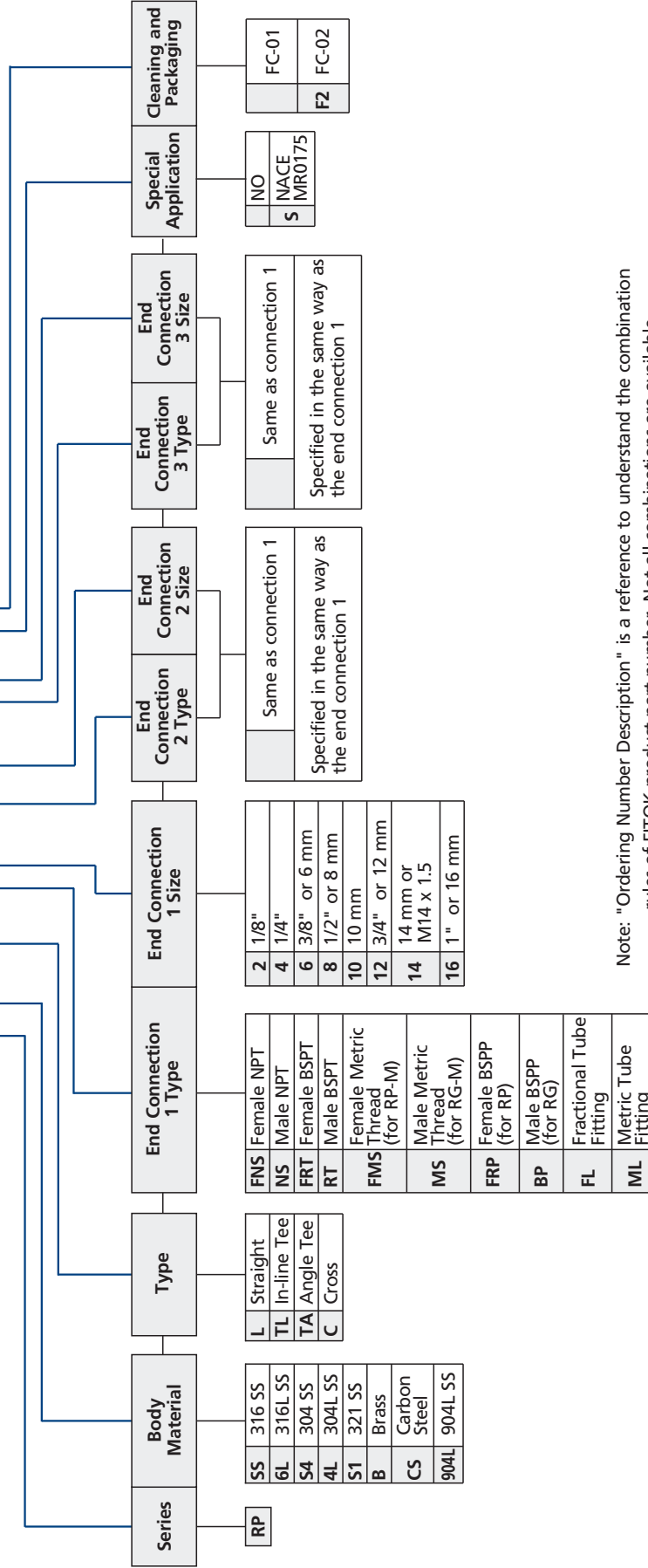
1. FITOK means FITOK double ferrule tube fittings.
2. Dimensions are shown with FITOK nuts finger-tightened. All dimensions are for reference only and are subject to change.
3. Sizes and types listed are standard. Other sizes and types are available upon request.

Bleed Valves  
Purge Valves

# Ordering Number Description

Bleed Valves  
Purge Valves

RPSS – C – FL8 – ML10 – FL8 – SF2



Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

1. Standard thread pitch for metric threads are as follows:

- M10 and below: 1 mm
- M12 to M24: 1.5 mm
- M27 and above: 2 mm

Standard thread pitch should be omitted in the ordering number, others should be specified.

2. Cleaning and Packaging:

- FC-01: Standard cleaning and packaging for general industrial procedures.
- FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement of ASTM G93 Level C.

# Filters

Filters

---



B-162

# Filters

FT, FB, FI and FW Series



Filters



## Filtration Definitions

- ⊙ Sintered element: metal powder (alloys are available) is pressed in a die at sufficient pressure that the powder particles adhere at their contact points.
- ⊙ Strainer element: the strainer is cup-shaped and includes an inner cup-shaped support structure having staggered perforations extending through the surfaces thereof, an outer cup-shaped strainer structure constructed of wire mesh is closely received over the support structure.
- ⊙ Element nominal pore size: the element nominal pore size is normally calculated from the pressure required to cause air to bubble from the largest pore in the filter element when submerged in a test liquid.

## Features

### Tee-type Filters

#### FT Series

- ⊙ Filter element replaceable without removing body from system
- ⊙ Union bonnet design
- ⊙ Nominal pore sizes for sintered element: 0.5, 2, 7, 15, 40, 60 and 80  $\mu\text{m}$
- ⊙ Nominal pore sizes for strainer element: 100, 150, 250 and 450  $\mu\text{m}$
- ⊙ Working pressure up to: 6000 psig (414 bar)
- ⊙ Working temperature: -20°F to 900°F (-28°C to 482°C)
- ⊙ Body materials: 316 SS, 316L SS, 304 SS, 304L SS, 904L SS and Brass
- ⊙ Variety of end connections available

### Bypass Filters

#### FB Series

- ⊙ Bypass port at filter bottom for the ease of sampling or purging
- ⊙ Union bonnet design
- ⊙ Nominal pore sizes for sintered element: 0.5, 2, 7, 15, 40, 60 and 80  $\mu\text{m}$
- ⊙ Nominal pore sizes for strainer element: 100, 150, 250 and 450  $\mu\text{m}$
- ⊙ Working pressure up to: 6000 psig (414 bar)
- ⊙ Working temperature: -20°F to 900°F (-28°C to 482°C)
- ⊙ Body materials: 316 SS, 316L SS, 304 SS, 304L SS, 904L SS and Brass
- ⊙ Variety of end connections available

### In-line Filters

#### FI Series

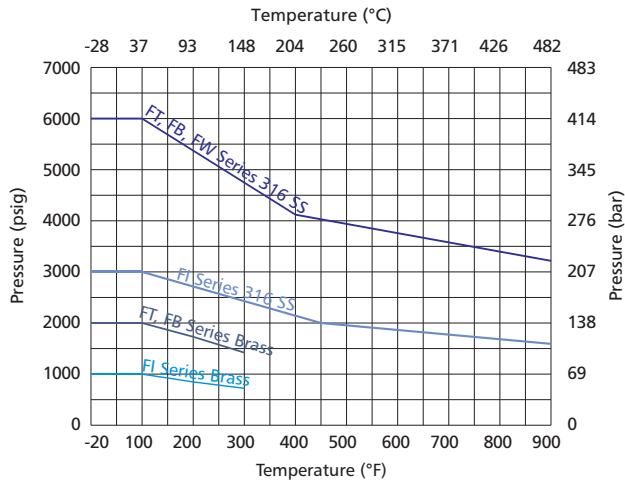
- ⊙ Compact and space-saving design
- ⊙ Nominal pore sizes for sintered element: 0.5, 2, 7, 15, 40, 60 and 80  $\mu\text{m}$
- ⊙ Nominal pore sizes for strainer element: 100, 150, 250 and 450  $\mu\text{m}$
- ⊙ Working pressure up to: 3000 psig (207 bar)
- ⊙ Working temperature: -20°F to 900°F (-28°C to 482°C)
- ⊙ Body materials: 316 SS, 316L SS, 304 SS, 304L SS, 321 SS, 904L SS and Brass
- ⊙ Variety of end connections available

### All-welded In-line Filters

#### FW Series

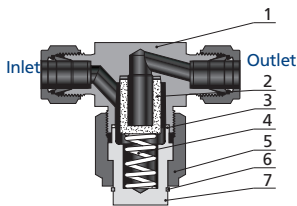
- ⊙ Large filtration area and high flow coefficient
- ⊙ All-welded construction for elimination of leakage
- ⊙ Easy cleaning of filters by backflushing
- ⊙ Full-penetration weld between body and filter element
- ⊙ Nominal pore sizes for sintered element: 0.5  $\mu\text{m}$
- ⊙ Nominal pore sizes for strainer element: 2, 7, 15 and 40  $\mu\text{m}$
- ⊙ Working pressure up to: 6000 psig (414 bar)
- ⊙ Working temperature: -20°F to 900°F (-28°C to 482°C)
- ⊙ Body materials: 316 SS, 316L SS, 304 SS, 304L SS and 904L SS
- ⊙ Variety of end connections available

## Pressure vs. Temperature

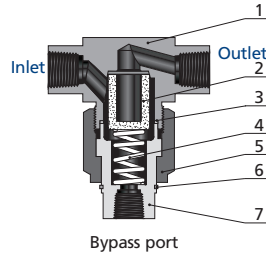


Contact FITOK Group or our authorized distributors for curve graph of other materials.

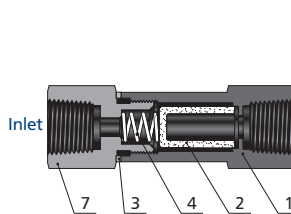
FT Series



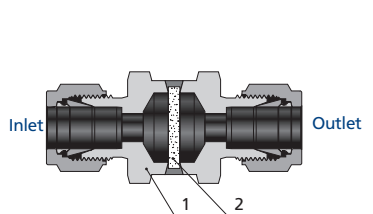
FB Series



FI Series



FW Series



## Standard Materials of Construction

Component		Material Grade/ASTM Specification	
		316 SS	Brass
1	Body	F316 SS/A182 (FT, FB Series), 316 SS/A479 (FI, FW Series)	Brass C37700/B283 (FT, FB Series) Brass C36000/B16 (FI Series)
2	Element	Sintered 316 SS or strainer 316 SS	Sintered 316 SS or strainer 316 SS
3	Gasket	316 SS/A479 with PTFE/D1710 coating or silver-plated	PTFE/D1710 or aluminum/B209
4	Spring	302 SS/A313	302 SS/A313
5	Bonnet Nut	316 SS/A479	C36000/B16
6	Backup Ring	Stainless steel	
7	Bonnet	316 SS/A479	C36000/B16

1. FW Series filters not available in brass

2. Lubricants: molybdenum disulfide-based and silicone-based

## Maximum Differential Pressure of Clean Filter at 70°F (20°C)

Series	Maximum Differential Pressure psig (bar)										
	0.5 micron	2 micron	7 micron	15 micron	40 micron	60 micron	80 micron	100 micron	150 micron	250 micron	450 micron
FT, FB, FI	1000 (69.0)										
FW	600 (41.4)		100 (6.9)								

## Filter Elements

Filter elements remove 95 % of particles larger than the nominal pore size.

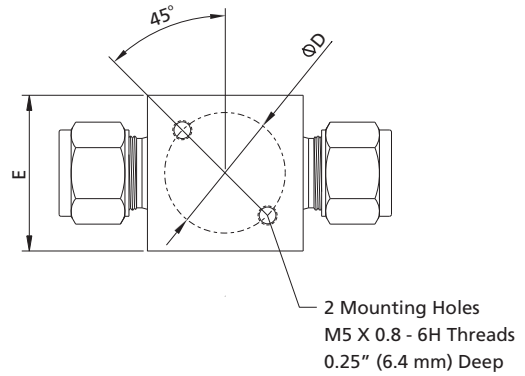
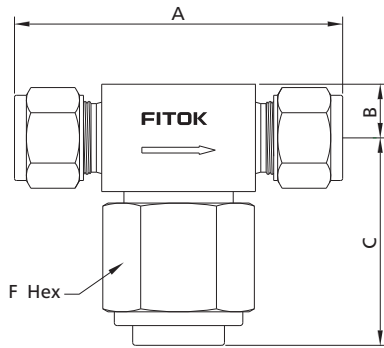
Nominal Pore Size $\mu\text{m}$	Pore Size Range $\mu\text{m}$	Element Type
0.5	0.5 to 2	Sintered
2	1 to 4	Sintered or Strainer
7	5 to 10	
15	11 to 25	
40	35 to 53	
60	50 to 75	
80	70 to 95	
100	—	Strainer
150	—	
250	—	
450	—	

## Filtration Area

Series	Orifice in. (mm)	Filtration Area in. <sup>2</sup> (mm <sup>2</sup> )	
		Sintered	Strainer
2FT, 2FB	0.09 (2.0)	1.30 (830)	1.00 (640)
4FT, 4FB	0.17 (4.4)	1.30 (830)	1.00 (640)
6FT, 6FB	0.21 (5.4)	2.00 (1280)	1.70 (1090)
8FT, 8FB	0.25 (6.4)	2.00 (1280)	1.70 (1090)
2FI	0.09 (2.4)	0.55 (350)	—
4FI	0.19 (4.8)	1.30 (830)	1.00 (640)
6FI	0.28 (7.1)	2.00 (1280)	1.70 (1090)
8FI	0.41 (10.3)	2.00 (1280)	1.70 (1090)
4FW	0.19 (4.8)	0.39 (254)	0.39 (254)

## Dimensions

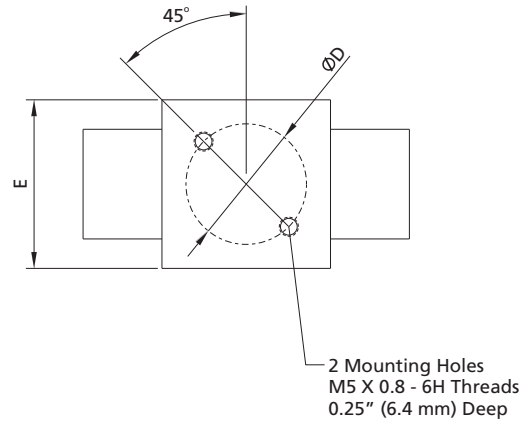
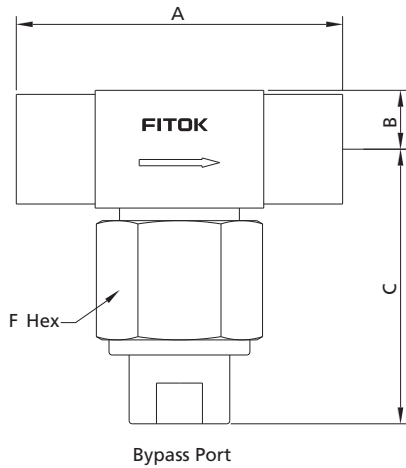
### FT Series



Basic Ordering Number	Connection Type and Size		Element Series	Filter Series	Dimensions, in. (mm)					
	Inlet	Outlet			A	B	C	$\phi D$	E	F
FT□□-FL2-	1/8" FITOK	1/8" FITOK	4	4FT	2.27 (57.7)	0.38 (9.7)	1.49 (37.8)	1.00 (25.4)	1.00 (25.4)	1 (25.4)
FT□□-FL4-	1/4" FITOK	1/4" FITOK	4	4FT	2.47 (62.7)					
FT□□-FL6-	3/8" FITOK	3/8" FITOK	8	8FT	2.84 (72.1)	0.46 (11.7)	1.74 (44.2)	1.13 (28.7)	1.13 (28.7)	1 1/8 (28.6)
FT□□-FL8-	1/2" FITOK	1/2" FITOK	8	8FT	3.04 (77.2)					
FT□□-ML6-	6 mm FITOK	6 mm FITOK	4	4FT	2.46 (62.5)	0.38 (9.7)	1.49 (37.8)	1.00 (25.4)	1.00 (25.4)	1 (25.4)
FT□□-ML8-	8 mm FITOK	8 mm FITOK	8	8FT	2.84 (72.1)	0.46 (11.7)	1.74 (44.2)	1.13 (28.7)	1.13 (28.7)	1 1/8 (28.6)
FT□□-ML10-	10 mm FITOK	10 mm FITOK	8	8FT	2.86 (72.6)					
FT□□-ML12-	12 mm FITOK	12 mm FITOK	8	8FT	3.04 (77.2)					
FT□□-TS4-	1/4" TS	1/4" TS	4	4FT	1.68 (42.7)	0.38 (9.7)	1.49 (37.8)	1.00 (25.4)	1.00 (25.4)	1 (25.4)
FT□□-TS6-	3/8" TS	3/8" TS	4	4FT						
FT□□-TB4-	1/4" TB	1/4" TB	4	4FT						
FT□□-TB6-	3/8" TB	3/8" TB	4	4FT						
FT□□-FNS2-	1/8 Female NPT	1/8 Female NPT	4	4FT	2.00 (50.8)	2.13 (54.1)				
FT□□-FNS4-	1/4 Female NPT	1/4 Female NPT	4	4FT						
FT□□-NS4-	1/4 Male NPT	1/4 Male NPT	4	4FT						
FT□□-NS6-	3/8 Male NPT	3/8 Male NPT	8	8FT	2.38 (60.5)	0.46 (11.7)	1.74 (44.2)	1.13 (28.7)	1.13 (28.7)	1 1/8 (28.6)
FT□□-NS8-	1/2 Male NPT	1/2 Male NPT	8	8FT	2.75 (69.9)					
FT□□-FR4-	1/4 Male FR	1/4 Male FR	4	4FT	2.30 (58.4)	0.38 (9.7)	1.49 (37.8)	1.00 (25.4)	1.00 (25.4)	1 (25.4)
FT□□-FR8-	1/2 Male FR	1/2 Male FR	8	8FT	2.55 (64.8)	0.46 (11.7)	1.74 (44.2)	1.13 (28.7)	1.13 (28.7)	1 1/8 (28.6)

Mounting holes not available with 1/4 female NPT end connections

FB Series

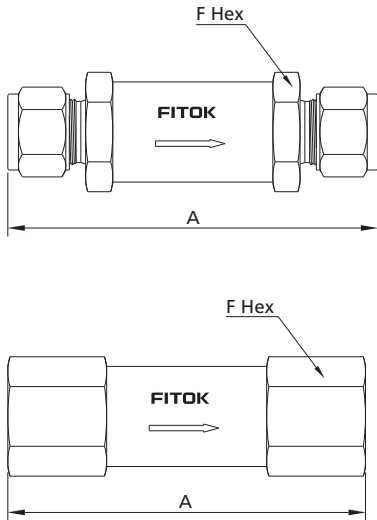


Basic Ordering Number	Connection Type and Size		Element Series	Filter Series	Dimensions, in. (mm)						
	Inlet	Outlet			A	B	C	ØD	E	F	Bypass Port
FB□□-FL2-	1/8" FITOK	1/8" FITOK	4	4FB	2.27 (57.7)	0.38 (9.7)	1.98 (50.2)	1.00 (25.4)	1.00 (25.4)	1 (25.4)	FL2
FB□□-FL4-	1/4" FITOK	1/4" FITOK	4	4FB	2.47 (62.7)		2.44 (61.9)				FL4
FB□□-FL6-	3/8" FITOK	3/8" FITOK	8	8FB	2.84 (72.1)	0.46 (11.7)	2.74 (69.1)	1.13 (28.7)	1.13 (28.7)	1 1/8 (28.6)	FL6
FB□□-FL8-	1/2" FITOK	1/2" FITOK	8	8FB	3.04 (77.2)		2.96 (74.2)				FL8
FB□□-ML6-	6 mm FITOK	6 mm FITOK	4	4FB	2.46 (62.5)	0.38 (9.7)	2.44 (61.9)	1.00 (25.4)	1.00 (25.4)	1 (25.4)	FL4
FB□□-ML8-	8 mm FITOK	8 mm FITOK	8	8FB	2.84 (72.1)	0.46 (11.7)	2.74 (69.1)	1.13 (28.7)	1.13 (28.7)	1 1/8 (28.6)	FL6
FB□□-ML10-	10 mm FITOK	10 mm FITOK	8	8FB	2.86 (72.6)		2.96 (74.2)				FL8
FB□□-ML12-	12 mm FITOK	12 mm FITOK	8	8FB	3.04 (77.2)						
FB□□-TS4-	1/4" TS	1/4" TS	4	4FB	1.68 (42.7)	0.38 (9.7)	1.83 (56.4)	1.00 (25.4)	1.00 (25.4)	1 (25.4)	TB4
FB□□-TS6-	3/8" TS	3/8" TS	4	4FB							
FB□□-TB4-	1/4" TB	1/4" TB	4	4FB							
FB□□-TB6-	3/8" TB	3/8" TB	4	4FB							
FB□□-FNS2-	1/8 Female NPT	1/8 Female NPT	4	4FB	2.00 (50.8)	0.46 (11.7)	2.00 (50.8)	1.13 (28.7)	1.13 (28.7)	1 1/8 (28.6)	FNS2
FB□□-FNS4-	1/4 Female NPT	1/4 Female NPT	4	4FB	2.13 (54.1)						
FB□□-NS4-	1/4 Male NPT	1/4 Male NPT	4	4FB							
FB□□-NS6-	3/8 Male NPT	3/8 Male NPT	8	8FB	2.38 (60.5)	0.46 (11.7)	2.00 (50.8)	1.13 (28.7)	1.13 (28.7)	1 1/8 (28.6)	FL4
FB□□-NS8-	1/2 Male NPT	1/2 Male NPT	8	8FB	2.75 (69.9)						
FB□□-FR4-	1/4 Male FR	1/4 Male FR	4	4FB	2.38 (60.5)	0.38 (9.7)	2.44 (61.9)	1.00 (25.4)	1.00 (25.4)	1 (25.4)	FL4
FB□□-FR8-	1/2 Male FR	1/2 Male FR	8	8FB	2.75 (69.9)	0.46 (11.7)	2.96 (74.2)	1.13 (28.7)	1.13 (28.7)	1 1/8 (28.6)	FL8

Mounting holes not available with 1/4 female NPT end connections

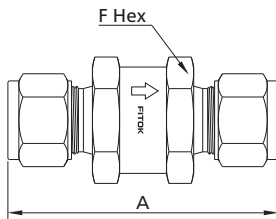
Filters

FI Series



Basic Ordering Number	Connection Type and Size		Element Series	Filter Series	Dimensions in. (mm)	
	Inlet	Outlet			A	F
FI□□-FL2-	1/8" FITOK	1/8" FITOK	2	2FI	2.35 (59.7)	9/16 (14.3)
FI□□-FL4-	1/4" FITOK	1/4" FITOK	4	4FI	2.95 (74.9)	3/4 (19.1)
FI□□-FL6-	3/8" FITOK	3/8" FITOK	8	8FI	3.21 (81.5)	1 (25.4)
FI□□-FL8-	1/2" FITOK	1/2" FITOK	8	8FI	3.49 (88.6)	
FI□□-ML3-	3 mm FITOK	3 mm FITOK	2	2FI	2.38 (60.5)	9/16 (14.3)
FI□□-ML6-	6 mm FITOK	6 mm FITOK	4	4FI	2.96 (75.2)	3/4 (19.1)
FI□□-FNS2-	1/8 Female NPT	1/8 Female NPT	2	2FI	2.16 (54.9)	9/16 (14.3)
FI□□-FNS4-	1/4 Female NPT	1/4 Female NPT	4	4FI	2.87 (72.9)	3/4 (19.1)
FI□□-NS2-	1/8 Male NPT	1/8 Male NPT	2	2FI	1.88 (47.7)	9/16 (14.3)
FI□□-NS4-	1/4 Male NPT	1/4 Male NPT	4	4FI	2.69 (68.3)	3/4 (19.1)
FI□□-FR2-	1/8 Male FR	1/8 Male FR	2	2FI	2.79 (70.8)	
FI□□-FR4-	1/4 Male FR	1/4 Male FR	4	4FI		
FI□□-FRT2-	1/8 Female BSPT	1/8 Female BSPT	2	2FI	2.16 (54.9)	9/16 (14.3)
FI□□-FRT4-	1/4 Female BSPT	1/4 Female BSPT	4	4FI	2.87 (72.9)	3/4 (19.1)
FI□□-RT2-	1/8 Male BSPT	1/8 Male BSPT	2	2FI	1.88 (47.7)	9/16 (14.3)
FI□□-RT4-	1/4 Male BSPT	1/4 Male BSPT	4	4FI	2.69 (68.3)	3/4 (19.1)

FW Series

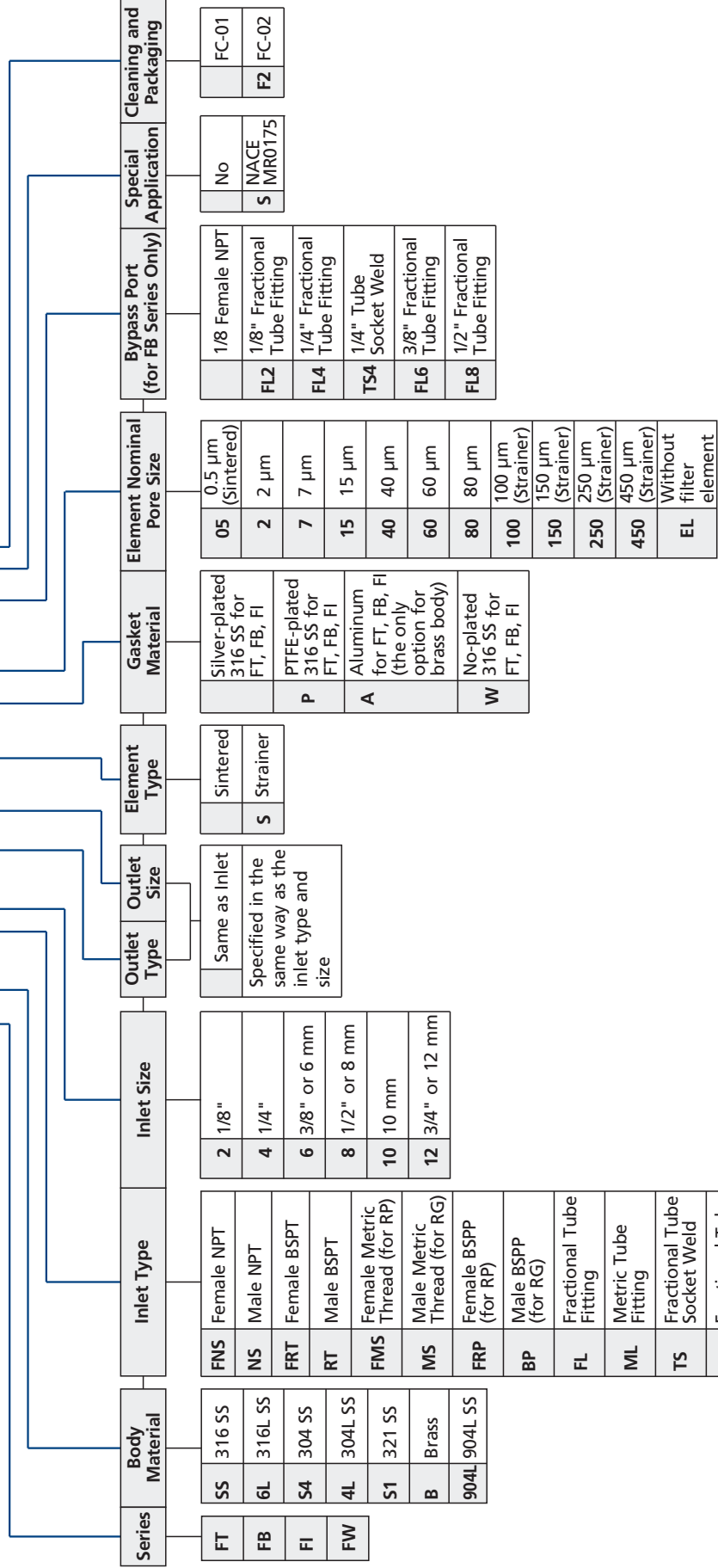


Basic Ordering Number	Connection Type and Size		Orifice in. (mm)	Dimensions in. (mm)	
	Inlet	Outlet		A	F
FW□□-FL4-	1/4" FITOK	1/4" FITOK	0.19 (4.75)	2.15 (54.6)	1 (25.4)
FW□□-ML6-	6 mm FITOK	6 mm FITOK			
FW□□-FNS4-	1/4 Female NPT	1/4 Female NPT	0.45 (11.5)	1.57 (39.9)	
FW□□-NS4-	1/4 Male NPT	1/4 Male NPT	0.28 (7.14)	1.89 (48.0)	
FW□□-FR4-	1/4 Male FR	1/4 Male FR	0.19 (4.75)	2.04 (51.8)	

1. FITOK means FITOK double ferrule tube fittings, FR means metal gasket seal fittings, TS means fractional tube socket weld, TB means fractional tube butt weld.
2. Sizes and types listed are standard. Other sizes and types are available upon request.
3. Dimensions are shown with FITOK nuts finger-tightened. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

# Filters Ordering Number Description

FBSS – FL8 – ML10 – S – P150 – FL4SF2



Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

1. Standard thread pitch for metric threads are as follows:

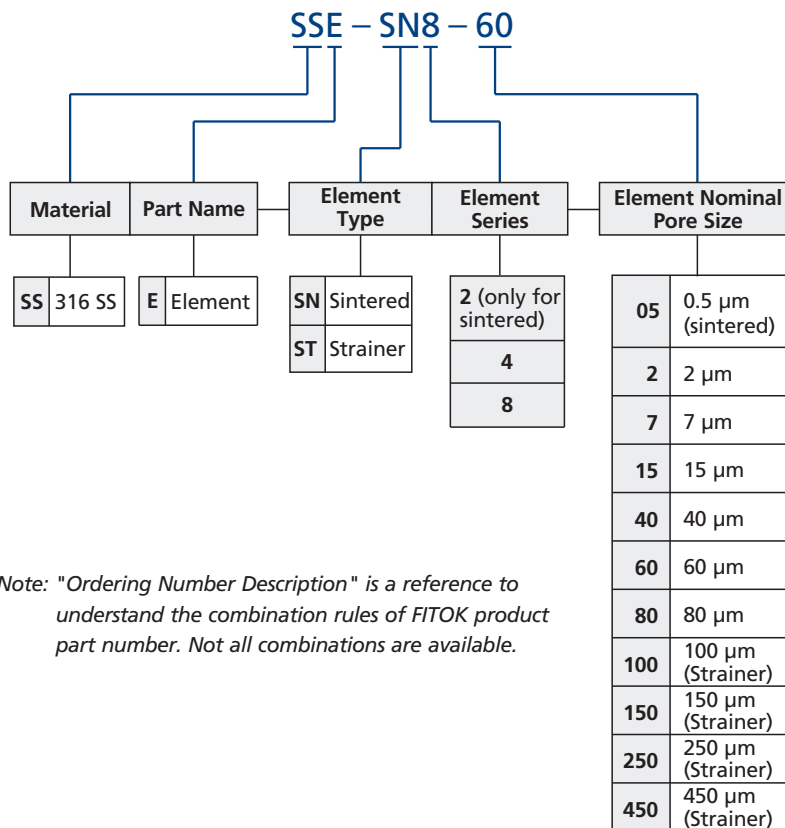
- M10 and below: 1 mm
- M12 to M24: 1.5 mm
- M27 and above: 2 mm

Standard thread pitch should be ignored in the ordering number, others should be specified.

2. Cleaning and Packaging:

- FC-01 Standard cleaning and packaging for basic industrial procedures.
- FC-02 Special cleaning and packaging for wetted system components to ensure compliance requirement as stated in ASTM G93 Level C.

## Elements Ordering Number Description



*Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.*



# Manifolds

Gauge Valves and Instrumentation Manifolds



C-02

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Block and Bleed Valves



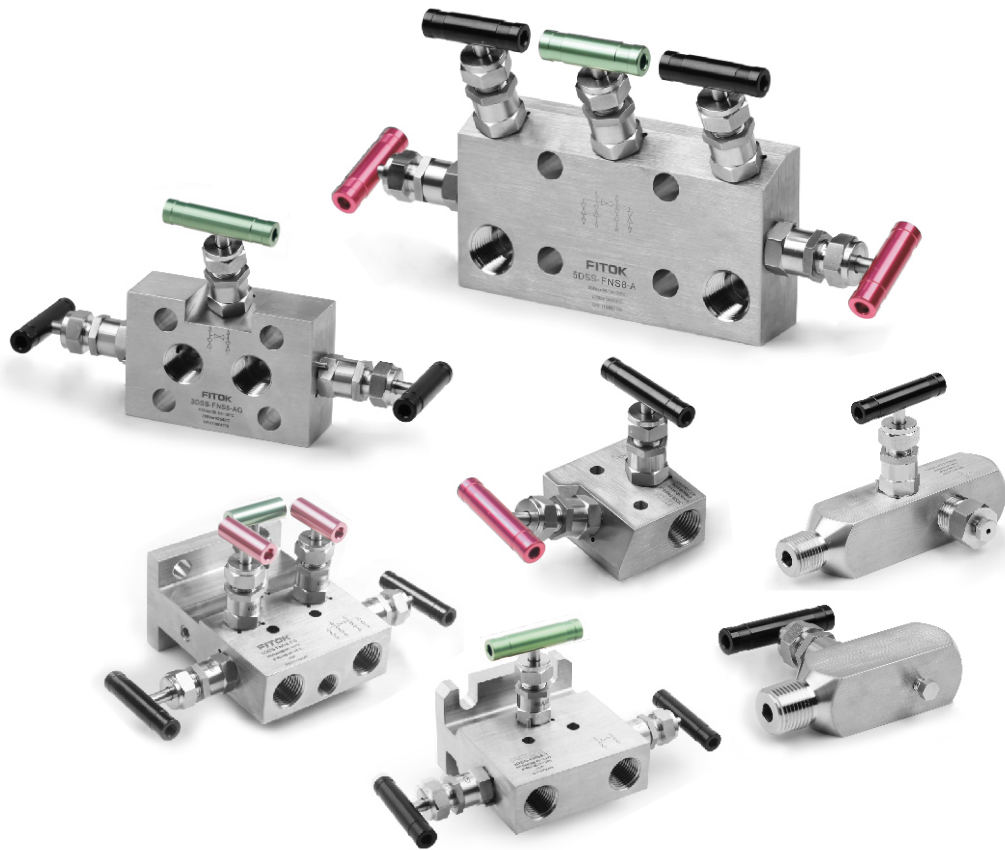
C-25

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# Gauge Valves and Instrumentation Manifolds

GV, GVH, GR Series

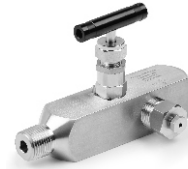
2-valve, 3-valve and 5-valve Manifold Series



# Contents

## Gauge Valves

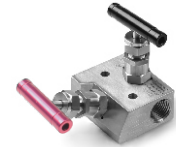
GV Series, GVH Series and GR Series



C-04

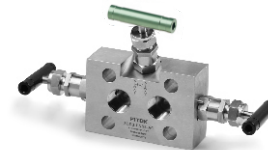
## Instrumentation Manifolds

2-valve Manifolds



C-09

3-valve Manifolds



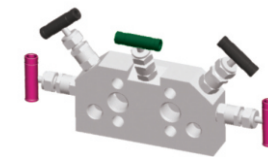
C-12

5-valve Manifolds



C-14

C Integral Manifolds



C-18

## Accessories

Manifold Bracket Supports

C-21

Kidney Flange / Eccentric Flange

C-21

Bleed Valves

C-22

Calibration Fittings

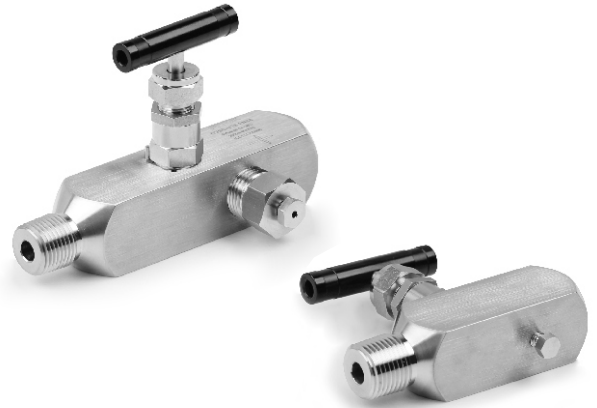
C-22

# Gauge Valves

## GV Series, GVH Series and GR Series

### Features

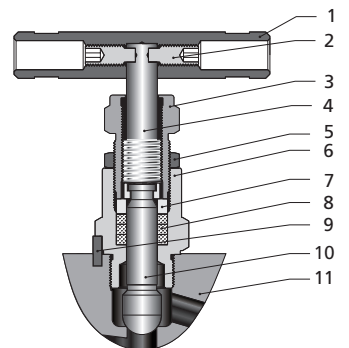
- ⦿ Working pressure up to:
  - Stainless steel: GV, GR up to 6000 psig (414 bar)
  - GVH up to 10000 psig (690 bar)
- ⦿ GV Series and GVH Series working temperature:
  - PTFE packing: -65°F to 450°F (-54°C to 232°C)
  - Graphite packing: -65°F to 1200°F (-54°C to 649°C)
- ⦿ GR Series working temperature:
  - Acetal seat: -20°F to 250°F (-28°C to 121°C)
  - PEEK seat: -20°F to 400°F (-28°C to 204°C)
- ⦿ Non-rotating lower stem, ball tip and plug tip designs
- ⦿ Variety of materials for seat and packing
- ⦿ Safety back seating seals in fully open position
- ⦿ Rolled spindle operating threads
- ⦿ Lubricant for stem thread isolated from the media
- ⦿ Externally adjustable gland
- ⦿ Bonnet locking pin fitted as standard
- ⦿ Low torque operating T bar handle
- ⦿ Option for different colored handles
- ⦿ Steady and durable fastening of the handle by double lock-pins
- ⦿ Each GV/GR Series gauge valve leak tested with Nitrogen or compressed air at the maximum working pressure, each GVH Series gauge valve leak tested with water at 1.1 times the maximum working pressure



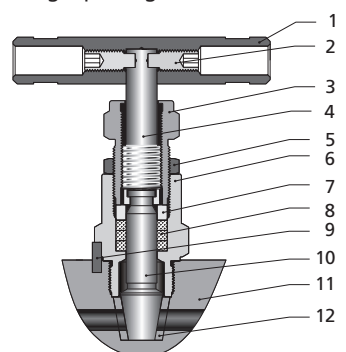
### Standard Materials of Construction

Item	Component	Valve Body Material	
		316 SS	
		Material Grade/ASTM Specification	
1	Handle	6061/B211	
2	Set Screw	Stainless steel	
3	Packing Bolt	304 SS/A479	
4	Upper Stem	316 SS/A479	
5	Lock Nut	Stainless steel	
6	Bonnet	316 SS/A479	
7	Gland	316 SS/A479	
8	Packing	PTFE or graphite	
9	Lock Pin	Stainless steel	
10	Lower Stem	Hardened 316 SS/A479	
11	Body	316 SS/A479 316 SS/A182	
12	Seat	Acetal or PEEK	
	Lubricant	Molybdenum disulfide-based	

Ball Tip Design Valves (GV, GVH)



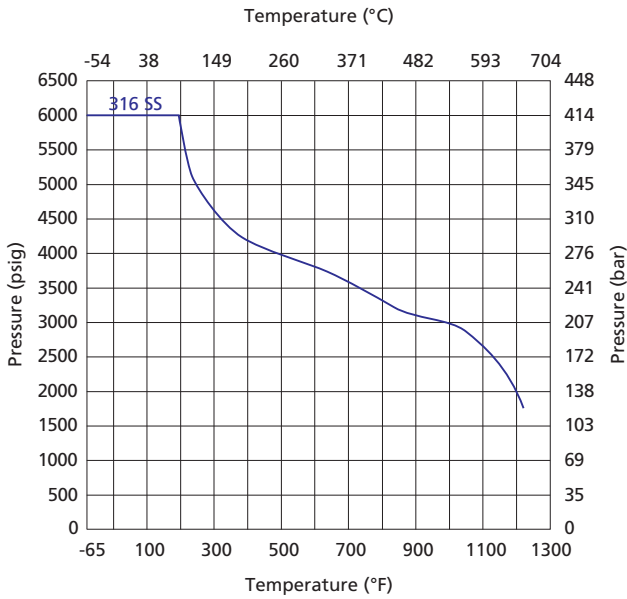
Plug Tip Design Valves (GR)



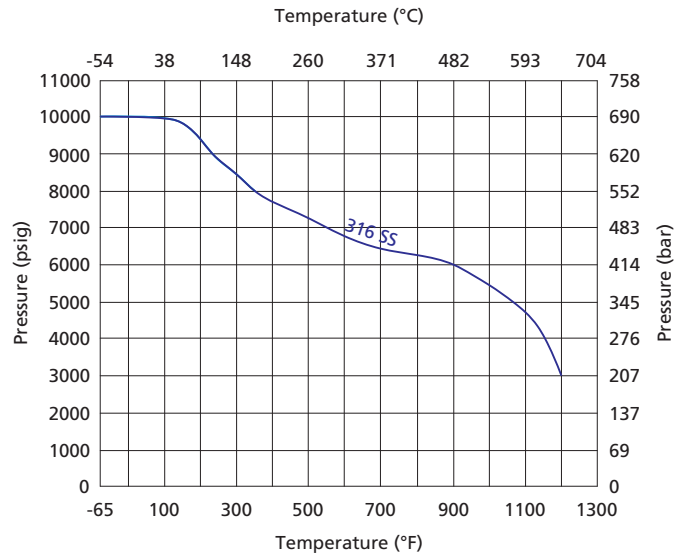
Process interface valves for sour gas service are available. Materials are selected in accordance with NACE MR0175/ISO 15156. Contact FITOK Group or our authorized distributors if you have any request.

## Pressure vs. Temperature

GV Series Ball Tip Design Gauge Valves

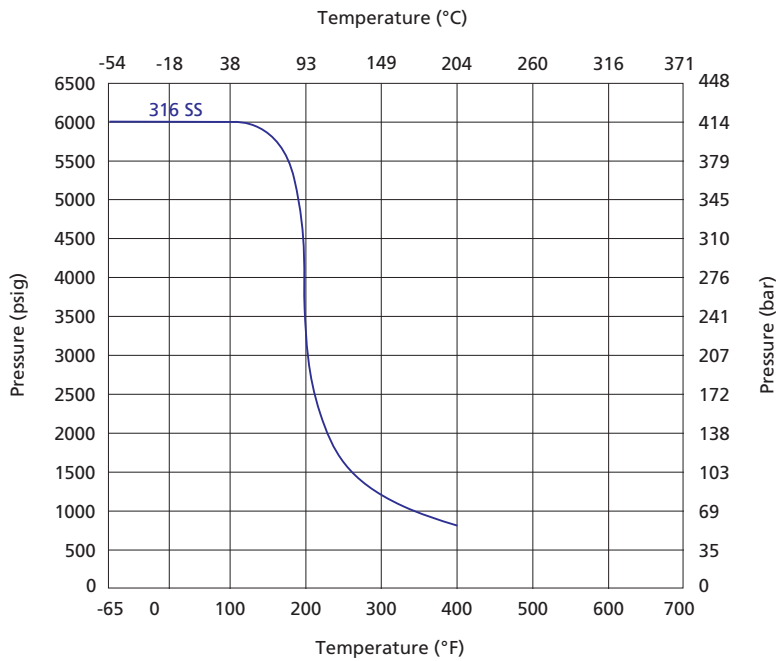


GVH Series Ball Tip Design Gauge Valves



Based on graphite packing.

GR Series Plug Tip Design Gauge Valves

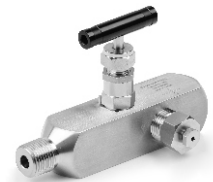
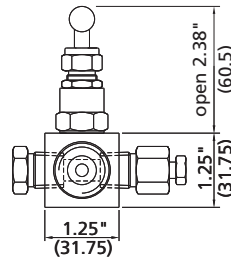
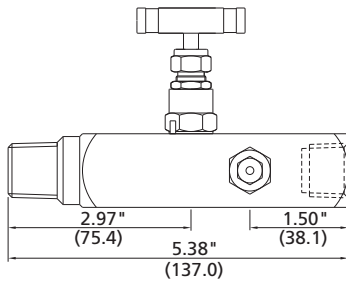
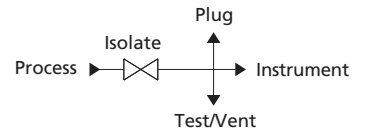


1. For manifolds of Acetal seat, the maximum medium temperature is 250°F (121°C), not recommended for temperature higher than 200°F (93°C) for water and steam application.
2. Based on PEEK seat and PTFE packing.

## Types and Dimensions

### Standard Type

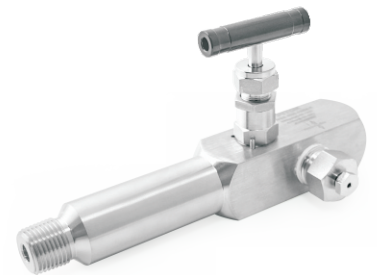
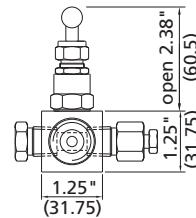
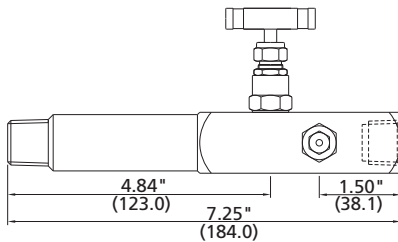
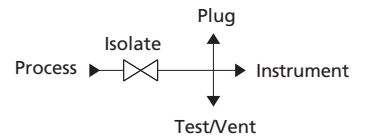
Basic Ordering Number	Design	Inlet/Process	Outlet/Instrument	Test/Vent/Plug
GV□□-NS8-FNS8	Ball Tip	1/2 Male NPT	1/2 Female NPT	1/2 Female NPT
GVH□□-NS8-FNS8				
GR□□-NS8-FNS8	Plug Tip			
GV□□-NS12-FNS8	Ball Tip	3/4 Male NPT	1/2 Female NPT	1/2 Female NPT
GVH□□-NS12-FNS8				
GR□□-NS12-FNS8	Plug Tip			



The dimensions shown are for GV series gauge valves. If you need the dimensions of GVH series, please contact FITOK Group.

### Lagging Extension Body Type

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test/Vent/Plug
GV□□-NS8-FNS8-E	1/2 Male NPT	1/2 Female NPT	1/2 Female NPT
GVH□□-NS8-FNS8-E			
GR□□-NS8-FNS8-E			

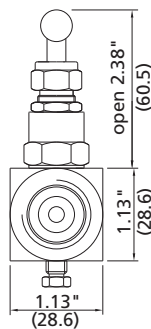
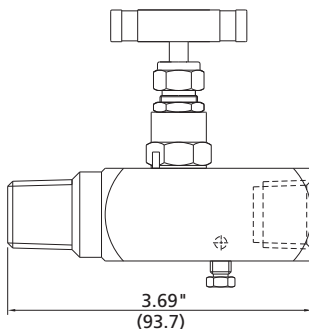
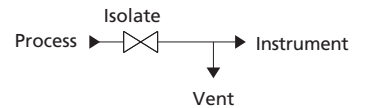


Lagging extension body is inserted through pipe insulation.

The dimensions shown are for GV series gauge valves. If you need the dimensions of GVH series, please contact FITOK Group.

### Miniature Type

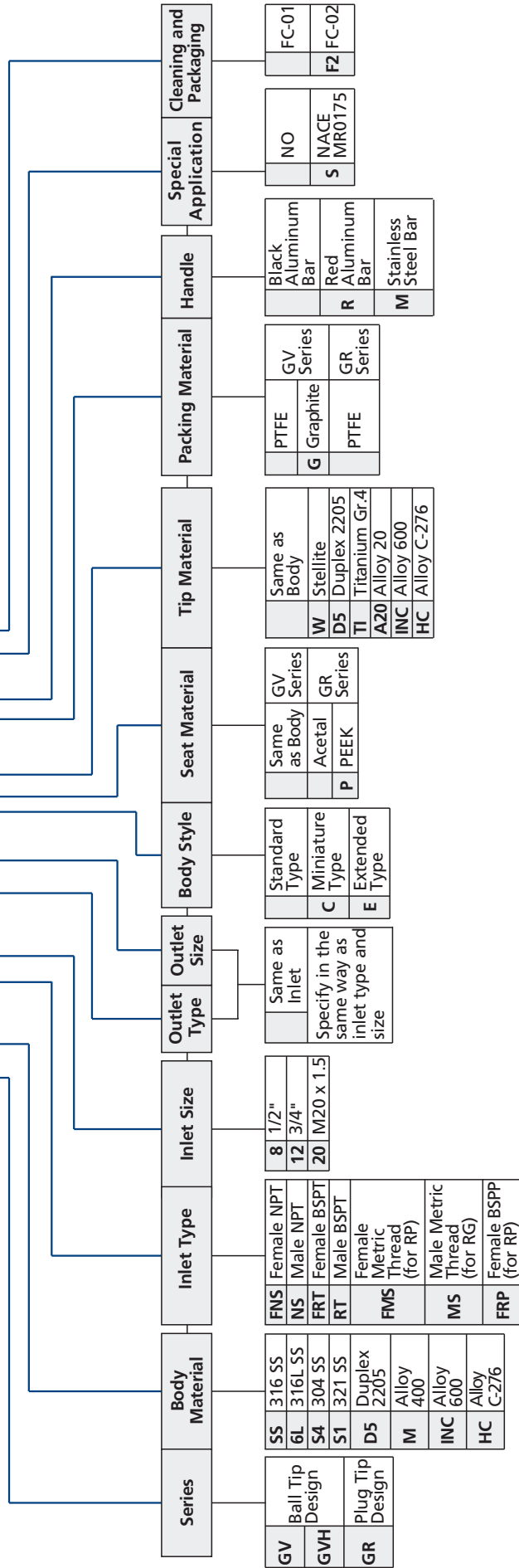
Basic Ordering Number	Inlet/Process	Outlet/Instrument	Vent
GV□□-NS8-FNS8-C	1/2 Male NPT	1/2 Female NPT	Vent stem
GVH□□-NS8-FNS8-C			
GR□□-NS8-FNS8-C			



The dimensions shown are for GV series gauge valves. If you need the dimensions of GVH series, please contact FITOK Group.

# Ordering Number Description

GRSS – NS8 – FNS8 – CPW – GR – SF2



Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

Cleaning and Packaging:

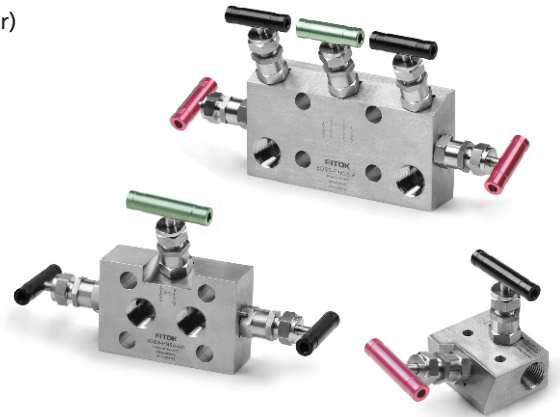
FC-01: Standard cleaning and packaging for general industrial procedures.

FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement as stated in ASTM G93 Level C.

# Instrumentation Manifolds

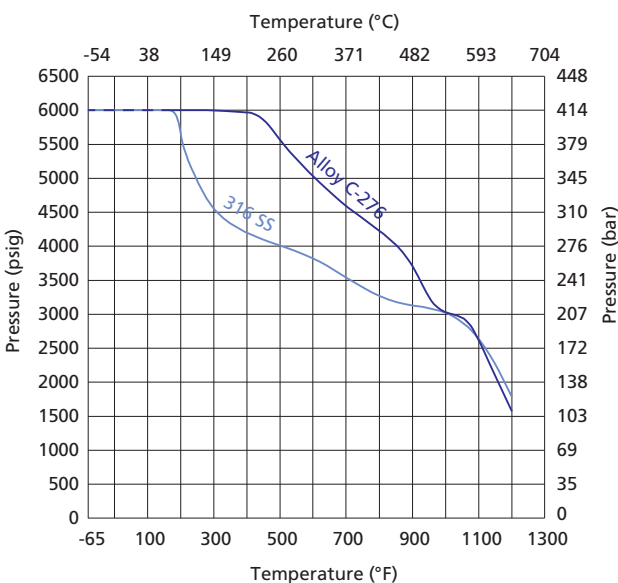
## Features

- ⦿ Working pressure up to:
  - Stainless steel: 2D, 2R, 3D, 3R, 5D, 5R up to 6000 psig (414 bar)
  - 2DH, 2RH, 3DH, 3RH, 5DH, 5RH up to 10000 psig (690 bar)
  - Alloy C-276: 2D, 2R, 3D, 3R, 5D, 5R up to 6000 psig (414 bar)
- ⦿ Working temperature:
  - PTFE packing: -65°F to 450°F (-54°C to 232°C)
  - Graphite packing: -65°F to 1200°F (-54°C to 649°C)
- ⦿ Orifice: 0.157" (4.0 mm)
- ⦿ Two-piece stem design: Upper stem threads cold rolled and hardened lower stem for high strength and smooth operation
- ⦿ Upper stem thread lubricant isolated from system media
- ⦿ Linear instead of rotary motion of the rising, non-rotating stem minimizes packing abrasion and reduces the friction between the seat and the tip
- ⦿ Safety back seating seals in fully open position
- ⦿ Steady and durable fastening of the handle by double lock-pins
- ⦿ Each 2D/2R/3D/3R/5D/5R Series manifold leak tested with Nitrogen or compressed air at the maximum working pressure, each 2DH/2RH/3DH/3RH/5DH/5RH Series manifold leak tested with water at 1.1 times the maximum working pressure

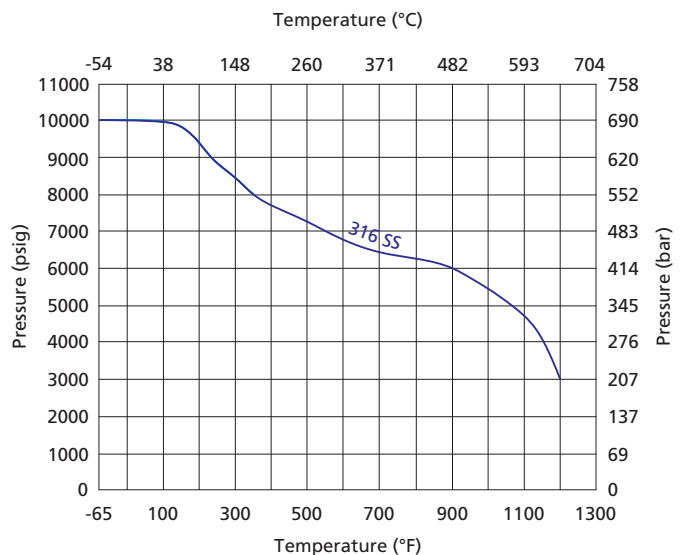


## Pressure vs. Temperature

2D, 2R, 3D, 3R, 5D, 5R Series



2DH, 2RH, 3DH, 3RH, 5DH, 5RH Series

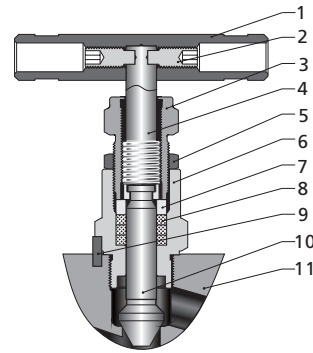


1. Based on graphite packing.  
 2. Contact FITOK Group or our authorized distributors for curve graph of other materials.



## Standard Materials of Construction

Item	Component	Valve Body Material	
		316 SS	Alloy C-276
		Material Grade/ASTM Specification	
1	Handle	6061/B211	
2	Set Screw	Stainless steel	
3	Packing Bolt	304 SS/A479	
4	Upper Stem	316 SS/A479	
5	Lock Nut	Stainless steel	
6	Bonnet	316 SS/A479	Alloy C-276/B574
7	Gland	316 SS/A479	
8	Packing	PTFE or Graphite	
9	Lock Pin	Stainless steel	
10	Lower Stem	Hardened 316 SS/A479	Alloy C-276/B574
11	Body	316 SS/A479 316 SS/A182	Alloy C-276/B564
	Lubricant	Molybdenum disulfide-based	



Handle colors indicate function:  
 BLACK=Isolate/block  
 RED=Test/vent  
 GREEN=Equalize

Process interface valves for sour gas service are available. Materials are selected in accordance with NACE MR0175/ISO 15156. Contact FITOK Group or our authorized distributors if you have any request.

## Design Standards

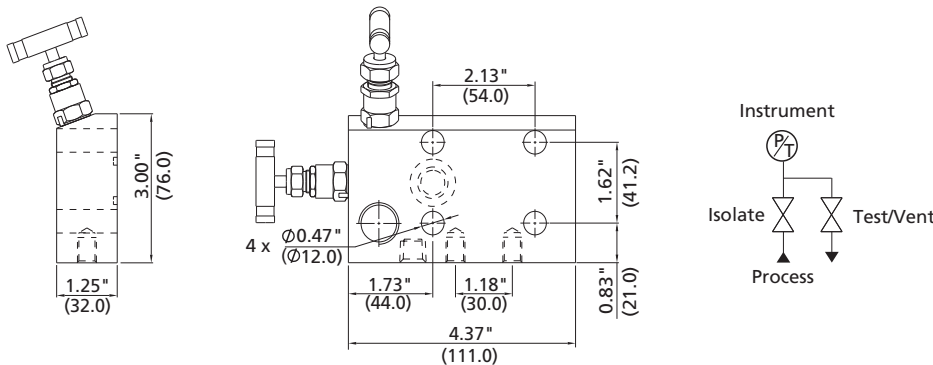
- Instrumentation manifolds are designed and manufactured in accordance with ASME B31.3 and MSS-SP-105. Flange design meets the requirements of MSS SP-99.
- 2-valve manifold is used with pressure gauges or pressure transmitters.
- 3-valve and 5-valve manifolds are used with differential pressure transmitters.

## Types and Dimensions

### 2-valve Manifolds

Consist of one block valve and one bleed valve

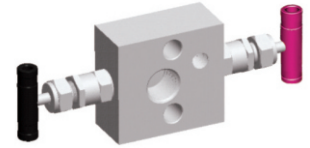
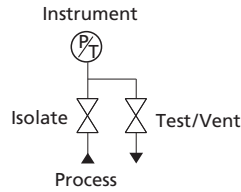
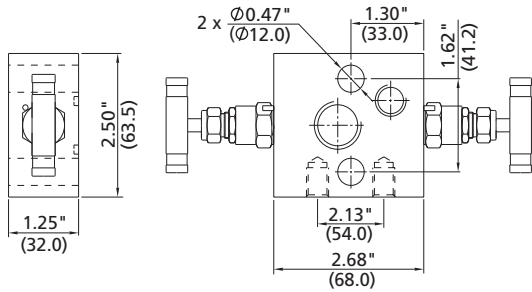
Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test/Vent
2D□□-FNS8-A	1/2 Female NPT	Flange	1/4 Female NPT
2DH□□-FNS8-A			



Notes: 1. Every manifold is supplied with one PTFE sealing ring for manifold-to-instrument and four 7/16" UNF x 1.75" high tensile bolts  
 2. Dimensions shown are for 2D Series manifolds. For dimensions of 2DH Series manifolds, please contact FITOK Group or our authorized distributors

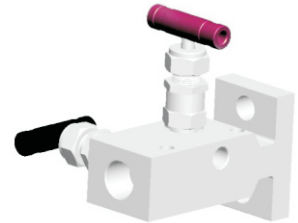
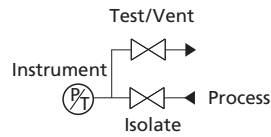
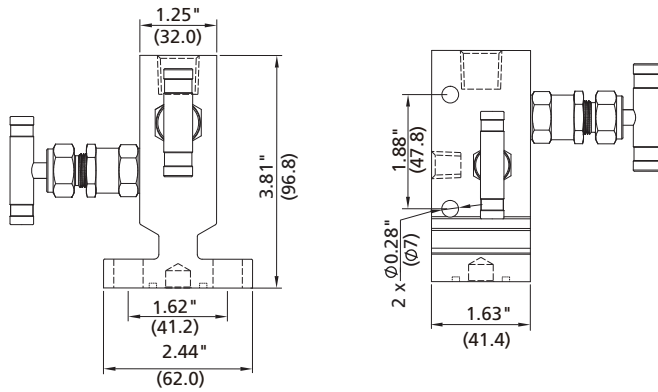
## C-10 Gauge Valves and Instrumentation Manifolds

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test/Vent
2D□□-FNS8-L	1/2 Female NPT	Flange	1/4 Female NPT



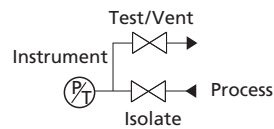
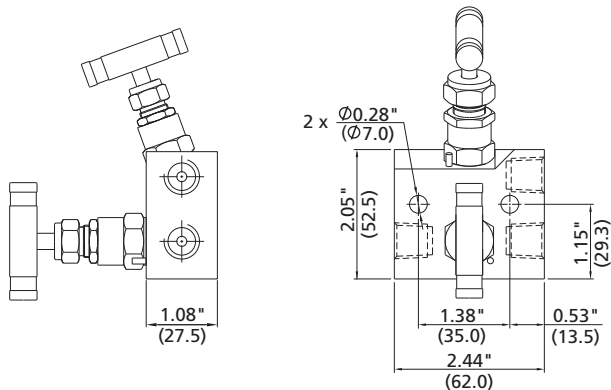
Every manifold is supplied with one PTFE sealing ring for manifold-to-instrument and two 7/16" UNF x 1.75" high tensile bolts.

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test/Vent
2D□□-FNS8-V	1/2 Female NPT	Flange	1/4 Female NPT



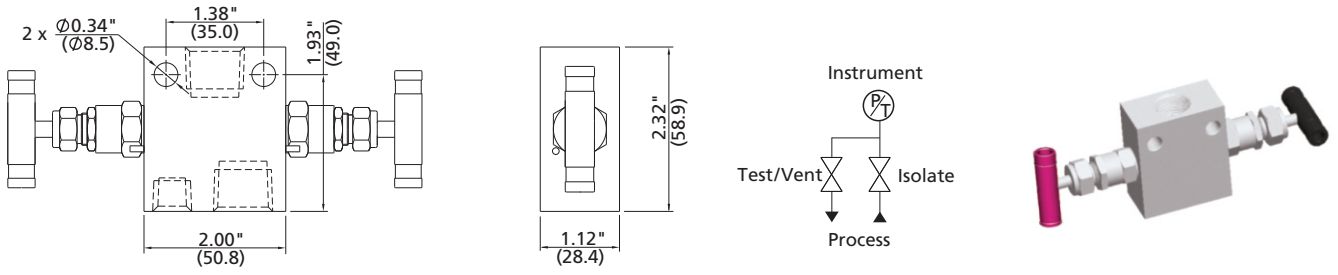
Every manifold is supplied with one PTFE sealing ring for manifold-to-instrument and two 7/16" UNF x 24 mm high tensile bolts.

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test/Vent
2R□□-FNS4-A	1/4 Female NPT	1/4 Female NPT	1/4 Female NPT
2RH□□-FNS4-A			

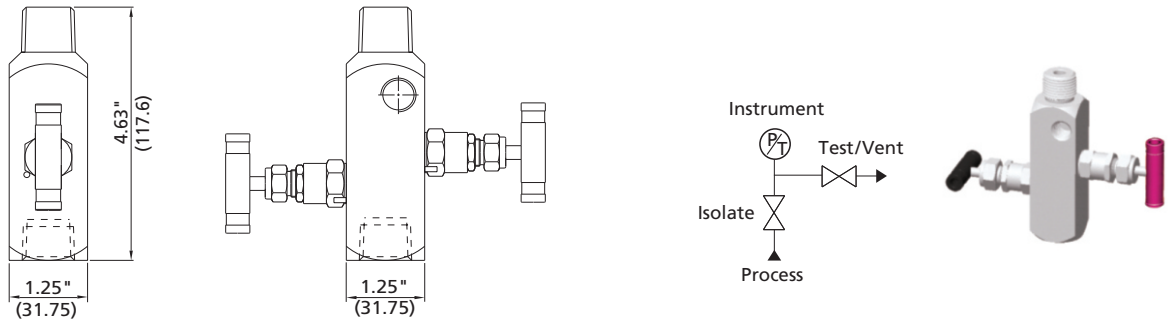


Dimensions shown are for 2R Series manifolds. For dimensions of 2RH Series manifolds, please contact FITOK Group or our authorized distributors.

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test/Vent
2R □□ -FNS8-L	1/2 Female NPT	1/2 Female NPT	1/4 Female NPT

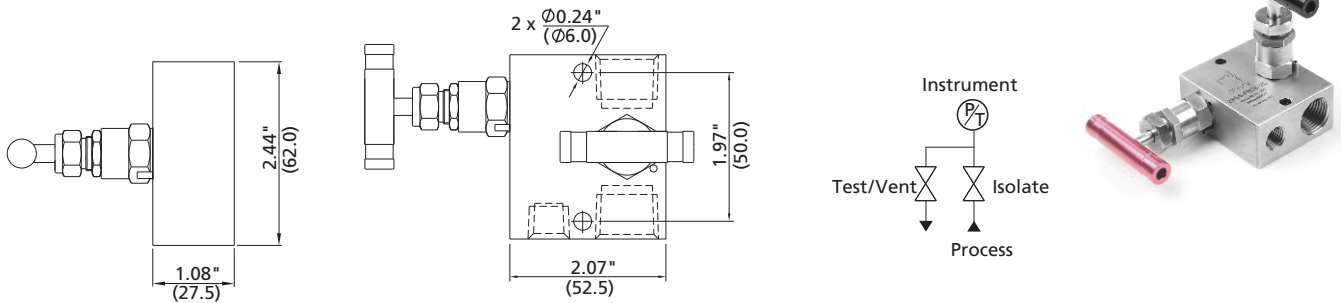


Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test/Vent
2R □□ -FNS8-NS8-H	1/2 Female NPT	1/2 Male NPT	1/4 Female NPT
2RH □□ -FNS8-NS8-H			
2R □□ -NS8-H	1/2 Male NPT	1/2 Male NPT	1/4 Female NPT
2RH □□ -NS8-H			



Dimensions shown are for 2R Series manifolds. For dimensions of 2RH Series manifolds, please contact FITOK Group or our authorized distributors.

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test/Vent
2R □□ -FNS8-V	1/2 Female NPT	1/2 Female NPT	1/4 Female NPT

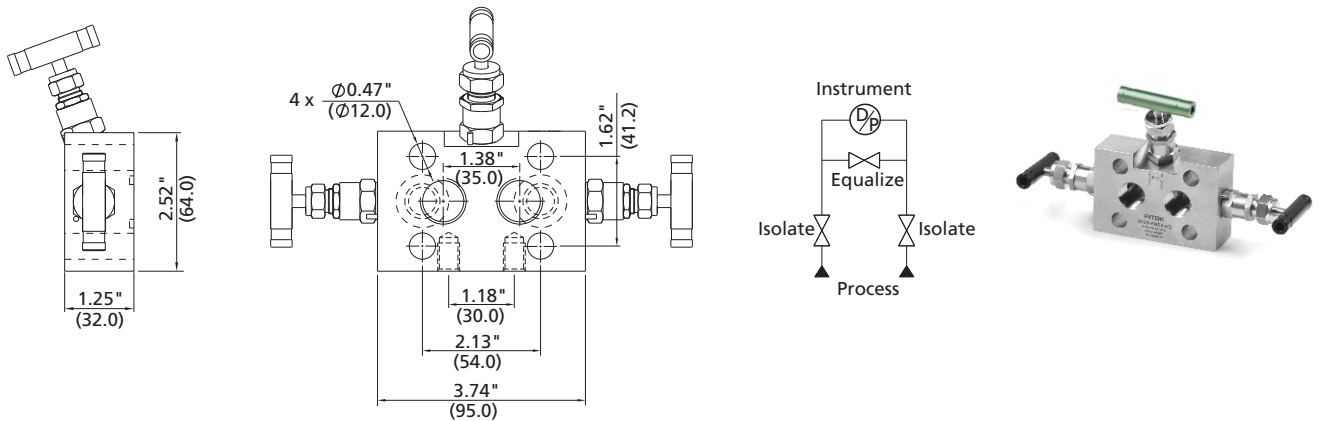


Manifolds

### 3-valve Manifolds

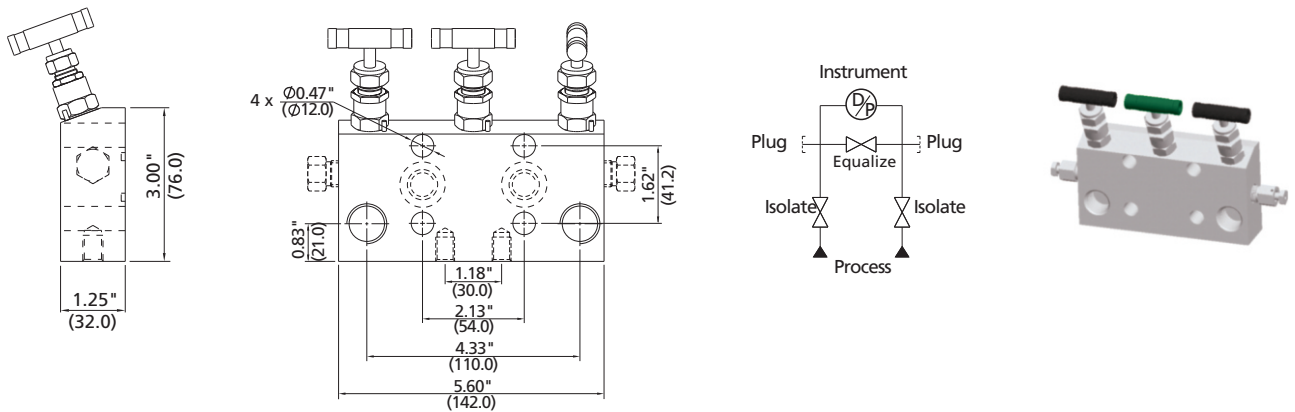
Consist of two block valves and one equalizer valve

Basic Ordering Number	Inlet/Process	Outlet/Instrument
3D □□ -FNS8-A	1/2 Female NPT	Flange
3DH □□ -FNS8-A		
3D □□ -FL8-A	1/2" FITOK	Flange



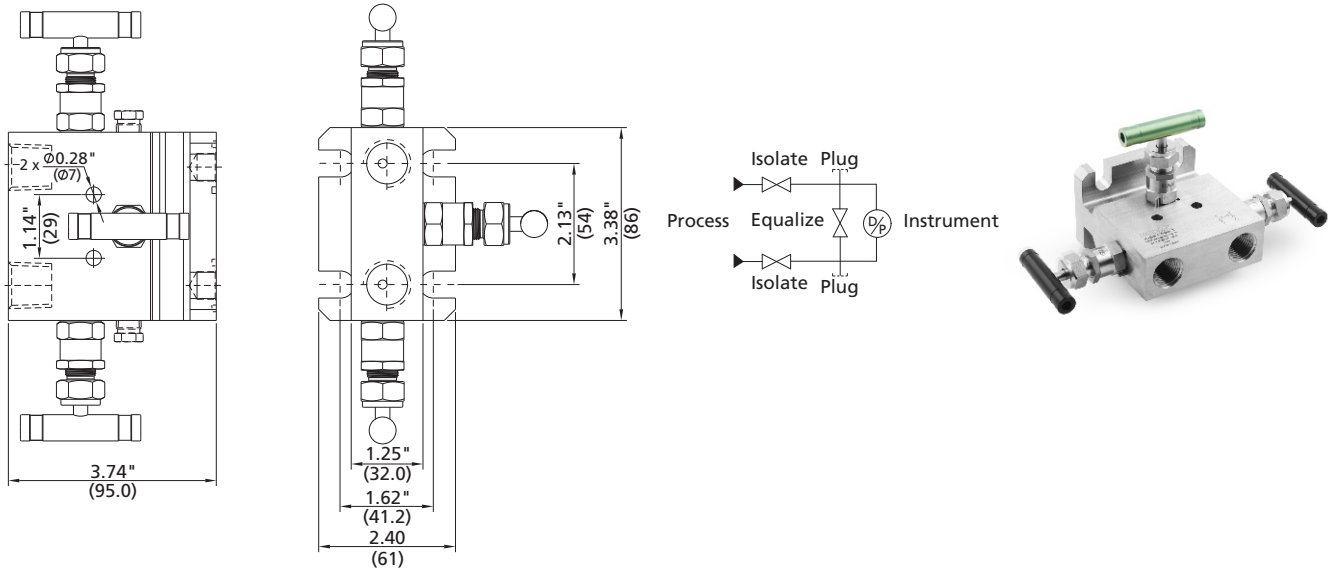
- Notes: 1. Every manifold is supplied with two PTFE sealing rings manifold-to-instrument and four 7/16" UNF x 1.75" high tensile bolts.  
 2. FL8 connections are obtained by adding an extra CM tube fitting to the FNS8 connections.  
 3. Dimensions shown are for 3D Series manifolds. For dimensions of 3DH Series manifolds, please contact FITOK Group or our authorized distributors.

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test/Vent
3D □□ -FNS8-L	1/2 Female NPT	Flange	Optional
3D □□ -FL8-L	1/2" FITOK	Flange	Optional



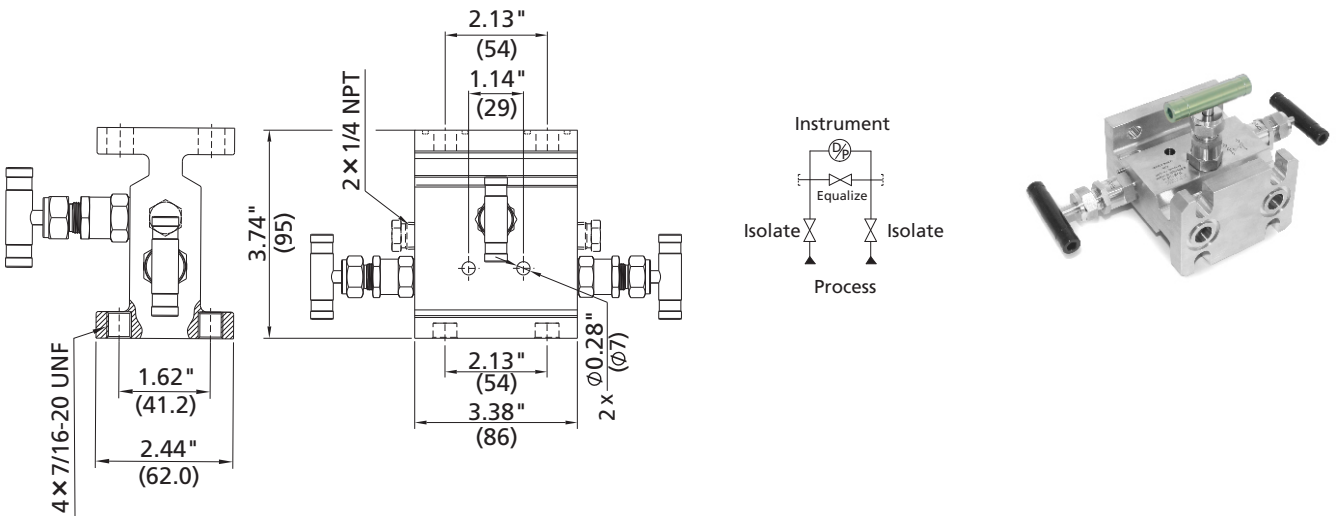
- Notes: 1. Every manifold is supplied with two PTFE sealing rings for manifold-to-instrument and four 7/16" UNF x 1.75" high tensile bolts.  
 2. FL8 connections are obtained by adding an extra CM tube fitting to the FNS8 connections.

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test
3D□□-FNS8-V	1/2 Female NPT	Flange	Optional



Every manifold is supplied with two PTFE sealing ring for manifold-to-instrument and four 7/16" UNF x 24 mm high tensile bolts.

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test
3D□□-F-V	Flange	Flange	Optional

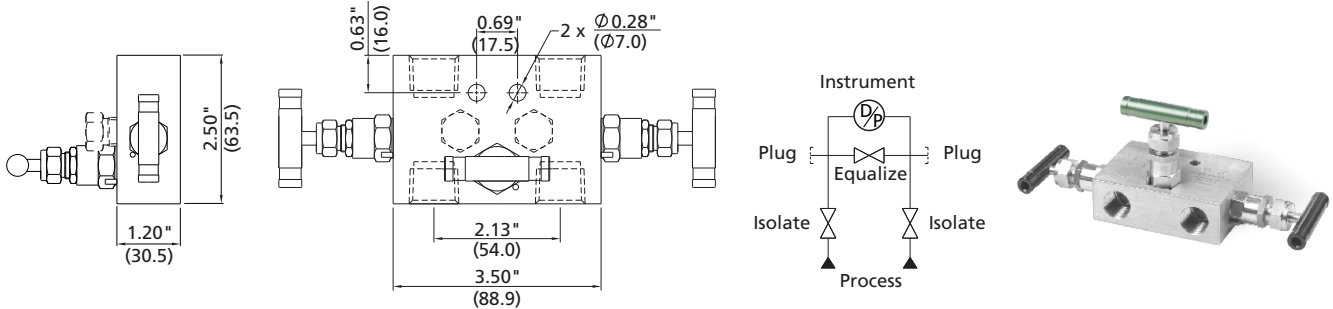


Every manifold is supplied with two PTFE sealing ring for manifold-to-instrument and four 7/16" UNF x 24 mm high tensile bolts.

Manifolds

## C-14 Gauge Valves and Instrumentation Manifolds

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test
3R □□ -FNS8-V	1/2 Female NPT	1/2 Female NPT	Optional
3RH □□ -FNS8-V			
3R □□ -FL8-V	1/2" FITOK	1/2" FITOK	Optional



Notes: 1. FL8 connections are obtained by adding an extra CM tube fitting to the FNS8 connections.

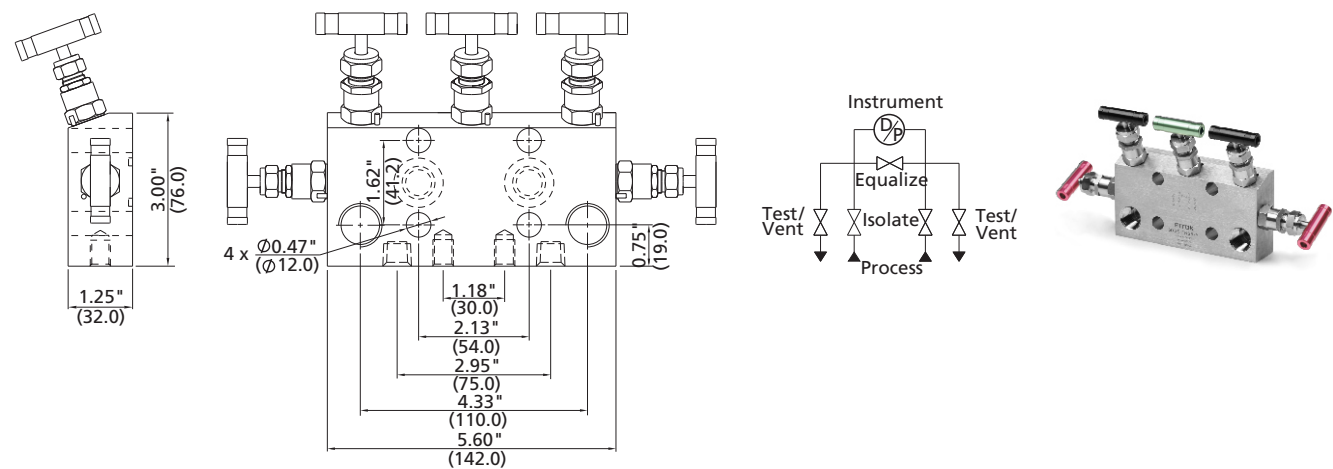
2. Dimensions shown are for 3R Series manifolds. For dimensions of 3RH Series manifolds, please contact FITOK Group or our authorized distributors.

## 5-valve Manifolds

### 1. 5-valve Manifold of Double-bleed Function:

consist of two block valves, two bleed valves and one equalizer valve

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test
5D □□ -FNS8-A	1/2 Female NPT	Flange	1/4 Female NPT
5DH □□ -FNS8-A			
5D □□ -FL8-A	1/2" FITOK	Flange	1/4 Female NPT

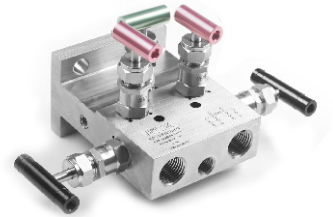
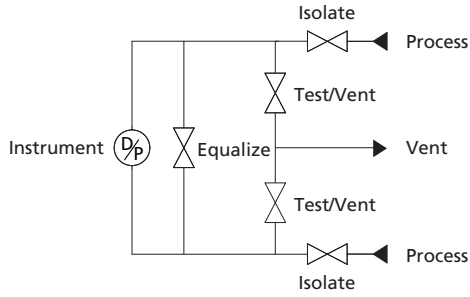
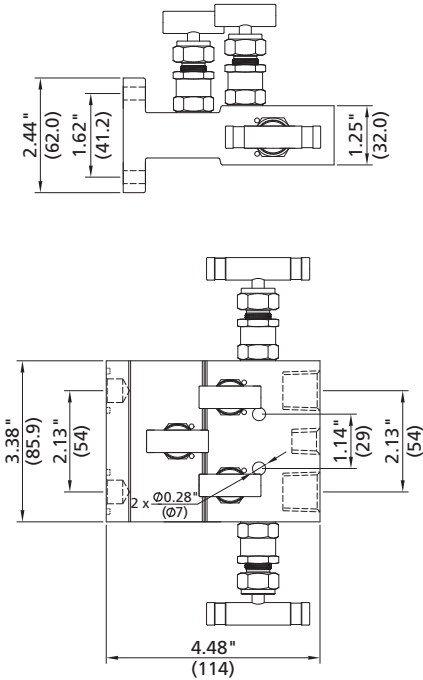


Notes: 1. Every manifold is supplied with two PTFE sealing rings for manifold-to-instrument and four 7/16" UNF x 1.75" high tensile bolts.

2. FL8 connections are obtained by adding an extra CM tube fitting to the FNS8 connections.

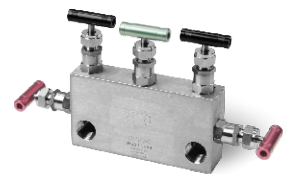
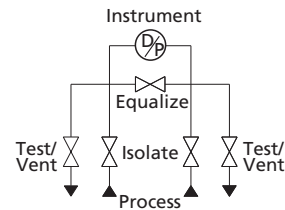
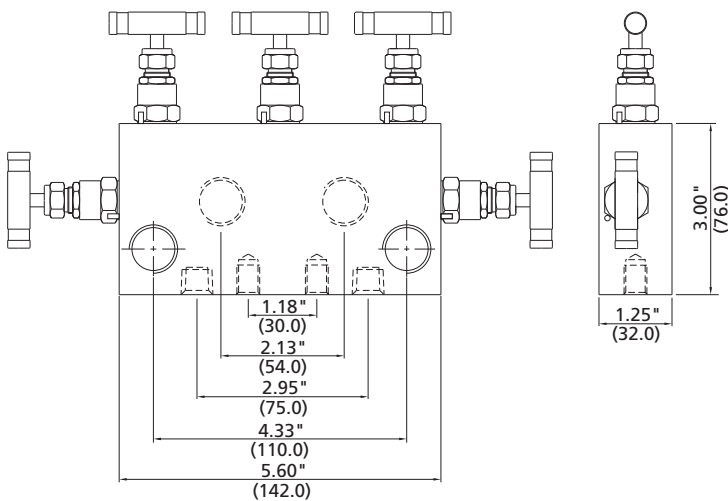
3. Dimensions shown are for 5D Series manifolds. For dimensions of 5DH Series manifolds, please contact FITOK Group or our authorized distributors.

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test/Vent
5D□□-FNS8-V	1/2 Female NPT	Flange	1/4 Female NPT



Every manifold is supplied with two PTFE sealing ring for manifold-to-instrument and four 7/16" UNF x 24 mm high tensile bolts.

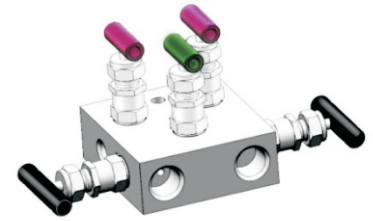
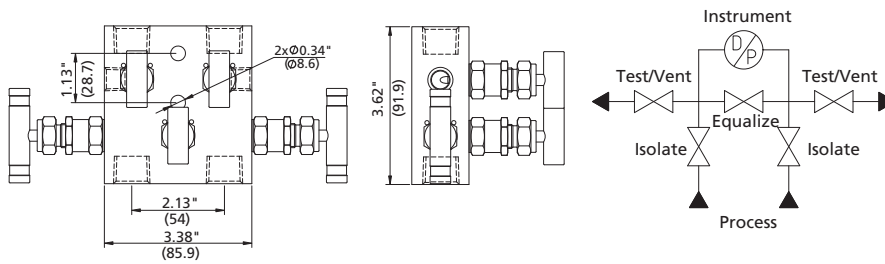
Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test/Vent
5R□□-FNS8-L	1/2 Female NPT	1/2 Female NPT	1/4 Female NPT
5RH□□-FNS8-L			
5R□□-FL8-FNS8-L	1/2" FITOK	1/2 Female NPT	1/4 Female NPT



Notes: 1. FL8 connections are obtained by adding an extra CM tube fitting to the FNS8 connections.  
 2. Dimensions shown are for 5R Series manifolds. For dimensions of 5RH Series manifolds, please contact FITOK Group or our authorized distributor.

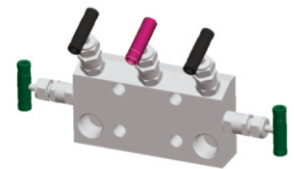
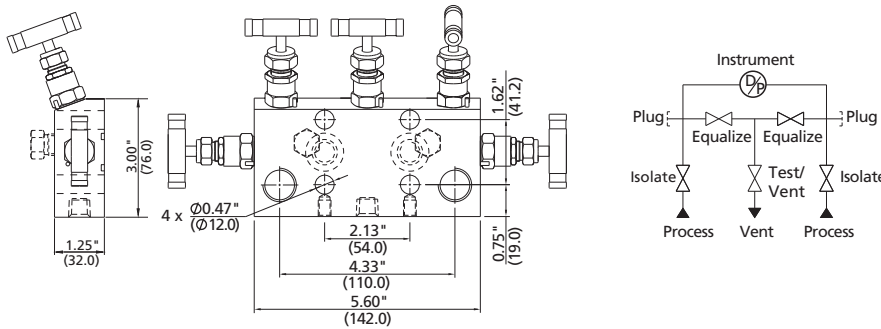
## C-16 Gauge Valves and Instrumentation Manifolds

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test/Vent
5R □□-FNS8-V	1/2 Female NPT	1/2 Female NPT	1/4 Female NPT



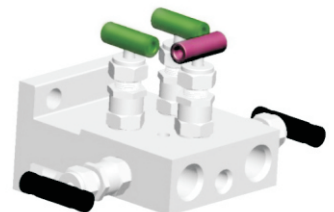
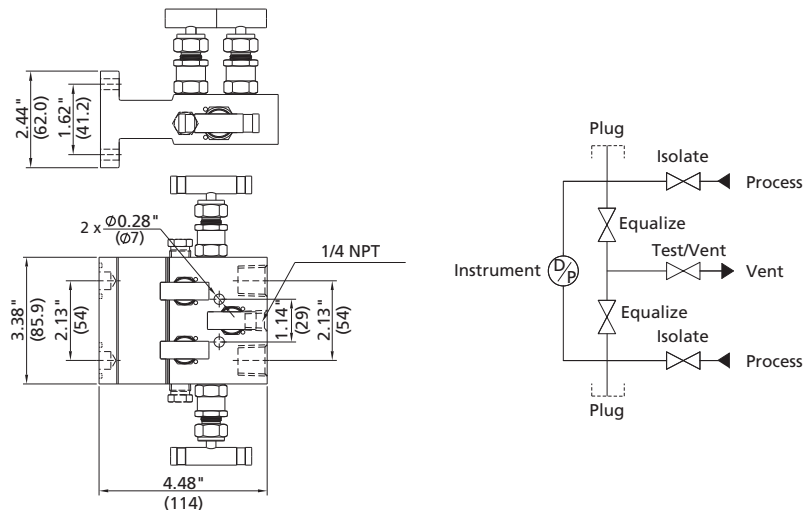
### 2. 5-valve Custody Transfer/Fiscal Metering Manifold (double-equalizer): consist of two block valves, one bleed valve and two equalizer valves

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Vent	Test
5D □□-FNS8-AB	1/2 Female NPT	Flange	1/4 Female NPT	Optional
5D □□-FL8-AB	1/2" FITOK	Flange	1/4 Female NPT	Optional



Notes: 1. Every manifold is supplied with two PTFE sealing rings for manifold-to-instrument and four 7/16" UNF x 1.75" high tensile bolts.  
2. FL8 connections are obtained by adding an extra CM tube fitting to the FNS8 connections.

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Vent	Test
5D □□-FNS8-VB	1/2 Female NPT	Flange	1/4 Female NPT	Optional



Every manifold is supplied with two PTFE sealing ring for manifold-to-instrument and four 7/16" UNF x 24 mm high tensile bolts.



Basic Ordering Number	Inlet/Process	Outlet/Instrument	Vent	Test
5D□□-F-VB	Flange	Flange	1/4 Female NPT	Optional

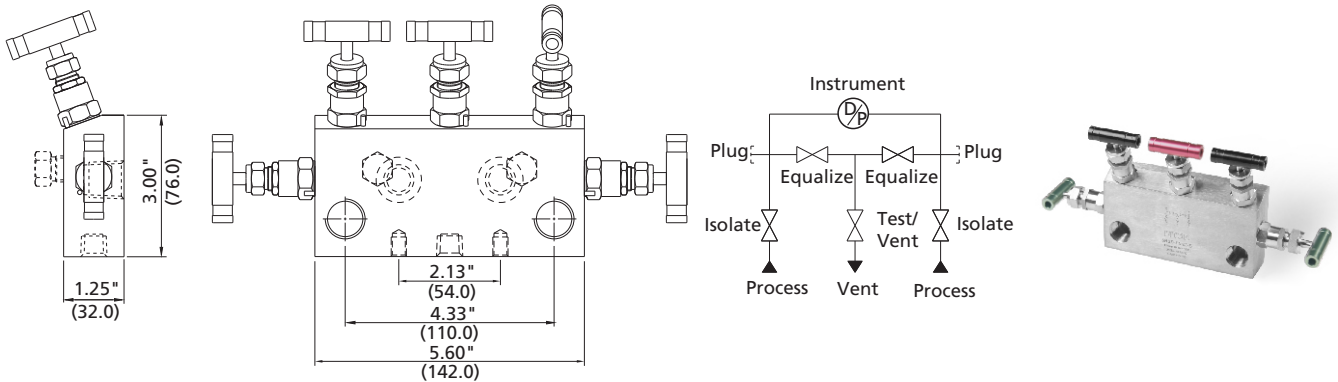
Every manifold is supplied with two PTFE sealing ring for manifold-to-instrument and four 7/16" UNF x 24 mm high tensile bolts.

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test/Vent
5R□□-FNS8-VB	1/2 Female NPT	1/2 Female NPT	1/4 Female NPT

Manifolds

## C-18 Gauge Valves and Instrumentation Manifolds

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Vent	Test
5R□□-FNS8-AB	1/2 Female NPT	1/2 Female NPT	1/4 Female NPT	Optional
5R□□-FL8-FNS8-AB	1/2" FITOK	1/2 Female NPT	1/4 Female NPT	Optional

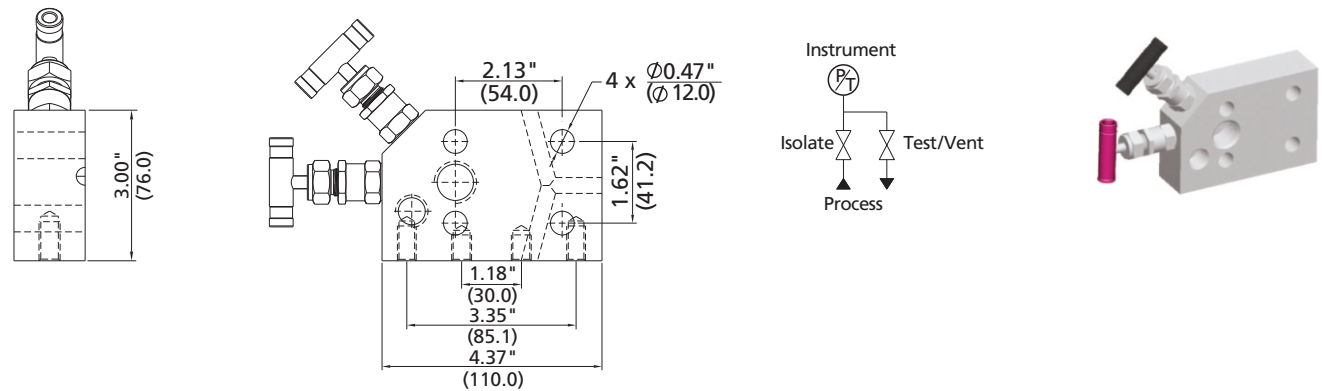


FL8 connections are obtained by adding an extra CM tube fitting to the FNS8 connections.

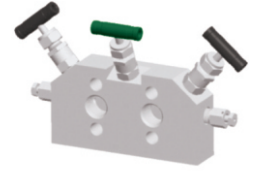
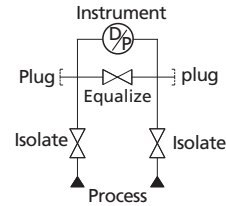
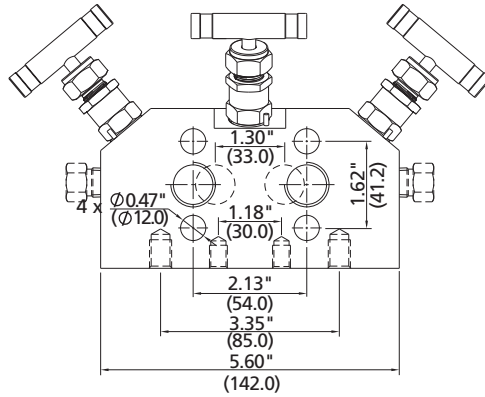
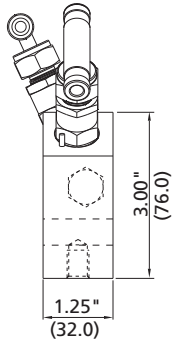
## C Integral Manifolds

C Integral Manifold is specifically designed for the pressure transmitters of Rosemount® coplanar™, including Model 3051C, 3051S, 2024 and 3095. It can be assembled directly to transmitters, eliminating the need for flanges. Each of the following manifolds contains four 7/16" UNF x 2" high tensile bolts.

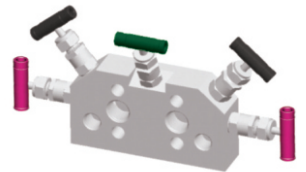
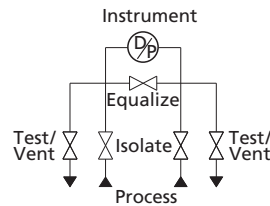
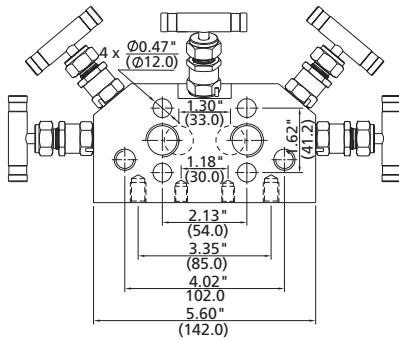
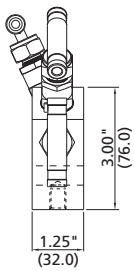
Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test/Vent
2D□□-FNS8-C	1/2 Female NPT	Flange	1/4 Female NPT
2DH□□-FNS8-C			



Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test/Vent
3D □ □ -FNS8-C	1/2 Female NPT	Flange	Optional
3DH □ □ -FNS8-C			
3D □ □ -FL8-C	1/2" FITOK	Flange	Optional



Basic Ordering Number	Inlet/Process	Outlet/Instrument	Test/Vent
5D □ □ -FNS8-C	1/2 Female NPT	Flange	1/4 Female NPT
5DH □ □ -FNS8-C			
5D □ □ -FL8-C	1/2" FITOK	Flange	1/4 Female NPT

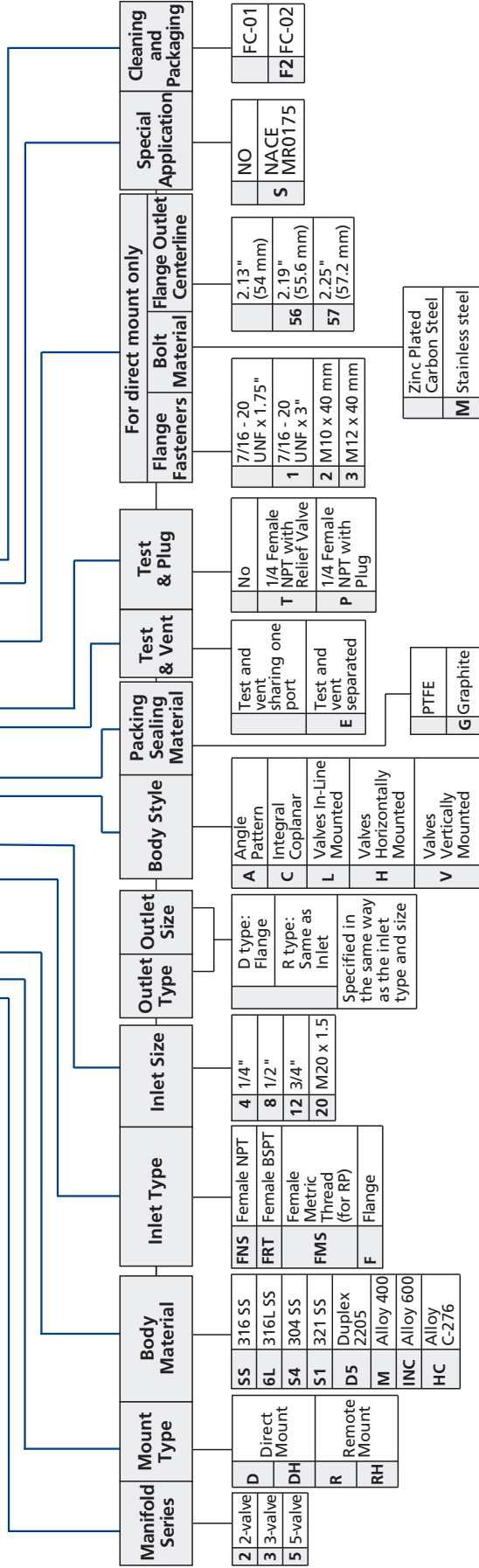


Dimensions shown are for 2DI/3DI/5D Series manifolds. For dimensions of 2DH/3DH/5DH Series manifolds, please contact FITOK Group or our authorized distributors.  
 FL8 connections are obtained by adding an extra CM tube fitting to the FNS8 connections.

Manifolds

# Ordering Number Description

3DSS - FNS8 - LG - ET - 1M - SF2



**Notes:**

1. To order 5-valve manifolds with double-equalize function, add B to the Body Style of the manifold ordering number. Example: 5DSS-FNS8-AB

2. Plug options are as follows:

- 1) If option of test and vent sharing one port with plug is needed, add "-P" to the ordering number. Example: 5DSS - FNS8 - AB - P;
- 2) If option of test and vent separating with a plug to the test port is needed, add "-EP" to the ordering number. Example: 5DSS - FNS8 - AB - EP;
- 3) If option of test and vent separating with plug for each port is needed, add "-E2P" to the ordering number. Example: 5DSS - FNS8 - AB - E2P.

3. The standard center line distance of direct mounting flange outlet of 3-valve manifold and 5-valve manifold is 2.13" (54 mm).

Center line distance of 2.188" (55.6 mm) is suitable for range 6 and 7, 1151 series transmitter.

Center line distance of 2.250" (57.2 mm) is suitable for range 8, 1151 series transmitter.

4. The standard configuration of direct mounting manifold contains PTFE flange seal ring and 7/16-20 UNF X 1.75" high tensile bolts; can be connected with transmitters under main brands, such as EJA, Honeywell, Foxboro 843 dlp, and Rosemount® 151, 2024, 3051H series.

5. 7/16-20 UNF x 3" high tensile bolts can be supplied, can be used for coplanar mounting of the Rosemount® 3051C transmitter with process flange and the manifold.

6. Cleaning and Packaging:

FC-01: Standard cleaning and packaging for general industrial procedures.

FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement as stated in ASTM G93 Level C.

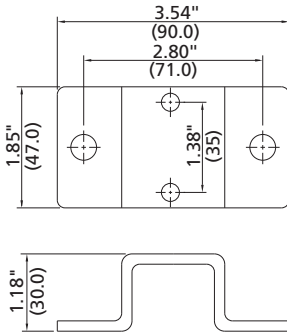
7. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

# Accessories

## Manifold Bracket Supports

### SS-M2P-2BK

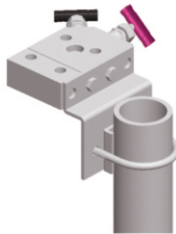
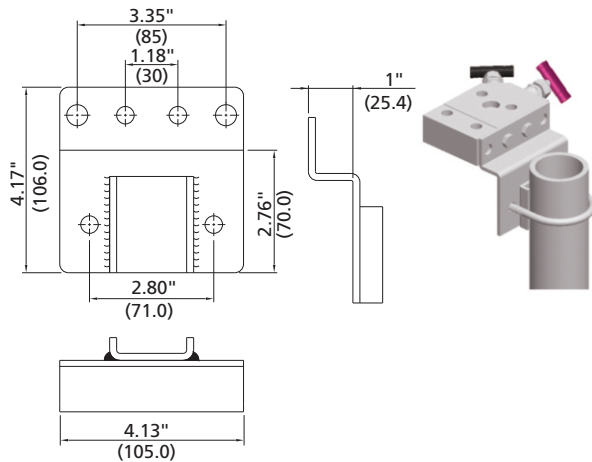
1. The integral assembly includes: bracket, U-bolts, bolts, gaskets, nuts
2. Fits with 2R□□-XX-A, 2R□□-XX-L, 2RH□□-XX-A



3. SS-M2P-2BK-50 fits with 2R□□-XX-V
4. SS-M2P-2BK-17.5 fits with 3R□□-XX-V
5. SS-M2P-2BK-28.7 fits with 5R□□-XX-VB, 5R□□-XX-V

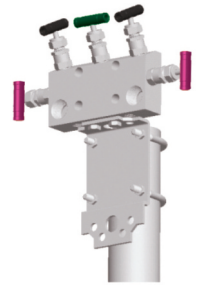
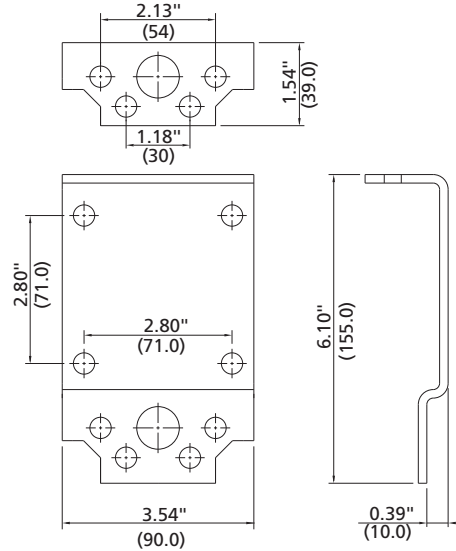
### SS-M2P-6BK

1. The integral assembly includes: bracket, U-bolts, bolts, gaskets, nuts
2. Fits with 2D□□-XX-C, 3D□□-XX-C, 5D□□-XX-C, 2DH□□-XX-C, 3DH□□-XX-C, 5DH□□-XX-C



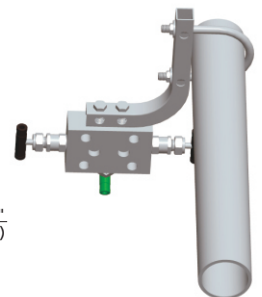
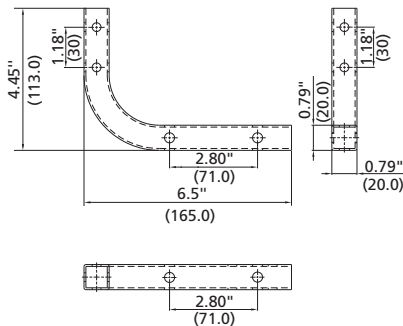
### SS-M2P-4BK

1. The bracket support is available for horizontal or vertical installation
2. The integral assembly includes: bracket, U-bolts, bolts, gaskets, nuts
3. Fits with 2D□□-XX-A, 2D□□-XX-L, 3D□□-XX-A, 3D□□-XX-L, 5D□□-XX-A, 5D□□-XX-AB, 5R□□-XX-L, 5R□□-XX-AB, 2DH□□-XX-A, 3DH□□-XX-A, 5DH□□-XX-A, 5RH□□-XX-AB



### SS-M2P-8BK

1. The bracket support is available for horizontal or vertical installation
2. The integral assembly includes: bracket, U-bolts, bolts, gaskets, nuts
3. Fits with 2D□□-XX-A, 3D□□-XX-A, 3D□□-XX-L, 2D□□-XX-C, 3D□□-XX-C, 5D□□-XX-C



For more installation information regarding other manifolds, please contact FITOK Group or our authorized distributors.

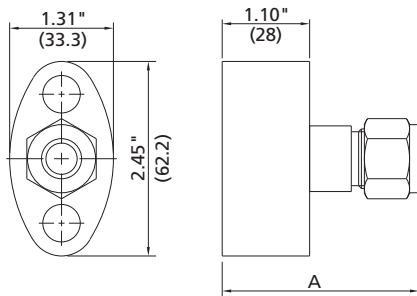
## Kidney Flanges and Eccentric Flanges

### Features

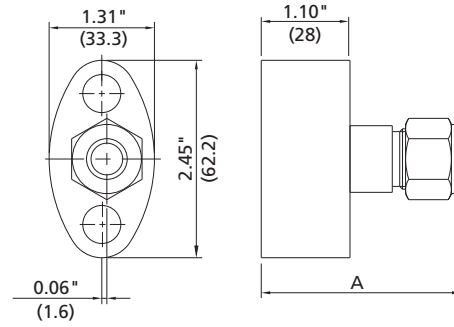
- Working temperature:
  - PTFE: -65°F to 450°F (-54°C to 232°C)
  - Graphite: -65°F to 1200°F (-54°C to 649°C)
- Integral forged body
- Standard material: A182 F316

## Types and Dimensions

### Kidney Flanges



### Eccentric Flanges



The process connection type of transmitter can be transformed to other connection types.

### Ordering Information

Basic Ordering Number	Connection Type and Size	Dimension in. (mm)
		A
SS-KF-FNS4	1/4 Female NPT	1.10 (28)
SS-KF-FNS8	1/2 Female NPT	1.10 (28)
SS-KF-FL8	1/2" FITOK	2.48 (63)
SS-KF-PB8	1/2 PB	2.10 (53.3)

A kidney flange set contains a PTFE flange seal ring and two 7/16 - 20 UNF high tensile bolts.

### Ordering Information

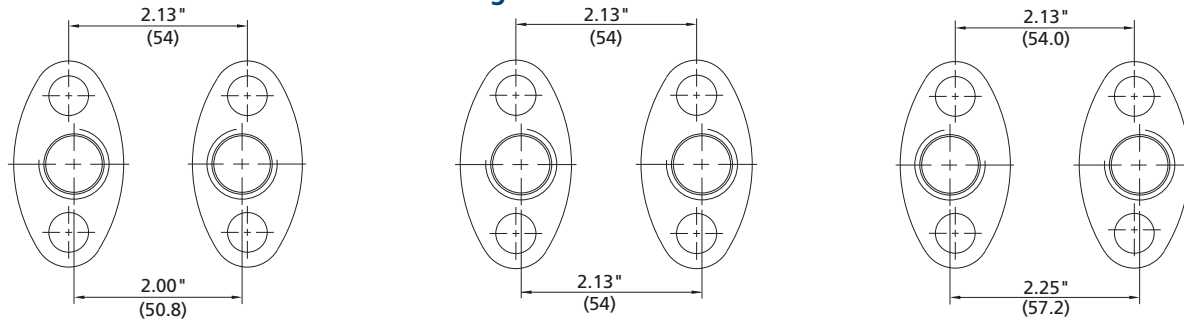
Basic Ordering Number	Connection Type and Size	Dimension in. (mm)
		A
SS-EF-FNS4	1/4 Female NPT	1.10 (28)
SS-EF-FNS8	1/2 Female NPT	1.10 (28)
SS-EF-FL8	1/2" FITOK	2.48 (63)
SS-EF-PB8	1/2 PB	2.10 (53.3)

1. Eccentric flange needs to be ordered in whole set.
2. A whole eccentric flange set contains two eccentric flanges, two PTFE flange seal rings and four 7/16 - 20 UNF high tensile bolts.

### The Selection of Flange Seal Materials

The standard flange seal material is PTFE, graphite is an option. To order graphite flange seal material, add "- G" as a suffix.

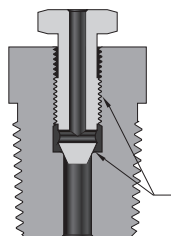
### Various Combinations of Eccentric Flange Set



Combinations of eccentric flange set can give different center line distances of 2.0" (50.8 mm), 2.13" (54 mm) and 2.25" (57 mm).

## Bleed Valves

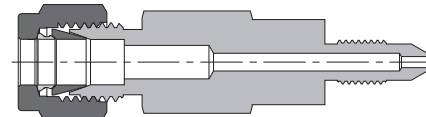
- RB Series RBSS-NS4 Bleed Valve is used as standard test/vent valve.
- For more information, refer to FITOK Bleed Valve RB Series.



Chrome-plated Stem and Tip Extend Cycle Life.

## Calibration Fittings

- The calibration fittings can be connected directly with the bleed port of transmitter so that the calibration process can be simplified.
- For more information, refer to FITOK Calibration Fittings.



# Block and Bleed Valves

BB, DB, SB and DBB Series



# Contents

BB Series: Single Block and Bleed Valves	C-28
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DB Series: Double Block Valves	C-34
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SB Series: Single Block Valves	C-35
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DBB Series: Double Block and Bleed Valves	C-36
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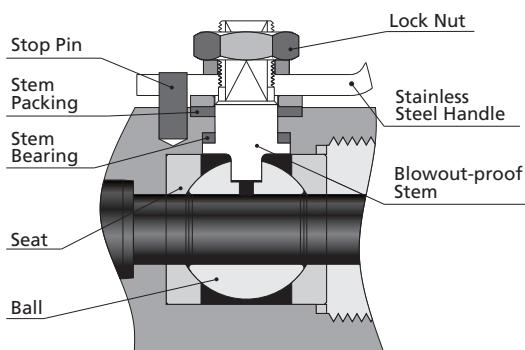
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## Features

- ⦿ Pressure ratings in accordance with ASME B16.34
- ⦿ Color coded handles indicate functions
- ⦿ Every valve is factory tested in accordance with API 598 or EN 12266
- ⦿ Flange connections comply with ASME B16.5, EN 1092-1 compliance is also available upon request
- ⦿ Bleed port equipped with plug
- ⦿ Weight, space and cost saving over traditional design

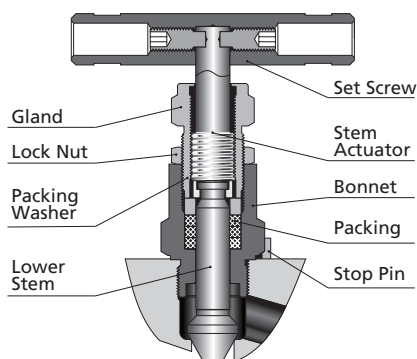
## Ball Valve Model



## Features

- ⦿ Pressure rating up to: Class 2500
- ⦿ Working temperature : -65°F to 450°F (-54°C to 232°C)
- ⦿ Actuate at quarter-turn
- ⦿ Directional stem flats show open or closed position
- ⦿ Bottom-loaded stem prevents stem blowout and enhances system safety
- ⦿ High-strength stem bearing provides smooth actuation and eliminates galling between valve stem and body
- ⦿ It may be required to adjust the packing during the service life of the valve
- ⦿ FITOK ball valves are designed to be operated in a fully open or fully closed position

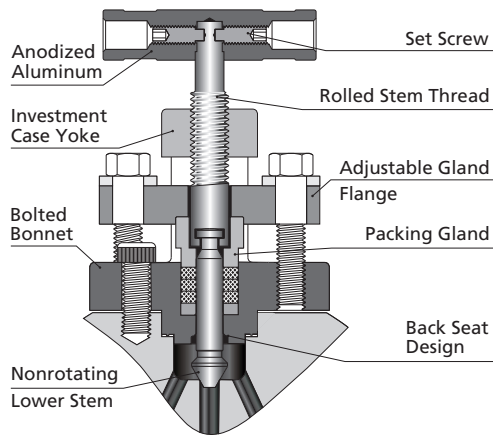
## Needle Type Valve Model



## Features

- ⦿ Pressure rating up to: Class 4500
- ⦿ Working temperatures are as follows:  
PTFE: -65°F to 450°F (-54°C to 232°C)  
Graphite: -65°F to 1200°F (-54°C to 649°C)
- ⦿ Two-piece stem design: Upper stem threads cold rolled and hardened lower stem for high strength and smooth operation
- ⦿ Upper stem thread lubricant is isolated from system fluid
- ⦿ Linear instead of rotary motion of the rising, non-rotating stem minimizes packing abrasion and reduces the friction between the seat and the tip
- ⦿ Stem back seating seals in fully open position
- ⦿ Double lock-pins enable steady and durable fastening of the handle

## OS&Y Needle Type Valve Model



### Features

- ⦿ Pressure rating up to: Class 2500
- ⦿ Working temperatures are as follows:  
PTFE: -65°F to 450°F (-54°C to 232°C)  
Graphite: -65°F to 1200°F (-54°C to 649°C)
- ⦿ Two-piece stem design: Upper stem threads cold rolled and hardened lower stem for high strength and smooth operation
- ⦿ Upper stem thread lubricant is isolated from system fluid
- ⦿ Linear instead of rotary motion of the rising, non-rotating stem minimizes packing abrasion and reduces the friction between the seat and the tip
- ⦿ Bolted bonnet enhances strength and reliability
- ⦿ Back seat design provides secondary stem sealing and prevents stem blowout
- ⦿ Adjustable gland flange allows easy access to the packing gland and packing adjustment for an effective stem seal
- ⦿ Investment case yoke is formed by precision casting which enhances strength and perfect stem alignment
- ⦿ Two handle pins make the handle fixed firmly and lastingly

Handle colors indicate functions:

Needle and OS&Y valves:

**BLACK** = Isolate/Block **RED** = Vent/Bleed

Ball valves:

**YELLOW** = Isolate/Block **RED** = Vent/Bleed

## Standard Materials of Construction

Component	Body Material				
	Stainless Steel		Carbon Steel	Duplex Stainless Steel	
	Material Grade/Specification				
Body/End Connector	316 SS, 316L SS /A182	316 SS, 316L SS /A479	A105, LF2/A350	F51/A182	S31803/A479
Ball Valve	Ball				
	Stem	316 SS, 316L SS/A479			S31803/A479
	Washer				
	Stop Block	304 SS/A240			
	Seat	PEEK/PCTFE			
	Needle Type Globe Valve	Stem Tip			
Stem		316 SS, 316L SS/A479			S31803/A479
Bonnet					
OS&Y Needle Type Globe Valve	Stem Tip				
	Stem	316 SS, 316L SS/A479			S31803/A479
	Packing Gland				
	Yoke	F316 SS/A182, A105 or LF2/A350			

Stainless steel is standard material, others are available upon request.

## Flange Connection

### Pressure - Temperature Rating

FITOK Block and Bleed Valves offer a variety of sizes and pressure ratings of the flange in accordance with ASME B16.5 Specifications. Ratings are taken from ASME B16.5, Table 2-2.2 and Table F2-2.2. The rating data are based on stainless steel F316/A182.

Temp. °C	ASME Ratings					
	150	300	600	900	1500	2500
	Working Pressure, bar					
-29 to 38	19.0	49.6	99.3	148.9	248.2	413.7
50	18.4	48.1	96.2	144.3	240.6	400.9
100	16.2	42.2	84.4	126.6	211.0	351.6
150	14.8	38.5	77.0	115.5	192.5	320.8
200	13.7	35.7	71.3	107.0	178.3	297.2
250	12.1	33.4	66.8	100.1	166.9	278.1
300	10.2	31.6	63.2	94.9	158.1	263.5
325	9.3	30.9	61.8	92.7	154.4	257.4
350	8.4	30.3	60.7	91.0	151.6	252.7
375	7.4	29.9	59.8	89.6	149.4	249.0
400	6.5	29.4	58.9	88.3	147.2	245.3
425	5.5	29.1	58.3	87.4	145.7	242.9
450	4.6	28.8	57.7	86.5	144.2	240.4

Temp. °F	ASME Ratings					
	150	300	600	900	1500	2500
	Working Pressure, psig					
-20 to 100	275	720	1440	2160	3600	6000
200	235	620	1240	1860	3095	5160
300	215	560	1120	1680	2795	4660
400	195	515	1025	1540	2570	4280
500	170	480	955	1435	2390	3980
600	140	450	900	1355	2255	3760
650	125	440	885	1325	2210	3680
700	110	435	870	1305	2170	3620
750	95	425	855	1280	2135	3560
800	80	420	845	1265	2110	3520
850	65	420	835	1255	2090	3480

### Sour Gas Service/NACE Compliant

Process interface valves for sour gas service are available. Materials are selected in accordance with NACE MR0175/ISO 15156. Contact FITOK Group or our authorized distributors if you have any request.

# BB Series: Single Block and Bleed Valves

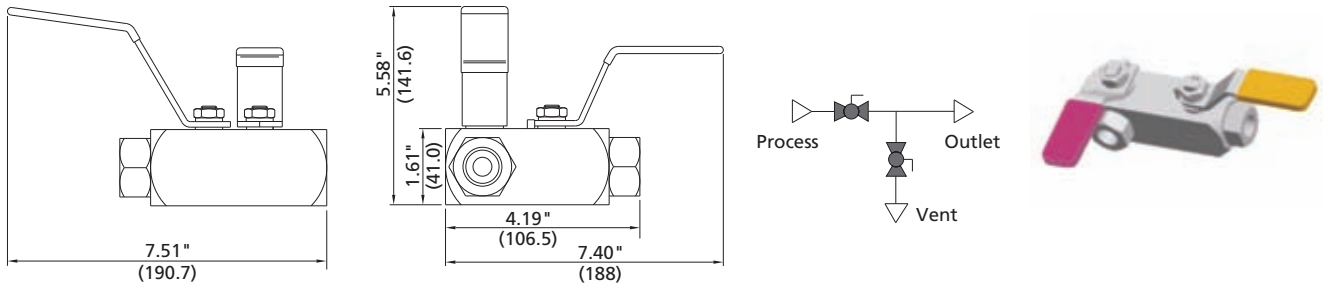
## Instrument Single Block and Bleed Valves

### Features

- ⊙ Threaded or one-piece forged body
- ⊙ Orifice (all-ball-valve configuration, ball-and-needle-valve configuration) : Ball 3/8 in. (9.5 mm), Needle 0.16 in. (4 mm); Orifice (all-needle-valve configuration) : 0.16 in. (4 mm) is standard, 0.25 in. (6.4 mm) and 0.38 in. (9.5 mm) are available upon request.

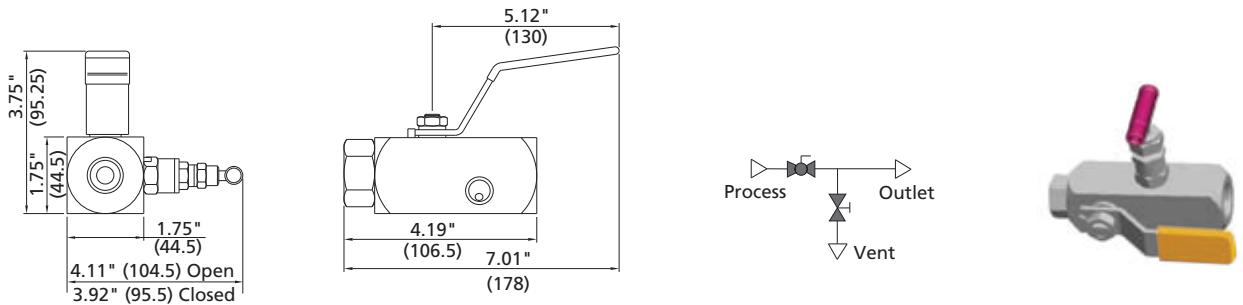
**Block: ball    Bleed: ball    (configuration: BB)**

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Vent/Bleed
BB□□-BB-FNS8-V4-C	1/2 female NPT	1/2 female NPT	1/4 female NPT
BB□□-BB-FNS8-V4-CG	1/2 female NPT	1/2 female NPT	1/4 female NPT



**Block: ball    Bleed: needle    (configuration: BN)**

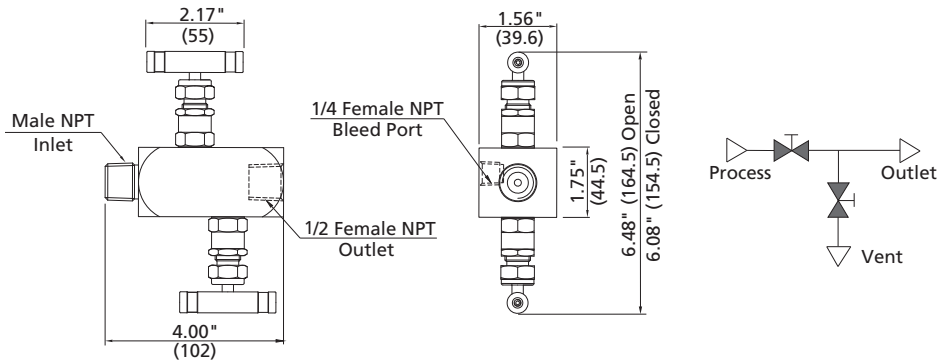
Basic Ordering Number	Inlet/Process	Outlet/Instrument	Vent/Bleed
BB□□-BN-FNS8-V4-V	1/2 female NPT	1/2 female NPT	1/4 female NPT
BB□□-BN-FNS8-V4-VG	1/2 female NPT	1/2 female NPT	1/4 female NPT
BB□□-BN-FNS8-NS8-V4-V	1/2 female NPT	1/2 male NPT	1/4 female NPT
BB□□-BN-FNS8-NS8-V4-VG	1/2 female NPT	1/2 male NPT	1/4 female NPT



Manifolds

Block: needle    Bleed: needle    (configuration: NN)

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Vent/Bleed
BB□□-NN-NS8-FNS8-V4-H	1/2 male NPT	1/2 female NPT	1/4 female NPT
BB□□-NN-NS12-FNS8-V4-HG	3/4 male NPT	1/2 female NPT	1/4 female NPT

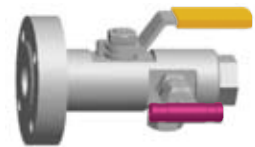
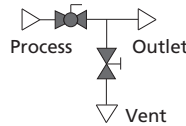
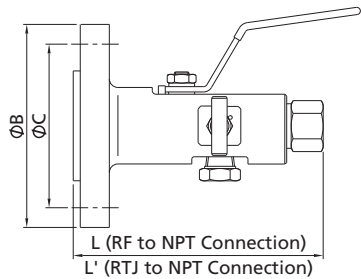


## Flange Single Block and Bleed Valves

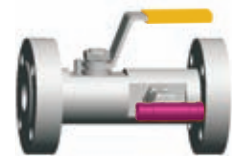
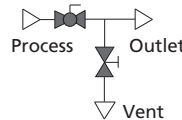
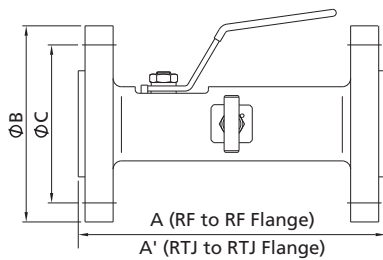
### Features

- ⊙ Threaded or one-piece forged body
- ⊙ Piping and instrument valves in one body
- ⊙ 1/2 female NPT standard outlet
- ⊙ Orifice (ball-and-needle-valve configuration) : Ball 3/8 in. (9.5 mm), Needle 0.16 in. (4 mm);  
Orifice (all-ball-valve configuration) : 3/8 in. (9.5 mm)

Block: ball    Bleed: needle    (configuration: BN)

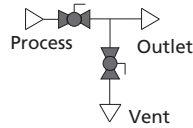
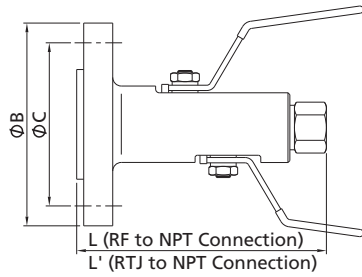


Block: ball    Bleed: needle    (configuration: BN)

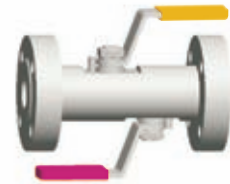
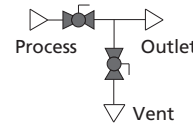
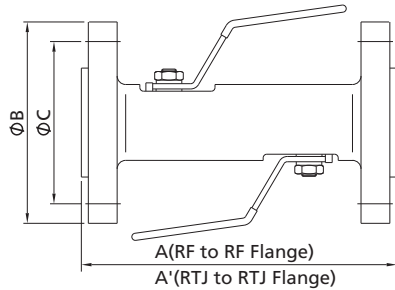


## C-30 Block and Bleed Valves

**Block: ball    Bleed: ball    (configuration: BB)**



**Block: ball    Bleed: ball    (configuration: BB)**



Flange Size	Bore Size in. (mm)	ASME Class	L in. (mm)	L' in. (mm)	A in. (mm)	A' in. (mm)	ØB in. (mm)	ØC in. (mm)		
NPS 1/2 (DN 15)	3/8 (9.5)	150	4.88 (124.0)	—	6.41 (162.8)	—	3.54 (90)	2.37 (60.3)		
		300		4.88 (124.0)	6.81 (173.0)	6.81 (173.0)	3.74 (95)	2.63 (66.7)		
		600	5.67 (144.0)	5.67 (144.0)	7.99 (202.9)	7.99 (202.9)	4.72 (120)	3.25 (82.6)		
		900/1500					5.31 (135)	3.50 (88.9)		
		2500					5.31 (135)	3.50 (88.9)		
NPS 3/4 (DN 20)	3/8 (9.5)	150	4.88 (124.0)	—	6.41 (162.8)	—	3.94 (100)	2.75 (69.9)		
		300		4.88 (124.0)	6.81 (173.0)	6.81 (173.0)	4.53 (115)	3.25 (82.6)		
		600	5.67 (144.0)	5.67 (144.0)	7.99 (202.9)	7.99 (202.9)	5.12 (130)	3.50 (88.9)		
		900/1500					5.51 (140)	3.75 (95.2)		
		2500					5.51 (140)	3.75 (95.2)		
NPS 1 (DN 25)	3/8 (9.5)	150	4.88 (124.0)	4.88 (124.0)	6.41 (162.8)	6.61 (167.9)	4.33 (110)	3.13 (79.4)		
		300			7.00 (177.8)	7.00 (177.8)	4.92 (125)	3.50 (88.9)		
		600	5.98 (151.9)	5.98 (151.9)	10.30 (261.6)	10.30 (261.6)	5.91 (150)	4.00 (101.6)		
		900/1500					10.70 (271.8)	10.70 (271.8)	6.30 (160)	4.25 (108.0)
		2500					10.70 (271.8)	10.70 (271.8)	6.30 (160)	4.25 (108.0)
NPS 1 1/2 (DN 40)	3/8 (9.5)	150	5.98 (151.9)	5.98 (151.9)	8.90 (226.1)	9.49 (241.0)	4.92 (125)	3.87 (98.4)		
		300			9.89 (251.2)	9.89 (251.2)	6.10 (155)	4.50 (114.3)		
		600	6.61 (167.9)	6.61 (167.9)	11.50 (292.1)	11.50 (292.1)	7.09 (180)	4.87 (123.8)		
		900/1500					12.40 (315.0)	12.40 (315.0)	8.07 (205)	5.75 (146)
		2500					12.40 (315.0)	12.40 (315.0)	8.07 (205)	5.75 (146)
NPS 2 (DN 50)	3/8 (9.5)	150	5.98 (151.9)	5.98 (151.9)	9.09 (230.9)	9.49 (241.0)	5.91 (150)	4.75 (120.7)		
		300			10.10 (256.5)	10.30 (261.6)	6.50 (165)	5.00 (127.0)		
		600	6.61 (167.9)	6.61 (167.9)	12.00 (304.8)	12.00 (304.8)	8.46 (215)	6.50 (165.1)		
		900/1500					13.60 (345.4)	13.60 (345.4)	9.25 (235)	6.75 (171.4)
		2500					13.60 (345.4)	13.60 (345.4)	9.25 (235)	6.75 (171.4)

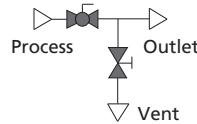
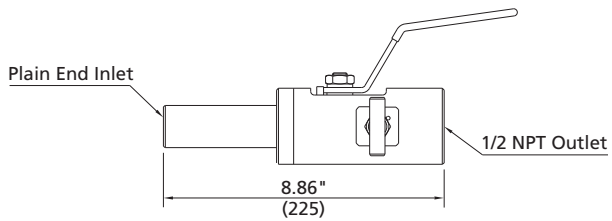
Dimensions are for reference only and are subject to change.

# Root Single Block and Bleed Valves

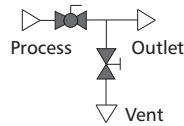
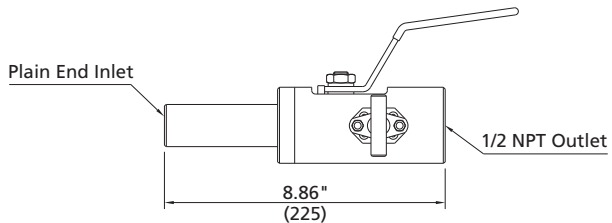
## Features

- ⦿ Directly-mounted root valves available to the vessel or process pipe
- ⦿ Weld inlet connection sizes from NPS 1/2 to NPS 2
- ⦿ 1/2 female NPT standard vent with plug
- ⦿ 1/2 female NPT standard outlet
- ⦿ Orifice (ball-and-needle-valve configuration) : Ball 3/8 in. (9.5 mm), Needle 0.16 in. (4 mm);  
Orifice ( all-needle-valve configuration) : 0.16 in. (4 mm) is standard, 0.25 in. (6.4 mm) and 0.38 in. (9.5 mm) are available upon request.

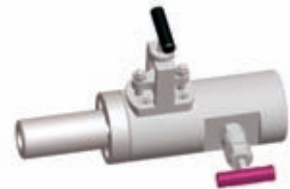
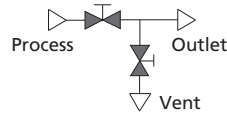
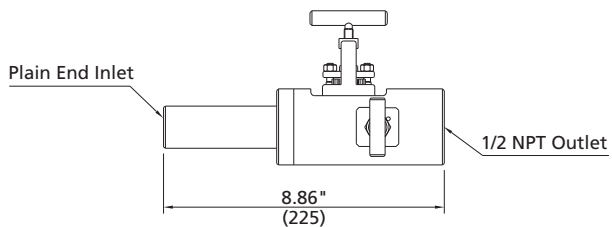
**Block: ball    Bleed: needle    (configuration: BN)**



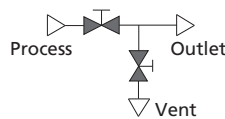
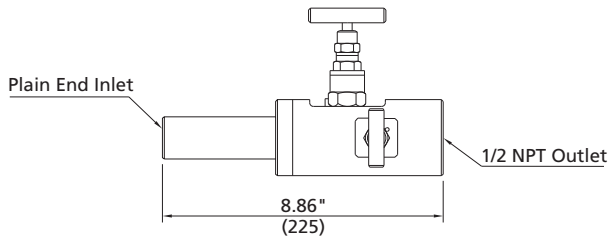
**Block: ball    Bleed: OS&Y    (configuration: BO)**



**Block: OS&Y    Bleed: needle    (configuration: ON)**



**Block: needle    Bleed: needle    (configuration: NN)**



*Dimensions are for reference only and are subject to change.*

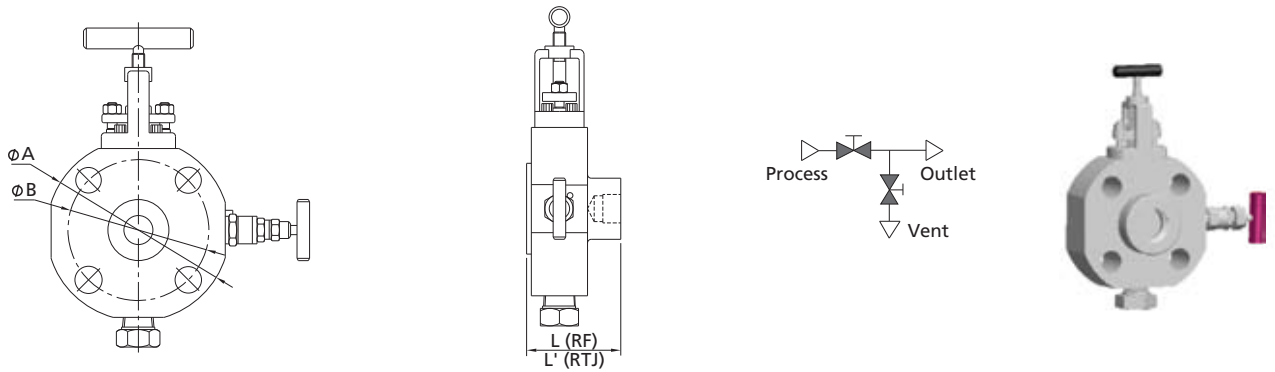
Manifolds

# Monoflange Single Block and Bleed Valves

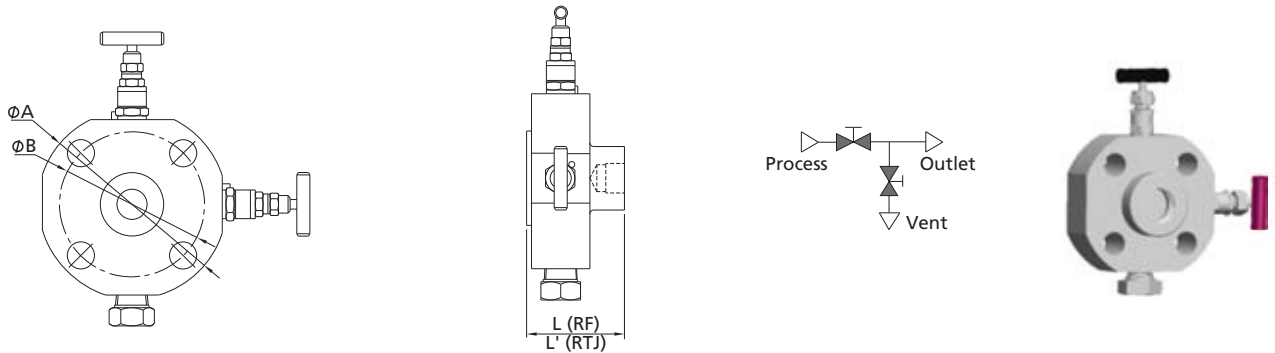
## Features

- Piping and instrument valves in one body
- 1/4 female NPT standard vent with plug
- 1/2 female NPT standard outlet
- Orifice: 0.16 in. (4 mm) is standard, 0.25 in. (6.4 mm) and 0.38 in. (9.5 mm) are available for some flange sizes

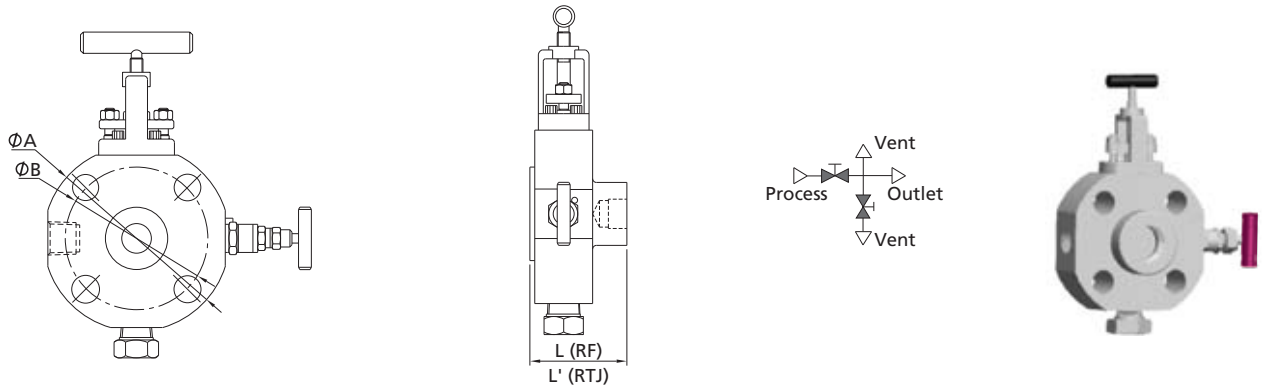
**Block: OS&Y Bleed: needle (configuration: ON)**



**Block: needle Bleed: needle (configuration: NN)**



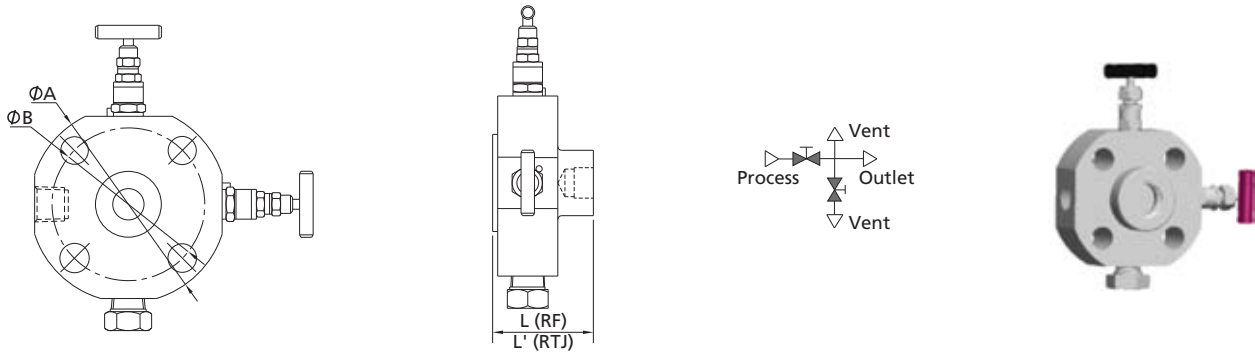
**Block: OS&Y Bleed: needle (configuration: ON, Two Vents)**



Manifolds



Block: needle Bleed: needle (configuration: NN, Two Vents)



Flange Size	Bore Size in. (mm)	ASME Class	L in. (mm)	L' in. (mm)	Ø A in. (mm)	Ø B in. (mm)
NPS 1/2 (DN 15)	0.16 (4.0)	150	2.03 (51.6)	—	3.54 (90)	2.37 (60.3)
		300		2.03 (51.6)	3.74 (95)	2.63 (66.7)
		600			4.72 (120)	3.25 (82.6)
		900/1500			5.31 (135)	3.50 (88.9)
		2500			5.91 (150)	4.00 (101.6)
NPS 3/4 (DN 20)		150	2.03 (51.6)	—	3.94 (100)	2.75 (69.9)
		300		2.03 (51.6)	4.53 (115)	3.25 (82.6)
		600			5.12 (130)	3.50 (88.9)
		900/1500			5.51 (140)	3.75 (95.2)
		2500	2.11 (53.5)	2.11 (53.5)	5.51 (140)	3.75 (95.2)
NPS 1 (DN 25)	150	2.03 (51.6)	2.03 (51.6)	4.33 (110)	3.13 (79.4)	
	300			4.92 (125)	3.50 (88.9)	
	600			2.11 (53.5)	5.91 (150)	4.00 (101.6)
	900/1500	6.30 (160)	4.25 (108.0)			
	2500	2.11 (53.5)	2.11 (53.5)	6.30 (160)	4.25 (108.0)	
NPS 1 1/2 (DN 40)	150	2.03 (51.6)	2.03 (51.6)	4.92 (125)	3.87 (98.4)	
	300	2.11 (53.5)	2.11 (53.5)	6.10 (155)	4.50 (114.3)	
	600			7.09 (180)	4.87 (123.8)	
	900/1500	2.19 (55.5)	2.19 (55.5)	7.09 (180)	4.87 (123.8)	
	2500	2.67 (67.9)	2.67 (67.9)	8.07 (205)	5.75 (146)	
NPS 2 (DN 50)	150	2.11 (53.5)	2.11 (53.5)	5.91 (150)	4.75 (120.7)	
	300	2.19 (55.5)	2.19 (55.5)	6.50 (165)	5.00 (127.0)	
	600			8.49 (215)	6.50 (165.1)	
	900/1500	2.42 (61.5)	2.42 (61.5)	8.49 (215)	6.50 (165.1)	
	2500	2.88 (73.4)	2.88 (73.4)	9.25 (235)	6.75 (171.4)	

Dimensions are for reference only and are subject to change.

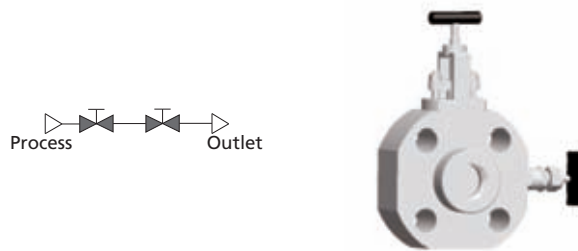
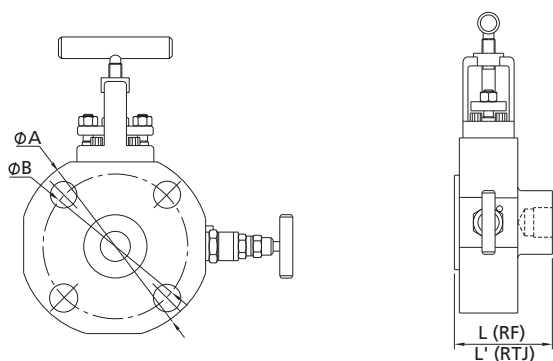
# DB Series: Double Block Valves

## Monoflange Double Block Valves

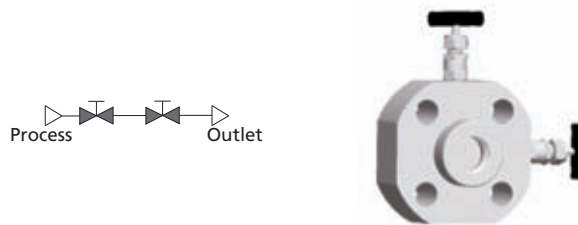
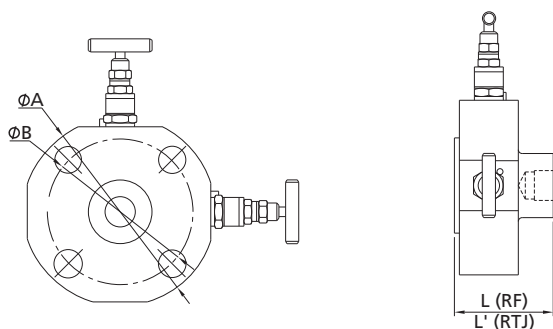
### Features

- Piping and instrument valves in one body
- 1/2 female NPT standard outlet
- Orifice: 0.16 in. (4 mm) is standard, 0.25 in. (6.4 mm) and 0.38 in. (9.5 mm) are available for some flange sizes

Primary: OS&Y Secondary: needle (configuration: ON)



Primary: needle Secondary: needle (configuration: NN)



Dimensions are the same as the monoflange single block & bleed valves

Manifolds

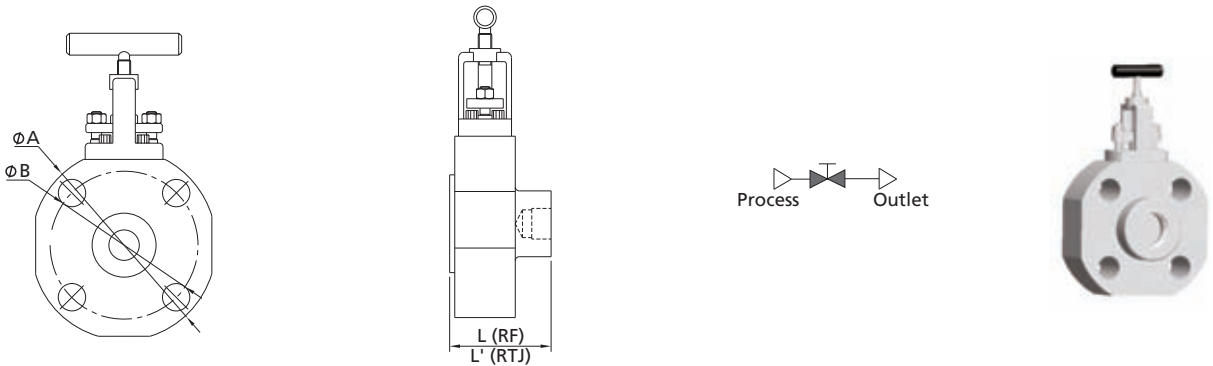
# SB Series: Single Block Valves

## Monoflange Single Block Valves

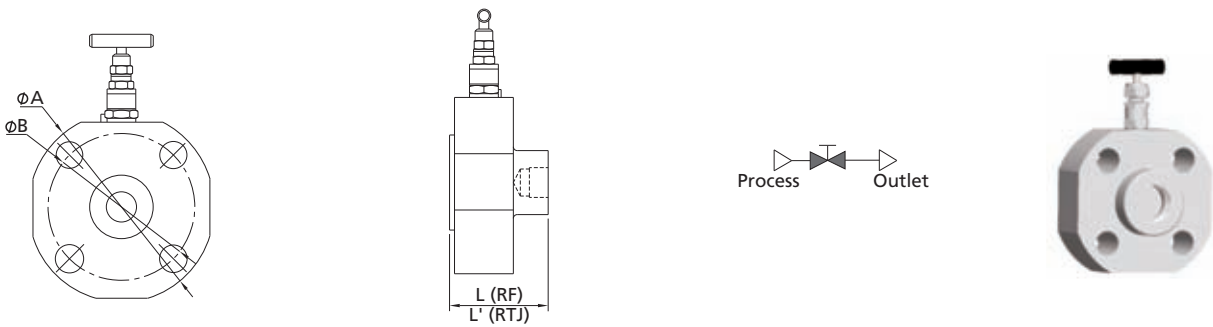
### Features

- Piping and instrument valves in one body
- 1/2 female NPT standard outlet
- Orifice: 0.16 in. (4 mm) is standard, 0.25 in. (6.4 mm) and 0.38 in. (9.5 mm) are available for some flange sizes

#### Block: OS&Y (O)



#### Block: needle (N)



Dimensions are the same as the Monoflange single block & bleed valves

# DBB Series: Double Block and Bleed Valves

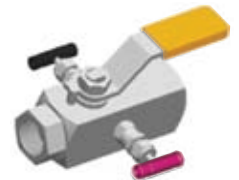
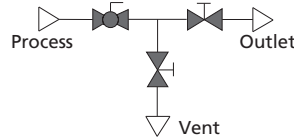
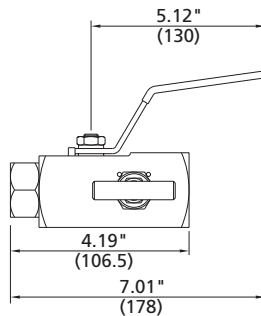
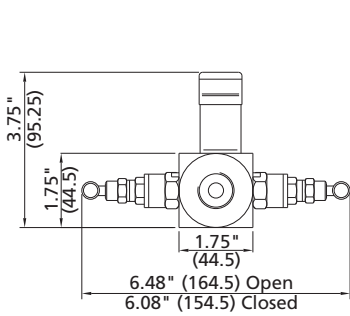
## Instrument Double Block and Bleed Valves

### Features

- ⊙ Threaded or one-piece forged body
- ⊙ Optional port sizes and thread forms available
- ⊙ Orifice (all-ball-valve configuration, ball-and-needle-valve configuration) : Ball 3/8 in. (9.5 mm), Needle 0.16 in. (4 mm); Orifice (all-needle-valve configuration) : 0.16 in. (4 mm) is standard, 0.25 in. (6.4 mm) and 0.38 in. (9.5 mm) are available upon request

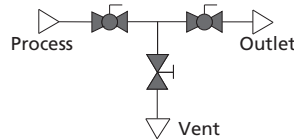
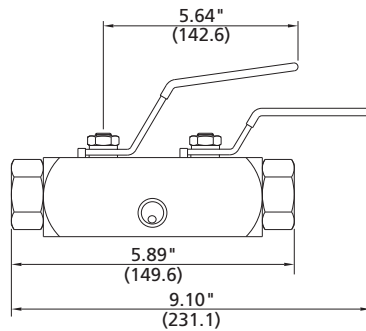
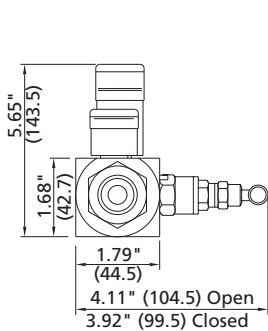
Primary: ball Secondary: needle Bleed: needle (configuration: BNN)

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Vent/Bleed
DBB□□-BNN-FNS8-V4-V	1/2 female NPT	1/2 female NPT	1/4 female NPT
DBB□□-BNN-FNS8-V4-VG	1/2 female NPT	1/2 female NPT	1/4 female NPT



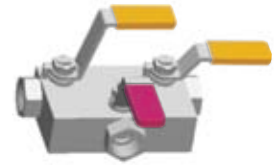
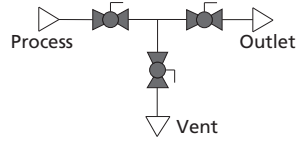
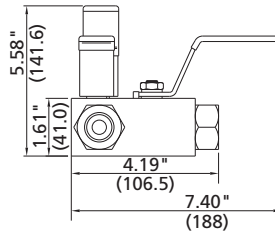
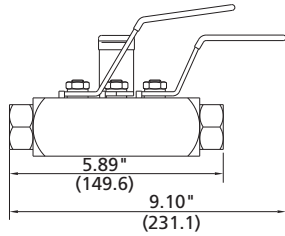
Primary: ball Secondary: ball Bleed: needle (configuration: BBN)

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Vent/Bleed
DBB□□-BBN-FNS8-V4-V	1/2 female NPT	1/2 female NPT	1/4 female NPT
DBB□□-BBN-FNS8-V4-VG	1/2 female NPT	1/2 female NPT	1/4 female NPT



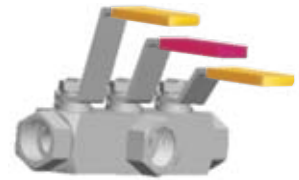
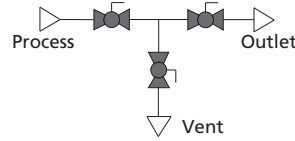
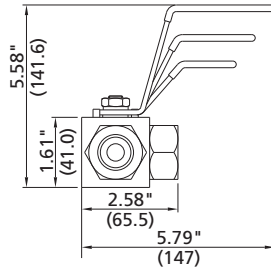
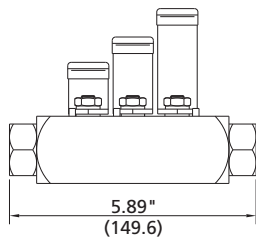
Primary: ball Secondary: ball Bleed: ball (configuration: BBB)

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Vent/Bleed
DBB□□-BBB-FNS8-V4-C	1/2 female NPT	1/2 female NPT	1/4 female NPT
DBB□□-BBB-FNS8-V4-CG	1/2 female NPT	1/2 female NPT	1/4 female NPT



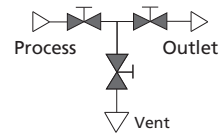
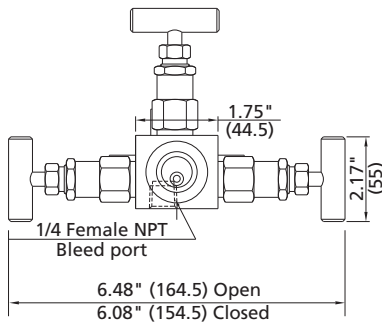
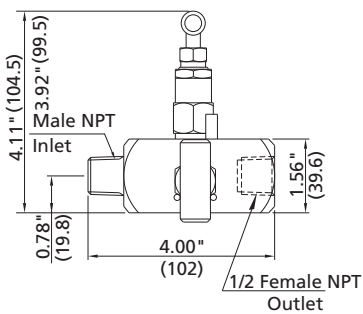
Primary: ball Secondary: ball Bleed: ball (configuration: BBB)

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Vent/Bleed
DBB□□-BBB-FNS8-V4-L	1/2 female NPT	1/2 female NPT	1/4 female NPT
DBB□□-BBB-FNS8-V4-LG	1/2 female NPT	1/2 female NPT	1/4 female NPT



Primary: needle Secondary: needle Bleed: needle (configuration: NNN)

Basic Ordering Number	Inlet/Process	Outlet/Instrument	Vent/Bleed
DBB□□-NNN-NS8-FNS8-V4-V	1/2 male NPT	1/2 female NPT	1/4 female NPT
DBB□□-NNN-NS12-FNS8-V4-VG	3/4 male NPT	1/2 female NPT	1/4 female NPT

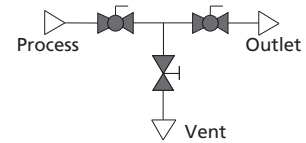
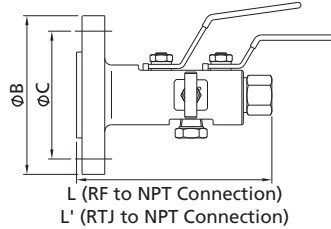
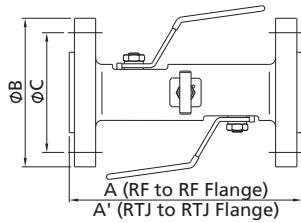


# Flange Double Block and Bleed Valves

## Features

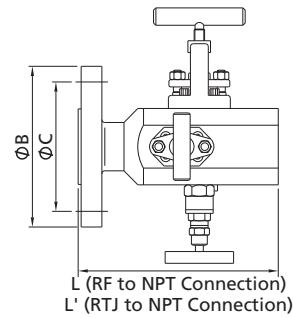
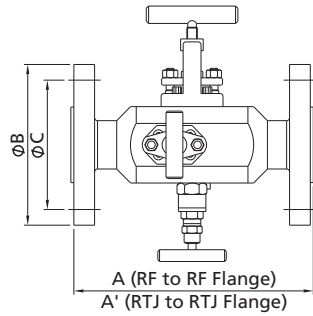
- ⦿ One piece forged body minimizes potential leak paths
- ⦿ Piping and instrument valves in one body
- ⦿ 1/2 female NPT standard outlet
- ⦿ Orifice (ball-and-needle-valve configuration) : Ball 3/8 in. (9.5 mm), Needle 0.16 in. (4 mm);  
Orifice (all-needle-valve configuration) : 0.38 in. (9.5 mm)

**Primary: ball    Secondary: ball    Bleed: needle    (configuration: BBN)**



Flange Size	Bore Size in. (mm)	ASME Class	L in. (mm)	L' in. (mm)	A in. (mm)	A' in. (mm)	ØB in. (mm)	ØC in. (mm)				
NPS 1/2 (DN 15)	3/8 (9.5)	150	5.91 (150.1)	—	6.41 (162.8)	—	3.54 (90)	2.37 (60.3)				
		300		5.91 (150.1)	6.81 (173.0)	6.81 (173.0)	3.74 (95)	2.63 (66.7)				
		600	6.69 (170.0)	6.69 (170.0)	7.99 (202.9)	7.99 (202.9)	4.72 (120)	3.25 (82.6)				
		900/1500					5.31 (135)	3.50 (88.9)				
		2500					5.51 (140)	3.75 (95.2)				
NPS 3/4 (DN 20)	3/8 (9.5)	150	5.91 (150.1)	—	6.41 (162.8)	—	3.94 (100)	2.75 (69.9)				
		300		5.91 (150.1)	6.81 (173.0)	6.81 (173.0)	4.53 (115)	3.25 (82.6)				
		600	6.69 (170.0)	6.69 (170.0)	7.99 (202.9)	7.99 (202.9)	5.12 (130)	3.50 (88.9)				
		900/1500					5.51 (140)	3.75 (95.2)				
		2500					5.51 (140)	3.75 (95.2)				
NPS 1 (DN 25)	3/8 (9.5)	150	5.91 (150.1)	5.91 (150.1)	6.41 (162.8)	6.61 (167.9)	4.33 (110)	3.13 (79.4)				
		300			7.00 (177.8)	7.00 (177.8)	4.92 (125)	3.50 (88.9)				
		600	7.00 (177.8)	7.00 (177.8)	10.30 (261.6)	10.30 (261.6)	5.91 (150)	4.00 (101.6)				
		900/1500					10.70 (271.8)	10.70 (271.8)	6.30 (160)	4.25 (108.0)		
		2500					10.70 (271.8)	10.70 (271.8)	6.30 (160)	4.25 (108.0)		
NPS 1 1/2 (DN 40)	3/8 (9.5)	150	7.00 (177.8)	7.00 (177.8)	8.90 (226.1)	9.49 (241.0)	4.92 (125)	3.87 (98.4)				
		300			9.89 (251.2)	9.89 (251.2)	6.10 (155)	4.50 (114.3)				
		600	7.64 (194.1)	7.64 (194.1)	11.50 (292.1)	11.50 (292.1)	7.09 (180)	4.87 (123.8)				
		900/1500					12.40 (315.0)	12.40 (315.0)	8.07 (205)	5.75 (146)		
		2500					12.40 (315.0)	12.40 (315.0)	8.07 (205)	5.75 (146)		
NPS 2 (DN 50)	3/8 (9.5)	150	7.00 (177.8)	7.00 (177.8)	9.09 (230.9)	9.49 (241.0)	5.91 (150)	4.75 (120.7)				
		300			10.10 (256.5)	10.30 (261.6)	6.50 (165)	5.00 (127.0)				
		600	7.64 (194.1)	7.64 (194.1)	12.00 (304.8)	12.00 (304.8)	8.46 (215)	6.50 (165.1)				
		900/1500					8.03 (204.0)	8.03 (204.0)	13.60 (345.4)	13.60 (345.4)	9.25 (235)	6.75 (171.4)
		2500					8.03 (204.0)	8.03 (204.0)	13.60 (345.4)	13.60 (345.4)	9.25 (235)	6.75 (171.4)

Primary: OS&Y Secondary: OS&Y Bleed: needle (configuration: OON)

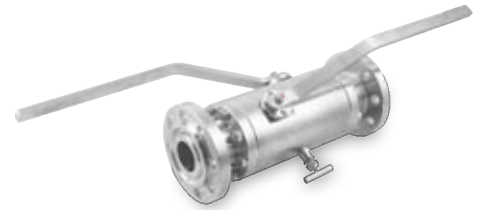
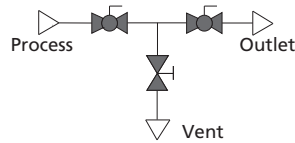
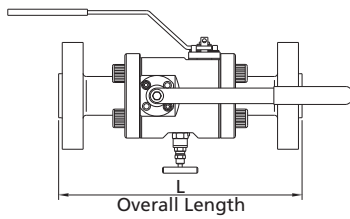


Flange Size	Bore Size in. (mm)	ASME Class	L in. (mm)	L' in. (mm)	A in. (mm)	A' in. (mm)	$\phi B$ in. (mm)	$\phi C$ in. (mm)		
NPS 1/2 (DN 15)	0.38 (9.5)	150	4.88 (124.0)	—	6.41 (162.8)	—	3.54 (90)	2.37 (60.3)		
		300		4.88 (124.0)	6.81 (173.0)	6.81 (173.0)	3.74 (95)	2.63 (66.7)		
		600	5.60 (142.2)	5.60 (142.2)	7.99 (202.9)	7.99 (202.9)	4.72 (120)	3.25 (82.6)		
		900/1500					5.31 (135)	3.50 (88.9)		
		2500					5.31 (135)	3.50 (88.9)		
NPS 3/4 (DN 20)	0.38 (9.5)	150	4.88 (124.0)	—	6.41 (162.8)	—	3.94 (100)	2.75 (69.9)		
		300		4.88 (124.0)	6.81 (173.0)	6.81 (173.0)	4.53 (115)	3.25 (82.6)		
		600	5.60 (142.2)	5.60 (142.2)	7.99 (202.9)	7.99 (202.9)	5.12 (130)	3.50 (88.9)		
		900/1500					5.51 (140)	3.75 (95.2)		
		2500					5.51 (140)	3.75 (95.2)		
NPS 1 (DN 25)	0.38 (9.5)	150	4.88 (124.0)	4.88 (124.0)	6.41 (162.8)	6.61 (167.9)	4.33 (110)	3.13 (79.4)		
		300			7.00 (177.8)	7.00 (177.8)	4.92 (125)	3.50 (88.9)		
		600	5.98 (151.9)	5.98 (151.9)	10.30 (261.6)	10.30 (261.6)	5.91 (150)	4.00 (101.6)		
		900/1500					10.70 (271.8)	10.70 (271.8)	6.30 (160)	4.25 (108.0)
		2500					10.70 (271.8)	10.70 (271.8)	6.30 (160)	4.25 (108.0)
NPS 1 1/2 (DN 40)	0.38 (9.5)	150	5.98 (151.9)	5.98 (151.9)	8.90 (226.1)	9.49 (241.0)	4.92 (125)	3.87 (98.4)		
		300			9.89 (251.2)	9.89 (251.2)	6.10 (155)	4.50 (114.3)		
		600	6.61 (167.9)	6.61 (167.9)	11.50 (292.1)	11.50 (292.1)	7.09 (180)	4.87 (123.8)		
		900/1500					12.40 (315.0)	12.40 (315.0)	8.07 (205)	5.75 (146)
		2500					12.40 (315.0)	12.40 (315.0)	8.07 (205)	5.75 (146)
NPS 2 (DN 50)	0.38 (9.5)	150	5.98 (151.9)	5.98 (151.9)	9.09 (230.9)	9.49 (241.0)	5.91 (150)	4.75 (120.7)		
		300			10.10 (256.5)	10.30 (261.6)	6.50 (165)	5.00 (127.0)		
		600	6.61 (167.9)	6.61 (167.9)	12.00 (304.8)	12.00 (304.8)	8.46 (215)	6.50 (165.1)		
		900/1500					7.00 (177.8)	7.00 (177.8)	9.25 (235)	6.75 (171.4)
		2500					7.00 (177.8)	7.00 (177.8)	9.25 (235)	6.75 (171.4)

# Three-Piece Bolted Flange Double Block and Bleed Valves

## Features

- ⦿ Complementing the existing one-piece range, flange to flange bolted construction DBB valves available in bore sizes from 3/8 in. to 2 in. (9.5 mm ~ 50.8 mm)
- ⦿ Designed and manufactured according to ASME SI B16.34 and ASME Boiler and Pressure Vessel Code, Section VIII
- ⦿ Three-piece, bolted joint, forged body design
- ⦿ API 607 Fire safe approved by TÜV SÜD. Anti-static design is also available.
- ⦿ Blowout-proof valve stems and needles
- ⦿ Materials are selected in accordance with NACE MR0175/ISO 15156
- ⦿ 1/2 female NPT standard vent



## Dimensions

Basic Ordering Number	Flange Size	Bore Size in. (mm)	ASME Class	L in. (mm)
DBB□□-BBN1-□□8□□□-V□-FS-I	NPS 1/2 (DN 15)	1/2 (14)	150	12.6 (321)
			300	12.9 (327)
			600	13.4 (340)
			900/1500	14.4 (366)
			2500	15.0 (382)
DBB□□-BBN2-□□12□□□-V□-FS-I	NPS 3/4 (DN 20)	3/4 (20)	150	12.7 (323)
			300	13.2 (336)
			600	13.7 (349)
			900/1500	14.6 (372)
			2500	15.2 (385)
DBB□□-BBN3-□□16□□□-V□-FS-I	NPS 1 (DN 25)	1 (25.4)	150	13.0 (330)
			300	13.2 (336)
			600	13.8 (350)
			900/1500	15.4 (392)
			2500	16.2 (412)
DBB□□-BBN4-□□24□□□-V□-FS-I	NPS 1 1/2 (DN 40)	1 1/2 (38.1)	150	14.2 (361)
			300	14.4 (367)
			600	15.1 (384)
			900/1500	15.8 (402)
			2500	18.2 (463)
DBB□□-BBN5-□□32□□□-V□-FS-I	NPS 2 (DN 50)	2 (50.8)	150	15.4 (390)
			300	15.7 (398)
			600	16.4 (416)
			900/1500	18.9 (481)



Basic Ordering Number	Flange Size	Bore Size in. (mm)	ASME Class	L in. (mm)
DBB□□-BBN□□8□□□-V□-FS-I	NPS 1/2 (DN 15)	3/8 (9.5)	150	9.1 (232)
			300	9.9 (252)
			600	10.7 (272)
			900/1500	12.3 (312)
			2500	13.5 (342)
DBB□□-BBN1-□□12□□□-V□-FS-I	NPS 3/4 (DN 20)	1/2 (14)	150	12.8 (324)
			300	13.2 (336)
			600	13.8 (350)
			900/1500	14.6 (372)
			2500	15.2 (385)
DBB□□-BBN2-□□16□□□-V□-FS-I	NPS 1 (DN 25)	3/4 (20)	150	12.9 (327)
			300	13.4 (340)
			600	13.9 (353)
			900/1500	15.1 (384)
			2500	15.6 (397)
DBB□□-BBN3-□□24□□□-V□-FS-I	NPS 1 1/2 (DN 40)	1 (25.4)	150	13.1 (332)
			300	13.9 (352)
			600	15.0 (382)
			900/1500	15.8 (402)
			2500	16.6 (422)
DBB□□-BBN4-□□32□□□-V□-FS-I	NPS 2 (DN 50)	1 1/2 (38.1)	150	12.3 (312)
			300	13.1 (332)
			600	13.9 (352)
			900/1500	15.8 (402)
			2500	16.6 (422)
DBB□□-BBN5-□□48□□□-V□-FS-I	NPS 3 (DN 80)	2 (50.8)	150	14.3 (364)
			300	14.6 (372)
			600	16.9 (428)
			900	17.4 (441)
			1500	19.7 (500)

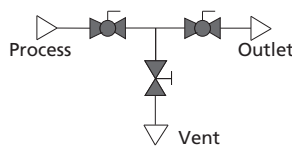
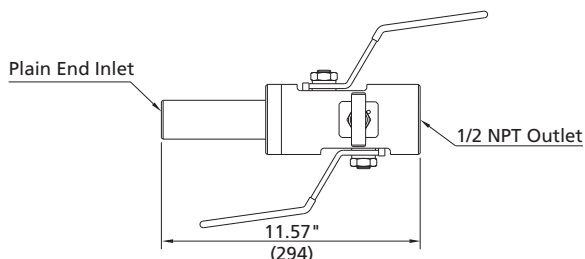
Dimensions are for reference only and are subject to change.

# Root Double Block and Bleed Valves

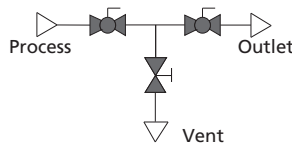
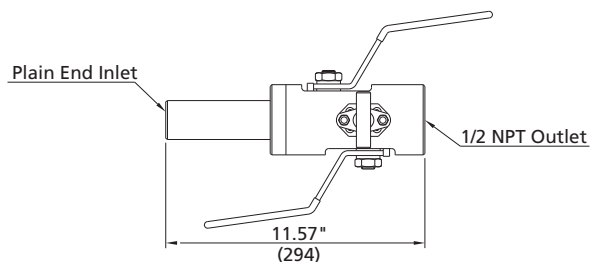
## Features

- ⦿ Directly-mounted root valves available to the vessel or process pipe
- ⦿ Weld inlet connections in sizes from NPS 1/2 to NPS 2
- ⦿ 1/2 female NPT standard vent with plug
- ⦿ 1/2 female NPT standard outlet
- ⦿ Orifice (ball-and-needle-valve configuration): Ball 3/8 in. (9.5 mm), Needle 0.16 in. (4 mm);  
Orifice (all-needle-valve configuration): 0.16 in. (4 mm) is standard, 0.25 in. (6.4 mm) and 0.38 in. (9.5 mm) are available upon request.

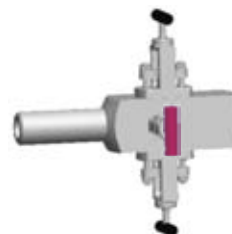
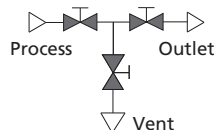
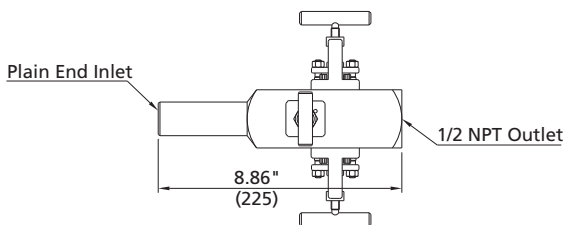
**Primary: ball Secondary: ball Bleed: needle (configuration: BBN)**



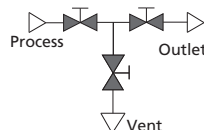
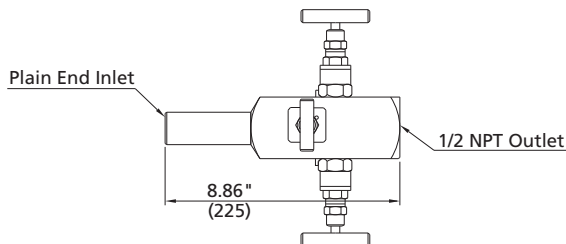
**Primary: ball Secondary: ball Bleed: OS&Y (configuration: BBO)**



**Primary: OS&Y Secondary: OS&Y Bleed: needle (configuration: OON)**



**Primary: needle Secondary: needle Bleed: needle (configuration: NNN)**



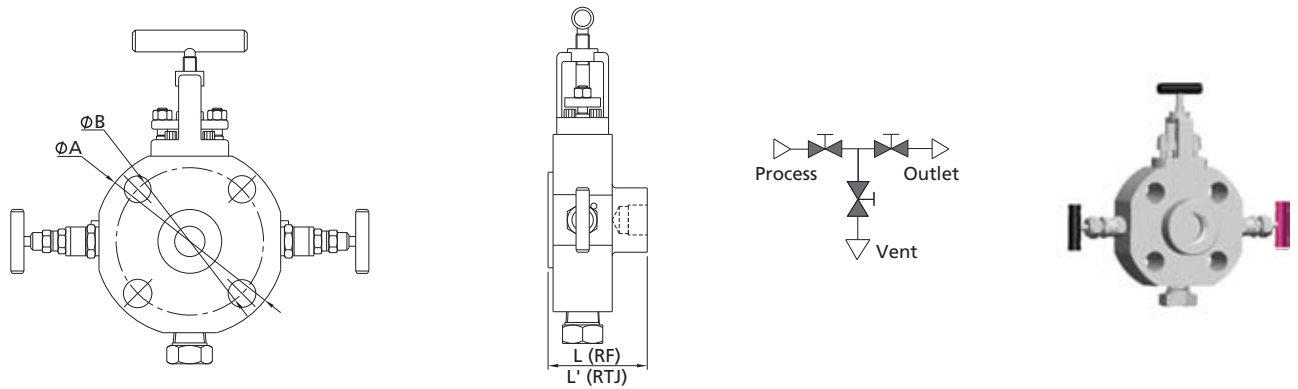
Dimensions are for reference only and are subject to change.

# Monoflange Double Block & Bleed Valves

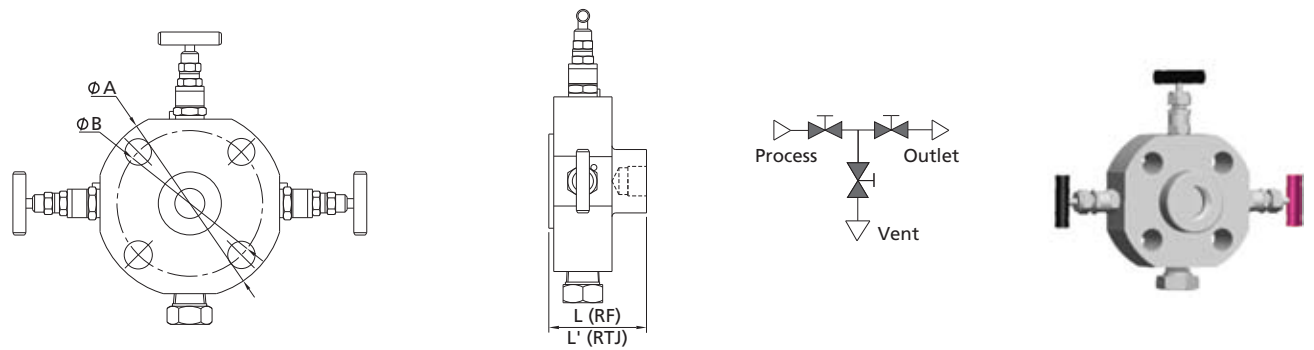
## Features

- ⦿ Piping and instrument valves in one body
- ⦿ 1/4 female NPT standard vent with plug
- ⦿ 1/2 female NPT standard outlet
- ⦿ Orifice: 0.16 in. (4 mm) is standard, 0.25 in. (6.4 mm) and 0.38 in. (9.5 mm) are available for some flange sizes

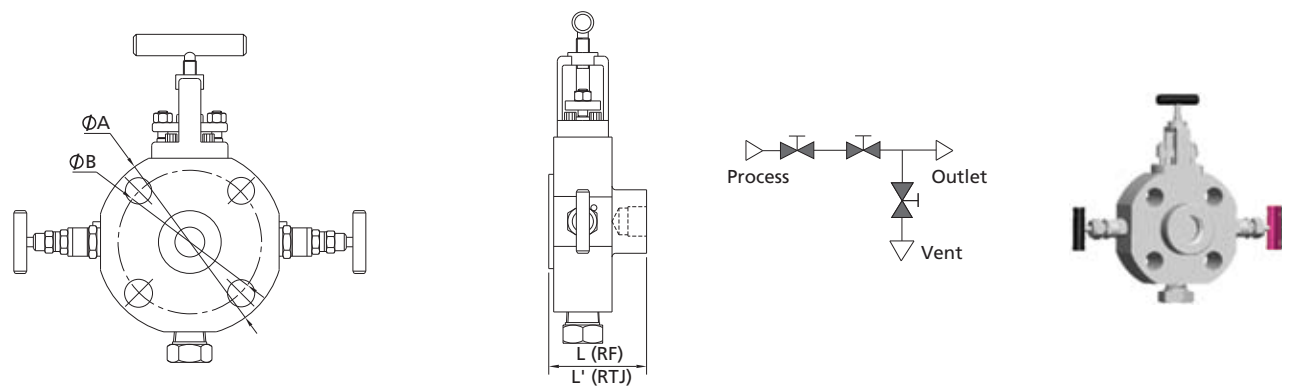
**Primary: OS&Y    Secondary: needle    Bleed: needle    (configuration: ONN)**



**Primary: needle    Secondary: needle    Bleed: needle    (configuration: NNN)**



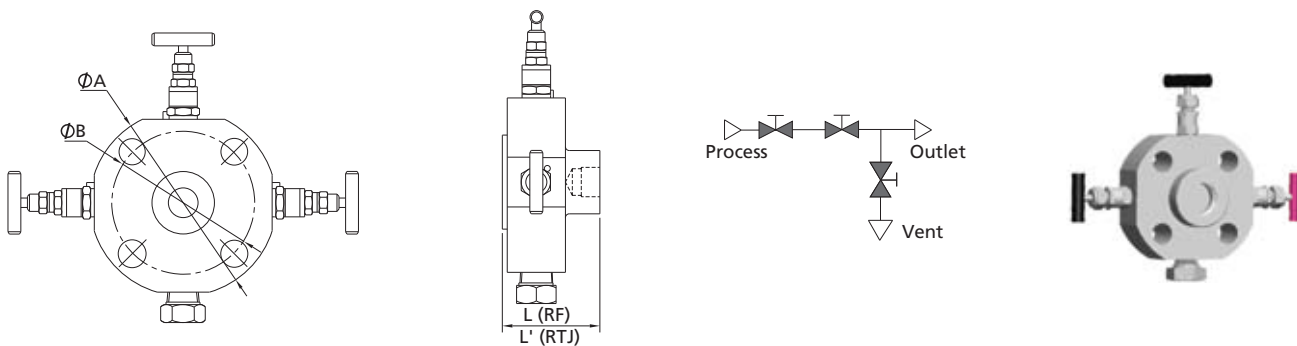
**Primary: OS&Y    Secondary: needle    Bleed: needle    (configuration: ONN, Block/Block/Bleed: X)**



Manifolds

# C-44 Block and Bleed Valves

Primary: needle Secondary: needle Bleed: needle (configuration: NNN, Block/Block/Bleed: X)



Flange Size	Bore Size in. (mm)	ASME Class	L in. (mm)	L' in. (mm)	ØA in. (mm)	ØB in. (mm)
NPS 1/2 (DN 15)	0.16 (4.0)	150	2.03 (51.6)	—	3.54 (90)	2.37 (60.3)
		300		2.03 (51.6)	3.74 (95)	2.63 (66.7)
		600			4.72 (120)	3.25 (82.6)
		900/1500			5.31 (135)	3.50 (88.9)
		2500			—	3.94 (100)
NPS 3/4 (DN 20)		150	2.03 (51.6)	2.03 (51.6)	4.53 (115)	3.25 (82.6)
		300			5.12 (130)	3.50 (88.9)
		600			5.51 (140)	3.75 (95.2)
		900/1500			2.11 (53.5)	2.11 (53.5)
NPS 1 (DN 25)		150	2.03 (51.6)	2.03 (51.6)	4.33 (110)	3.13 (79.4)
	300	4.92 (125)			3.50 (88.9)	
	600	5.91 (150)			4.00 (101.6)	
	900/1500	2.11 (53.5)	2.11 (53.5)	6.30 (160)	4.25 (108.0)	
	2500	—	2.03 (51.6)	2.03 (51.6)	4.92 (125)	3.87 (98.4)
NPS 1 1/2 (DN 40)	150	2.11 (53.5)	2.11 (53.5)	6.10 (155)	4.50 (114.3)	
	300			7.09 (180)	4.87 (123.8)	
	600			8.07 (205)	5.75 (146)	
	900/1500	2.19 (55.5)	2.19 (55.5)	5.91 (150)	4.75 (120.7)	
	2500	2.67 (67.9)	2.67 (67.9)	6.50 (165)	5.00 (127.0)	
NPS 2 (DN 50)	150	2.19 (55.5)	2.19 (55.5)	8.46 (215)	6.50 (165.1)	
	300			9.25 (235)	6.75 (171.4)	
	600			—	—	
	900/1500	2.42 (61.5)	2.42 (61.5)	—	—	
	2500	2.88 (73.4)	2.88 (73.4)	—	—	

Dimensions are for reference only and are subject to change.

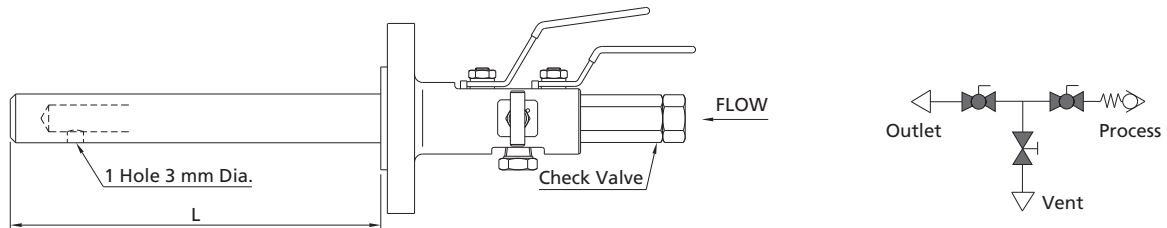
Manifolds

# Injection Double Block & Bleed Valves

## Function - injection

Injection of chemicals and other media into the process stream can be accomplished with this design. A check valve is installed to prevent process fluid from reaching the inlet injection position. There is a 0.125" (3 mm) hole in the injection nozzle orifice. The length of the injection nozzle orifice can be manufactured to meet customer requirements.

The injection orifice can also be rotated. Injection valves can be provided in most of the styles and options offered for the DBB ranges.



### Injection Quill

The injection quill length (L) is manufactured to meet customer requirements.

The injection nozzle is a 3 mm diameter hole (standard).

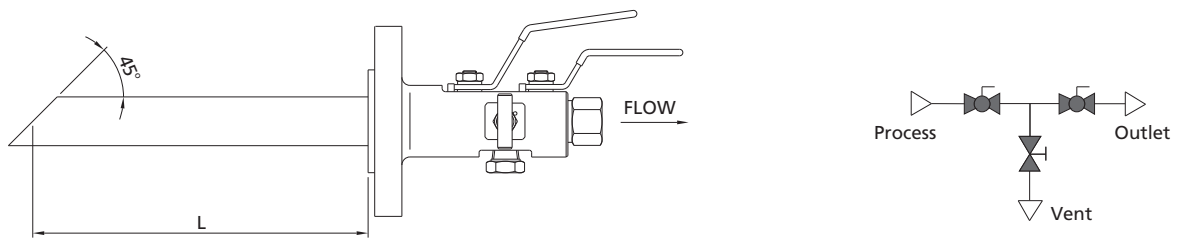
### Integral Check Valve

This poppet type spring return valve has a FKM soft seal (standard).

# Sampling Double Block & Bleed Valves

## Function - sampling

This design is developed to remove a sample directly from process stream at full system pressure. The customized sampling probe extends from the pipe flange connection for correct sample removal. Sampling valves can be provided without a probe and valves can be provided in most of the styles and options offered for the DBB ranges.

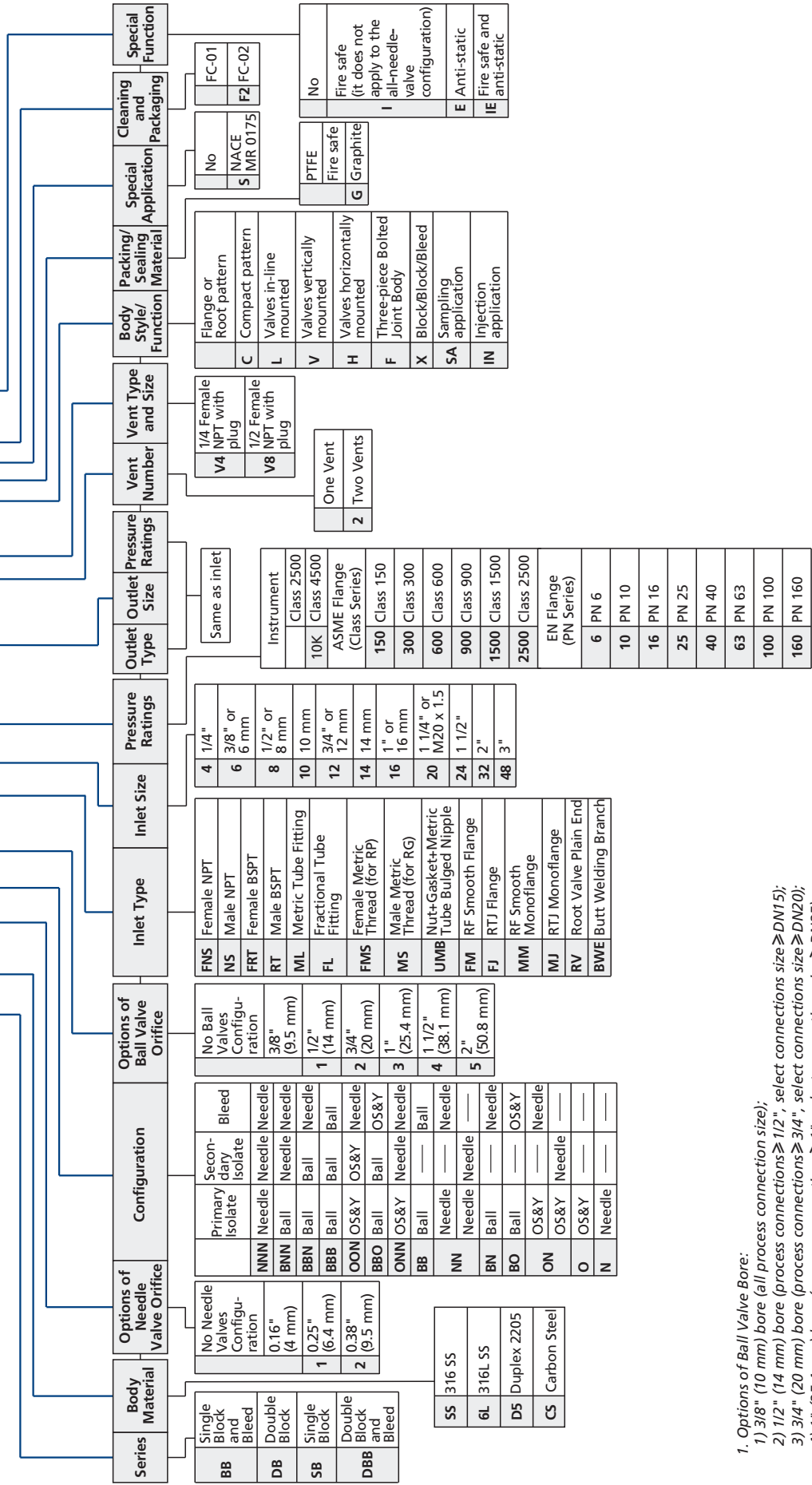


### Sampling Probe

The sampling probe length (L) is manufactured to meet customer requirements.

DBSS - 1BBO1 - FM16300 - FNS8 - 2V8 - HGFS2 - IE

Ordering Number Description



- Options of Ball Valve Bore:
  - 3/8" (10 mm) bore (all process connection size);
  - 1/2" (14 mm) bore (process connections  $\geq 1/2"$ , select connections size  $\geq DN15$ );
  - 3/4" (20 mm) bore (process connections  $\geq 3/4"$ , select connections size  $\geq DN20$ );
  - 1" (25.4 mm) bore (process connections  $\geq 1"$ , select connections size  $\geq DN25$ );
  - 1-1/2" (38.1 mm) bore (process connections  $\geq 1-1/2"$ , select connections size  $\geq DN40$ );
  - 2" (50.8 mm) bore (process connections  $\geq 2"$ , select connections size  $\geq DN50$ ).
- For more information about hazards and risks of oxygen-enriched system, please contact FITOK Group or our authorized distributors.
- Cleaning and Packaging:
  - FC-01: Standard cleaning and packaging for general industrial procedures.
  - FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirement as stated in ASTM G93 Level C.

NOTE: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

Manifolds

# Air Headers and Distribution Manifolds

Air Headers and Distribution Manifolds

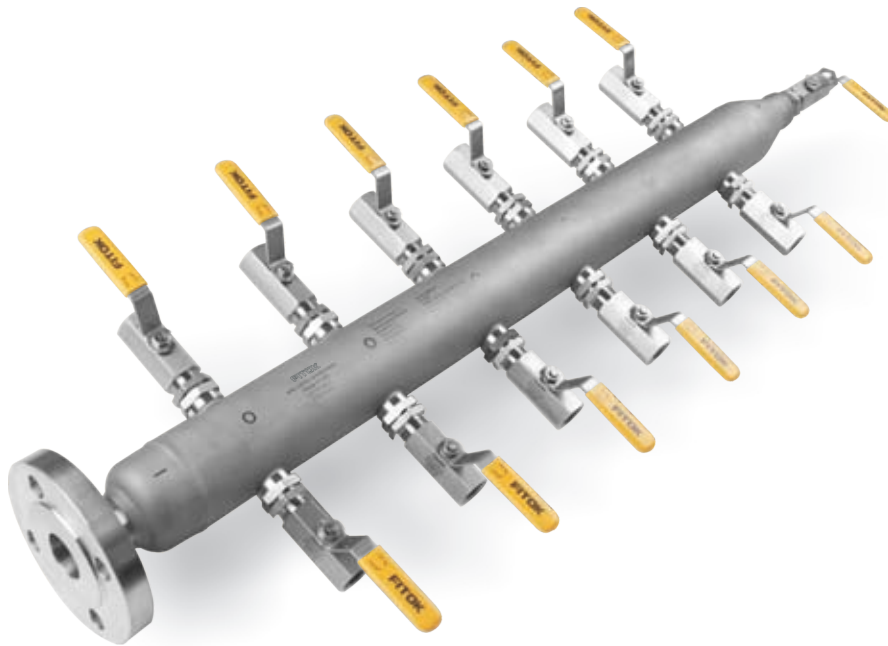
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C-48

# Air Headers and Distribution Manifolds

AH, AP, MP, MN and CM Series





# Air Headers and Distribution Manifolds

## AH, AP, MP, MN and CM Series

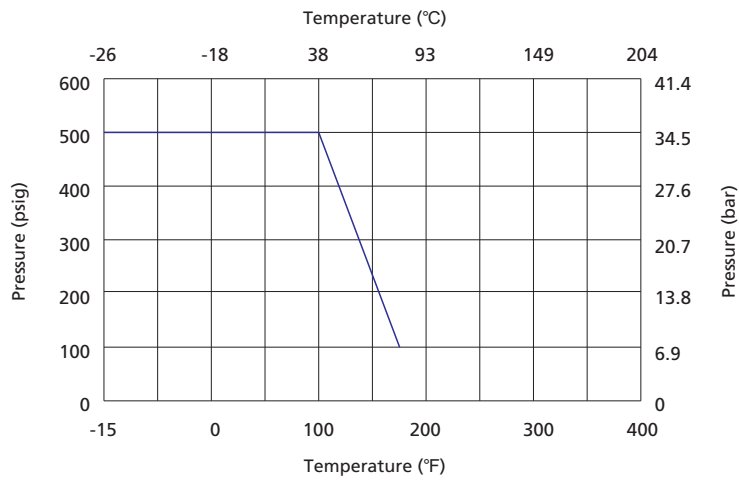
### Features

- ⦿ Distribution lines available upon request
- ⦿ Ball valve, plug valve, needle valve available for distribution lines and drain port
- ⦿ Color coded handles available
- ⦿ Leak-tight performance testing for every valve under nitrogen condition at the maximum working pressure

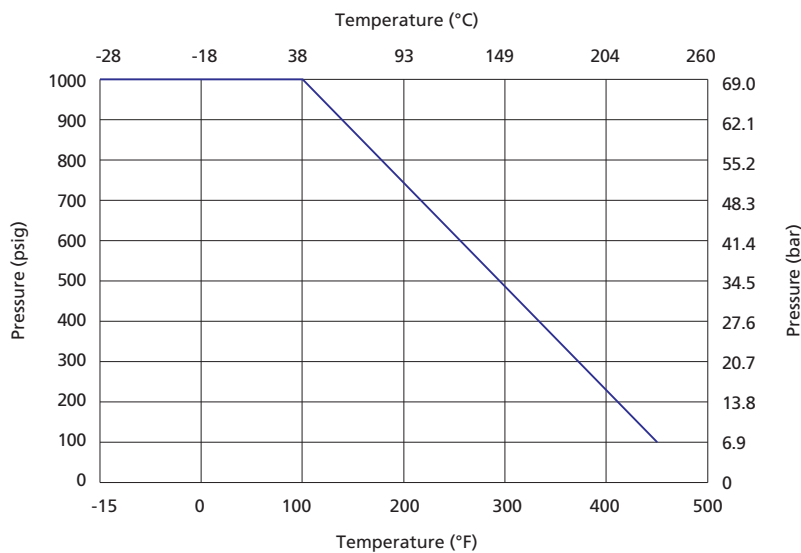
### Pressure vs. Temperature

#### Air Headers

##### AH Series

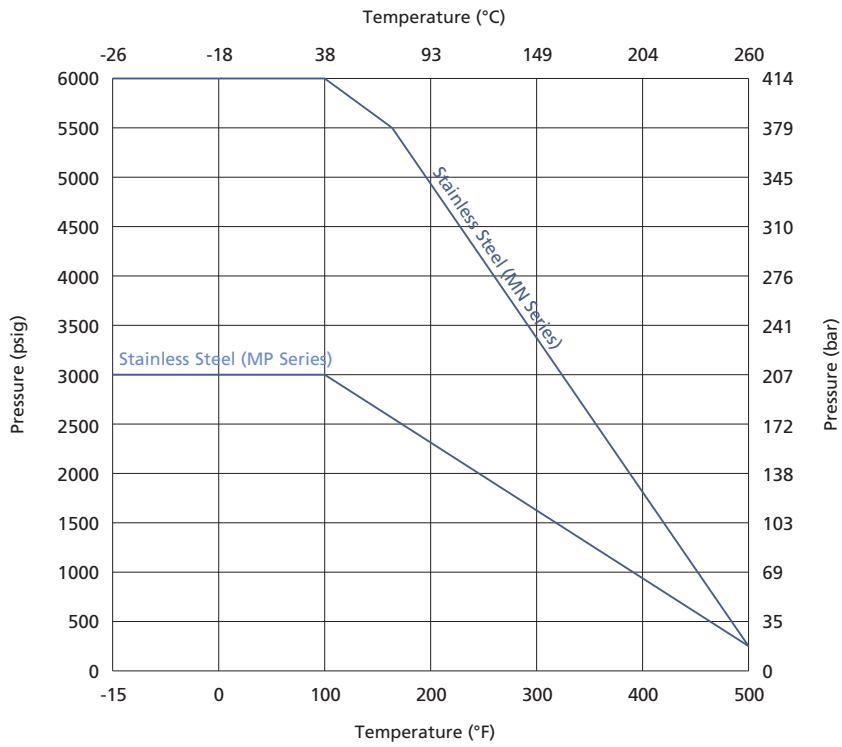


##### AP Series



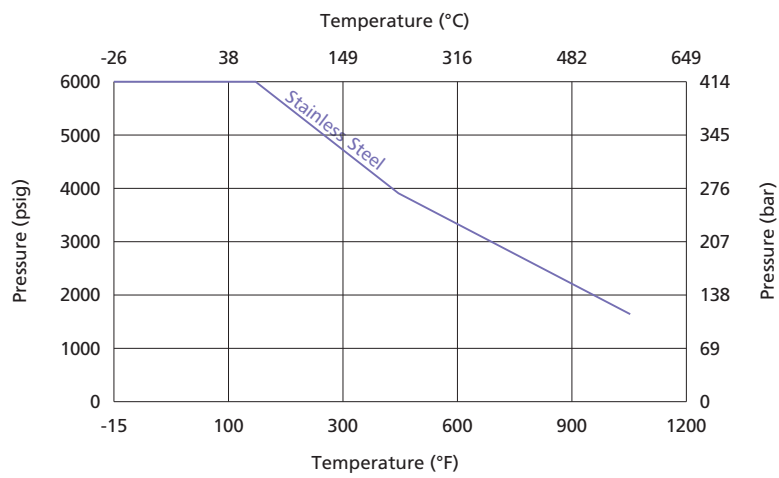
# C-50 Air Headers and Distribution Manifolds

## MP and MN Series



## Distribution Manifolds

### CM Series



## End Connections

### AH, AP, MP, MN Series

Part	Type	Size	Standard
Inlet Connection	Male NPT	1/2, 3/4, 1	ASME B 1.20.1, GB/T 12716
	Female NPT		ISO 7/1, DIN 2999, GB/T 7306.2
	Female BSP Tapered		
	Female BSP Parallel		
	Flange	Class 150, Class 300 PN16, PN25, PN40	ANSI B 16.5 GB/T 9115, EN 1092
Outlet Connection	Male NPT	1/4, 1/2	ASME B 1.20.1, GB/T 12716
	Female NPT		
	Fractional Tube Fitting	1/2"	FITOK Tube Fitting
	Metric Tube Fitting	12 mm	
Drain Connection	Female NPT	1/4, 1/2	ASME B 1.20.1, GB/T 12716
	Male NPT		

1. Sizes and types listed are standard. Other sizes and types are available upon request.

2. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

### CM Series

Part	Type	Size	Standard
Inlet Connection	Female NPT	1/2, 3/4, 1	ASME B 1.20.1, GB/T 12716
Outlet Connection	Female NPT	1/4, 3/8, 1/2	
Drain Connection	Female NPT	1/2, 3/4, 1	

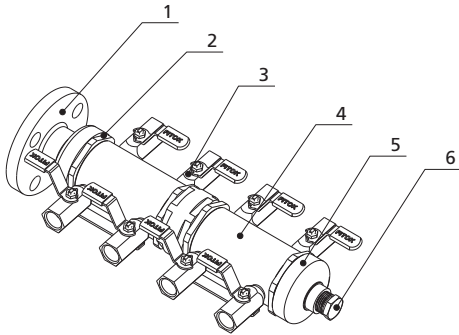
1. Sizes and types listed are standard. Other sizes and types are available upon request.

2. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

## Construction

### Air Headers

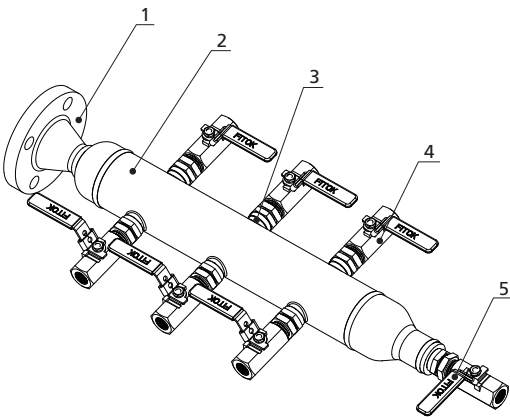
#### AH Series



#### Caution:

Hold the valve body first when installing the fitting onto the outlet line. If the valve body bears large rotational torque, branch seal areas may be loose and leak may occur.

#### AP Series



#### Standard Materials of Construction

Item	Component	Material/ASTM Specification	
1	Inlet Valve	BG Series Ball Valve	
	Flange	CF8/A351	CF8M/A351
2	Locking Nut	304SS/A312	
3	Distribution Valve	BR Series Ball Valve	
4	Main Line	304SS/A312	316SS/A312
5	Drain Connection	304SS/A479	316SS/A479
6	Drain Valve	BR Series Ball Valve	
	Plug	304 SS/A479	316 SS/A479

#### Optimized Setting of the Main Pipe and the Branch

Main Line Size	Quantity of Distribution Valves	Distance Between Two Outlets (mm)
NPS 2 (Sch 10)	4	Only 70
	8	

- Quantity of distribution valves listed is standard. Other types are available upon request.
- For dimensions not shown above, please contact FITOK Group or our authorized distributors.

#### Standard Materials of Construction

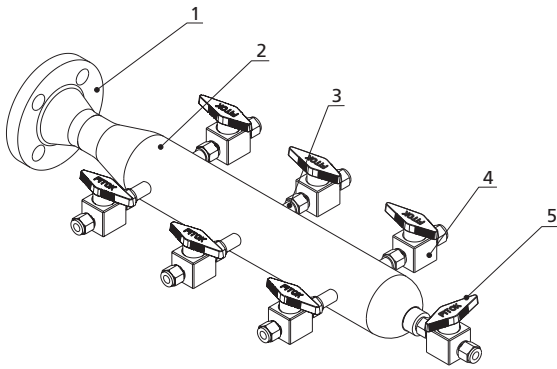
Item	Component	Material/ASTM Specification	
		Stainless Steel	
1	Inlet Valve	BG Series Ball Valve	
	Flange	304 SS/A182	316 SS/A182
2	Main Line	304 SS/A312	316 SS/A312
3	Branch Fitting	304 SS/A276	316 SS/A276
4	Distribution Valve	BR series ball valve as standard option	
5	Drain Valve	BR series ball valve as standard option	
	Plug	304 SS/A276	316 SS/A276

#### Optimized Setting of the Main Pipe and the Branch

Main Line Size	Quantity of Distribution Valves	Distance Between Two Outlets (mm)
NPS 2 (Sch 10)	6	100
	12	

- Quantity of distribution valves listed is standard. Other sizes and types are available upon request.
- For dimensions not shown above, please contact FITOK Group or our authorized distributors.

**MP Series**



**Standard Materials of Construction**

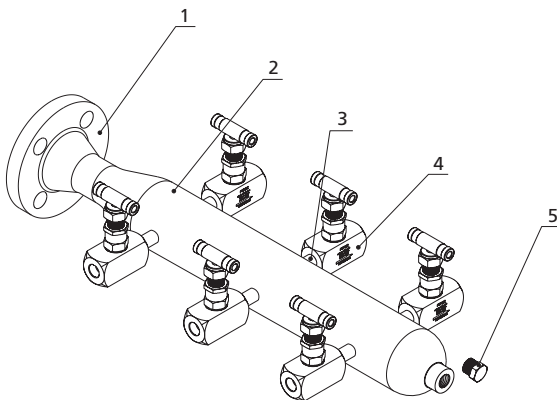
Item	Component	Material/ASTM Specification	
		Stainless Steel	
1	Inlet Valve	BH Series Ball Valve	
	Flange	304 SS/A182	316 SS/A182
2	Main Line	304 SS/A312	316 SS/A312
3	Branch Fitting	304 SS/A276	316 SS/A276
4	Distribution Valve	PV series plug valve as standard option	
5	Drain Valve	PV series plug valve as standard option	
	Plug	304 SS/A276	316 SS/A276

**Optimized Setting of the Main Pipe and the Branch**

Main Line Size	Quantity of Distribution Valves	Distance Between Two Outlets (mm)
NPS 2 (Sch 160)	6	100
	12	

1. Quantity of distribution valves listed is standard. Other sizes and types are available upon request.
2. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

**MN Series**



**Standard Materials of Construction**

Item	Component	Material/ASTM Specification	
		Stainless Steel	
1	Inlet Valve	NB Series needle valve	
	Flange	304 SS/A182	316 SS/A182
2	Main Line	304 SS/A312	316 SS/A312
3	Branch Fitting	304 SS/A276	316 SS/A276
4	Distribution Valve	NF series needle valve as standard option	
5	Drain Valve	NF series needle valve as standard option	
	Plug	304 SS/A276	316 SS/A276

**Optimized Setting of the Main Pipe and the Branch**

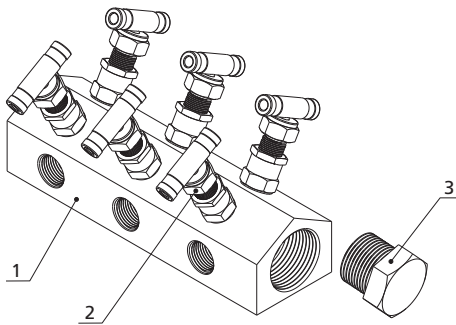
Main Line Size	Quantity of Distribution Valves	Distance Between Two Outlets (mm)
NPS 2 (Sch 160)	6	100~150*
	12	

\* Distance between two outlets are determined by the distribution valves.

1. Quantity of distribution valves listed is standard. Other sizes and types are available upon request.
2. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

## Distribution Manifolds

### CM Series



### Standard Materials of Construction

Item	Component	Material/ASTM Specification	
		Stainless Steel	
1	Main Line	304 SS/A479	316 SS/A479
2	Distribution Valve	NB series needle valve	
3	Drain Plug	304 SS/A276	316 SS/A276

Carbon steel and other materials are available upon request.

### Optimized Setting of the Main Pipe and the Branch

Quantity of Outlet Connections	Type and size of Outlet Connections	Distance Between Two Outlets (mm)
4~18	1/4" female NPT	60

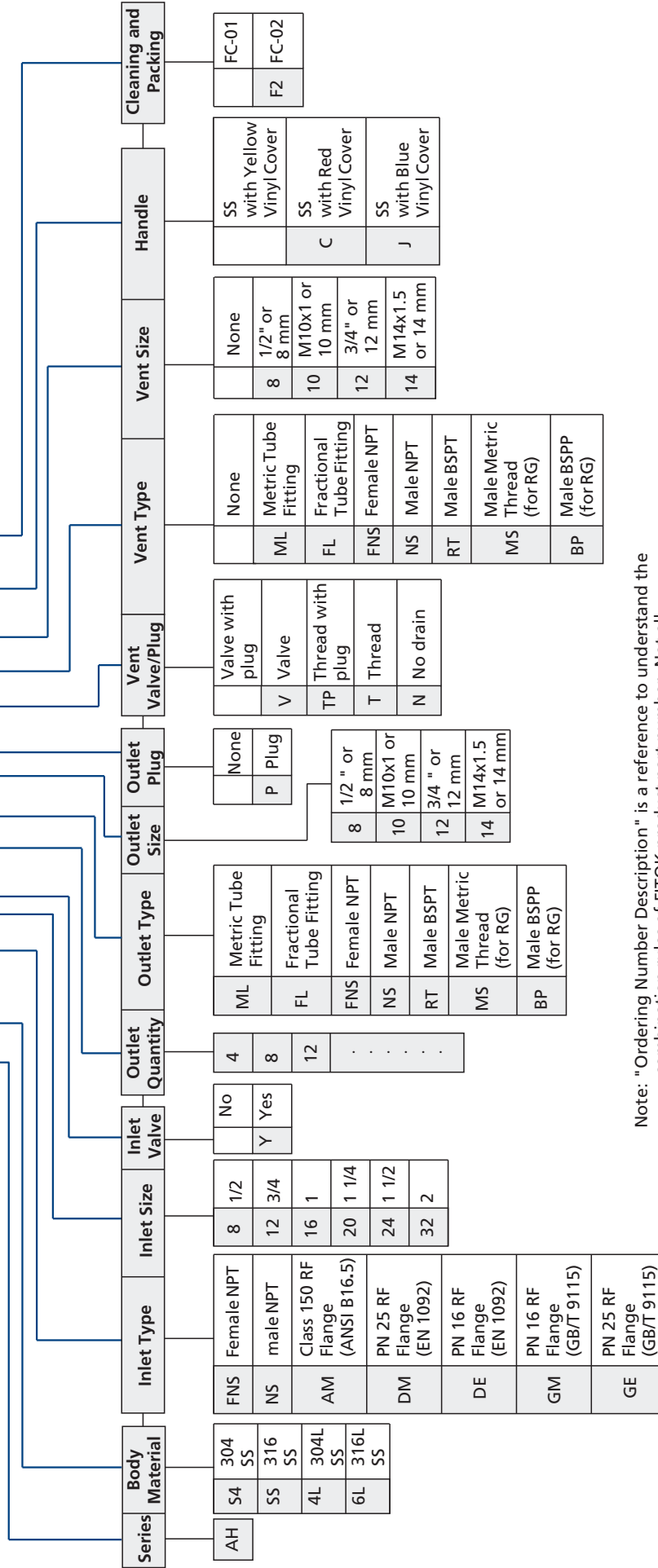
1. Quantity of distribution valve listed are standard. Other sizes and types are available upon request.

2. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

# Ordering Number Description

## AH Series

AHS4 – FNS8Y – 4ML10P – VFNS8 – C – F2



Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

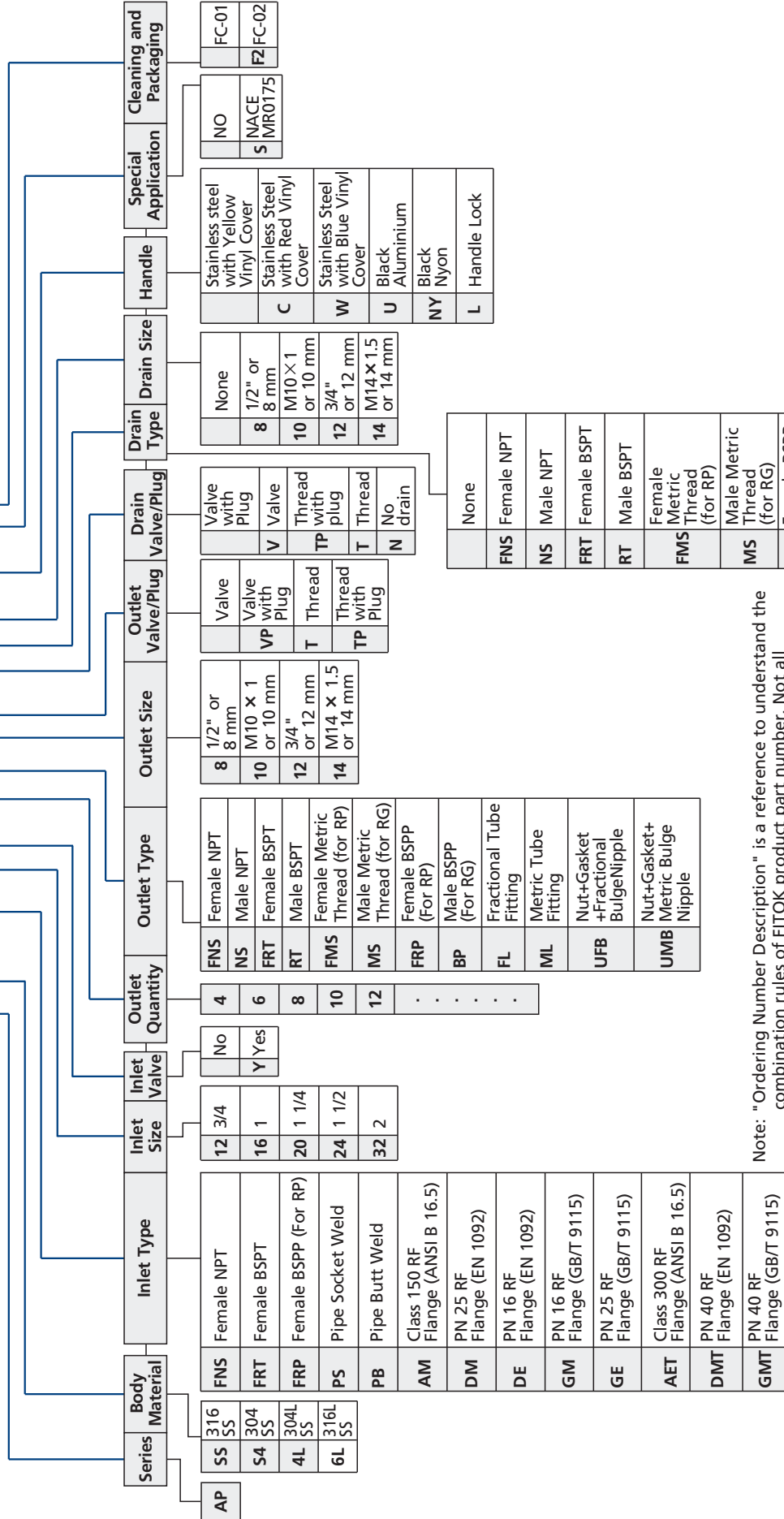
Cleaning and Packaging:

FC-01: Standard cleaning and packaging for general industrial procedures.

FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirements as stated in ASTM G93 Level C.

AP Series

APSS – FNS16Y – 8NS12T – TNS8 – C – SF2



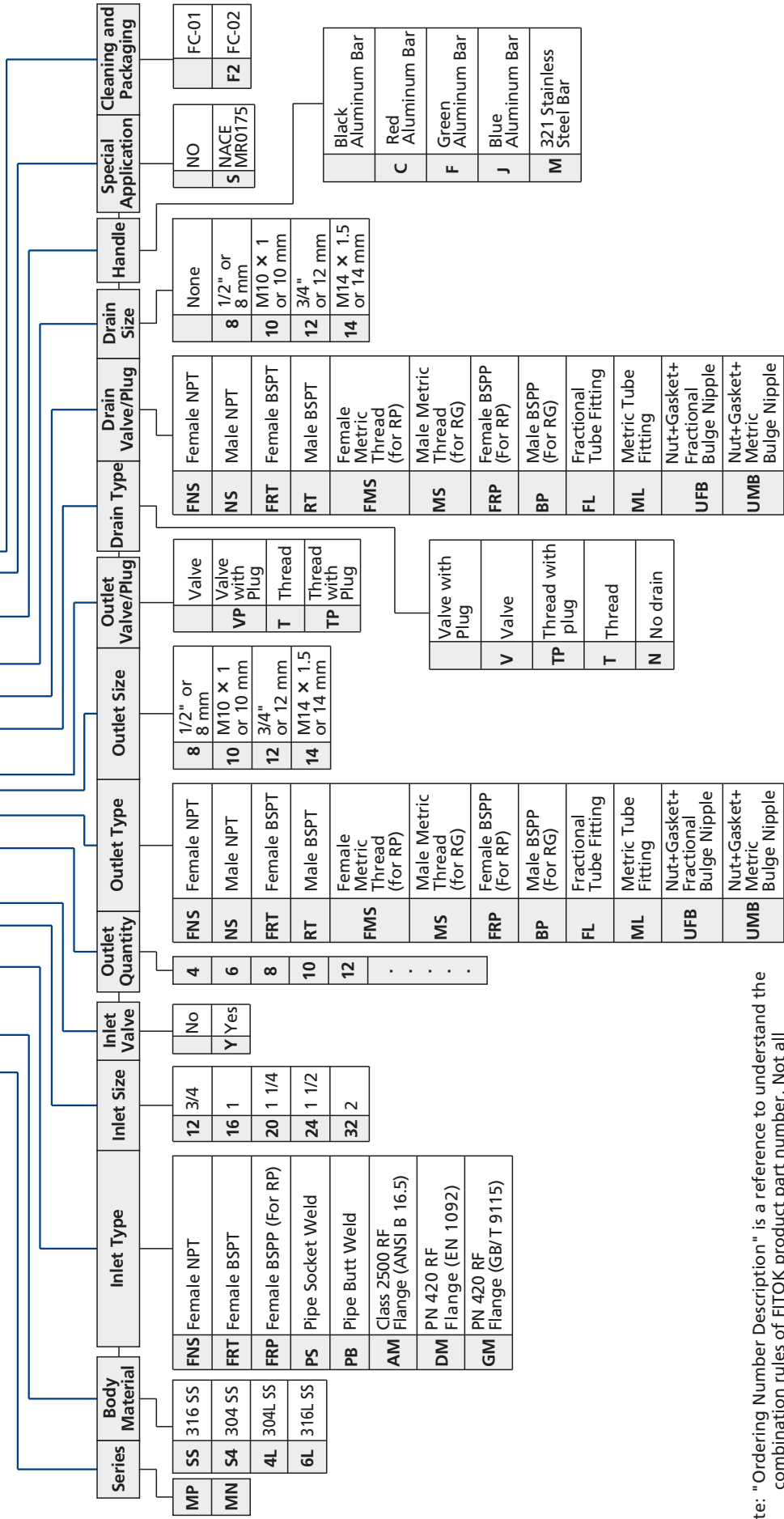
Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

- Cleaning and Packaging:**  
 FC-01: Standard cleaning and packaging for general industrial procedures.  
 FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleanliness requirements as stated in ASTM G93 Level C.



**MP, MN Series**

MNSS – FNS16Y – 10NS8T – BFNS8 – C – SF2



Series	Body Material	Inlet Type	Inlet Valve	Inlet Size	Outlet Quantity	Outlet Type	Outlet Size	Outlet Valve/Plug	Drain Type	Drain Valve/Plug	Drain Size	Handle	Special Application	Cleaning and Packaging
MP	SS 316 SS	FNS Female NPT	No	12 3/4	4	Female NPT	8 1/2" or 8 mm	Valve	FNS	Female NPT	None	None	NO	FC-01
MN	S4 304 SS	FRT Female BSPT	Y Yes	16 1	6	Male NPT	10 M10 x 1 or 10 mm	VP Valve with Plug	NS	Male NPT	8 1/2" or 8 mm	8	INACE S IMR0175	F2 FC-02
	4L 304L SS	FRP Female BSPP (For RP)		20 1 1/4	8	Female BSPT	12 3/4" or 12 mm	T Thread	FRT	Female BSPT	M10 x 1 or 10 mm	10		
	6L 316L SS	PS Pipe Socket Weld		24 1 1/2	10	Male BSPT	14 M14 x 1.5 or 14 mm	TP Thread with Plug	RT	Male BSPT	3/4" or 12 mm	12		
		PB Pipe Butt Weld		32 2	12	Female Metric Thread (for RP)			FMS	Female Metric Thread (for RP)	M14 x 1.5 or 14 mm	14		
		AM Class 2500 RF Flange (ANSI B 16.5)			.	Male Metric Thread (for RG)			MS	Male Metric Thread (for RG)				Black Aluminum Bar
		DM PN 420 RF Flange (EN 1092)			.	Female BSPP (For RP)			FRP	Female BSPP (For RP)				Red Aluminum Bar
		GM PN 420 RF Flange (GB/T 9115)			.	Male BSPP (For RG)			BP	Male BSPP (For RG)				Green Aluminum Bar
					.	Fractional Tube Fitting			FL	Fractional Tube Fitting				Blue Aluminum Bar
					.	Metric Tube Fitting			ML	Metric Tube Fitting				321 Stainless Steel Bar
					.	Nut+Gasket+Fractional Bulge Nipple			UFB	Nut+Gasket+Fractional Bulge Nipple				
					.	Nut+Gasket+Metric Bulge Nipple			UMB	Nut+Gasket+Metric Bulge Nipple				

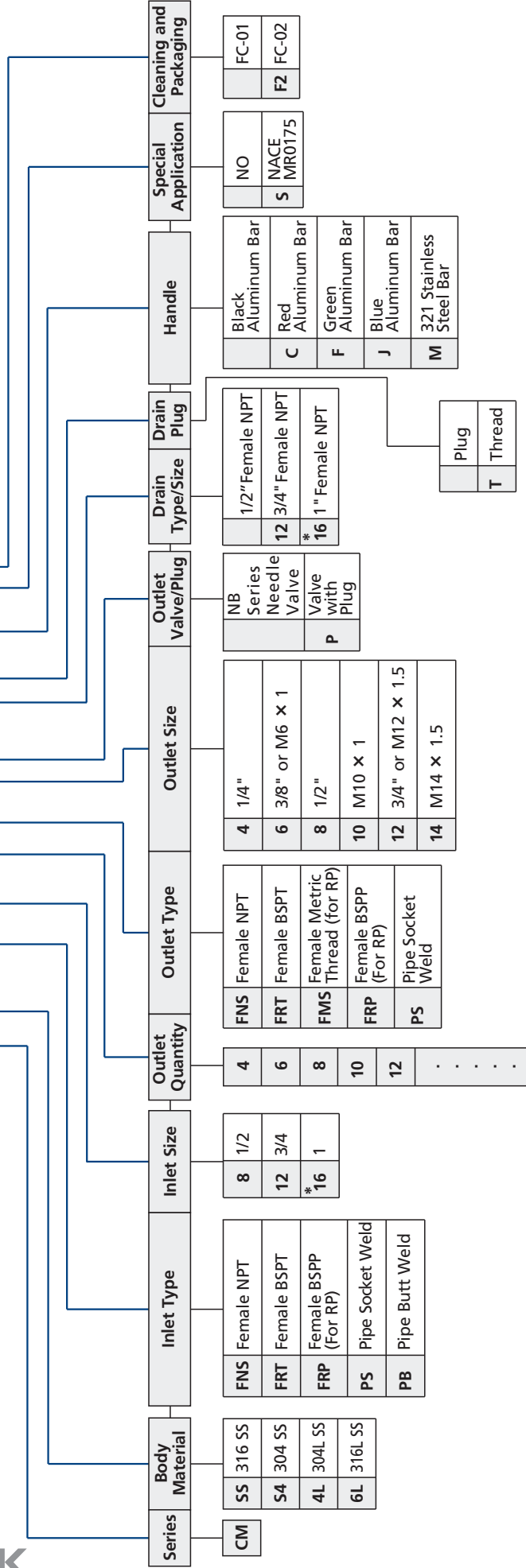
Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

**Cleaning and Packaging:**  
 FC-01: Standard cleaning and packaging for general industrial procedures.  
 FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleaning requirement as stated in ASTM G93 Level C.



CM Series

CMSS – FNS16 – 8FNS12P – 12T – C – SF2



Note: \* only applies to maximum working pressure up to 3000 psig.  
 "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

Cleaning and Packaging:  
 FC-01: Standard cleaning and packaging for general industrial procedures.  
 FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleaning requirement as stated in ASTM G93 Level C.

# Hoses, Quick-connects

Hoses and Connectors



D-02

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Quick-connects

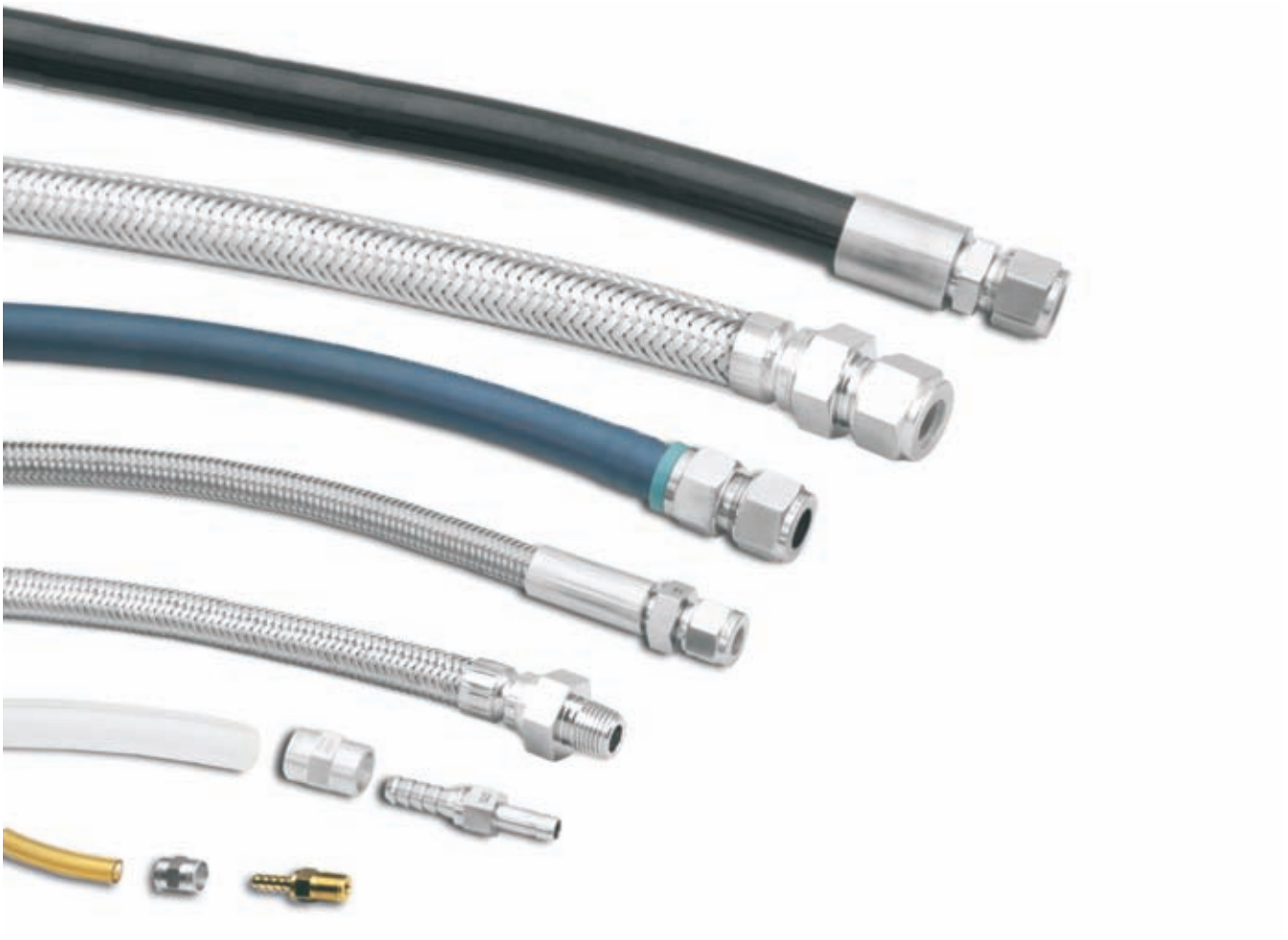


D-25

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# Hoses and Connectors

MH, MM, PS, MP, TH and HC Series



Hoses  
Quick-connects

# Contents

## Metal Flexible Hoses

MH, MM Series



D-04

## PTFE-lined, Stainless Steel Braided Hoses

PS Series



D-10

## Multipurpose Push-on Hoses

MP Series



D-14

## Thermoplastic Hoses

TH Series



D-18

## Hose Connectors and Sleeves

HC Series



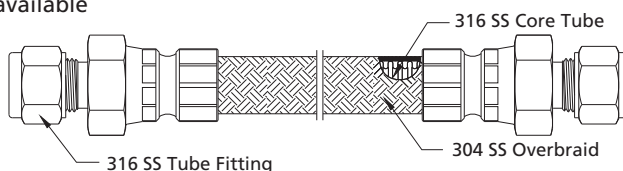
D-20

# Metal Flexible Hoses

## MH, MM Series

### Features

- ⦿ Core tube and fitting material: 316 stainless steel
- ⦿ Overbraid material: 304 stainless steel (316 SS available)
- ⦿ Vacuum and positive pressure applications
- ⦿ Working pressure up to: 3100 psig (213 bar)
- ⦿ Hose size: 1/4" to 2"
- ⦿ Working temperature: -325°F to 800°F (-200°C to 426°C)
- ⦿ End connections:
  - 1/4 to 2 thread
  - 1/4" to 2" and 6 mm to 22 mm tube fitting
- ⦿ Welded fitting-to-hose construction to ensure reliable seal
- ⦿ Standard and custom length available



### Hose Technical Data (MH Series)

Nominal Hose Size	Inside Diameter	Min. Bend Radius		Temperature Range	Working Pressure at 70°F (20°C)	Burst Pressure at 70°F (20°C)	Hose Series
		Static	Dynamic				
in. (mm)	in. (mm)	in. (mm)	in. (mm)	°F (°C)	psig (bar)	psig (bar)	
1/4 (6.4)	0.28 (7.1)	2.25 (57.2)	10.0 (254)	-325 to 800 (-200 to 426)	3100 (213)	12400 (854)	MH4
3/8 (9.7)	0.42 (10.6)	3.00 (76.2)	12.0 (305)		2000 (137)	8000 (551)	MH6
1/2 (12.7)	0.53 (13.5)	4.50 (114)	16.0 (406)		1800 (124)	7200 (496)	MH8
3/4 (19.0)	0.80 (20.3)	6.00 (152)	17.0 (432)		1500 (103)	6000 (413)	MH12
1 (25.4)	1.03 (26.0)	6.75 (171)	20.0 (508)		1200 (82.6)	4800 (330)	MH16
1 1/4 (31.8)	1.30 (33.0)	8.86 (225)	23.0 (584)		950 (65.4)	3800 (261)	MH20
1 1/2 (38.1)	1.53 (38.9)	11.0 (280)	26.0 (660)		900 (62.0)	3600 (248)	MH24
2 (50.8)	2.05 (52.1)	13.8 (350)	32.0 (813)		500 (34.4)	2000 (137)	MH32

### Hose Technical Data (MM Series)

Nominal Hose Size	Inside Diameter	Min. Bend Radius		Temperature Range	Working Pressure at 70°F (20°C)	Burst Pressure at 70°F (20°C)	Hose Series
		Static	Dynamic				
in. (mm)	in. (mm)	in. (mm)	in. (mm)	°F (°C)	psig (bar)	psig (bar)	
1/4 (6.4)	0.25 (6.4)	1.38 (35)	8.66 (220)	-325 to 800 (-200 to 426)	1600 (110)	6400 (440)	MM4
3/8 (9.7)	0.38 (9.5)	2.36 (60)	10.40 (264)		1470 (101)	6000 (413)	MM6
1/2 (12.7)	0.50 (12.7)	2.95 (75)	11.89 (302)		1110 (76.4)	4500 (310)	MM8
3/4 (19.0)	0.75 (19.0)	3.54 (90)	13.58 (345)		860 (59.2)	3500 (241)	MM12
1 (25.4)	1.00 (25.4)	4.13 (105)	15.00 (381)		680 (46.8)	2680 (184)	MM16
1 1/4 (31.8)	1.25 (31.8)	4.72 (120)	16.22 (412)		680 (46.8)	2600 (179)	MM20
1 1/2 (38.1)	1.50 (38.1)	5.51 (140)	16.89 (429)		520 (35.8)	2200 (151)	MM24
2 (50.8)	2.00 (50.8)	6.30 (160)	18.43 (468)		450 (31.0)	1800 (124)	MM32

## Testing

Every FITOK metal flexible hose assembly is factory tested with helium to a maximum leak rate of  $1 \times 10^{-5}$  std cm<sup>3</sup>/s.

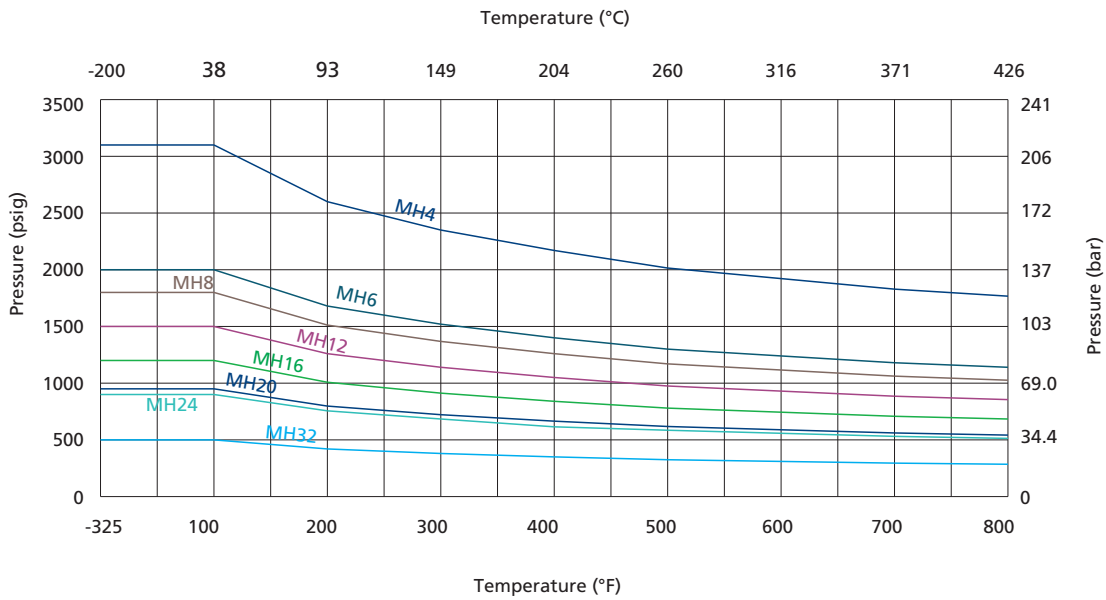
## Cleaning and Packaging

FITOK metal flexible hose components are cleaned in accordance with FITOK *Standard Cleaning and Packaging Process (FC-01)* for general industrial procedures.

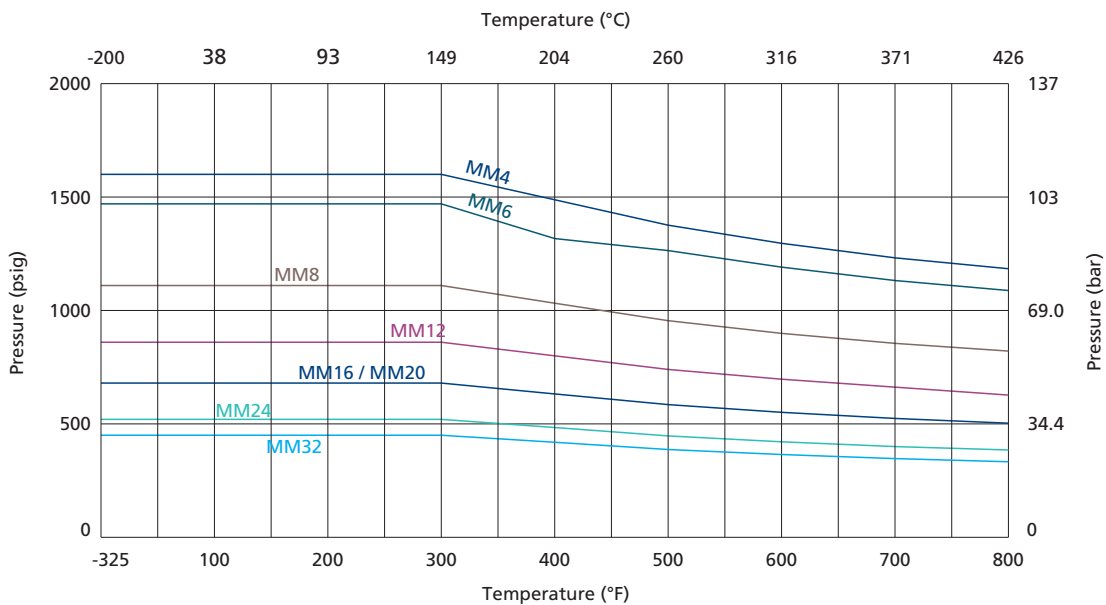
Shorter hoses are packed in cartons with suitable protective material, longer hoses are coiled, bagged and boxed or crated.

## Pressure vs. Temperature

### MH series



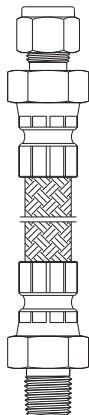
### MM series



When pulsating, surge, or shock pressures exist, the peak pressure in the system should not exceed 50% of the rated working pressure of the hose.

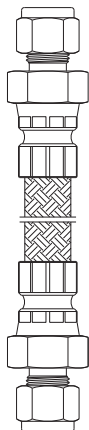
## Standard Assemblies

### Tube Fitting to Male NPT End



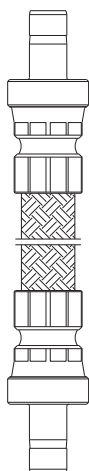
Nominal Hose Size	Tube Fitting Size	NPT Size	Hose Series	Overall Length	Ordering Number	Minimum Inside Diameter	Maximum Outside Dimension
				in. (mm)		in. (mm)	in. (mm)
1/4	1/4	1/4	MH4	12 (305)	SS-MH4-FL4-NS4-F12	0.19 (4.8)	0.94 (23.8)
			MM4	36 (914)	SS-MM4-FL4-NS4-F36	0.19 (4.8)	0.87 (22.0)
3/8	3/8	3/8	MH6	18 (457)	SS-MH6-FL6-NS6-F18	0.28 (7.1)	1.09 (27.7)
			MM6	36 (914)	SS-MM6-FL6-NS6-F36	0.28 (7.1)	1.01 (25.7)
1/2	1/2	1/2	MH8	18 (457)	SS-MH8-FL8-NS8-F18	0.41 (10.4)	1.23 (31.3)
			MM8	48 (1220)	SS-MM8-FL8-NS8-F48	0.41 (10.4)	1.23 (31.3)
3/4	3/4	3/4	MH12	18 (457)	SS-MH12-FL12-NS12-F18	0.66 (16.0)	1.74 (44.2)
			MM12	48 (1220)	SS-MM12-FL12-NS12-F48	0.66 (16.0)	1.59 (40.5)
1	1	1	MH16	24 (610)	SS-MH16-FL16-NS16-F24	0.88 (22.4)	1.82 (46.3)

### Tube Fitting End



Nominal Hose Size	Tube Fitting Size	Hose Series	Overall Length	Ordering Number	Minimum Inside Diameter	Maximum Outside Dimension
			in. (mm)		in. (mm)	in. (mm)
1/4	1/4	MH4	12 (305)	SS-MH4-FL4-F12	0.19 (4.8)	0.94 (23.8)
		MM4	36 (914)	SS-MM4-FL4-F36	0.19 (4.8)	0.87 (22.0)
3/8	3/8	MH6	18 (457)	SS-MH6-FL6-F18	0.28 (7.1)	1.09 (27.7)
		MM6	36 (914)	SS-MM6-FL6-F36	0.28 (7.1)	1.01 (25.7)
1/2	1/2	MH8	18 (457)	SS-MH8-FL8-F18	0.41 (10.4)	1.23 (31.3)
		MM8	48 (1220)	SS-MM8-FL8-F48	0.41 (10.4)	1.23 (31.3)
3/4	3/4	MH12	18 (457)	SS-MH12-FL12-F18	0.66 (16.0)	1.74 (44.2)
		MM12	48 (1220)	SS-MM12-FL12-F48	0.66 (16.0)	1.59 (40.5)
1	1	MH16	24 (610)	SS-MH16-FL16-F24	0.88 (22.4)	1.82 (46.3)

### Tube Adapter End



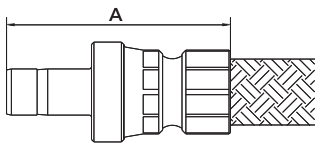
Nominal Hose Size	Tube Adapter Size	Hose Series	Overall Length	Ordering Number	Minimum Inside Diameter	Maximum Outside Dimension
			in. (mm)		in. (mm)	in. (mm)
1/4	1/4	MH4	12 (305)	SS-MH4-FT4-F12	0.16 (4.1)	0.81 (20.6)
		MM4	36 (914)	SS-MM4-FT4-F36	0.16 (4.1)	0.76 (19.2)
3/8	3/8	MH6	12 (305)	SS-MH6-FT6-F12	0.27 (6.9)	1.01 (25.6)
		MM6	36 (914)	SS-MM6-FT6-F36	0.27 (6.9)	0.91 (23.1)

1. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.
2. Types listed are standard. Other types are available upon request.



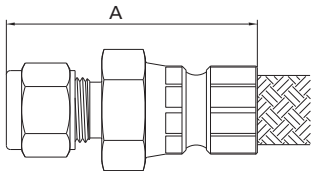
## End Connections

### Tube Adapters

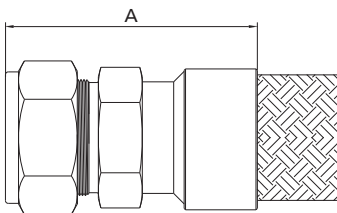


Tube Adapter Size	Nominal Hose Size	End Connection Designator	Dimensions		
			A	Minimum Inside Diameter	Maximum Outside Dimension
in.	in.		in. (mm)		
1/4	1/4	FT4	1.76 (44.7)	0.16 (4.1)	0.81 (20.6)
3/8	3/8	FT6	1.82 (46.2)	0.27 (6.9)	1.01 (25.6)
1/2	1/2	FT8	2.22 (56.4)	0.37 (9.4)	1.23 (31.3)
3/4	3/4	FT12	2.35 (59.7)	0.58 (14.7)	1.53 (38.8)
1	1	FT16	2.69 (68.3)	0.80 (20.3)	1.82 (46.3)
mm	in.	—	mm (in. )		
6	1/4	MT6	44.4 (1.75)	4.1 (0.16)	20.6 (0.81)
10	3/8	MT10	47.0 (1.85)	7.1 (0.28)	25.6 (1.01)
12	1/2	MT12	57.2 (2.25)	8.9 (0.35)	31.3 (1.23)

### Tube Fittings



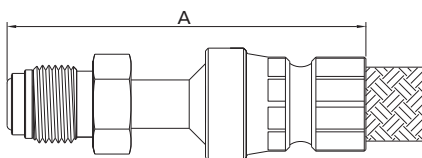
Automatic Weld Style-1 in. and Under



Manual Weld Style-Over 1 in.

Tube Fitting Size	Nominal Hose Size	End Connection Designator	Dimensions		
			A	Minimum Inside Diameter	Maximum Outside Dimension
in.	in.		in. (mm)		
1/4	1/4	FL4	1.94 (49.3)	0.19 (4.8)	0.94 (23.8)
3/8	1/4	FL6	2.00 (50.8)	0.28 (7.1)	0.94 (23.8)
3/8	3/8	FL6	2.02 (51.3)	0.28 (7.1)	1.09 (27.7)
1/2	1/2	FL8	2.24 (56.9)	0.41 (10.4)	1.23 (31.3)
5/8	1/2	FL10	2.27 (57.7)	0.50 (12.7)	1.23 (31.3)
3/4	3/4	FL12	2.35 (59.7)	0.63 (16.0)	1.74 (44.2)
1	1	FL16	2.64 (67.1)	0.88 (22.4)	1.82 (46.3)
1 1/4	1 1/4	FL20	4.04 (103)	1.09 (27.7)	2.23 (58.9)
1 1/2	1 1/2	FL24	4.75 (121)	1.34 (34.0)	2.61 (66.3)
2	2	FL32	5.72 (145)	1.88 (47.8)	3.48 (88.4)
mm	in.	—	mm (in. )		
6	1/4	ML6	62.2 (2.45)	4.8 (0.19)	20.6 (0.81)
8	1/4	ML8	63.2 (2.49)	6.4 (0.25)	20.6 (0.81)
10	3/8	ML10	51.6 (2.03)	7.9 (0.31)	31.3 (1.23)
12	1/2	ML12	56.9 (2.24)	9.7 (0.38)	38.8 (1.53)

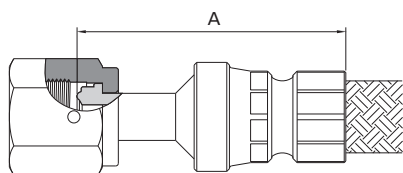
### Male FR Metal Gasket Face Seal Fittings Swivel



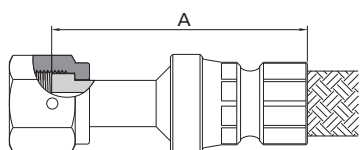
FR Size	Nominal Hose Size	End Connection Designator	Dimensions		
			A	Minimum Inside Diameter	Maximum Outside Dimension
in.	in.		in. (mm)		
1/4	1/4	SFR4	2.60 (66.0)	0.18 (4.6)	0.81 (20.6)
1/2	1/2	SFR8	2.83 (71.9)	0.40 (10.2)	1.23 (31.3)
3/4	3/4	SFR12	4.19 (106)	0.65 (16.5)	1.52 (38.7)
1	1	SFR16	4.80 (122)	0.87 (22.1)	1.53 (38.8)

## End Connections

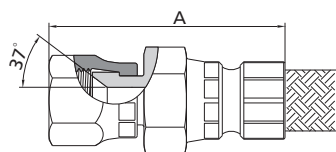
**Female FR Metal Gasket Face Seal Fittings Swivel**



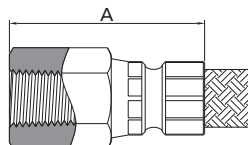
**Female FO O-Ring Face Seal Fittings Swivel**



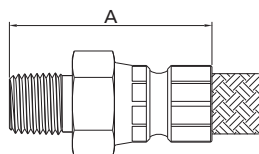
**SAE 37° (JIC) Female Swivel**



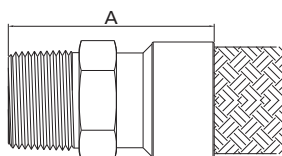
**Female Pipe Threads, NPT**



**Male Pipe Threads, NPT**



Automatic Weld Style-1 in. and Under



Manual Weld Style-Over 1 in.

FR Size	Nominal Hose Size	End Connection Designator	Dimensions		
			A	Minimum Inside Diameter	Maximum Outside Dimension
in.	in.		in. (mm)		
1/4	1/4	SFFR4	2.00 (50.8)	0.18 (4.6)	0.87 (22.1)
1/2	1/2	SFFR8	2.16 (54.9)	0.40 (10.2)	1.23 (31.3)
3/4	3/4	SFFR12	4.19 (106)	0.65 (16.5)	1.74 (44.2)
1	1	SFFR16	4.80 (122)	0.87 (22.1)	2.03 (51.6)

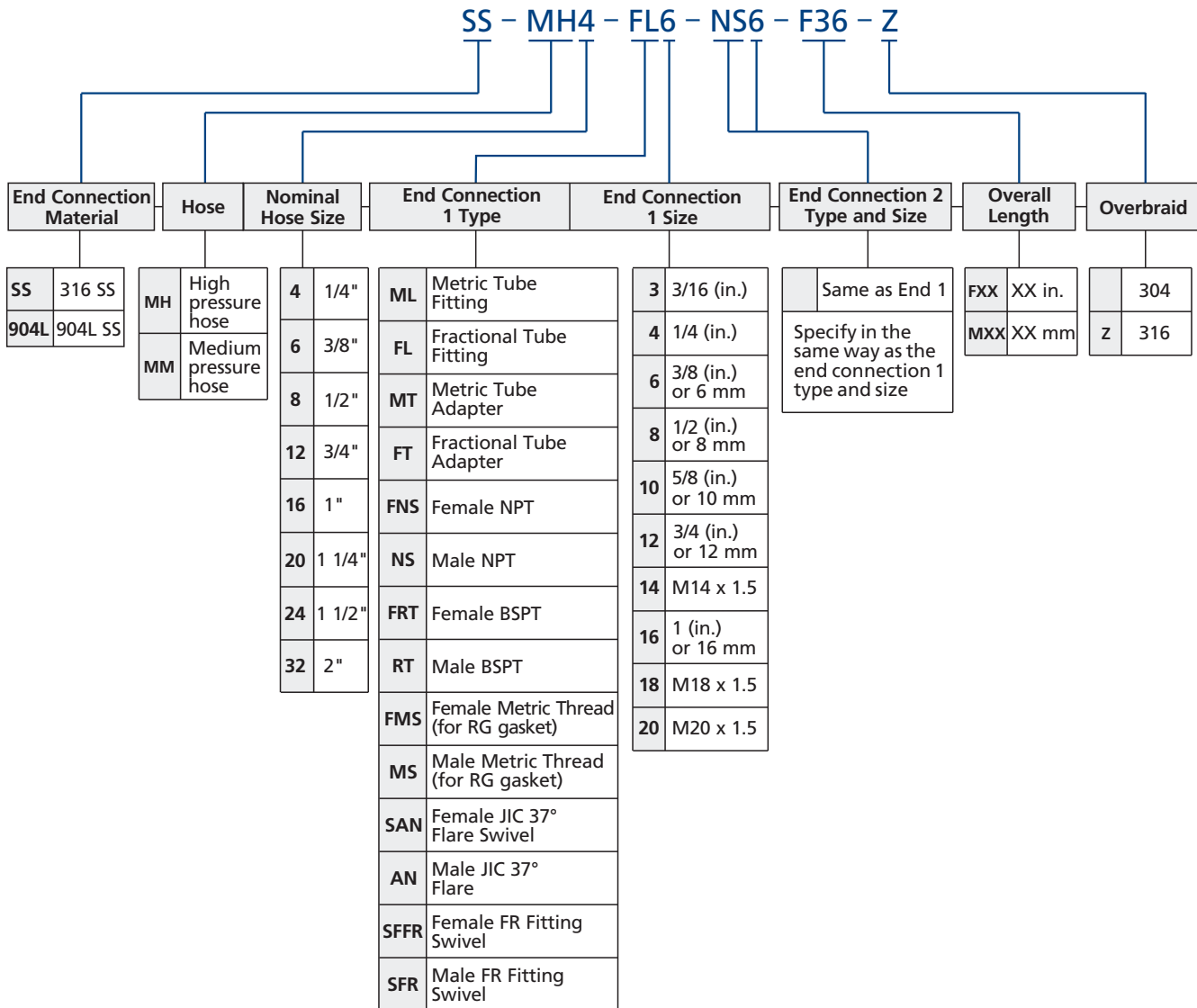
FO Size	Nominal Hose Size	End Connection Designator	Dimensions		
			A	Minimum Inside Diameter	Maximum Outside Dimension
in.	in.		in. (mm)		
1/4	1/4	SFFO4	2.11 (53.6)	0.18 (4.6)	0.81 (20.6)
1/2	1/2	SFFO8	2.14 (54.4)	0.40 (10.2)	1.23 (31.3)

Swivel Size	Nominal Hose Size	End Connection Designator	Dimensions		
			A	Minimum Inside Diameter	Maximum Outside Dimension
in.	in.		in. (mm)		
1/4	1/4	SAN4	1.87 (47.5)	0.17 (4.3)	0.81 (20.6)
3/8	3/8	SAN6	1.98 (50.3)	0.28 (7.1)	1.01 (25.6)
1/2	1/2	SAN8	2.25 (57.2)	0.42 (10.7)	1.23 (31.3)

NPT Size	Nominal Hose Size	End Connection Designator	Dimensions		
			A	Minimum Inside Diameter	Maximum Outside Dimension
in.	in.		in. (mm)		
1/4	1/4	FNS4	1.81 (46.0)	0.28 (7.1)	0.94 (23.9)
3/8	3/8	FNS6	1.87 (47.5)	0.38 (9.7)	1.09 (27.7)
1/2	1/2	FNS8	2.18 (55.4)	0.47 (11.9)	1.23 (31.3)
3/4	3/4	FNS12	2.21 (56.1)	0.72 (18.3)	1.74 (44.2)

NPT Size	Nominal Hose Size	End Connection Designator	Dimensions		
			A	Minimum Inside Diameter	Maximum Outside Dimension
in.	in.		in. (mm)		
1/4	1/4	NS4	1.80 (45.7)	0.28 (7.1)	0.94 (23.9)
1/4	3/8	NS4	1.81 (46.0)	0.28 (7.1)	1.09 (27.7)
3/8	3/8	NS6	1.81 (46.0)	0.38 (9.7)	1.09 (27.7)
1/2	1/4	NS8	1.99 (50.6)	0.47 (11.9)	1.02 (25.8)
1/2	1/2	NS8	2.15 (54.6)	0.47 (11.9)	1.23 (31.3)
3/4	3/4	NS12	2.22 (56.4)	0.63 (16.0)	1.74 (44.2)
1	1	NS16	2.54 (64.5)	0.88 (22.4)	1.82 (46.3)
1 1/4	1 1/4	NS20	3.06 (77.7)	1.09 (27.7)	2.03 (51.6)
1 1/2	1 1/2	NS24	3.72 (94.5)	1.34 (34.0)	2.47 (62.6)
2	2	NS32	4.19 (106)	1.81 (46.0)	3.19 (81.0)

## Ordering Number Description



**Example: SS-MH4-FT6-M710**

**SS:** End connection material is 316 stainless steel.

**MH4:** MH series, hose size is 1/4".

**FT6:** End connection 1 is 3/8" tube adapter.

End connection 2 is 3/8" tube adapter.

**M710:** Overall length is 710 mm.

End 1 and end 2 follow the orders and regulations below:

1. Metric Double Ferrules - Fractional Double Ferrules - Metric Tube Adapters - Fractional Tube Adapters - NPT Threads - BSPT Threads - BSPP Threads - SAE/MS Parallel Threads - 37° Flare - Others
2. Put the sizes from the biggest down to the smallest if they are of the same type.
3. Put the female before male if they are of the same type and size.

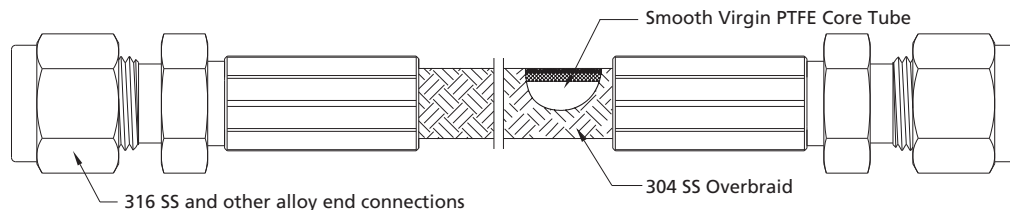
Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

# PTFE-lined, Stainless Steel Braided Hoses

## PS Series

### Features

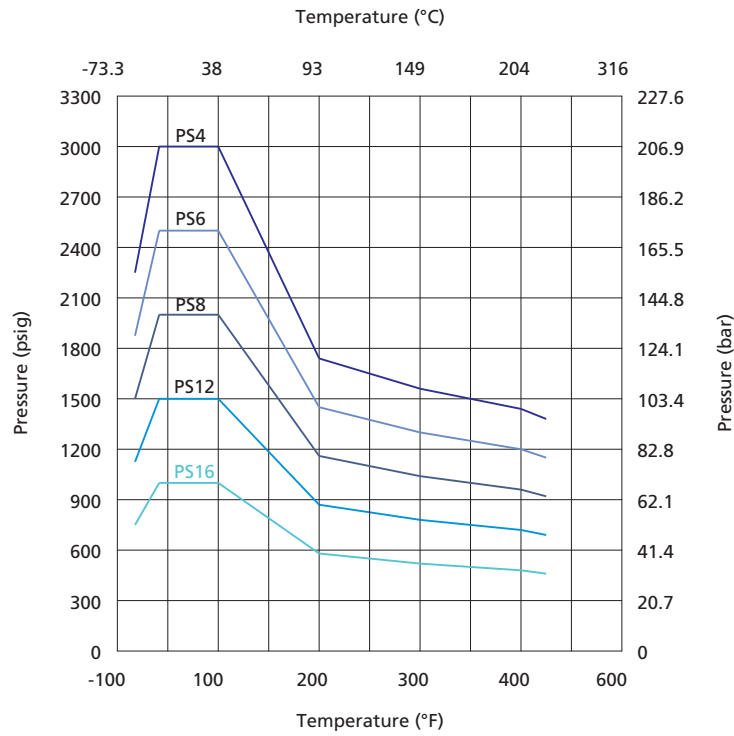
- ⦿ Lightweight construction for easy handling and installation
- ⦿ Core tube material: smooth virgin PTFE
- ⦿ Overbraid material: 304 stainless steel
- ⦿ Working pressure up to: 3000 psig (207 bar)
- ⦿ Hose size: 1/4" to 1"
- ⦿ Working temperature: -65°F to 400°F (-53°C to 204°C)
- ⦿ Standard and custom length available



### Hose Technical Data

Nominal Hose Size	Inside Diameter	Min. Inside Bend Radius		Temperature Range	Working Pressure at 70°F (20°C)	Burst Pressure at 70°F (20°C)
		Static	Dynamic			
in. (mm)	in. (mm)	in. (mm)	in. (mm)	°F (°C)	psig (bar)	psig (bar)
1/4 (6.4)	0.19 (4.8)	1.5 (38.1)	2.0 (50.8)	-65 to 400 (-53 to 204)	3000 (206)	12000 (826)
3/8 (9.5)	0.31 (7.9)	3.5 (88.9)	5.0 (127)		2500 (172)	10000 (690)
1/2 (12.7)	0.41 (10.3)	4.5 (114)	6.0 (152)		2000 (137)	8000 (551)
3/4 (19.0)	0.63 (15.9)	6.0 (152)	7.5 (190)		1500 (103)	6000 (413)
1 (25.4)	0.88 (22.2)	9.0 (229)	11.3 (287)		1000 (68)	4000 (275)

## Pressure vs. Temperature



## Testing

Every FITOK PTFE-lined hose assembly is factory tested with pure water at 1.5 times the maximum working pressure.

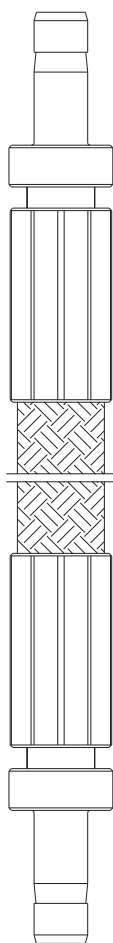
## Cleaning and Packaging

FITOK PTFE-lined hose components are cleaned in accordance with FITOK *Standard Cleaning and Packaging Process (FC-01)* for general industrial procedures.

Shorter hoses are packed in cartons with suitable protective material, longer hoses are coiled, bagged and boxed or crated.

## PTFE-lined Hose Standard Assemblies

### Tube Adapters

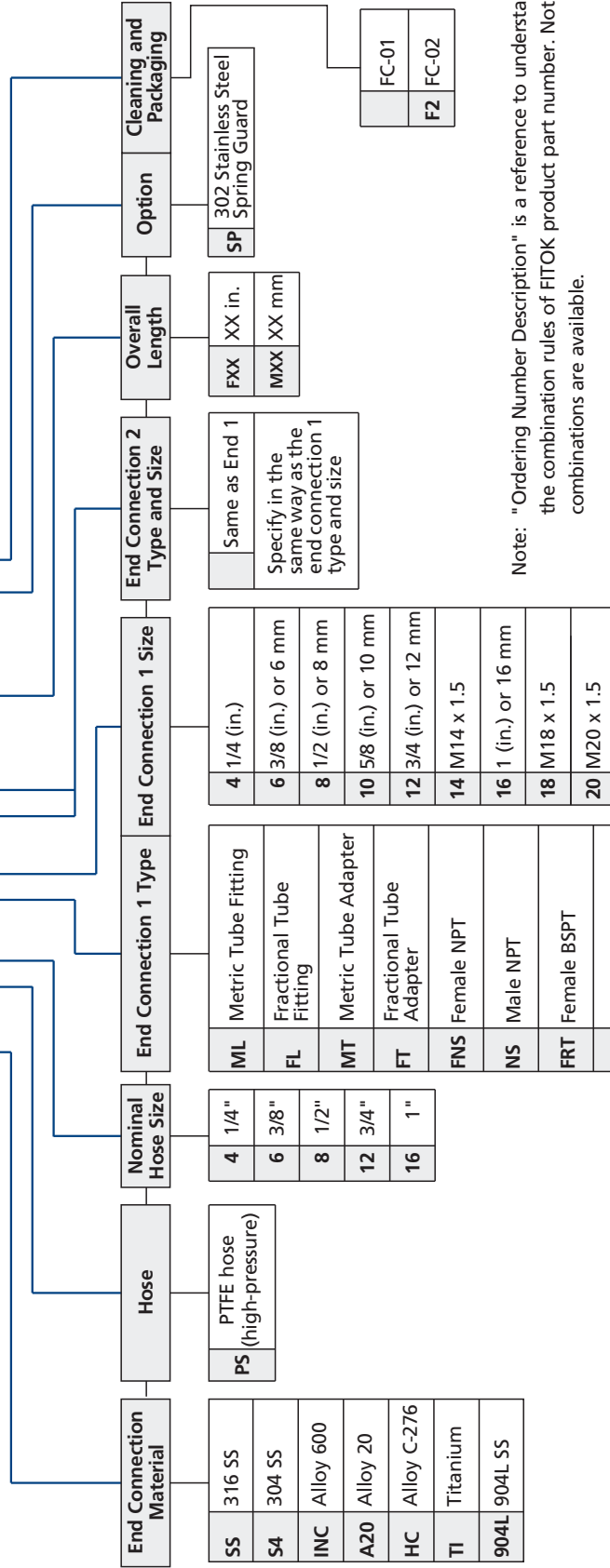


Nominal Hose Size	Tube Adapter Size	Overall Length	Ordering Number	Minimum Inside Diameter	Maximum Outside Dimension
in.	in.	in. (mm)		in. (mm)	in. (mm)
1/4	1/4	6.0 (153)	SS-PS4-FT4-F6	0.16 (4.1)	0.54 (13.7)
		12.0 (305)	SS-PS4-FT4-F12		
		18.0 (458)	SS-PS4-FT4-F18		
		24.0 (610)	SS-PS4-FT4-F24		
		36.0 (915)	SS-PS4-FT4-F36		
		48.0 (1220)	SS-PS4-FT4-F48		
		60.0 (1530)	SS-PS4-FT4-F60		
		72.0 (1829)	SS-PS4-FT4-F72		
		120.0 (3050)	SS-PS4-FT4-F120		
3/8	3/8	12.0 (305)	SS-PS6-FT6-F12	0.27 (6.9)	0.73 (18.5)
		18.0 (458)	SS-PS6-FT6-F18		
		24.0 (610)	SS-PS6-FT6-F24		
		36.0 (915)	SS-PS6-FT6-F36		
		48.0 (1220)	SS-PS6-FT6-F48		
		60.0 (1530)	SS-PS6-FT6-F60		
		72.0 (1829)	SS-PS6-FT6-F72		
		96.0 (2439)	SS-PS6-FT6-F96		
		120.0 (3050)	SS-PS6-FT6-F120		
1/2	1/2	12.0 (305)	SS-PS8-FT8-F12	0.36 (9.1)	0.86 (21.8)
		24.0 (610)	SS-PS8-FT8-F24		
		36.0 (915)	SS-PS8-FT8-F36		
		48.0 (1220)	SS-PS8-FT8-F48		
		60.0 (1530)	SS-PS8-FT8-F60		
		72.0 (1829)	SS-PS8-FT8-F72		
3/4	3/4	24.0 (610)	SS-PS12-FT12-F24	0.53 (13.5)	1.04 (26.4)
		36.0 (915)	SS-PS12-FT12-F36		
1	1	36.0 (915)	SS-PS16-FT16-F36	0.80 (20.3)	1.36 (34.5)
		48.0 (1220)	SS-PS16-FT16-F48		
in.	mm	in. (mm)	—	in. (mm)	in. (mm)
1/4	6	12.0 (305)	SS-PS4-MT6-F12	0.16 (4.1)	0.54 (13.7)
		24.0 (610)	SS-PS4-MT6-F24		
		36.0 (915)	SS-PS4-MT6-F36		
1/2	12	24.0 (610)	SS-PS8-MT12-F24	0.33 (8.4)	0.86 (21.8)
		36.0 (915)	SS-PS8-MT12-F36		

1. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.
2. Sizes and types listed are standard. Other sizes and types are available on request.

# Ordering Number Description

SS – PS4 – FL6 – FT6 – M1000 – SPF2



Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

- Options and accessories do not change hose technical data. Hose operating parameters must be considered when selecting a cover.
- 302 stainless steel spring guard covers entire hose to protect against kinking and abrasion.

Example: SS-PS4-SAN4-M500

SS: End connection material is 316 stainless steel.

PS4: PS series, hose inside diameter is 3/16".

SAN4: End connection 1 is 1/4" female JIC 37° flare swivel.

End connection 2 is 1/4" female JIC 37° flare swivel.

M500: Overall length is 500 mm.

End 1 and end 2 follow the orders and regulations below:

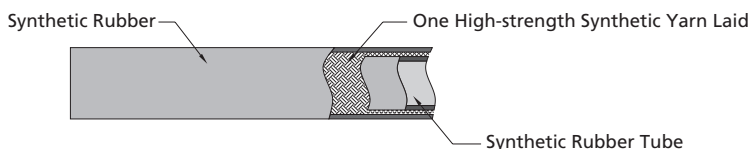
- Metric Double Ferrules - Fractional Double Ferrules - Metric Tube Adapters - Fractional Tube Adapters - NPT Threads - BSPT Threads - BSPP Threads - SAE/MS Parallel Threads - 37° Flare - Others
- Put the sizes from the biggest down to the smallest if they are of the same type.
- Put the female before male if they are of the same type and size.

# Multipurpose Push-on Hoses

## MP Series

### Features

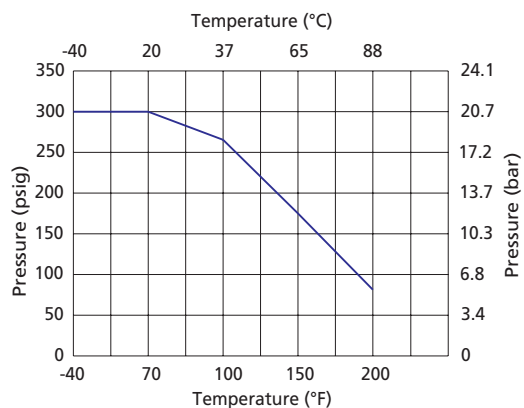
- ⦿ Cover: weatherproof, abrasion withstanding and oil-resistant synthetic rubber
- ⦿ Reinforcement: single-braid high-strength synthetic fiber woven for maximum strength and end connection retention
- ⦿ Core tube: highly oil-resistant rubber
- ⦿ Hose colors: blue, black, green, gray, red and yellow
- ⦿ Working pressure up to: 300 psig (20.7 bar)
- ⦿ Hose size: 1/4" to 3/4"
- ⦿ Working temperature: -40°F to 200°F (-40°C to 93°C)
- ⦿ End connection materials: stainless steel and brass
- ⦿ End connections reusable
- ⦿ Custom length available



### Hose Technical Data

Nominal Hose Size	Inside Diameter	Min. Inside Bend Radius	Temperature Range	Working Pressure at -40 to 70°F (-40 to 20°C)	Min. Burst Pressure at 70°F (20°C)
in. (mm)	in. (mm)	in. (mm)	°F(°C)	psig (bar)	psig (bar)
1/4 (6.4)	0.26 (6.6)	2.50 (63.5)	-40 to 200 (-40 to 93)	300 (20.6)	1200 (82.7)
3/8 (9.5)	0.39 (9.9)	3.00 (76.2)			
1/2 (12.7)	0.50 (12.7)	5.00 (127)			
3/4 (19.0)	0.76 (19.3)	7.00 (178)			

### Pressure vs. Temperature



### Testing

Every FITOK multipurpose push-on hose assembly is factory tested with pure water at 1.5 times the maximum working pressure.

### Cleaning and Packaging

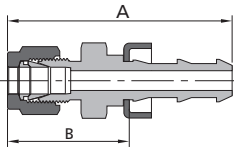
FITOK multipurpose push-on hose components are cleaned in accordance with FITOK *Standard Cleaning and Packaging Process (FC-01)* for general industrial procedures.

Shorter hoses are packed in cartons with suitable protective material, longer hoses are coiled, bagged and boxed or crated.



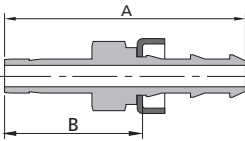
## Multipurpose Push-on Hose End Connections

### Tube Fittings



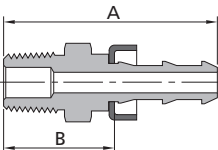
Nominal Hose Size	Tube Fitting Size	Basic Ordering Number	Dimensions, in. (mm)			
			A	B	Minimum Inside Diameter	Maximum Outside Dimension
in.	in.					
1/4	1/4	-MP4-FL4	1.97 (50.0)	1.21 (30.7)	0.16 (4.1)	0.67 (17.0)
3/8	3/8	-MP6-FL6	2.11 (53.6)	1.24 (31.5)	0.27 (6.9)	0.87 (22.1)
1/2	1/2	-MP8-FL8	2.47 (62.7)	1.42 (36.1)	0.37 (9.5)	1.02 (25.8)

### Tube Adapters



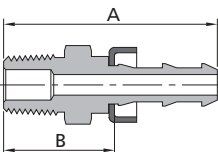
Nominal Hose Size	Tube Adapter Size	Basic Ordering Number	Dimensions, in. (mm)			
			A	B	Minimum Inside Diameter	Maximum Outside Dimension
in.	in.					
1/4	1/4	-MP4-FT4	1.93 (49.0)	1.17 (29.7)	0.15 (3.8)	0.67 (17.0)
3/8	3/8	-MP6-FT6	2.03 (51.6)	1.16 (29.5)	0.24 (6.1)	0.83 (21.1)
1/2	1/2	-MP8-FT8	2.47 (62.7)	1.42 (36.1)	0.34 (8.7)	0.98 (24.9)
3/4	3/4	-MP12-FT12	3.14 (79.8)	1.48 (37.6)	0.57 (14.5)	1.23 (31.3)
in.	mm	—	mm(in. )			
1/4	6	-MP4-MT6	49.0 (1.93)	29.7 (1.17)	3.8 (0.15)	17.0 (0.67)
1/4	8	-MP4-MT8	48.8 (1.92)	29.5 (1.16)	4.1 (0.16)	17.0 (0.67)
3/8	8	-MP6-MT8	52.1 (2.05)	30.0 (1.18)	5.6 (0.22)	21.1 (0.83)
3/8	10	-MP6-MT10	51.6 (2.03)	29.5 (1.16)	6.9 (0.27)	21.1 (0.83)
1/2	12	-MP8-MT12	62.7 (2.47)	36.1 (1.42)	8.1 (0.32)	24.9 (0.98)
3/4	18	-MP12-MT18	79.8 (3.14)	37.3 (1.47)	8.6 (0.34)	31.3 (1.23)

### Male NPT



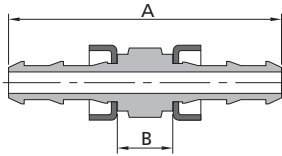
Nominal Hose Size	NPT Size	Basic Ordering Number	Dimensions, in. (mm)			
			A	B	Minimum Inside Diameter	Maximum Outside Dimension
in.						
1/4	1/4	-MP4-NS4	1.68 (42.7)	0.92 (23.4)	0.16 (4.1)	0.67 (17.0)
3/8	1/4	-MP6-NS4	1.80 (45.7)	0.93 (23.6)	0.27 (6.9)	0.83 (21.1)
3/8	3/8	-MP6-NS6	1.80 (45.7)	0.93 (23.6)	0.27 (6.9)	0.83 (21.1)
1/2	1/2	-MP8-NS8	2.19 (55.6)	1.14 (29.0)	0.37 (9.5)	1.02 (25.9)
3/4	3/4	-MP12-NS12	2.81 (71.4)	1.14 (29.0)	0.61 (15.6)	1.31 (33.3)

### Male BSPT



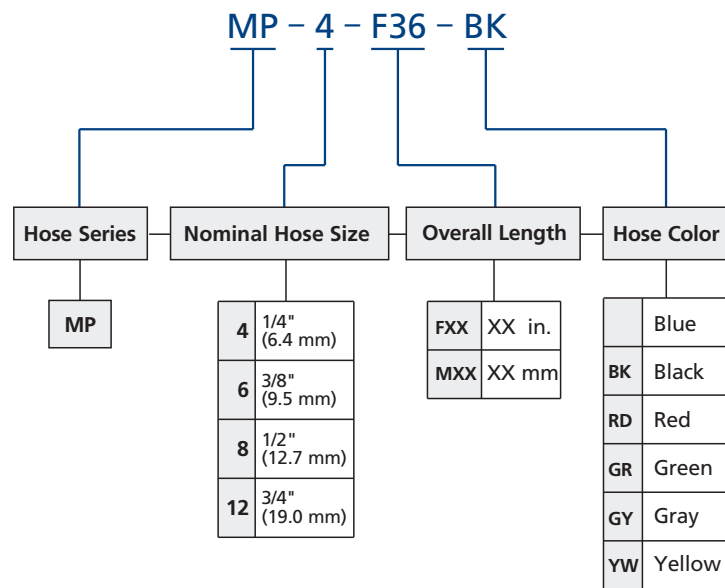
Nominal Hose Size	BSPT Size	Basic Ordering Number	Dimensions, in. (mm)			
			A	B	Minimum Inside Diameter	Maximum Outside Dimension
in.						
1/4	1/4	-MP4-RT4	1.68 (42.7)	0.92 (23.4)	0.16 (4.1)	0.67 (17.0)
3/8	1/4	-MP6-RT4	1.80 (45.7)	0.93 (23.6)	0.27 (6.9)	0.83 (21.1)
3/8	3/8	-MP6-RT6	1.80 (45.7)	0.93 (23.6)	0.27 (6.9)	0.83 (21.1)
1/2	1/2	-MP8-RT8	2.19 (55.6)	1.14 (29.0)	0.37 (9.5)	1.02 (25.9)
3/4	3/4	-MP12-RT12	2.81 (71.4)	1.14 (29.0)	0.61 (15.6)	1.31 (33.3)

Unions



Nominal Hose Size	Basic Ordering Number	Dimensions, in. (mm)			
		A	B	Minimum Inside Diameter	Maximum Outside Dimension
in.					
1/4	-MP4-4	2.07 (52.6)	0.43 (11.4)	0.16 (4.1)	0.67 (17.0)
3/8	-MP6-6	2.25 (57.2)	0.40 (12)	0.27 (6.9)	0.83 (21.1)
1/2	-MP8-8	2.61 (69.8)	0.40 (14)	0.37 (9.5)	0.96 (24.5)
3/4	-MP12-12	3.85 (97.8)	0.47 (12.0)	0.61 (15.6)	1.23 (31.3)

## Hose Ordering Number Description



Example: **MP-8-F60-BK**

**MP:** Hose series

**8:** Hose size is 1/2".

**F60:** Overall length is 60".

**BK:** Hose color is black.

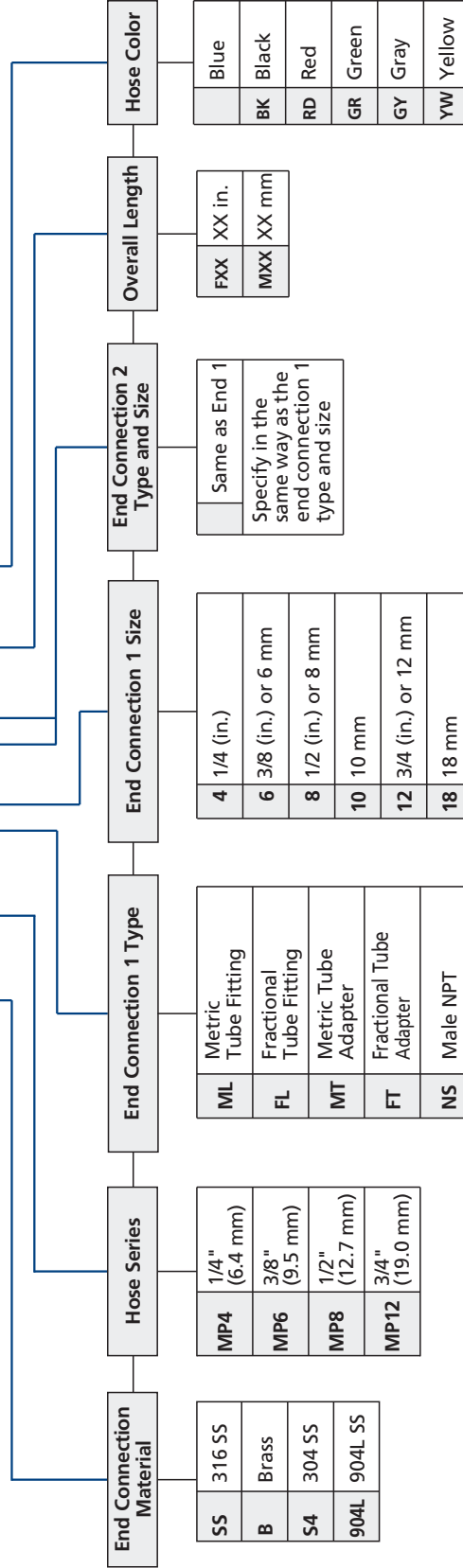
Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

# Multipurpose Push-On Hose Custom Assemblies



## Ordering Number Description

SS – MP4 – FL4 – FT4 – F36 – BK



Example: **SS-MP4-FT4-F28-BK**

**SS:** End connection material is 316 stainless steel.

**MP4:** MP series, hose size is 1/4" .

**FT4:** End connection 1 is 1/4" tube adapter.

End connection 2 is 1/4" tube adapter.

**F28:** Overall length is 28" .

**BK :** Hose color is black.

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

End 1 and end 2 follow the orders and regulations below:

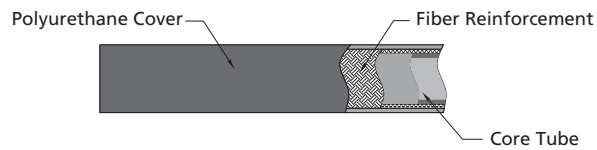
1. Metric Double Ferrules - Fractional Double Ferrules - Metric Tube Adapters - Fractional Tube Adapters - NPT Threads - BSPT Threads - SAE/IMS Parallel Threads - 37° Flare - Others
2. Put the sizes from the biggest down to the smallest if they are of the same type.
3. Put the female before male if they are of the same type and size.

# Thermoplastic Hoses

## TH Series

### Features

- ⊙ Polyurethane cover: resists oil, weather and abrasion
- ⊙ Reinforcement: double-braid high-strength synthetic fiber
- ⊙ Core tube: nylon
- ⊙ Working pressure up to: 5000 psig (345 bar)
- ⊙ Hose size: 3/16" to 1"
- ⊙ Working temperature: -40°F to 200°F (-40°C to 93°C)
- ⊙ End connections: 1/4 to 1 thread, 1/4" to 1" and 6 mm to 22 mm tube fitting
- ⊙ End connection materials: stainless steel, brass and carbon steel
- ⊙ Custom length available



### Technical Data

#### Thermoplastic Hydraulic Hose (SAE 100R7)

Nominal Hose Size	Hose Series	Min. Inside Bend Radius	Inside Diameter	Temperature Range	Working Pressure at 70°F (20°C)	Min. Burst Pressure at 70°F (20°C)	Specification
in. (mm)		in. (mm)	in. (mm)	°F (°C)	psig (bar)	psig (bar)	
3/16 (4.8)	TH3	1.58 (40)	0.19 (4.8)	-40 to 200 (-40 to 93)	3000 (207)	12000 (828)	SAE J517 100R7
1/4 (6.4)	TH4	1.97 (50)	0.25 (6.4)		2750 (189)	11000 (758)	
5/16 (8.0)	TH5	2.36 (60)	0.31 (7.9)		2500 (173)	10000 (690)	
3/8 (9.6)	TH6	2.95 (75)	0.38 (9.8)		2250 (155)	9000 (620)	
1/2 (12.7)	TH8	3.74 (95)	0.50 (12.7)		2000 (137)	8000 (551)	

#### Thermoplastic Hydraulic Hose (SAE 100R8)

Nominal Hose Size	Hose Series	Min. Inside Bend Radius	Inside Diameter	Temperature Range	Working Pressure at 70°F (20°C)	Min. Burst Pressure at 70°F (20°C)	Specification
in. (mm)		in. (mm)	in. (mm)	°F (°C)	psig (bar)	psig (bar)	
3/16 (4.8)	TH3	2.00 (50.8)	0.19 (4.8)	-40 to 200 (-40 to 93)	5000 (344)	20000 (1378)	SAE J517 100R8
1/4 (6.4)	TH4	2.00 (50.8)	0.25 (6.4)		5000 (344)	20000 (1378)	
3/8 (9.6)	TH6	2.50 (63.5)	0.38 (9.8)		4000 (275)	16000 (1102)	
1/2 (12.7)	TH8	4.00 (102)	0.50 (12.7)		3500 (241)	14000 (964)	
3/4 (19.0)	TH12	6.50 (165)	0.75 (19.0)		2250 (155)	9000 (620)	
1 (25.4)	TH16	10.0 (254)	1.00 (25.4)		2000 (137)	8000 (551)	

### Testing

Every FITOK thermoplastic hose assembly is factory tested with pure water at 1.5 times the maximum working pressure.

### Cleaning and Packaging

FITOK thermoplastic hose components are cleaned in accordance with FITOK *Standard Cleaning and Packaging Process (FC-01)* for general industrial procedures.

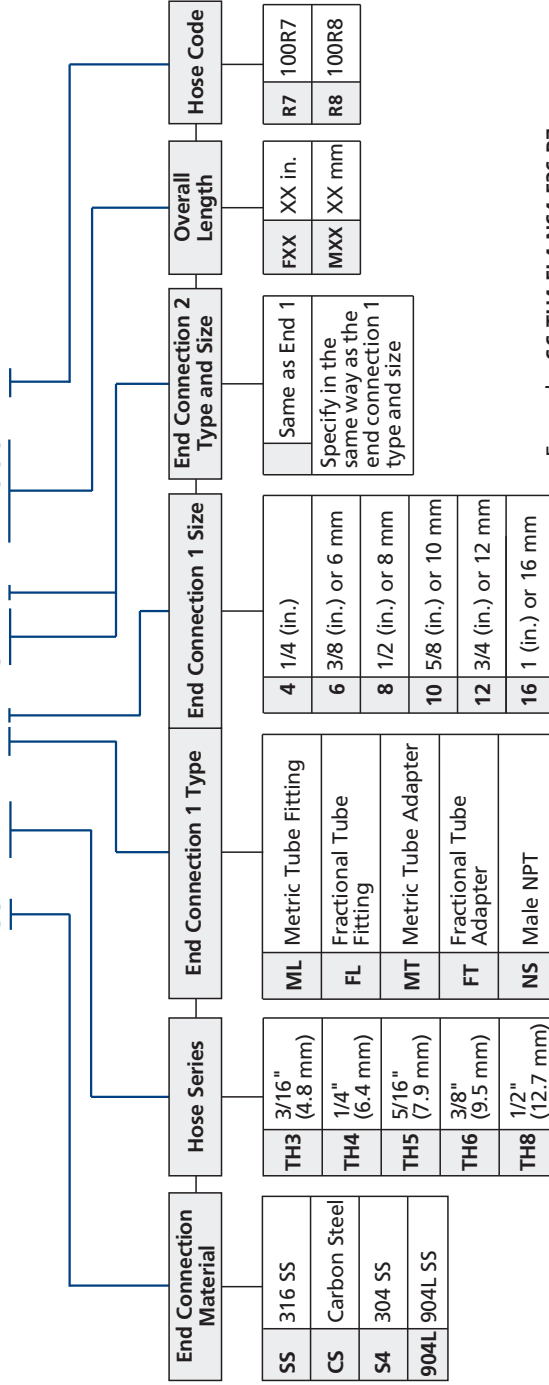
Shorter hoses are packed in cartons with suitable protective material, longer hoses are coiled, bagged and boxed or crated.

# Thermoplastic Hose Assemblies



## Ordering Number Description

SS – TH4 – FL4 – SAN4 – M1000 – R7



Example: **SS-TH4-FL4-NS4-F36-R7**

**SS:** End connection material is 316 stainless steel.

**TH4:** TH series, hose size is 1/4"

**FL4:** End connection 1 is 1/4" tube fitting.

**NS4 :** End connection 2 is 1/4 male NPT.

**F36 :** Overall length is 36"

**R7 :** SAE J517 100R7.

End 1 and end 2 follow the orders and regulations below:

1. Metric Double Ferrules - Fractional Double Ferrules - Metric Tube Adapters - Fractional Tube Adapters - NPT Threads - BSPT Threads - BSPP Threads - SAE/MS Parallel Threads - 37° Flare - Others
2. Put the sizes from the biggest down to the smallest if they are of the same type.
3. Put the female before male if they are of the same type and size.

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

# Hose Connectors and Sleeves

## HC Series

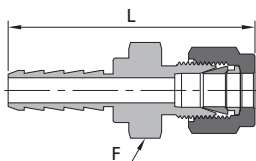
### Features

- Used to connect soft plastic or rubber tubing
- Working pressures and working temperatures are wider than those of the connected hoses
- Stainless steel or brass is available
- Shank design holds tubing inside diameter securely
- Hose connectors are reusable



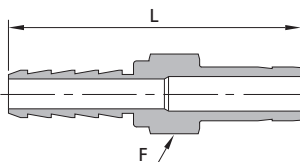
### Hose Connectors

#### Tube Fittings



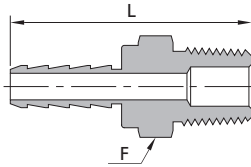
Hose ID	Tube Size	Basic Ordering Number	Dimensions		
			Minimum Inside Diameter	F	L
in.	in.		in. (mm)	in.	in. (mm)
1/8	1/8	-HC-F2-FL2	0.08 (2.0)	7/16	1.42 (36.1)
1/4	1/8	-HC-F4-FL2	0.09 (2.3)	7/16	1.81 (46.0)
	1/4	-HC-F4-FL4	0.19 (4.8)	9/16	1.92 (48.8)
3/8	1/4	-HC-F6-FL4	0.19 (4.8)	9/16	1.99 (50.6)
	3/8	-HC-F6-FL6	0.28 (7.1)	3/4	2.06 (52.3)
1/2	1/2	-HC-F8-FL8	0.38 (9.7)	7/8	2.24 (56.9)
mm	mm	—	mm (in. )	mm	mm (in. )
6	6	-HC-M6-ML6	4.8 (0.19)	14	49.5 (1.95)
8	8	-HC-M8-ML8	6.4 (0.25)	16	49.8 (1.96)
	10	-HC-M8-ML10	6.4 (0.25)	18	51.6 (2.03)
10	10	-HC-M10-ML10	7.9 (0.31)	19	52.3 (2.06)
12	12	-HC-M12-ML12	9.7 (0.38)	22	57.4 (2.26)

#### Tube Adapters



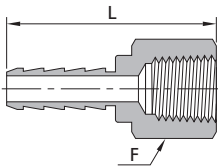
Hose ID	Tube Size	Basic Ordering Number	Dimensions		
			Minimum Inside Diameter	F	L
in.	in.		in. (mm)	in.	in. (mm)
1/8	1/8	-HC-F2-FT2	0.08 (2.0)	5/16	1.37 (34.8)
	1/4	-HC-F2-FT4	0.09 (2.3)	3/8	1.47 (37.3)
1/4	1/4	-HC-F4-FT4	0.19 (4.8)	7/16	1.86 (47.2)
	3/8	-HC-F4-FT6	0.19 (4.8)	7/16	1.92 (48.8)
5/16	1/4	-HC-F5-FT4	0.19 (4.8)	7/16	1.94 (49.3)
3/8	1/4	-HC-F6-FT4	0.19 (4.8)	9/16	1.94 (49.3)
	3/8	-HC-F6-FT6	0.28 (7.1)	9/16	2.00 (50.8)
	1/2	-HC-F6-FT8	0.30 (7.6)	5/8	2.26 (57.4)
1/2	3/8	-HC-F8-FT6	0.28 (7.1)	11/16	2.07 (52.6)
	1/2	-HC-F8-FT8	0.38 (9.7)	11/16	2.33 (59.2)
3/4	3/4	-HC-F12-FT12	0.63 (16.0)	13/16	2.50 (63.5)
1	1	-HC-F16-FT16	0.80 (20.3)	1 3/8	3.03 (77.0)

Male NPT



Hose ID	NPT Size	Basic Ordering Number	Dimensions		
			Minimum Inside Diameter	F	L
in.			in. (mm)	in.	in. (mm)
1/8	1/8	-HC-F2-NS2	0.08 (2.0)	7/16	1.08 (27.4)
	1/4	-HC-F2-NS4	0.08 (2.0)	9/16	1.26 (32.0)
3/16	1/8	-HC-F3-NS2	0.13 (3.3)	7/16	1.27 (32.2)
	1/4	-HC-F3-NS4	0.13 (3.3)	9/16	1.45 (36.8)
1/4	1/8	-HC-F4-NS2	0.19 (4.8)	7/16	1.47 (37.3)
	1/4	-HC-F4-NS4	0.19 (4.8)	9/16	1.65 (41.9)
	3/8	-HC-F4-NS6	0.19 (4.8)	11/16	1.66 (42.2)
	1/2	-HC-F4-NS8	0.19 (4.8)	7/8	1.85 (47.0)
5/16	1/8	-HC-F5-NS2	0.19 (4.8)	7/16	1.55 (39.4)
	1/4	-HC-F5-NS4	0.19 (4.8)	9/16	1.73 (43.9)
	3/8	-HC-F5-NS6	0.19 (4.8)	11/16	1.74 (44.2)
	1/2	-HC-F5-NS8	0.19 (4.8)	7/8	1.96 (49.8)
3/8	1/4	-HC-F6-NS4	0.30 (7.6)	9/16	1.73 (43.9)
	3/8	-HC-F6-NS6	0.30 (7.6)	11/16	1.74 (44.2)
	1/2	-HC-F6-NS8	0.30 (7.6)	7/8	1.96 (49.8)
1/2	1/4	-HC-F8-NS4	0.30 (7.6)	11/16	1.80 (45.7)
	3/8	-HC-F8-NS6	0.38 (9.7)	11/16	1.81 (46.0)
	1/2	-HC-F8-NS8	0.38 (9.7)	7/8	2.03 (51.6)
5/8	3/8	-HC-F10-NS6	0.38 (9.7)	1 1/16	1.88 (47.8)
	1/2	-HC-F10-NS8	0.47 (11.9)	1 1/16	2.07 (52.6)
	3/4	-HC-F10-NS12	0.50 (12.7)	1 1/16	2.07 (52.6)
3/4	1/2	-HC-F12-NS8	0.47 (11.9)	1 1/16	2.14 (54.4)
	3/4	-HC-F12-NS12	0.63 (16.0)	1 1/16	2.14 (54.4)
	1	-HC-F12-NS16	0.63 (16.0)	1 3/8	2.43 (61.7)
1	3/4	-HC-F16-NS12	0.63 (16.0)	1 3/8	2.38 (60.5)
	1	-HC-F16-NS16	0.88 (22.4)	1 3/8	2.57 (65.3)

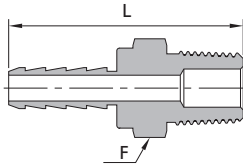
Female NPT



Hose ID	NPT Size	Basic Ordering Number	Dimensions		
			Minimum Inside Diameter	F	L
in.			in. (mm)	in.	in. (mm)
1/8	1/8	-HC-F2-FNS2	0.08 (2.0)	9/16	1.11 (28.2)
	1/4	-HC-F2-FNS4	0.08 (2.0)	3/4	1.26 (32.0)
3/16	1/8	-HC-F3-FNS2	0.13 (3.3)	9/16	1.29 (32.8)
	1/4	-HC-F3-FNS4	0.13 (3.3)	3/4	1.44 (36.6)
1/4	1/8	-HC-F4-FNS2	0.19 (4.8)	9/16	1.47 (37.3)
	1/4	-HC-F4-FNS4	0.19 (4.8)	3/4	1.64 (41.7)
	3/8	-HC-F4-FNS6	0.19 (4.8)	7/8	1.71 (43.4)
5/16	1/4	-HC-F5-FNS4	0.19 (4.8)	3/4	1.73 (43.9)
	3/8	-HC-F5-FNS6	0.19 (4.8)	7/8	1.82 (46.2)
3/8	1/4	-HC-F6-FNS4	0.30 (7.6)	3/4	1.69 (42.9)
	3/8	-HC-F6-FNS6	0.30 (7.6)	7/8	1.78 (45.2)
	1/2	-HC-F6-FNS8	0.30 (7.6)	1 1/16	2.03 (51.6)
1/2	1/2	-HC-F8-FNS8	0.38 (9.7)	1 1/16	2.13 (54.1)

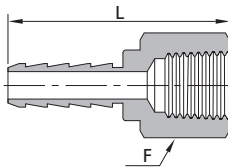
Hoses Quick-connects

Male BSPT



Hose ID	BSPT Size	Basic Ordering Number	Dimensions		
			Minimum Inside Diameter	F	L
in.			in. (mm)	in.	in. (mm)
1/8	1/8	-HC-F2-RT2	0.08 (2.0)	7/16	1.28 (32.5)
	1/4	-HC-F2-RT4	0.08 (2.0)	9/16	1.40 (35.5)
3/16	1/8	-HC-F3-RT2	0.13 (3.3)	7/16	1.40 (35.5)
	1/4	-HC-F3-RT4	0.13 (3.3)	9/16	1.58 (40.1)
1/4	1/8	-HC-F4-RT2	0.19 (4.8)	7/16	1.47 (37.3)
	1/4	-HC-F4-RT4	0.19 (4.8)	9/16	1.65 (41.9)
	3/8	-HC-F4-RT6	0.19 (4.8)	11/16	1.66 (42.2)
	1/2	-HC-F4-RT8	0.19 (4.8)	7/8	1.90 (48.3)
5/16	1/8	-HC-F5-RT2	0.19 (4.8)	7/16	1.67 (42.4)
	1/4	-HC-F5-RT4	0.19 (4.8)	9/16	1.86 (47.2)
	3/8	-HC-F5-RT6	0.19 (4.8)	11/16	1.87 (47.5)
	1/2	-HC-F5-RT8	0.19 (4.8)	7/8	2.10 (53.3)
3/8	1/4	-HC-F6-RT4	0.30 (7.6)	9/16	1.73 (43.9)
	3/8	-HC-F6-RT6	0.30 (7.6)	11/16	1.74 (44.2)
	1/2	-HC-F6-RT8	0.30 (7.6)	7/8	1.96 (49.8)
1/2	1/4	-HC-F8-RT4	0.30 (7.6)	11/16	1.80 (45.7)
	3/8	-HC-F8-RT6	0.38 (9.7)	11/16	1.81 (46.0)
	1/2	-HC-F8-RT8	0.38 (9.7)	7/8	2.03 (51.6)
5/8	3/8	-HC-F10-RT6	0.38 (9.7)	1 1/16	1.88 (47.8)
	1/2	-HC-F10-RT8	0.47 (11.9)	1 1/16	2.07 (52.6)
	3/4	-HC-F10-RT12	0.50 (12.7)	1 1/16	2.07 (52.6)
3/4	1/2	-HC-F12-RT8	0.47 (11.9)	1 1/16	2.14 (54.4)
	3/4	-HC-F12-RT12	0.63 (16.0)	1 1/16	2.14 (54.4)
	1	-HC-F12-RT16	0.63 (16.0)	1 3/8	2.43 (61.7)
1	3/4	-HC-F16-RT12	0.63 (16.0)	1 3/8	2.38 (60.5)
	1	-HC-F16-RT16	0.88 (22.4)	1 3/8	2.57 (65.3)

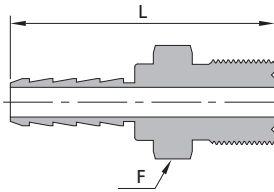
Female BSPT



Hose ID	BSPT Size	Basic Ordering Number	Dimensions		
			Minimum Inside Diameter	F	L
in.			in. (mm)	in.	in. (mm)
1/8	1/8	-HC-F2-FRT2	0.08 (2.0)	9/16	1.11 (28.2)
	1/4	-HC-F2-FRT4	0.08 (2.0)	3/4	1.26 (32.0)
3/16	1/8	-HC-F3-FRT2	0.13 (3.3)	9/16	1.29 (32.8)
	1/4	-HC-F3-FRT4	0.13 (3.3)	3/4	1.44 (36.6)
1/4	1/8	-HC-F4-FRT2	0.19 (4.8)	9/16	1.47 (37.3)
	1/4	-HC-F4-FRT4	0.19 (4.8)	3/4	1.64 (41.7)
	3/8	-HC-F4-FRT6	0.19 (4.8)	7/8	1.71 (43.4)
5/16	1/4	-HC-F5-FRT4	0.19 (4.8)	3/4	1.73 (43.9)
	3/8	-HC-F5-FRT6	0.19 (4.8)	7/8	1.82 (46.2)
3/8	1/4	-HC-F6-FRT4	0.30 (7.6)	3/4	1.69 (42.9)
	3/8	-HC-F6-FRT6	0.30 (7.6)	7/8	1.78 (45.2)
	1/2	-HC-F6-FRT8	0.30 (7.6)	1 1/16	2.03 (51.6)
1/2	1/2	-HC-F8-FRT8	0.38 (9.7)	1 1/16	2.13 (54.1)

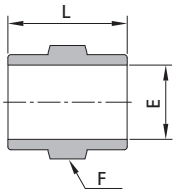


### Metric Thread



Hose ID	Thread Size	Basic Ordering Number	Dimensions		
			Minimum Inside Diameter	F	L
mm	in.		in. (mm)	mm	in. (mm)
6	M10 x 1	-HC-M6-MS10	4.3 (0.17)	12	39.6 (1.54)
	M12 x 1.5	-HC-M6-MS12	4.3 (0.17)	14	40.4 (1.59)
	M14 x 1.5	-HC-M6-MS14	4.3 (0.17)	15	42.2 (1.66)
8	M14 x 1.5	-HC-M8-MS14	4.8 (0.19)	15	44.2 (1.74)
	M16 x 1.5	-HC-M8-MS16	4.8 (0.19)	18	46.2 (1.82)
10	M16 x 1.5	-HC-M10-MS16	7.9 (0.31)	18	46.2 (1.82)
	M18 x 1.5	-HC-M10-MS18	7.9 (0.31)	19	47.2 (1.86)
12	M20 x 1.5	-HC-M12-MS20	8.9 (0.35)	22	50.3 (1.98)
	M22 x 1.5	-HC-M12-MS22	8.9 (0.35)	24	52.8 (2.08)

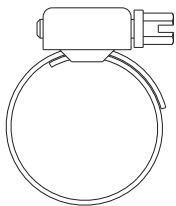
### Hose Connector Sleeves



Hose ID	Hose OD	Ordering Number	Dimensions, in. (mm)		
			E	F	L
in.	in.				
1/8	1/4	AL-HC-F2-F4	0.26 (6.6)	3/8	0.40 (10.2)
1/4	3/8	AL-HC-F4-F6	0.41 (10.4)	9/16	0.79 (20.1)
1/4	7/16	AL-HC-F4-F7	0.46 (11.7)	5/8	0.79 (20.1)
1/4	1/2	AL-HC-F4-F8	0.52 (13.2)	11/16	0.79 (20.1)
5/16	7/16	AL-HC-F5-F7	0.48 (12.2)	5/8	0.87 (22.1)
3/8	1/2	AL-HC-F6-F8	0.55 (14.0)	11/16	0.87 (22.1)
3/8	9/16	AL-HC-F6-F9	0.61 (15.5)	3/4	0.87 (22.1)
7/16	5/8	AL-HC-F7-F10	0.69 (17.5)	13/16	0.94 (23.9)
1/2	11/16	AL-HC-F8-F11	0.76 (19.3)	7/8	0.94 (23.9)
3/4	1	AL-HC-F12-F16	1.10 (27.9)	1 1/4	1.07 (27.2)

- ⦿ Material: Aluminum
- ⦿ Reusable

### Hose Clamps

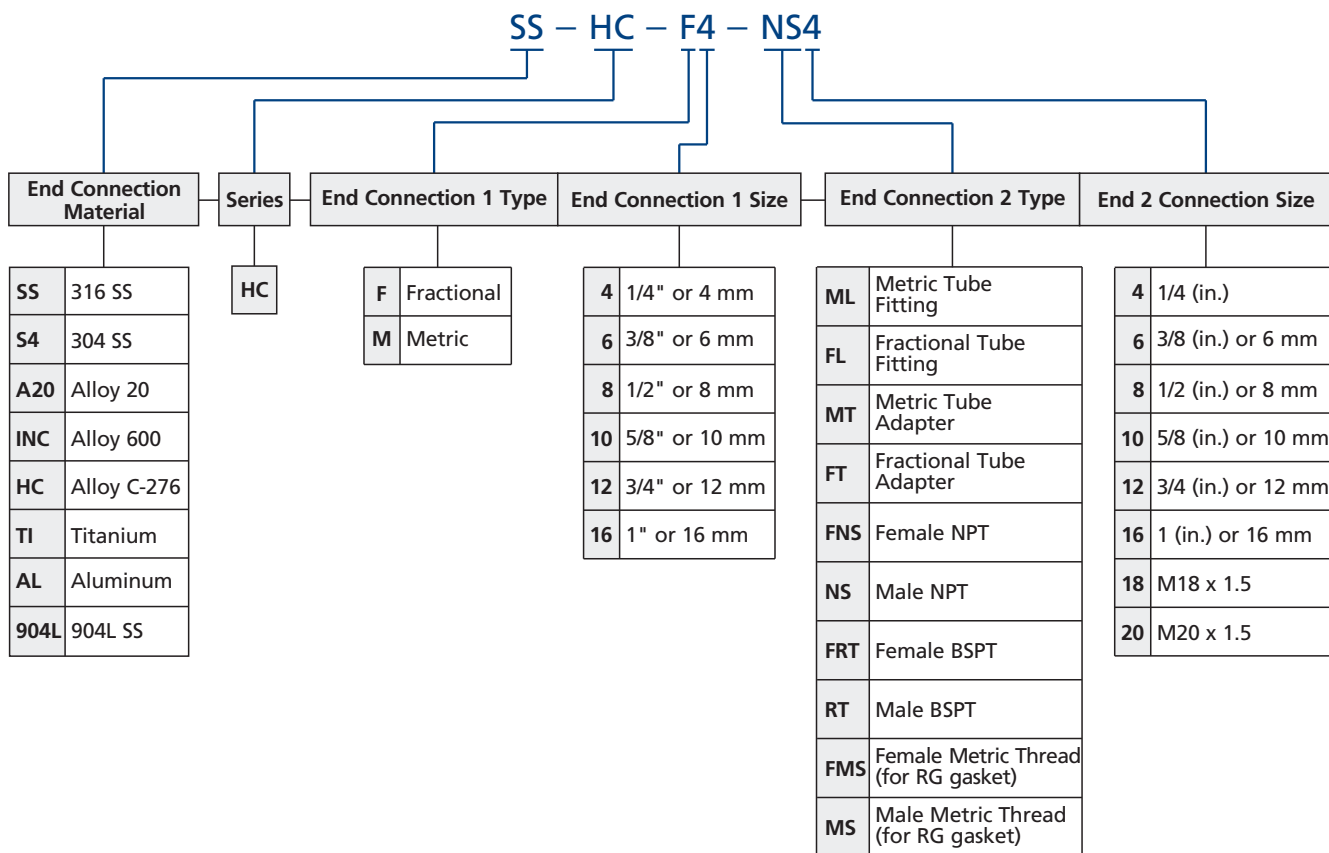


Min. Hose OD	Max. Hose OD	Ordering Number
mm	mm	
8	12	CP8-12
10	16	CP10-16
12	20	CP12-20
16	25	CP16-25
20	32	CP20-32
25	40	CP25-40

- ⦿ Material: 304 SS
- ⦿ Reusable

1. Sizes and types listed are standard. Other sizes and types are available upon request.
2. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact FITOK Group or our authorized distributors.

## Ordering Number Description



**Example: SS-HC-F4-FT6**

**SS:** End connection material is 316 stainless steel.

**HC:** HC series.

**F4:** Hose ID is 1/4" .

**FT6:** End connection 2 is 3/8" tube adapter.

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

# Quick-connects

QC, QF, QV, QM and QTM Series



# Contents

## QC Series



D-27

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## QF Series



D-36

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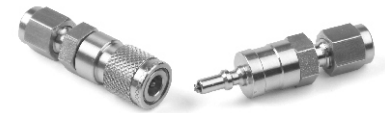
## QV Series



D-41

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## QM Series



D-44

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## QTM Series



D-48

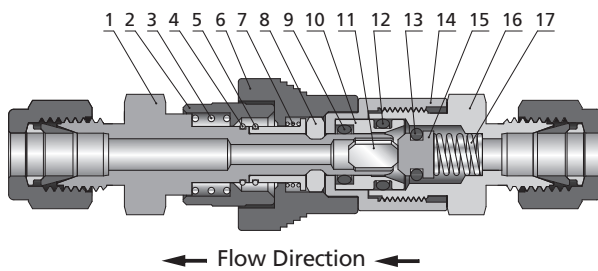
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# QC Series

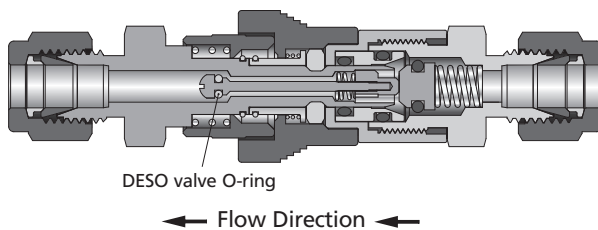
## Features

- Working pressure up to: 3000 psig (207 bar)
- Materials: Stainless steel or brass
- Reliable, leak-tight O-ring seal for vacuum or pressure systems
- Interchangeable with other key manufacturers' products
- Single-end shutoff, double-end shutoff and full-flow model available
- Push-to-connect coupling to enable quick and easy operation
- Locking mechanism with large contact area to ensure reliable stem retention

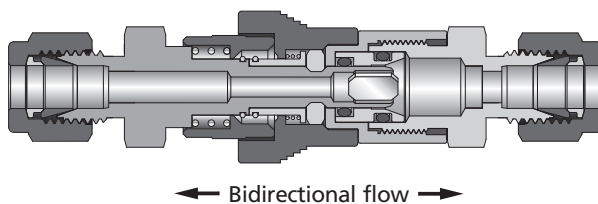
### Single-end Shutoff (SESO)



### Double-end Shutoff (DESO) - Red Stem Sleeve



### Full-flow Quick-connects



## Standard Materials of Construction

Item	Component	Stainless Steel	Brass
		Material Grade/ASTM Standard	
1	Stem	316 SS/A479	Brass C36000/B16
2	DESO stem sleeve	PTFE-coated 316L SS/A479	PTFE-coated Brass C36000/B16
	SESO stem sleeve	316L SS/A479	Brass C36000/B16
3	Springs	316 SS/A313	
4	Snap rings	316 SS/A313	
5			
6	Body sleeve	316L SS/A479	Brass C36000/B16
7	Springs	316 SS/A313	
8	Locking dogs	Xylan <sup>®</sup> -coated 316 SS powdered metal	
9	O-rings	Fluorocarbon FKM	Buna N
10	Sliding sleeve	316 SS/A479	Brass C36000/B16
11	SESO stem insert	316 SS/A240	Brass C26000/B36
12	O-rings	Fluorocarbon FKM	Buna N
13	O-rings	Fluorocarbon FKM	Buna N
14	Housing	316L SS/A479	Brass C36000/B16
15	Plug	316 SS/A479	Brass C36000/B16
16	Body	316 SS/A479	Brass C36000/B16
17	Springs	316 SS/A313	
18	Lubricants	Silicone-based	

## Insertion Depth

Series	Insertion Depth	
	SESO	DESO
	in. (mm)	in. (mm)
QC4	1.09 (27.7)	1.15 (29.2)
QC6	1.18 (30.0)	1.30 (33.0)
QC8	1.48 (37.6)	1.68 (42.7)

In order to measure overall length in the coupled position, the insertion depth should be deducted from any overall stem and body combination length.

## Spillage and Air Inclusion

**Spillage** - the amount of system fluid that escapes when a quick-connect is uncoupled (DESO only)

**Air Inclusion** - the amount of air trapped between the body and stem that enters the system when a quick-connect is coupled (DESO only)

Series	Spillage, cm <sup>3</sup>	Air Inclusion, cm <sup>3</sup>
QC4	0.3	0.3
QC6	1.0	1.0
QC8	3.0	3.0

## Pressure-Temperature Ratings

Pressure rating restrictions apply when coupling and uncoupling (DESO only). Refer to the tables below for specific data.

### QC4 Series

Material	316 SS			Brass
O-Ring Material	Fluorocarbon FKM	Ethylene propylene	Perfluoro-carbon FFKM	Buna N
Temperature °F (°C)	Pressure Rating, psig (bar)			
<b>Coupled</b>				
-50 (-45)	—	3000 (206)	—	—
0 (-17)	3000 (206)	3000 (206)	3000 (206)	2000 (137)
10 (-12)	3000 (206)	3000 (206)	3000 (206)	2000 (137)
60 (15)	3000 (206)	3000 (206)	3000 (206)	2000 (137)
100 (37)	3000 (206)	3000 (206)	3000 (206)	2000 (137)
150 (65)	2750 (189)	2750 (189)	2750 (189)	1300 (895)
200 (93)	2300 (158)	2300 (158)	2300 (158)	700 (48)
250 (121)	1850 (127)	1850 (127)	1850 (127)	300 (20.6)
300 (148)	1400 (96.4)	1400 (96.4)	1400 (96.4)	—
350 (176)	950 (65.4)	—	950 (65.4)	—
400 (204)	500 (34.4)	—	500 (34.4)	—
500 (260)	—	—	150 (10.3)	—
<b>Uncoupled and When Coupling and Uncoupling</b>				
70 (20)	250 (17.2)			

### QC6 Series

Material	316 SS			Brass	
O-Ring Material	Fluorocarbon FKM	Ethylene propylene	Perfluoro-carbon FFKM	Buna N	
Temperature °F (°C)	Pressure Rating, psig (bar)				
<b>Coupled</b>					
-50 (-45)	—	1500 (103)	—	—	
0 (-17)	1500 (103)	1500 (103)	1500 (103)	1000 (68.9)	
10 (-12)	1500 (103)	1500 (103)	1500 (103)	1000 (68.9)	
60 (15)	1500 (103)	1500 (103)	1500 (103)	1000 (68.9)	
100 (37)	1500 (103)	1500 (103)	1500 (103)	1000 (68.9)	
150 (65)	1350 (93.0)	1350 (93.0)	1350 (93.0)	700 (48.2)	
200 (93)	1150 (79.2)	1150 (79.2)	1150 (79.2)	450 (31.0)	
250 (121)	970 (66.8)	970 (66.8)	970 (66.8)	300 (20.6)	
300 (148)	750 (51.6)	750 (51.6)	750 (51.6)	—	
350 (176)	580 (39.9)	—	580 (39.9)	—	
400 (204)	400 (27.5)	—	400 (27.5)	—	
500 (260)	—	—	150 (10.3)	—	
<b>Uncoupled and When Coupling and Uncoupling</b>					
70 (20)	250 (17.2)				

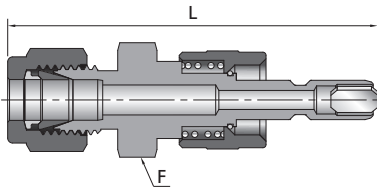
### QC8 Series

Material	316 SS			Brass
O-Ring Material	Fluorocarbon FKM	Ethylene propylene	Perfluoro-carbon FFKM	Buna N
Temperature °F (°C)	Pressure Rating, psig (bar)			
<b>Coupled</b>				
-50 (-45)	—	750 (51.6)	—	—
0 (-17)	750 (51.6)	750 (51.6)	750 (51.6)	500 (34.4)
10 (-12)	750 (51.6)	750 (51.6)	750 (51.6)	500 (34.4)
60 (15)	750 (51.6)	750 (51.6)	750 (51.6)	500 (34.4)
100 (37)	750 (51.6)	750 (51.6)	750 (51.6)	500 (34.4)
150 (65)	680 (46.8)	680 (46.8)	680 (46.8)	400 (27.5)
200 (93)	600 (41.3)	600 (41.3)	600 (41.3)	350 (24.1)
250 (121)	520 (35.8)	520 (35.8)	520 (35.8)	300 (20.6)
300 (148)	440 (30.3)	440 (30.3)	440 (30.3)	—
350 (176)	360 (24.8)	—	360 (24.8)	—
400 (204)	300 (20.6)	—	300 (20.6)	—
500 (260)	—	—	150 (10.3)	—
<b>Uncoupled and When Coupling and Uncoupling</b>				
70 (20)	250 (17.2)			

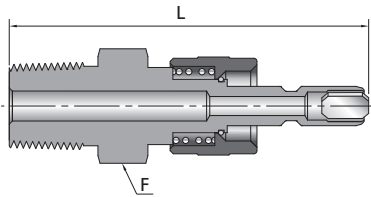
## Dimensions

### SESO Stems

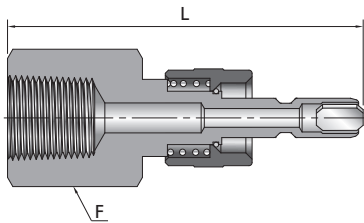
#### Tube Fitting



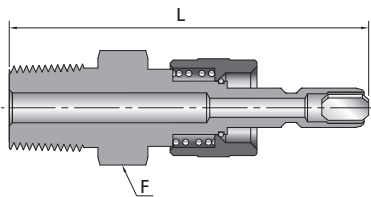
#### Male NPT



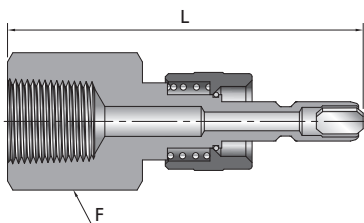
#### Female NPT



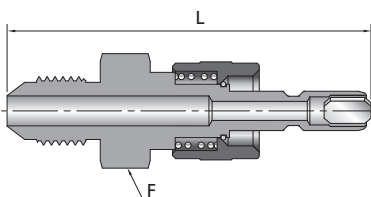
#### Male BSPT



#### Female BSPT



#### Male JIC(AN) 37° Flare



Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			F	L
			in.	in. (mm)
1/8	-QC4-FL2-S	0.08	5/8	2.32 (58.9)
1/4	-QC4-FL4-S	0.3	5/8	2.36 (59.9)
3/8	-QC6-FL6-S	1.0	3/4	2.52 (64.0)
1/2	-QC8-FL8-S	2.4	15/16	2.96 (75.2)
mm	—	—	mm	mm (in.)
6	-QC4-ML6-S	0.3	16	59.9 (2.36)
10	-QC6-ML10-S	1.0	19	67.3 (2.65)
12	-QC8-ML12-S	2.4	24	75.2 (2.96)

NPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			F	L
			in.	in. (mm)
1/8	-QC4-NS2-S	0.3	5/8	2.07 (52.6)
1/4	-QC4-NS4-S	0.3	5/8	2.22 (56.4)
1/4	-QC6-NS4-S	0.8	3/4	2.32 (58.9)
3/8	-QC6-NS6-S	0.8	3/4	2.35 (59.7)
1/2	-QC8-NS8-S	2.0	15/16	2.84 (72.1)

NPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			F	L
			in.	in. (mm)
1/8	-QC4-FNS2-S	0.3	5/8	2.01 (51.1)
1/4	-QC4-FNS4-S	0.3	3/4	2.26 (57.4)
1/4	-QC6-FNS4-S	0.8	3/4	2.35 (59.7)
3/8	-QC6-FNS6-S	0.8	7/8	2.35 (59.7)
1/2	-QC8-FNS8-S	2.0	1 1/16	2.82 (71.6)

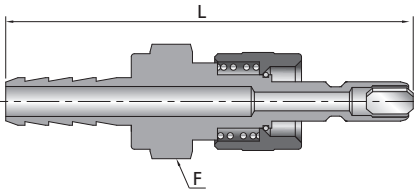
BSPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			F	L
			in.	in. (mm)
1/8	-QC4-RT2-S	0.3	5/8	2.07 (52.6)
1/4	-QC4-RT4-S	0.3	5/8	2.22 (56.4)
1/4	-QC6-RT4-S	0.8	3/4	2.32 (58.9)
3/8	-QC6-RT6-S	0.8	3/4	2.35 (59.7)
1/2	-QC8-RT8-S	2.0	15/16	2.84 (72.1)

BSPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			F	L
			in.	in. (mm)
1/8	-QC4-FRT2-S	0.3	5/8	2.01 (51.1)
1/4	-QC4-FRT4-S	0.3	3/4	2.26 (57.4)
1/4	-QC6-FRT4-S	0.8	3/4	2.35 (59.7)
3/8	-QC6-FRT6-S	0.8	7/8	2.35 (59.7)
1/2	-QC8-FRT8-S	2.0	1 1/16	2.82 (71.6)

Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			F	L
			in.	in. (mm)
1/4	-QC4-AN4-S	0.2	5/8	2.23 (56.6)
3/8	-QC6-AN6-S	1.0	3/4	2.35 (59.7)
1/2	-QC8-AN8-S	2.4	15/16	2.79 (70.9)

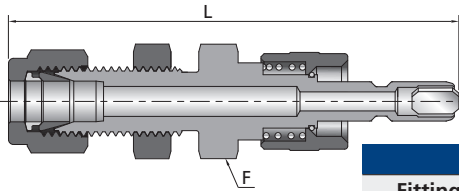
# D-30 Quick-connects

## Hose Connector



Hose Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			F in.	L in. (mm)
1/4	-QC4-HC4-S	0.2	5/8	2.47 (62.7)
3/8	-QC6-HC6-S	1.0	3/4	2.66 (67.6)
1/2	-QC8-HC8-S	2.4	15/16	3.07 (78.0)

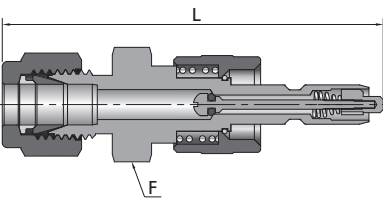
## Bulkhead Tube Fitting



Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions		Min. Panel Orifice in. (mm)	Max. Panel Thickness in. (mm)
			F in.	L in. (mm)		
1/4	-QC4-BFL4-S	0.3	5/8	2.74 (69.6)	0.47 (11.9)	0.25 (6.4)
3/8	-QC6-BFL6-S	1.0	3/4	2.92 (74.2)	0.60 (15.2)	0.27 (6.9)
1/2	-QC8-BFL8-S	2.4	15/16	3.43 (87.1)	0.78 (19.8)	0.26 (6.6)
mm	—	—	mm	mm (in.)	mm (in.)	mm (in.)
6	-QC4-BML6-S	0.3	16	69.6 (2.74)	11.7 (0.46)	6.4 (0.25)
10	-QC6-BML10-S	1.0	22	77.7 (3.06)	16.8 (0.66)	6.9 (0.27)
12	-QC8-BML12-S	2.4	24	87.1 (3.43)	19.6 (0.77)	6.6 (0.26)

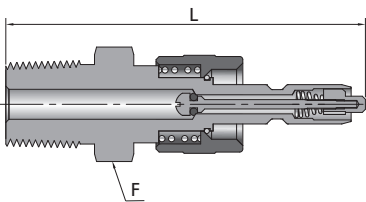
## DESO Stems

### Tube Fitting



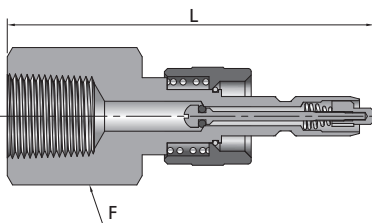
Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			F in.	L in. (mm)
1/8	-QC4-FL2-D	0.08	5/8	2.77 (70.4)
1/4	-QC4-FL4-D	0.2	5/8	2.42 (61.5)
3/8	-QC6-FL6-D	0.5	3/4	2.64 (67.1)
1/2	-QC8-FL8-D	1.5	15/16	3.16 (80.3)
mm	—	—	mm	mm (in.)
6	-QC4-ML6-D	0.2	16	61.5 (2.42)
10	-QC6-ML10-D	0.5	19	70.4 (2.77)
12	-QC8-ML12-D	1.5	24	80.3 (3.16)

### Male NPT



BSPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			F in.	L in. (mm)
1/8	-QC4-NS2-D	0.2	5/8	2.13 (54.1)
1/4	-QC4-NS4-D	0.2	5/8	2.28 (57.8)
1/4	-QC6-NS4-D	0.5	3/4	2.44 (61.9)
3/8	-QC6-NS6-D	0.5	3/4	2.47 (62.7)
1/2	-QC8-NS8-D	1.3	15/16	3.04 (77.2)

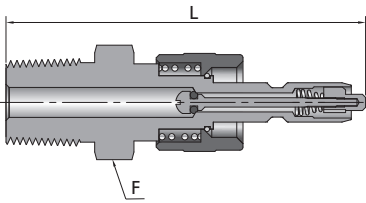
### Female NPT



BSPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			F in.	L in. (mm)
1/8	-QC4-FNS2-D	0.2	5/8	2.07 (52.6)
1/4	-QC4-FNS4-D	0.2	3/4	2.32 (58.9)
1/4	-QC6-FNS4-D	0.5	3/4	2.47 (62.7)
3/8	-QC6-FNS6-D	0.5	7/8	2.47 (62.7)
1/2	-QC8-FNS8-D	1.3	1 1/16	3.04 (77.2)

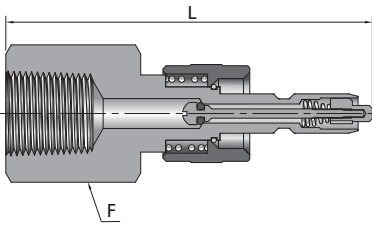


**Male BSPT**



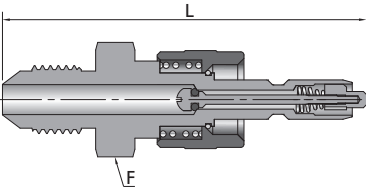
BSPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			F	L
			in.	in. (mm)
1/8	-QC4-RT2-D	0.2	5/8	2.13 (54.1)
1/4	-QC4-RT4-D	0.2	5/8	2.28 (57.8)
1/4	-QC6-RT4-D	0.5	3/4	2.44 (61.9)
3/8	-QC6-RT6-D	0.5	3/4	2.47 (62.7)
1/2	-QC8-RT8-D	1.3	15/16	3.04 (77.2)

**Female BSPT**



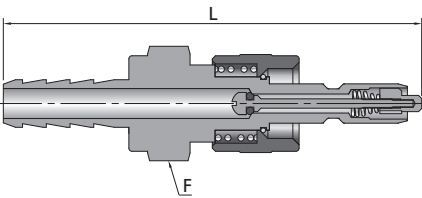
BSPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			F	L
			in.	in. (mm)
1/8	-QC4-FRT2-D	0.2	5/8	2.07 (52.6)
1/4	-QC4-FRT4-D	0.2	3/4	2.32 (58.9)
1/4	-QC6-FRT4-D	0.5	3/4	2.47 (62.7)
3/8	-QC6-FRT6-D	0.5	7/8	2.47 (62.7)
1/2	-QC8-FRT8-D	1.3	1 1/16	3.04 (77.2)

**Male JIC(AN) 37° Flare**



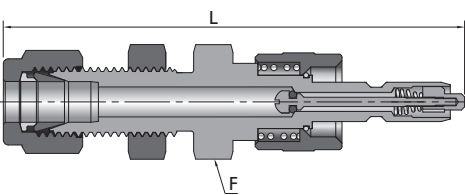
Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			F	L
			in.	in. (mm)
1/4	-QC4-AN4-D	0.2	5/8	2.29 (58.2)
3/8	-QC6-AN6-D	0.5	3/4	2.47 (62.7)
1/2	-QC8-AN8-D	1.5	15/16	2.99 (75.9)

**Hose Connector**



Hose Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			F	L
			in.	in. (mm)
1/4	-QC4-HC4-D	0.2	5/8	2.53 (64.3)
3/8	-QC6-HC6-D	0.5	3/4	2.78 (70.6)
1/2	-QC8-HC8-D	1.5	15/16	3.27 (83.1)

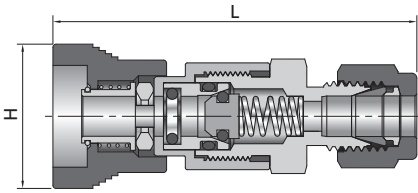
**Bulkhead Tube Fitting**



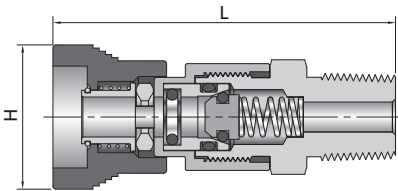
Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions		Min. Panel Orifice in. (mm)	Max. Panel Thickness in. (mm)
			F	L		
			in.	in. (mm)		
1/4	-QC4-BFL4-D	0.2	5/8	2.80 (71.1)	0.47 (11.9)	0.25 (6.4)
3/8	-QC6-BFL6-D	0.5	3/4	3.07 (78.0)	0.60 (15.2)	0.27 (6.9)
1/2	-QC8-BFL8-D	1.5	15/16	3.63 (92.2)	0.78 (19.8)	0.26 (6.6)
mm			mm	mm (in.)	mm (in.)	mm (in.)
6	-QC4-BML6-D	0.2	16	71.1 (2.80)	11.7 (0.46)	6.4 (0.25)
10	-QC6-BML10-D	0.5	22	78.7 (3.10)	16.8 (0.66)	6.9 (0.27)
12	-QC8-BML12-D	1.5	24	92.2 (3.63)	19.6 (0.77)	6.6 (0.26)

**Bodies**

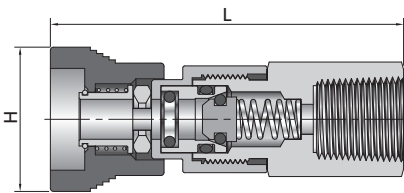
**Tube Fitting**



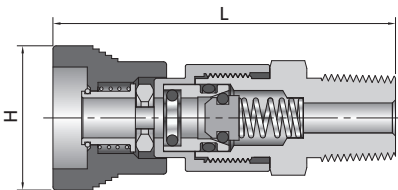
**Male NPT**



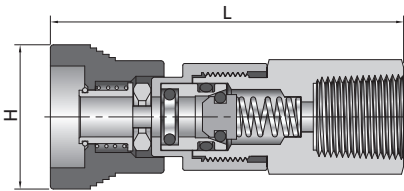
**Female NPT**



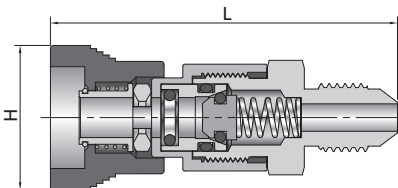
**Male BSPT**



**Female BSPT**



**Male JIC (AN) 37° Flare**



Fitting Size in.	Basic Ordering Number	Dimensions	
		H in.	L in. (mm)
1/8	-QC4-FL2-B	0.91 (23.1)	2.26 (57.4)
1/4	-QC4-FL4-B	0.91 (23.1)	2.30 (58.4)
3/8	-QC6-FL6-B	1.03 (26.2)	2.58 (65.5)
1/2	-QC8-FL8-B	1.21 (30.7)	3.09 (78.5)
mm	—	mm (in.)	mm (in.)
6	-QC4-ML6-B	23.1 (0.91)	58.4 (2.30)
10	-QC6-ML10-B	26.2 (1.03)	68.1 (2.68)
12	-QC8-ML12-B	30.7 (1.21)	78.5 (3.09)

NPT Size in.	Basic Ordering Number	Dimensions	
		H in.	L in. (mm)
1/8	-QC4-NS2-B	0.91 (23.1)	2.01 (51.1)
1/4	-QC4-NS4-B	0.91 (23.1)	2.16 (54.9)
1/4	-QC6-NS4-B	1.03 (26.2)	2.38 (60.5)
3/8	-QC6-NS6-B	1.03 (26.2)	2.38 (60.5)
1/2	-QC8-NS8-B	1.21 (30.7)	2.97 (75.4)

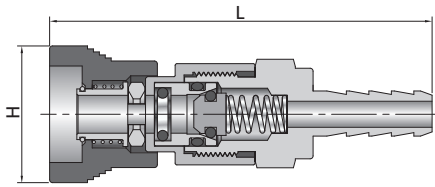
NPT Size in.	Basic Ordering Number	Dimensions	
		H in.	L in. (mm)
1/8	-QC4-FNS2-B	0.91 (23.1)	2.16 (54.9)
1/4	-QC4-FNS4-B	0.91 (23.1)	2.42 (61.5)
1/4	-QC6-FNS4-B	1.03 (26.2)	2.54 (64.5)
3/8	-QC6-FNS6-B	1.03 (26.2)	2.57 (65.3)
1/2	-QC8-FNS8-B	1.21 (30.7)	3.22 (81.8)

BSPT Size in.	Basic Ordering Number	Dimensions	
		H in.	L in. (mm)
1/8	-QC4-RT2-B	0.91 (23.1)	2.01 (51.1)
1/4	-QC4-RT4-B	0.91 (23.1)	2.16 (54.9)
1/4	-QC6-RT4-B	1.03 (26.2)	2.38 (60.5)
3/8	-QC6-RT6-B	1.03 (26.2)	2.38 (60.5)
1/2	-QC8-RT8-B	1.21 (30.7)	2.97 (75.4)

BSPT Size in.	Basic Ordering Number	Dimensions	
		H in.	L in. (mm)
1/8	-QC4-FRT2-B	0.91 (23.1)	2.16 (54.9)
1/4	-QC4-FRT4-B	0.91 (23.1)	2.42 (61.5)
1/4	-QC6-FRT4-B	1.03 (26.2)	2.54 (64.5)
3/8	-QC6-FRT6-B	1.03 (26.2)	2.57 (65.3)
1/2	-QC8-FRT8-B	1.21 (30.7)	3.22 (81.8)

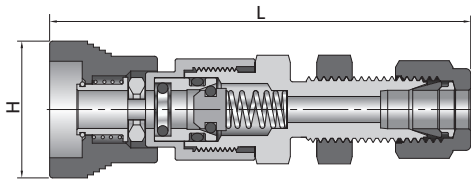
Fitting Size in.	Basic Ordering Number	Dimensions	
		H in.	L in. (mm)
1/4	-QC4-AN4-B	0.91 (23.1)	2.17 (55.1)
3/8	-QC6-AN6-B	1.03 (26.2)	2.41 (61.2)
1/2	-QC8-AN8-B	1.21 (30.7)	2.92 (74.2)

**Hose Connector**



Hose Size in.	Basic Ordering Number	Dimensions	
		H in.	L in. (mm)
1/4	-QC4-HC4-B	0.91 (23.1)	2.41 (61.2)
3/8	-QC6-HC6-B	1.03 (26.2)	2.72 (69.1)
1/2	-QC8-HC8-B	1.21 (30.7)	3.20 (81.3)

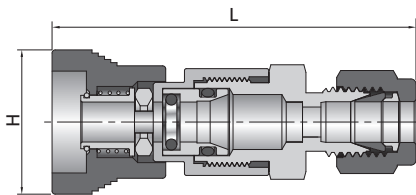
**Bulkhead Tube Fitting**



Fitting Size in.	Basic Ordering Number	Dimensions		Min. Panel Orifice in. (mm)	Max. Panel Thickness in. (mm)
		H in.	L in. (mm)		
1/4	-QC4-BFL4-B	0.91 (23.1)	2.67 (67.8)	0.47 (11.9)	0.25 (6.4)
3/8	-QC6-BFL6-B	1.03 (26.2)	2.98 (75.7)	0.60 (15.2)	0.27 (6.9)
1/2	-QC8-BFL8-B	1.21 (30.7)	3.56 (90.4)	0.78 (19.8)	0.26 (6.6)
mm		mm (in.)	mm (in.)	mm (in.)	mm (in.)
6	-QC4-BML6-B	23.1 (0.91)	67.8 (2.67)	11.7 (0.46)	6.4 (0.25)
10	-QC6-BML10-B	26.2 (1.03)	75.9 (2.99)	16.8 (0.66)	6.9 (0.27)
12	-QC8-BML12-B	30.7 (1.21)	90.4 (3.56)	19.6 (0.77)	6.6 (0.26)

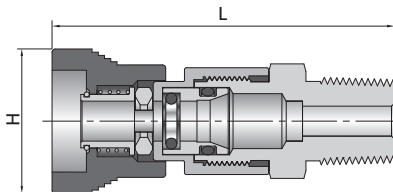
**Full-flow Bodies**

**Tube Fitting**



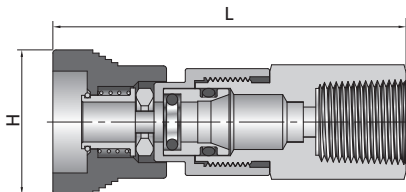
Fitting Size in.	Basic Ordering Number	Dimensions	
		H in.	L in. (mm)
1/8	-QC4-FL2-F	0.91 (23.1)	2.26 (57.4)
1/4	-QC4-FL4-F	0.91 (23.1)	2.30 (58.4)
3/8	-QC6-FL6-F	1.03 (26.2)	2.58 (65.5)
1/2	-QC8-FL8-F	1.21 (30.7)	3.09 (78.5)
mm		mm (in.)	mm (in.)
6	-QC4-ML6-F	23.1 (0.91)	58.4 (2.30)
10	-QC6-ML10-F	26.2 (1.03)	68.1 (2.68)
12	-QC8-ML12-F	30.7 (1.21)	78.5 (3.09)

**Male NPT**



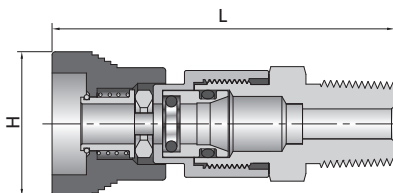
NPT Size in.	Basic Ordering Number	Dimensions	
		H in.	L in. (mm)
1/8	-QC4-NS2-F	0.91 (23.1)	2.01 (51.1)
1/4	-QC4-NS4-F	0.91 (23.1)	2.16 (54.9)
1/4	-QC6-NS4-F	1.03 (26.2)	2.38 (60.5)
3/8	-QC6-NS6-F	1.03 (26.2)	2.38 (60.5)
1/2	-QC8-NS8-F	1.21 (30.7)	2.97 (75.4)

**Female NPT**



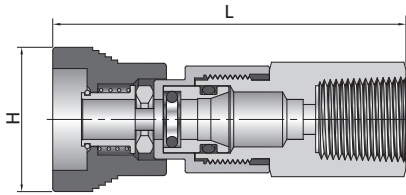
NPT Size in.	Basic Ordering Number	Dimensions	
		H in.	L in. (mm)
1/8	-QC4-FNS2-F	0.91 (23.1)	2.16 (54.9)
1/4	-QC4-FNS4-F	0.91 (23.1)	2.42 (61.5)
1/4	-QC6-FNS4-F	1.03 (26.2)	2.54 (65.4)
3/8	-QC6-FNS6-F	1.03 (26.2)	2.57 (65.3)
1/2	-QC8-FNS8-F	1.21 (30.7)	3.22 (81.8)

**Male BSPT**



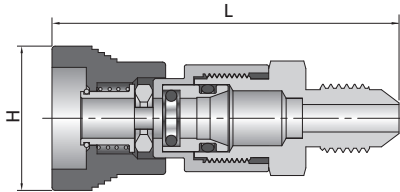
BSPT Size in.	Basic Ordering Number	Dimensions	
		H in.	L in. (mm)
1/8	-QC4-RT2-F	0.91 (23.1)	2.01 (51.1)
1/4	-QC4-RT4-F	0.91 (23.1)	2.16 (54.9)
1/4	-QC6-RT4-F	1.03 (26.2)	2.38 (60.5)
3/8	-QC6-RT6-F	1.03 (26.2)	2.38 (60.5)
1/2	-QC8-RT8-F	1.21 (30.7)	2.97 (75.4)

**Female BSPT**



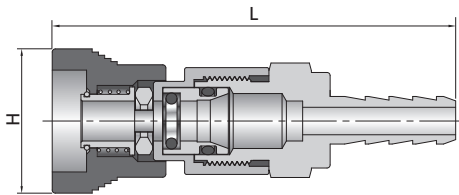
BSPT Size in.	Basic Ordering Number	Dimensions	
		H in.	L in. (mm)
1/8	-QC4-FRT2-F	0.91 (23.1)	2.16 (54.9)
1/4	-QC4-FRT4-F	0.91 (23.1)	2.42 (61.5)
1/4	-QC6-FRT4-F	1.03 (26.2)	2.54 (64.5)
3/8	-QC6-FRT6-F	1.03 (26.2)	2.57 (65.3)
1/2	-QC8-FRT8-F	1.21 (30.7)	3.22 (81.8)

**Male JIC (AN) 37° Flare**



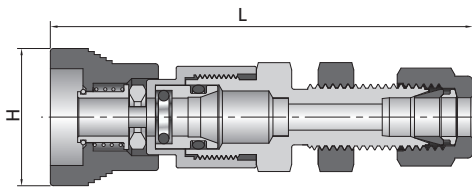
Fitting Size in.	Basic Ordering Number	Dimensions	
		H in.	L in. (mm)
1/4	-QC4-AN4-F	0.91 (23.1)	2.17 (55.1)
3/8	-QC6-AN6-F	1.03 (26.2)	2.41 (61.2)
1/2	-QC8-AN8-F	1.21 (30.7)	2.92 (74.2)

**Hose Connector**



Hose Size in.	Basic Ordering Number	Dimensions	
		H in.	L in. (mm)
1/4	-QC4-HC4-F	0.91 (23.1)	2.41 (61.2)
3/8	-QC6-HC6-F	1.03 (26.2)	2.72 (69.1)
1/2	-QC8-HC8-F	1.21 (30.7)	3.20 (81.3)

**Bulkhead Tube Fitting**



Fitting Size in.	Basic Ordering Number	Dimensions		Min. Panel Orifice in. (mm)	Max. Panel Thickness in. (mm)
		H in.	L in. (mm)		
1/4	-QC4-BFL4-F	0.91 (23.1)	2.67 (67.8)	0.47 (11.9)	0.25 (6.4)
3/8	-QC6-BFL6-F	1.03 (26.2)	2.98 (75.7)	0.60 (15.2)	0.27 (6.9)
1/2	-QC8-BFL8-F	1.21 (30.7)	3.56 (90.4)	0.78 (19.8)	0.26 (6.6)
mm	—	mm (in.)	mm (in.)	mm (in.)	mm (in.)
6	-QC4-BML6-F	23.1 (0.91)	67.8 (2.67)	11.7 (0.46)	6.4 (0.25)
10	-QC6-BML10-F	26.2 (1.03)	75.9 (2.99)	16.8 (0.66)	6.9 (0.27)
12	-QC8-BML12-F	30.7 (1.21)	90.4 (3.56)	19.6 (0.77)	6.6 (0.26)

**Options, QC Series**

**Keyed QC Series**

FITOK keyed quick-connects provide a reliable mechanical lockout system to prevent accidental intermixing of different lines in multifluid or multipressure systems.

**QC Series Key Numbers and Sleeve Outside Diameters**

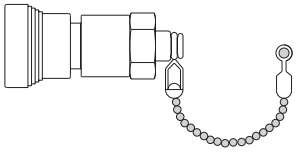
Key Number	Color	QC4		QC6		QC8	
		Body Sleeve	Stem Sleeve	Body Sleeve	Stem Sleeve	Body Sleeve	Stem Sleeve
		in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)
K1	Black	0.96 (24.4)	0.82 (20.8)	1.13 (28.7)	0.99 (25.1)	1.26 (32.0)	1.10 (27.9)
K2	Orange	0.99 (25.1)	0.85 (21.6)	1.16 (29.5)	1.02 (25.9)	1.29 (32.8)	1.14 (29.0)
K3	Green	1.02 (25.9)	0.88 (22.4)	1.19 (30.2)	1.05 (26.7)	1.32 (33.5)	1.17 (29.7)
K4	Yellow	1.05 (26.7)	0.91 (23.1)	1.22 (31.0)	1.08 (27.4)	1.35 (34.3)	1.20 (30.5)
K5	Blue	1.08 (27.4)	0.94 (23.9)	1.24 (31.5)	1.11 (28.2)	1.38 (35.1)	1.23 (31.2)
K6	White	1.11 (28.2)	0.97 (24.6)	1.28 (32.5)	1.14 (29.0)	1.41 (35.8)	1.26 (32.0)
K7	Purple	1.14 (29.0)	1.00 (25.4)	1.31 (33.3)	1.17 (29.7)	1.44 (36.6)	1.29 (32.8)
K8	Brown	1.17 (29.7)	1.03 (26.2)	1.34 (34.0)	1.20 (30.5)	1.47 (37.3)	1.32 (33.5)

## Options, QC Series

### Stem and Body Protector

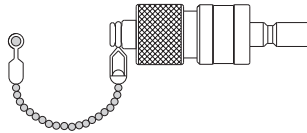
Stem and body protector can prevent the stem and the body from being damaged and polluted when uncoupling.

#### Stem Protector



Series	Basic Ordering Number
QC4	-QC4-SP
QC6	-QC6-SP
QC8	-QC8-SP

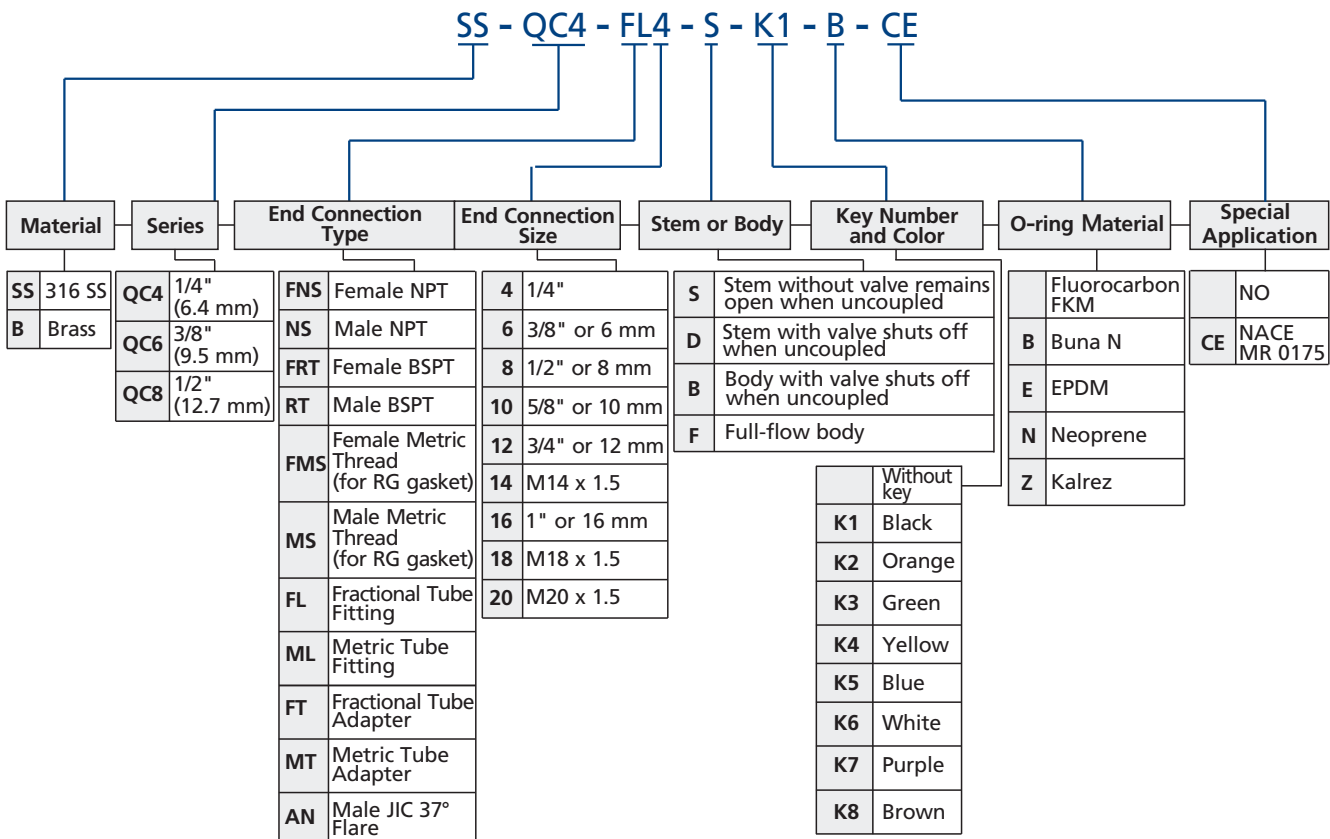
#### Body Protector



Series	Basic Ordering Number
QC4	-QC4-BP
QC6	-QC6-BP
QC8	-QC8-BP

- Ordering number description of the protector: Material designator (SS for stainless steel or B for brass) + Basic Ordering Number.  
Example: **SS-QC4-BP**
- Ordering number description of the keyed protector: Material designator (SS for stainless steel or B for brass) + Basic Ordering Number+Key  
Number from the table below.  
Example: **SS-QC4-BP-K2**
- The protector is not a pressure sustaining device. To order it, please contact FITOK Group or our authorized distributors.

## Ordering Number Description

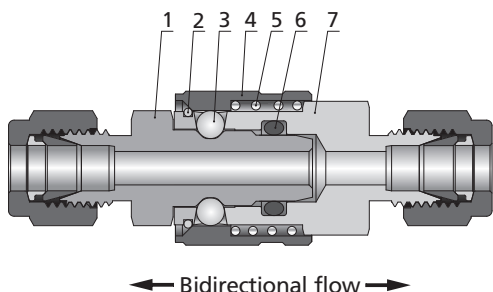


- Note: 1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.  
2. Dimensions are for reference only and are subject to change.

# QF Series

## Features

- ⦿ Working pressure up to: 6000 psig (414 bar)
- ⦿ Materials: stainless steel or brass
- ⦿ Full flow
- ⦿ Quick, easy operation
- ⦿ Smooth and open bores without valve on either end to minimize pressure drop and allow easy cleaning



## Standard Materials of Construction

Item	Component	Stainless Steel	Brass
		Material Grade/ASTM Standard	
1	Stem	316 SS/A479	Brass C36000/B16
2	Snap rings	316 SS/A313	
3	Locking balls	440C/A276	
4	Sliding sleeve	316L SS/A479	C36000/B16
5	Springs	316 SS/A313	
6	O-rings	Fluorocarbon FKM	Buna N
7	Body	316 SS/A479	Brass C36000/B16
8	Lubricants	Silicone-based	

## Insertion Depth

Series	Insertion Depth
	in. (mm)
QF4	0.78 (19.8)
QF8	0.81 (20.6)
QF12	0.90 (22.9)
QF16	0.94 (23.9)

In order to measure overall length in the coupled position, insertion depth should be deducted from any overall stem and body combination length.

## Pressure-Temperature Ratings

1. Pressure ratings may be limited by end connections.
2. Quick-connects in compliance with NACE MR0175 are subject to a lower pressure rating. For more information, please Contact FITOK Group or our authorized distributors.
3. Do not uncouple under pressure.

### QF4 Series and QF8 Series

Material	316 SS			Brass	
	Fluorocarbon FKM	Ethylene propylene	Perfluorocarbon FFKM	Buna N	
Series	QF4 and QF8			QF4	QF8
Temperature °F (°C)	Pressure Rating, psig (bar)				
Coupled					
-50 (-45)	—	6000 (413)	—	—	—
0 (-17)	6000 (413)	6000 (413)	6000 (413)	4000 (275)	3000 (206)
10 (-12)	6000 (413)	6000 (413)	6000 (413)	4000 (275)	3000 (206)
40 (4)	6000 (413)	6000 (413)	6000 (413)	4000 (275)	3000 (206)
100 (37)	6000 (413)	6000 (413)	6000 (413)	4000 (275)	3000 (206)
150 (65)	5000 (344)	4000 (275)	5000 (344)	2700 (186)	2000 (137)
200 (93)	4000 (275)	2700 (186)	4000 (275)	1400 (96.4)	1000 (68.9)
250 (121)	3000 (206)	1400 (96.4)	3000 (206)	300 (20.6)	300 (20.6)
300 (148)	2000 (137)	400 (27.5)	2000 (137)	—	—
350 (176)	1200 (82.6)	—	1200 (82.6)	—	—
400 (204)	400 (27.5)	—	400 (27.5)	—	—
500 (260)	—	—	200 (13.7)	—	—

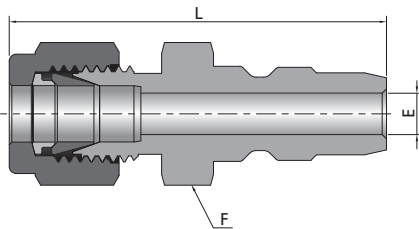
## QF12 Series and QF16 Series

Material	316 SS			Brass
O-Ring Material	Fluorocarbon FKM	Ethylene propylene	Perfluorocarbon FFKM	Buna N
Temperature °F (°C)	Pressure Rating, psig (bar)			
Coupled				
-50 (-45)	—	4000 (275)	—	—
0 (-17)	4000 (275)	4000 (275)	4000 (275)	2000 (137)
10 (-12)	4000 (275)	4000 (275)	4000 (275)	2000 (137)
40 (4)	4000 (275)	4000 (275)	4000 (275)	2000 (137)
100 (37)	4000 (275)	4000 (275)	4000 (275)	2000 (137)
150 (65)	3500 (241)	2000 (137)	3500 (241)	1300 (89.5)
200 (93)	2800 (192)	1300 (89.5)	2800 (192)	700 (48.2)
250 (121)	2100 (144)	700 (48.2)	2100 (144)	200 (13.7)
300 (148)	1400 (96.4)	200 (13.7)	1400 (96.4)	—
350 (176)	800 (55.1)	—	800 (55.1)	—
400 (204)	200 (13.7)	—	200 (13.7)	—
500 (260)	—	—	150 (10.3)	—

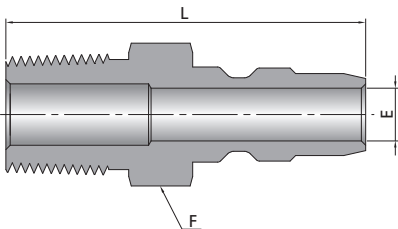
## Dimensions

## Stems

## Tube Fitting



## Male NPT

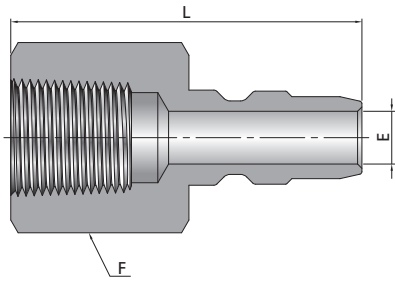


Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions		
			E	F	L
			in. (mm)	in.	in. (mm)
1/4	-QF4-FL4-S	2.2	0.19 (4.8)	9/16	1.77 (45.0)
3/8	-QF4-FL6-S	2.8	0.24 (6.1)	11/16	1.77 (45.0)
3/8	-QF8-FL6-S	2.8	0.28 (7.1)	7/8	1.88 (47.8)
1/2	-QF8-FL8-S	13.0	0.41 (10.4)	7/8	1.99 (50.5)
3/4	-QF12-FL12-S	26.0	0.62 (15.7)	1 1/16	2.15 (54.6)
1	-QF16-FL16-S	45.0	0.88 (22.4)	1 3/8	2.45 (62.2)
mm	—	—	(mm) in.	mm	(mm) in.
6	-QF4-ML6-S	2.2	4.8 (0.19)	15	45.0 (1.77)
10	-QF8-ML10-S	2.8	7.1 (0.28)	22	48.5 (1.91)
12	-QF8-ML12-S	13.0	9.5 (0.37)	22	51.3 (2.02)
20	-QF12-ML20-S	26.0	15.7 (0.62)	30	54.6 (2.15)
25	-QF16-ML25-S	45.0	22.4 (0.88)	36	63.5 (2.50)

NPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions		
			E	F	L
			in. (mm)	in.	in. (mm)
1/4	-QF4-NS4-S	1.7	0.24 (6.1)	9/16	1.59 (40.4)
3/8	-QF4-NS6-S	1.7	0.24 (6.1)	11/16	1.59 (40.4)
3/8	-QF8-NS6-S	7.1	0.41 (10.4)	7/8	1.65 (41.9)
1/2	-QF8-NS8-S	11.5	0.50 (12.7)	7/8	1.84 (46.7)
3/4	-QF12-NS12-S	23.6	0.72 (18.3)	1 1/16	2.03 (51.6)
1	-QF16-NS16-S	39.0	0.88 (22.4)	1 3/8	2.35 (59.7)

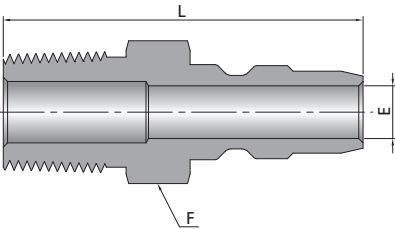
## Stems

### Female NPT



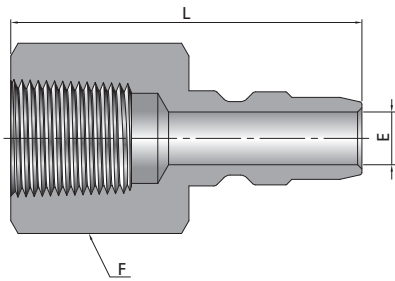
NPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions		
			E	F	L
			in. (mm)	in.	in. (mm)
1/4	-QF4-FNS4-S	1.7	0.24 (6.1)	3/4	1.60 (40.6)
3/8	-QF4-FNS6-S	1.7	0.24 (6.1)	7/8	1.67 (42.4)
3/8	-QF8-FNS6-S	7.1	0.41 (10.4)	1 1/16	1.59 (40.4)
1/2	-QF8-FNS8-S	11.5	0.50 (12.7)	1 1/16	1.82 (46.2)
3/4	-QF12-FNS12-S	23.6	0.72 (18.3)	1 5/16	2.08 (52.8)
1	-QF16-FNS16-S	39.0	0.88 (22.4)	1 5/8	2.49 (63.2)

### Male BSPT



BSPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions		
			E	F	L
			in. (mm)	in.	in. (mm)
1/4	-QF4-RT4-S	1.7	0.24 (6.1)	9/16	1.59 (40.4)
3/8	-QF4-RT6-S	1.7	0.24 (6.1)	11/16	1.59 (40.4)
3/8	-QF8-RT6-S	7.1	0.41 (10.4)	7/8	1.65 (41.9)
1/2	-QF8-RT8-S	11.5	0.50 (12.7)	7/8	1.84 (46.7)
3/4	-QF12-RT12-S	23.6	0.72 (18.3)	1 1/16	2.03 (51.6)
1	-QF16-RT16-S	39.0	0.88 (22.4)	1 3/8	2.35 (59.7)

### Female BSPT

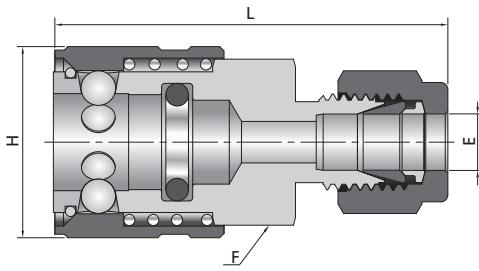


BSPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions		
			E	F	L
			in. (mm)	in.	in. (mm)
1/4	-QF4-FRT4-S	1.7	0.24 (6.1)	3/4	1.60 (40.6)
3/8	-QF4-FRT6-S	1.7	0.24 (6.1)	7/8	1.67 (42.4)
3/8	-QF8-FRT6-S	7.1	0.41 (10.4)	1 1/16	1.59 (40.4)
1/2	-QF8-FRT8-S	11.5	0.50 (12.7)	1 1/16	1.82 (46.2)
3/4	-QF12-FRT12-S	23.6	0.72 (18.3)	1 5/16	2.08 (52.8)
1	-QF16-FRT16-S	39.0	0.88 (22.4)	1 5/8	2.49 (63.2)

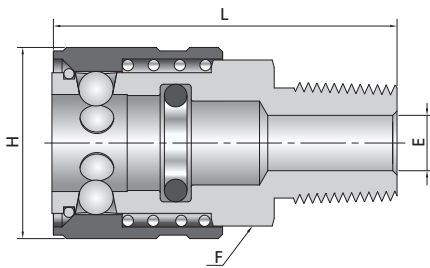


## Bodies

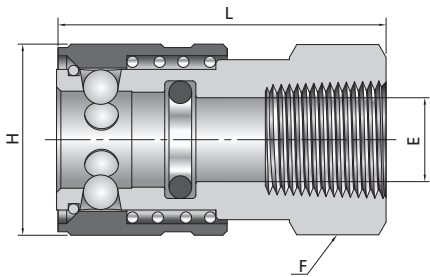
### Tube Fitting



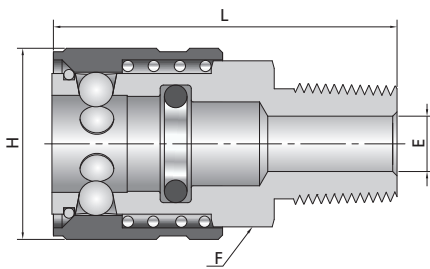
### Male NPT



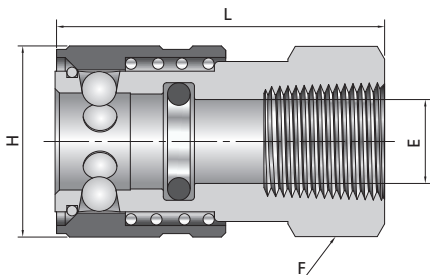
### Female NPT



### Male BSPT



### Female BSPT



Fitting Size in.	Basic Ordering Number	Dimensions			
		E in. (mm)	F in.	H in. (mm)	L in. (mm)
1/4	-QF4-FL4-B	0.19 (4.8)	11/16	0.87 (22.1)	1.80 (45.7)
3/8	-QF4-FL6-B	0.28 (7.1)	11/16	0.87 (22.1)	1.81 (46.0)
3/8	-QF8-FL6-B	0.28 (7.1)	1 1/16	1.30 (33.0)	2.17 (55.1)
1/2	-QF8-FL8-B	0.47 (11.9)	1 1/16	1.30 (33.0)	2.23 (56.6)
3/4	-QF12-FL12-B	0.62 (15.7)	1 1/2	1.66 (42.2)	2.45 (62.2)
1	-QF16-FL16-B	0.88 (22.4)	1 11/16	1.88 (47.8)	2.75 (69.9)
mm		(mm) in.	mm	(mm) in.	(mm) in.
6	-QF4-ML6-B	4.8 (0.19)	18	22.1 (0.87)	45.7 (1.80)
10	-QF8-ML10-B	7.1 (0.28)	27	33.0 (1.30)	55.9 (2.20)
12	-QF8-ML12-B	10.4 (0.41)	27	33.0 (1.30)	57.4 (2.26)
20	-QF12-ML20-B	15.9 (0.63)	38	42.2 (1.66)	63.5 (2.50)
25	-QF16-ML25-B	21.8 (0.86)	46	47.8 (1.88)	70.0 (2.76)

NPT Size in.	Basic Ordering Number	Dimensions			
		E in. (mm)	F in.	H in. (mm)	L in. (mm)
1/4	-QF4-NS4-B	0.25 (6.4)	11/16	0.87 (22.1)	1.57 (39.9)
3/8	-QF4-NS6-B	0.37 (9.4)	11/16	0.87 (22.1)	1.57 (39.9)
3/8	-QF8-NS6-B	0.41 (10.4)	1 1/16	1.30 (33.0)	1.83 (46.5)
1/2	-QF8-NS8-B	0.50 (12.7)	1 1/16	1.30 (33.0)	2.08 (52.8)
3/4	-QF12-NS12-B	0.72 (18.3)	1 1/2	1.66 (42.2)	2.33 (59.2)
1	-QF16-NS16-B	0.88 (22.4)	1 11/16	1.88 (47.8)	2.65 (67.3)

NPT Size in.	Basic Ordering Number	Dimensions			
		E in. (mm)	F in.	H in. (mm)	L in. (mm)
1/4	-QF4-FNS4-B	0.38 (9.7)	3/4	0.87 (22.1)	1.50 (38.1)
3/8	-QF4-FNS6-B	0.38 (9.7)	7/8	0.87 (22.1)	1.63 (41.4)
3/8	-QF8-FNS6-B	0.59 (15.0)	1 1/16	1.30 (33.0)	1.73 (43.9)
1/2	-QF8-FNS8-B	0.63 (16.0)	1 1/16	1.30 (33.0)	1.73 (43.9)
3/4	-QF12-FNS12-B	0.88 (22.4)	1 1/2	1.66 (42.2)	1.89 (48.0)
1	-QF16-FNS16-B	1.06 (26.9)	1 11/16	1.88 (47.8)	2.12 (53.8)

BSPT Size in.	Basic Ordering Number	Dimensions			
		E in. (mm)	F in.	H in. (mm)	L in. (mm)
1/4	-QF4-RT4-B	0.25 (6.4)	11/16	0.87 (22.1)	1.57 (39.9)
3/8	-QF4-RT6-B	0.37 (9.4)	11/16	0.87 (22.1)	1.57 (39.9)
3/8	-QF8-RT6-B	0.41 (10.4)	1 1/16	1.30 (33.0)	1.83 (46.5)
1/2	-QF8-RT8-B	0.50 (12.7)	1 1/16	1.30 (33.0)	2.08 (52.8)
3/4	-QF12-RT12-B	0.72 (18.3)	1 1/2	1.66 (42.2)	2.33 (59.2)
1	-QF16-RT16-B	0.88 (22.4)	1 11/16	1.88 (47.8)	2.65 (67.3)

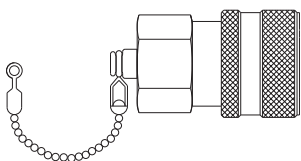
BSPT Size in.	Basic Ordering Number	Dimensions			
		E in. (mm)	F in.	H in. (mm)	L in. (mm)
1/4	-QF4-FRT4-B	0.38 (9.7)	3/4	0.87 (22.1)	1.50 (38.1)
3/8	-QF4-FRT6-B	0.38 (9.7)	7/8	0.87 (22.1)	1.63 (41.4)
3/8	-QF8-FRT6-B	0.59 (15.0)	1 1/16	1.30 (33.0)	1.73 (43.9)
1/2	-QF8-FRT8-B	0.63 (16.0)	1 1/16	1.30 (33.0)	1.73 (43.9)
3/4	-QF12-FRT12-B	0.88 (22.4)	1 1/2	1.66 (42.2)	1.89 (48.0)
1	-QF16-FRT16-B	1.06 (26.9)	1 11/16	1.88 (47.8)	2.12 (53.8)

## Options, QF Series

### Stem and Body Protector

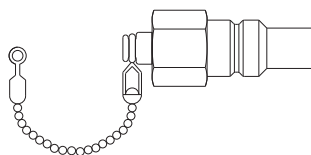
Stem and body protector can prevent the stem and the body from being damaged and polluted when uncoupling.

#### Stem Protector



Series	Basic Ordering Number
QF4	-QF4-SP
QF8	-QF8-SP
QF12	-QF12-SP
QF16	-QF16-SP

#### Body Protector

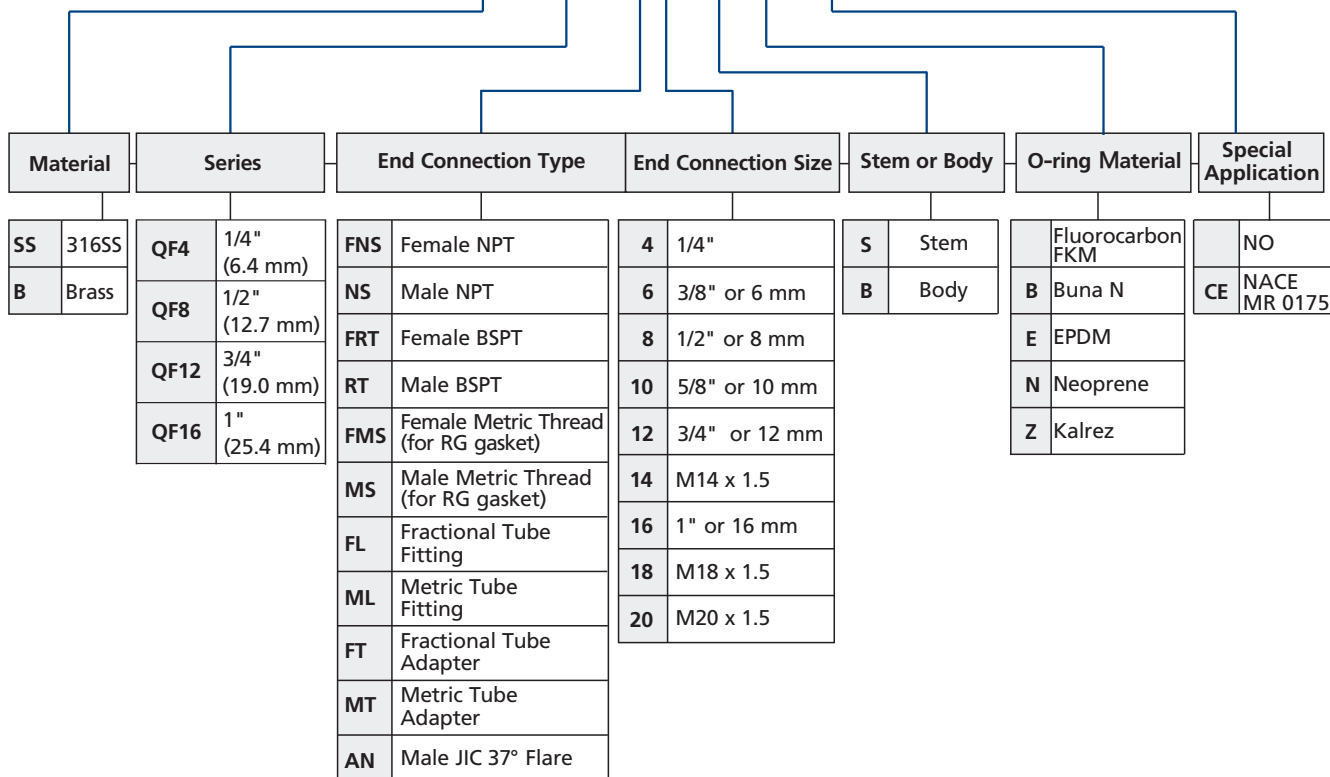


Series	Basic Ordering Number
QF4	-QF4-BP
QF8	-QF8-BP
QF12	-QF12-BP
QF16	-QF16-BP

- Ordering number description of the protector: Material designator (SS for stainless steel or B for brass) + Basic Ordering Number.  
Example: **SS-QF4-BP**
- The protector is not a pressure sustaining device. To order it, please contact FITOK Group or our authorized distributors.

## Ordering Number Description

**SS - QF4 - FL4 - S - B - CE**

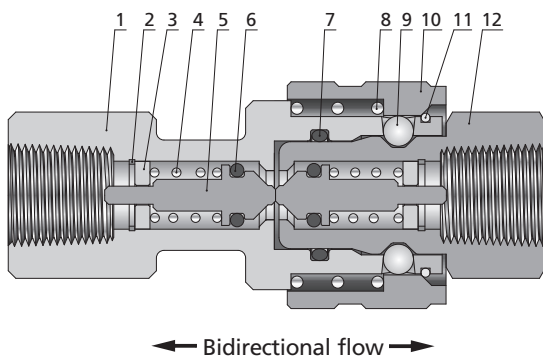


Note: 1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.  
2. Dimensions are for reference only and are subject to change.

# QV Series

## Features

- ⦿ Working pressure up to: 2000 psig (137 bar)
- ⦿ Large flow area to ensure high flow capacity
- ⦿ Positive valve stop to maintain valve alignment and to provide metal to metal valve stop to ensure that the valves are fully open
- ⦿ Hardened nipples and sleeves as well as solid barstock construction to make for a quality coupling with maximum resistance to damage from hydraulic and mechanical shock
- ⦿ Designed to withstand high pressure with reliable sealing
- ⦿ Durable ball-locking mechanism to assure reliable connection



## Standard Materials of Construction

Item	Component	Stainless Steel	Brass
		Material Grade/ASTM Standard	
1	Body	316 SS/A479	C36000/B16
2	Locating ring	304 SS	
3	Locating block	316 SS/A276	Brass C36000/B16
4	Springs	316 SS/A313	
5	Valve Stem	316 SS/A479	C36000/B16
6	O-rings	Fluorocarbon FKM	Buna N
8	Springs	316 SS/A313	
9	Locking balls	440C/A276	
10	Body sleeve	316L SS/A479	Brass C36000/B16
11	Snap rings	316 SS/A313	
12	Stem	316 SS/A479	C36000/B16
13	Lubricants	Silicone-based	

## Pressure-Temperature Ratings

Do not couple or uncouple under pressure.

Body Material	Stainless Steel						Brass					
	Series	QV2	QV4	QV6	QV8	QV12	QV16	QV2	QV4	QV6	QV8	QV12
O-ring	FKM						Buna N					
Temperature Range	-10°F to 400°F (-23°C to 204°C)						-10°F to 250°F (-23°C to 121°C)					
Working Pressure psig (bar)	2000 (137)		1500 (103)		1000 (69.0)		1000 (69.0)					

## Insertion Depth

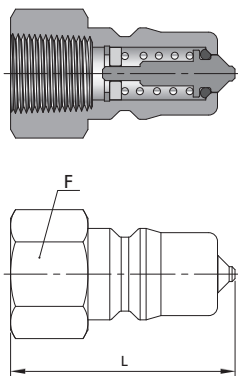
Series	Insertion Depth
	in. (mm)
QV2	0.81 (20.5)
QV4	0.98 (25)
QV6	1.17 (29.7)
QV8	1.26 (32)
QV12	1.64 (41.6)
QV16	1.93 (49.1)

In order to measure overall length in the coupled position, the insertion depth should be deducted from any overall stem and body combination length.

## Dimensions

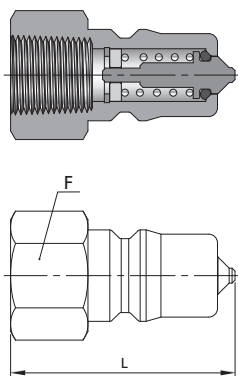
### Stems

#### Female NPT



NPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L in. (mm)	F in.
1/8	-QV2-FNS2-D	0.2	1.16 (29.5)	9/16
1/4	-QV4-FNS4-D	0.6	1.39 (35.3)	3/4
3/8	-QV6-FNS6-D	1.2	1.50 (38.1)	7/8
1/2	-QV8-FNS8-D	2.6	1.75 (44.5)	1 1/8
3/4	-QV12-FNS12-D	3.3	2.16 (54.9)	1 3/8
1	-QV16-FNS16-D	6.2	2.91 (73.9)	1 5/8

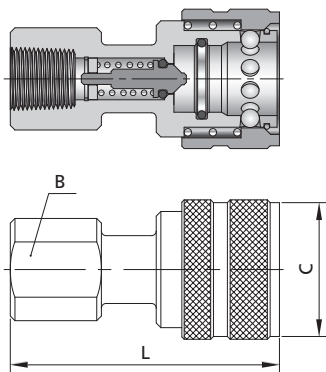
#### Female BSPT



BSPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L in. (mm)	F in.
1/8	-QV2-FRT2-D	0.2	1.16 (29.5)	9/16
1/4	-QV4-FRT4-D	0.6	1.39 (35.3)	3/4
3/8	-QV6-FRT6-D	1.2	1.50 (38.1)	7/8
1/2	-QV8-FRT8-D	2.6	1.75 (44.5)	1 1/8
3/4	-QV12-FRT12-D	3.3	2.16 (54.9)	1 3/8
1	-QV16-FRT16-D	6.2	2.91 (73.9)	1 5/8

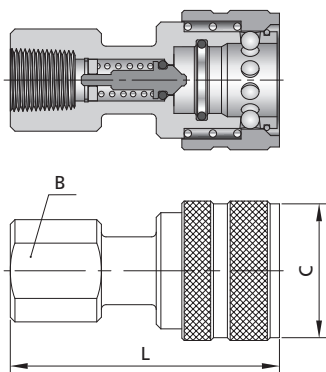
### Bodies

#### Female NPT



NPT Size in.	Basic Ordering Number	Dimensions		
		L in. (mm)	B in. (mm)	C in. (mm)
1/8	-QV2-FNS2-B	1.90 (48.3)	0.63 (15.9)	0.96 (24.4)
1/4	-QV4-FNS4-B	2.26 (57.4)	0.81 (20.6)	1.14 (29.0)
3/8	-QV6-FNS6-B	2.49 (63.2)	0.88 (22.2)	1.40 (35.6)
1/2	-QV8-FNS8-B	2.87 (72.9)	1.13 (28.6)	1.77 (45.0)
3/4	-QV12-FNS12-B	3.56 (90.4)	1.31 (33.3)	2.14 (54.4)
1	-QV16-FNS16-B	4.18 (106.2)	1.63 (41.3)	2.52 (64.0)

#### Female BSPT



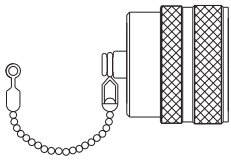
BSPT Size in.	Basic Ordering Number	Dimensions		
		L in. (mm)	B in. (mm)	C in. (mm)
1/8	-QV2-FRT2-B	1.90 (48.3)	0.69 (17.5)	0.96 (24.4)
1/4	-QV4-FRT4-B	2.26 (57.4)	0.81 (20.6)	1.14 (29.0)
3/8	-QV6-FRT6-B	2.49 (63.2)	0.88 (22.2)	1.40 (35.6)
1/2	-QV8-FRT8-B	2.87 (72.9)	1.13 (28.6)	1.77 (45.0)
3/4	-QV12-FRT12-B	3.56 (90.4)	1.31 (33.3)	2.14 (54.4)
1	-QV16-FRT16-B	4.18 (106.2)	1.63 (41.3)	2.52 (64.0)

## Options, QV Series

### Stem and Body Protector

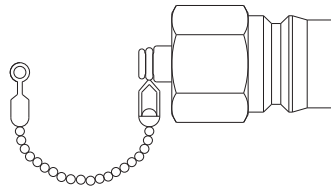
Stem and body protector can prevent the stem and the body from being damaged and polluted when uncoupling.

#### Stem Protector



Series	Basic Ordering Number
QV2	-QV2-SP
QV4	-QV4-SP
QV6	-QV6-SP
QV8	-QV8-SP
QV12	-QV12-SP
QV16	-QV16-SP

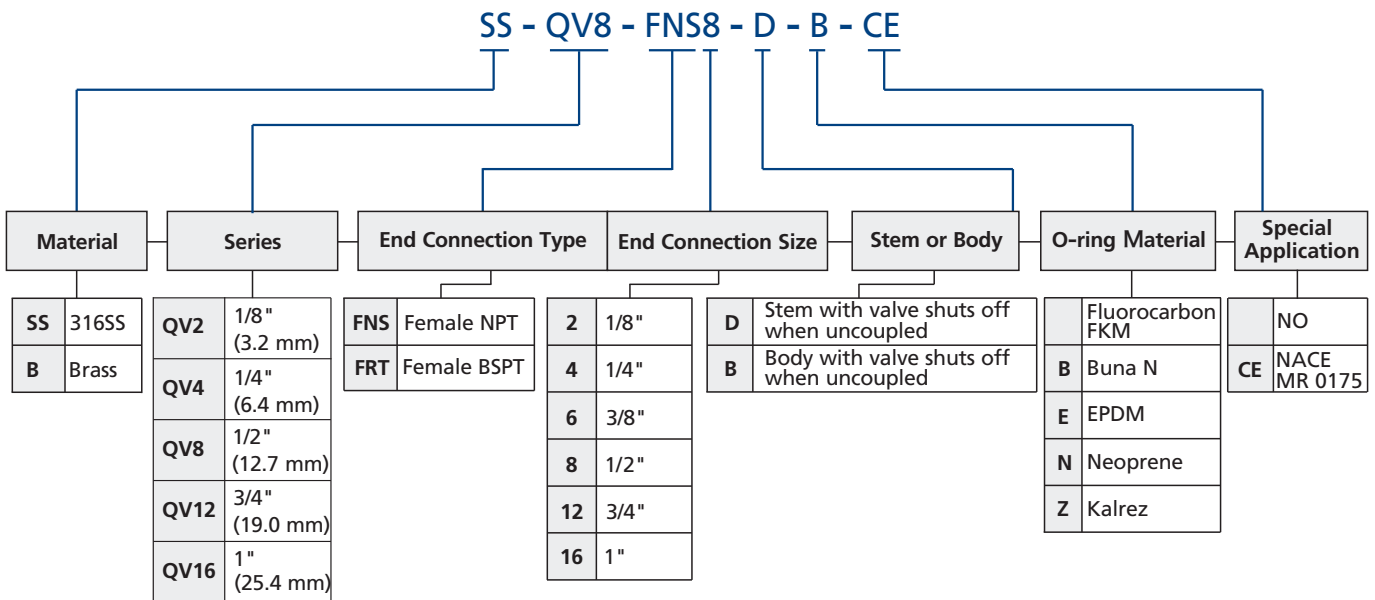
#### Body Protector



Series	Basic Ordering Number
QV2	-QV2-BP
QV4	-QV4-BP
QV6	-QV6-BP
QV8	-QV8-BP
QV12	-QV12-BP
QV16	-QV16-BP

- Ordering number description of the protector: Material designator (SS for stainless steel or B for brass) + Basic Ordering Number.  
Example: **SS-QV4-BP**
- The protector is not a pressure sustaining device. To order it, please contact FITOK Group or our authorized distributors.

## Ordering Number Description



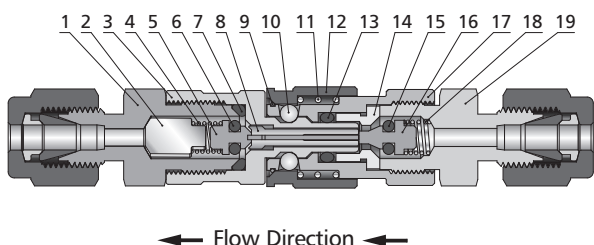
- Note: 1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.  
2. Dimensions are for reference only and are subject to change.

# QM Series

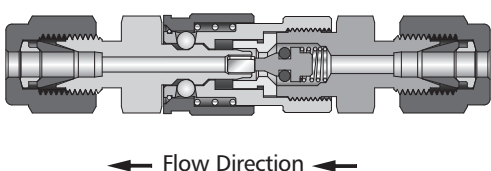
## Features

- ⦿ Working pressure up to: 4000 psig (276 bar)
- ⦿ Single-end shutoff, double-end shutoff and full-flow model available
- ⦿ Quick and easy operation

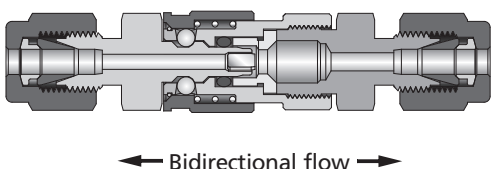
### Double-end Shutoff (DESO)



### Single-end Shutoff (SESO)



### Full-flow Quick-connects



## Insertion Depth

In order to measure overall length in the coupled position, insertion depth should be deducted from any overall stem and body combination length.

Depth in. (mm)	
SESO	DESO
0.47 (11.9)	0.53 (13.5)

## Spillage and Air Inclusion

0.1cm<sup>3</sup>  
(DESO only)

## Standard Materials of Construction

Item.	Component	Material Grade/ASTM Standard	
		Stainless Steel	Brass
1	Stem body	316 SS/A479	Brass C36000/B16
2	Valve block	316 SS/A240	Brass C26000/B36
3	Stem	316 SS/A479	Brass C36000/B16
4	Springs	316 SS/A313	
5	Valve head	316 SS/A479	Brass C36000/B16
6	O-rings	Fluorocarbon FKM	Buna N
7			
8	Stem insert	316 SS/A240	Brass C26000/B36
9	Snap rings	316 SS/A313	
10	Steel ball	440C/A276	
11	Springs	316 SS/A313	
12	Body sleeve	316L SS/A479	Brass C36000/B16
13	O-rings	Fluorocarbon FKM	Buna N
14	Insert	316 SS/A479	Brass C36000/B16
15	O-rings	Fluorocarbon FKM	Buna N
16	Valve head	316 SS/A479	Brass C36000/B16
17	housing	316 SS/A479	Brass C36000/B16
18	Springs	316 SS/A313	
19	Body	316 SS/A479	Brass C36000/B16
20	Lubricants	Silicone-based	

## Pressure -Temperature Ratings

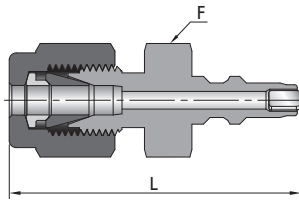
Pressure rating restrictions apply when coupling and uncoupling (DESO only). Refer to the table below for specific data.

Material	316 SS			Brass
	Fluorocarbon FKM	Ethylene propylene	Perfluorocarbon FFKM	Buna N
O-Ring Material				
Temperature °F (°C)	Pressure Rating, psig (bar)			
	<b>Coupled</b>			
-50 (-45)	—	4000 (275)	—	—
0 (-17)	4000 (275)	4000 (275)	4000 (275)	2000 (137)
10 (-12)	4000 (275)	4000 (275)	4000 (275)	2000 (137)
40 (4)	4000 (275)	4000 (275)	4000 (275)	2000 (137)
100 (37)	4000 (275)	4000 (275)	4000 (275)	2000 (137)
150 (65)	3500 (241)	3500 (241)	3500 (241)	1300 (89.5)
200 (93)	2800 (192)	2800 (192)	2800 (192)	700 (48)
250 (121)	2100 (144)	2100 (144)	2100 (144)	200 (13.7)
300 (148)	1400 (96.4)	1400 (96.4)	1400 (96.4)	—
350 (176)	800 (55.1)	—	800 (55.1)	—
400 (204)	200 (13.7)	—	200 (13.7)	—
500 (260)	—	—	150 (10.3)	—
	<b>Uncoupled and When Coupling and Uncoupling</b>			
70 (20)	100 (6.8)			

## Dimensions

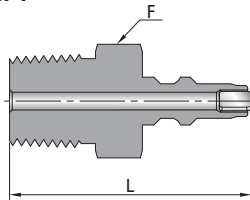
### SESO Stems

#### Tube Fitting



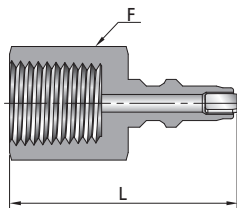
Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L	F
			in. (mm)	in.
1/16	QM-FL1-S	0.06	1.18 (30.0)	7/16
1/8	QM-FL2-S		1.29 (32.8)	

#### Male NPT



NPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L	F
			in. (mm)	in.
1/16	QM-NS1-S	0.06	1.03 (26.2)	7/16
1/8	QM-NS2-S			

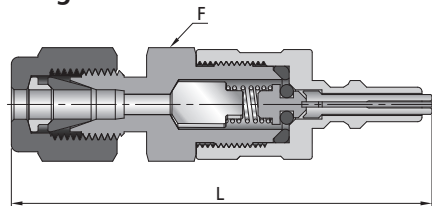
#### Female NPT



NPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L	F
			in. (mm)	in.
1/16	QM-FNS1-S	0.06	1.03 (26.2)	7/16
1/8	QM-FNS2-S		1.18 (30.0)	9/16

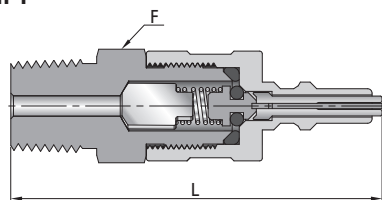
### DESO Stems

#### Tube Fitting



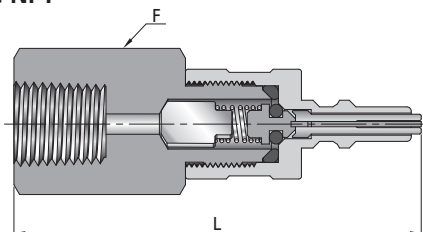
Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L	F
			in. (mm)	in.
1/16	QM-FL1-D	0.05	1.76 (44.7)	7/16
1/8	QM-FL2-D		1.87 (47.5)	

#### Male NPT



NPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L	F
			in. (mm)	in.
1/16	QM-NS1-D	0.05	1.61 (40.9)	7/16
1/8	QM-NS2-D			

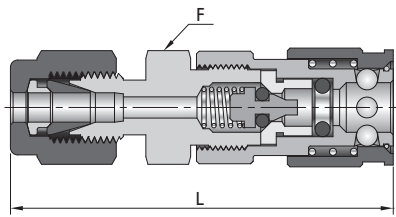
#### Female NPT



NPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L	F
			in. (mm)	in.
1/16	QM-FNS1-D	0.05	1.61 (40.9)	7/16
1/8	QM-FNS2-D		1.81 (46.0)	9/16

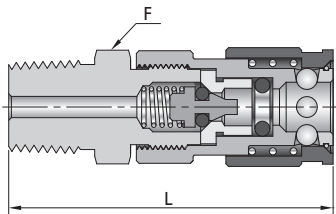
## Bodies

### Tube Fitting



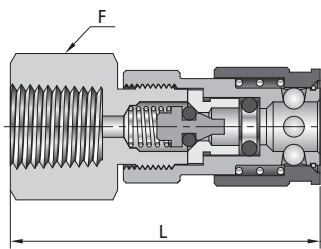
Fitting Size in.	Basic Ordering Number	Dimensions	
		L in. (mm)	F in.
1/16	QM-FL1-B	1.50 (38.1)	7/16
1/8	QM-FL2-B	1.70 (43.2)	

### Male NPT



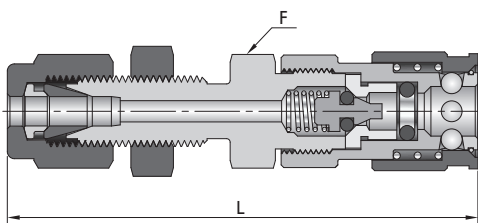
NPT Size in.	Basic Ordering Number	Dimensions	
		L in. (mm)	F in.
1/16	QM-NS1-B	1.42 (36.1)	7/16
1/8	QM-NS2-B	1.44 (36.6)	

### Female NPT



NPT Size in.	Basic Ordering Number	Dimensions	
		L in. (mm)	F in.
1/16	QM-FNS1-B	1.43 (36.3)	7/16
1/8	QM-FNS2-B	1.62 (41.1)	9/16

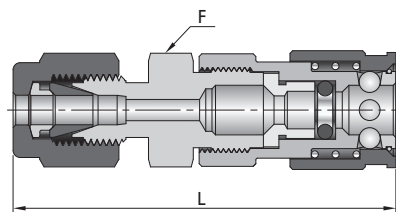
### Bulkhead Tube Fitting



Fitting Size in.	Basic Ordering Number	Dimensions		Min. Panel Hole in. (mm)	Max. Panel Thickness in. (mm)
		A in. (mm)	F in.		
1/8	QM-BFL2-B	2.09 (53.1)	7/16	0.33 (8.3)	0.25 (6.4)

## Full-flow Bodies

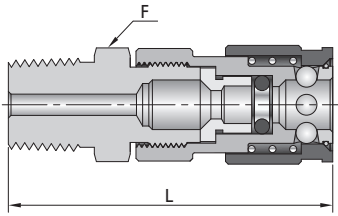
### Tube Fitting



Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L in. (mm)	F in.
1/16	QM-FL1-F	0.06	1.50 (38.1)	7/16
1/8	QM-FL2-F		1.70 (43.2)	

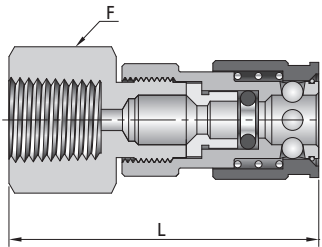


Male NPT



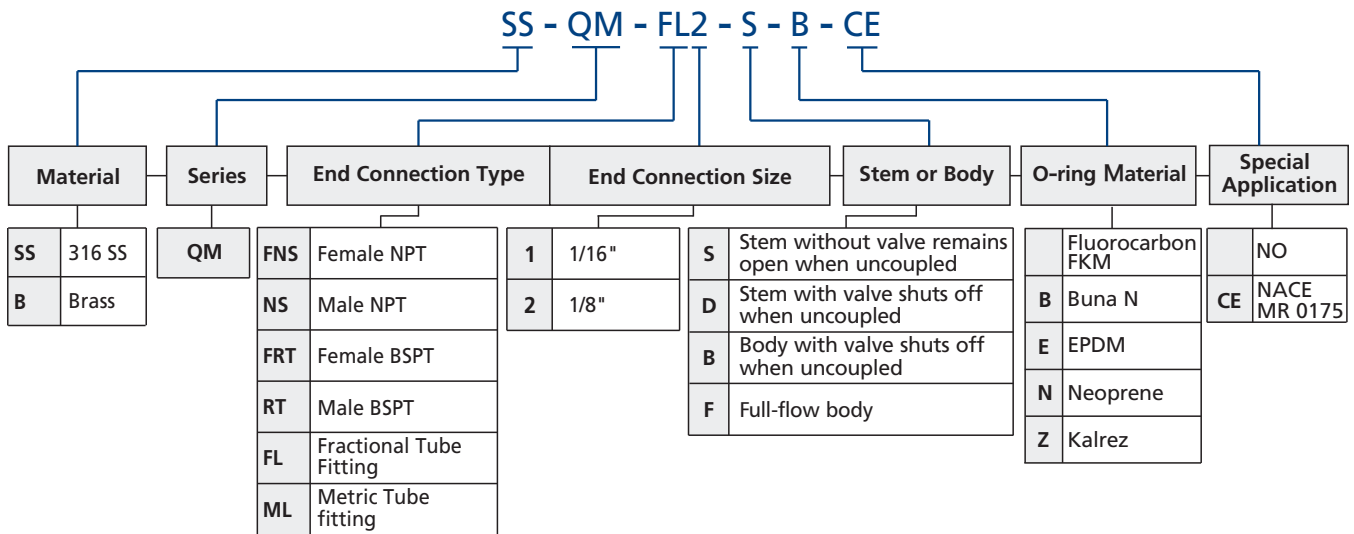
Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L	F
			in. (mm)	in.
1/16	QM-NS1-F	0.06	1.42 (36.1)	7/16
1/8	QM-NS2-F		1.44 (36.6)	

Female NPT



NPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L	F
			in. (mm)	in.
1/16	QM-FNS1-F	0.06	1.43 (36.3)	7/16
1/8	QM-FNS2-F		1.62 (41.1)	9/16

Ordering Number Description



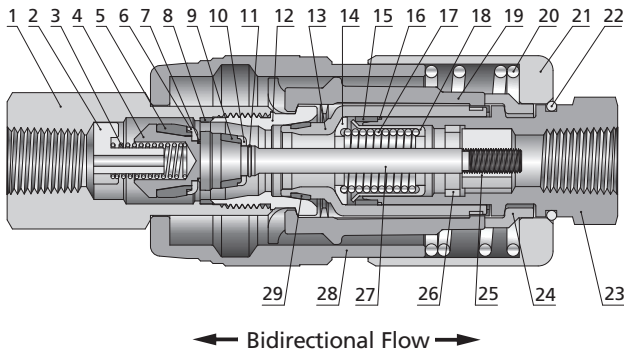
Note: 1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.  
 2. Dimensions are for reference only and are subject to change.

# QTM Series

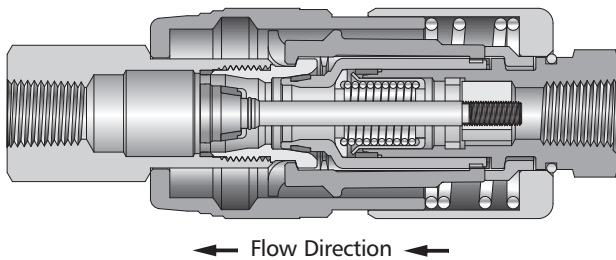
## Features

- Working pressure up to: 4500 psig (310 bar)
- Special design to reduce air inclusion and spillage
- PTFE sealing to enable applications for diverse media types
- Push-to-connect design to enable quick and easy operation
- Locking mechanism with large contact area to ensure reliable stem retention

## Double-end Shutoff (DESO)



## Single-end Shutoff (SESO)



## Pressure - Temperature Ratings

Temperature °F (°C)	316 SS			Alloy 400
	QTM2	QTM4	QTM8	QTM2
<b>Pressure Rating, psig (bar)</b>				
<b>Coupled</b>				
0~120 (-17~48)	4500 (310)	3200 (220)	3200 (220)	3200 (220)
<b>Uncoupled</b>				
0~120 (-17~48)	1000 (68.9)			
<b>When Coupling and Uncoupling</b>				
70 (20)	250 (17.2)	100 (6.8)	50 (3.4)	250 (17.2)

Note: Pressure ratings may be restricted by end connections.

## Standard Materials of Construction

Item	Component	Material	
1	Stem	316 SS/A479	Alloy 400/B164
2	Spring seat	316 SS/A479	Alloy 400/B164
3	Spring	316 SS/313	Alloy X-750/AMS 5699
4	DESO valve	316 SS/A479	Alloy 400/B164
5	DESO seal ring	PTFE/D1710	PTFE/D1710
6	DESO stem fin	316 SS/A479	Alloy 400/B164
7	Roundwire snap ring for shaft	316 SS/A313	Alloy X-750/AMS 5699
8	Adapter seal gasket	PTFE/D1710	PTFE/D1710
9	Body valve seal ring	PTFE/D1710	PTFE/D1710
10	Body fin	316 SS/A479	Alloy 400/B164
11	Roundwire snap ring for shaft	316 SS/A313	Alloy X-750/AMS 5699
12	Stem adapter	316 SS/A479	Alloy 400/B164
13	Body sliding sleeve	316 SS/A479	Alloy 400/B164
14	Spring pad	316 SS/A479	Alloy 400/B164
15	Body packing ring	PTFE/D1710	PTFE/D1710
16	Packing backup ring	PTFE/D1710	PTFE/D1710
17	Spring	Elgiloy Alloy	Elgiloy Alloy
18	Body insert	316 SS/A479	Alloy 400/B164
19	Sliding hooks with spring ring	316 SS/A479	Alloy 400/B164
20	Spring	316 SS/A313	Alloy X-750/AMS 5699
21	Body valve cap 2	316 SS/A479	Alloy 400/B164
22	Roundwire snap rings for shaft	316 SS/A313	Alloy X-750/AMS 5699
23	Body	Xylan-coated 316 SS/A479	Xylan-coated alloy 400/B164
24	Locking block	316 SS/A479	Alloy 400/B164
25	Threaded connecting ring	316 SS/A479	Alloy 400/B164
26	Retaining ring	316 SS/A313	Alloy X-750/AMS 5699
27	Body bolt	316 SS/A479	Alloy 400/B164
28	Body valve cap 1	316 SS/A479	Alloy 400/B164
29	Body valve seal ring	PTFE/D1710	PTFE/D1710
30	Lubricants	PTFE-based	PTFE-based

## Spillage and Air Inclusion

DESO only

Series	Spillage cm <sup>3</sup>	Air Inclusion cm <sup>3</sup>
QTM2	0.1	0.1
QTM4	0.2	0.4
QTM8	1.0	2.0

## Insertion Depth

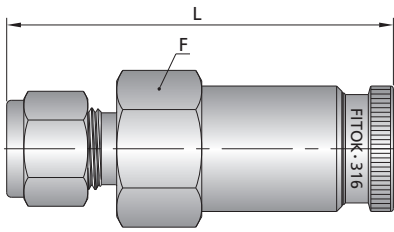
Series	Depth in. (mm)
QTM2	1.26 (32.1)
QTM4	0.95 (24.0)
QTM8	1.15 (29.1)

In order to measure overall length in the coupled position, insertion depth should be deducted from any overall stem and body combination length.

## Dimensions

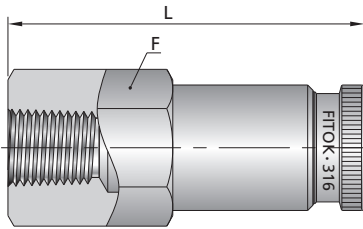
### DESO Stems

#### Tube Fitting



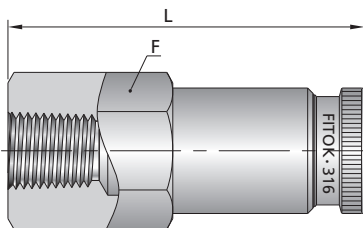
Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L in. (mm)	F in.
1/4	-QTM2-FL4-D	0.6	2.02 (51.3)	5/8
1/4	-QTM4-FL4-D	0.8	2.61 (66.3)	15/16
3/8	-QTM2-FL6-D	0.8	2.08 (52.8)	11/16
3/8	-QTM4-FL6-D	1.6	2.67 (67.8)	15/16
1/2	-QTM8-FL8-D	3.1	3.06 (77.7)	1 5/16
3/4	-QTM8-FL12-D	6.5	3.06 (77.7)	1 5/16
1	-QTM8-FL16-D	7.8	3.27 (83.1)	1 3/8
mm			mm (in.)	mm
6	-QTM2-ML6-D	0.6	51.3 (2.02)	16
6	-QTM4-ML6-D	0.8	66.3 (2.61)	24
8	-QTM2-ML8-D	0.8	53.1 (2.09)	11/16 in.
10	-QTM4-ML10-D	1.6	68.1 (2.68)	24
12	-QTM8-ML12-D	3.1	77.7 (3.06)	35

#### Female NPT



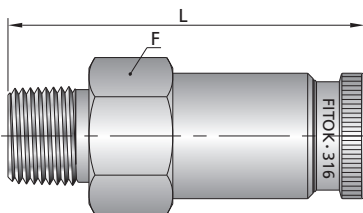
NPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L in. (mm)	F in.
1/8	-QTM2-FNS2-D	0.7	1.73 (43.9)	5/8
1/4	-QTM2-FNS4-D	0.7	2.04 (51.8)	3/4
1/4	-QTM4-FNS4-D	1.4	2.36 (59.9)	15/16
3/8	-QTM2-FNS6-D	0.6	2.14 (54.4)	7/8
3/8	-QTM4-FNS6-D	1.7	2.48 (63.0)	15/16
1/2	-QTM8-FNS8-D	4.4	2.66 (67.6)	1 5/16
3/4	-QTM8-FNS12-D	7.8	2.66 (67.6)	1 5/16
1	-QTM8-FNS16-D	—	3.17 (80.5)	1 5/8

#### Female BSPT



BSPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L in. (mm)	F in.
1/8	-QTM2-FRT2-D	0.7	1.73 (43.9)	5/8
1/4	-QTM2-FRT4-D	0.7	2.04 (51.8)	3/4
1/4	-QTM4-FRT4-D	1.4	2.36 (59.9)	15/16
3/8	-QTM2-FRT6-D	0.6	2.14 (54.4)	7/8
3/8	-QTM4-FRT6-D	1.7	2.48 (63.0)	15/16
1/2	-QTM8-FRT8-D	4.4	2.66 (67.6)	1 5/16
3/4	-QTM8-FRT12-D	7.8	2.66 (67.6)	1 5/16
1	-QTM8-FRT16-D	—	3.17 (80.5)	1 5/8

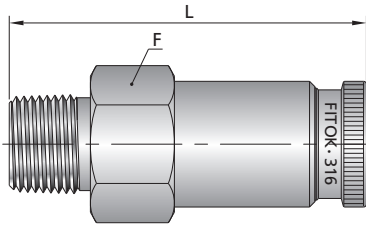
#### Male NPT



NPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L in. (mm)	F in.
1/4	-QTM2-NS4-D	0.2	1.91 (48.5)	5/8
1/4	-QTM4-NS4-D	1.4	2.46 (62.5)	15/16
3/8	-QTM2-NS6-D	0.6	2.04 (51.8)	3/4
3/8	-QTM4-NS6-D	1.7	2.46 (62.5)	15/16
1/2	-QTM8-NS8-D	4.4	2.78 (70.6)	1 5/16
3/4	-QTM8-NS12-D	7.8	2.78 (70.6)	1 5/16
1	-QTM8-NS16-D	—	3.03 (77.0)	1 3/8

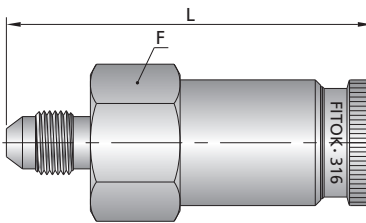
## D-50 Quick-connects

### Male BSPT



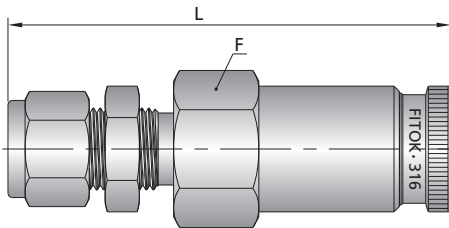
BSPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L	F
			in. (mm)	in.
1/4	-QTM2-RT4-D	0.2	1.91 (48.5)	5/8
1/4	-QTM4-RT4-D	1.4	2.46 (62.5)	15/16
3/8	-QTM2-RT6-D	0.6	2.04 (51.8)	3/4
3/8	-QTM4-RT6-D	1.7	2.46 (62.5)	15/16
1/2	-QTM8-RT8-D	4.4	2.78 (70.6)	1 5/16
3/4	-QTM8-RT12-D	7.8	2.78 (70.6)	1 5/16
1	-QTM8-RT16-D	—	3.03 (77.0)	1 3/8

### Male JIC (AN) 37° Flare



Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L	F
			in. (mm)	in.
1/4	-QTM4-AN4-D	—	2.52 (64.0)	15/16
1/2	-QTM8-AN8-D	2.7	2.46 (70.6)	1 5/16

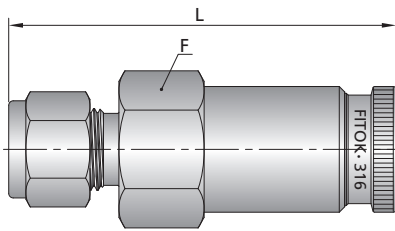
### Bulkhead Tube Fitting



Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions		Min. Panel Orifice in. (mm)	Max. Panel Thickness in. (mm)
			L	F		
			in. (mm)	in.		
1/4	-QTM4-BFL4-D	0.8	3.05 (77.5)	15/16	0.46 (11.7)	0.15 (3.8)
3/8	-QTM4-BFL6-D	1.6	3.05 (77.5)	15/16	0.58 (14.7)	0.15 (3.8)
1/2	-QTM8-BFL8-D	3.1	3.54 (89.9)	1 5/16	0.77 (19.6)	0.19 (4.8)
mm	—	—	mm (in.)	mm	mm (in.)	mm (in.)
6	-QTM4-BML6-D	0.8	77.5 (3.05)	24	11.7 (0.46)	3.8 (0.15)
10	-QTM4-BML10-D	1.6	77.7 (3.06)	24	16.8 (0.66)	3.8 (0.15)
12	-QTM8-BML12-D	3.1	89.9 (3.54)	35	19.6 (0.77)	4.8 (0.19)

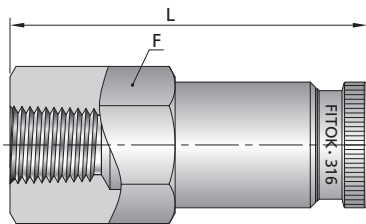
## SESO Stem

### Tube Fitting



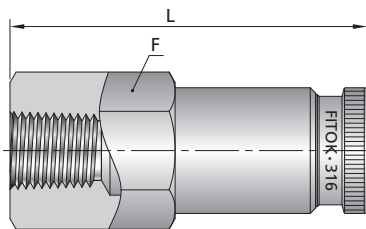
Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L in. (mm)	F in.
1/4	-QTM2-FL4-S	0.7	2.02 (51.3)	5/8
1/4	-QTM4-FL4-S	0.9	2.61 (66.3)	15/16
3/8	-QTM2-FL6-S	0.9	2.08 (52.8)	11/16
3/8	-QTM4-FL6-S	1.7	2.67 (67.8)	15/16
1/2	-QTM8-FL8-S	4.2	3.06 (77.7)	1 5/16
3/4	-QTM8-FL12-S	6.7	3.06 (77.7)	1 5/16
1	-QTM8-FL16-S	9.0	3.27 (83.1)	1 3/8
6	-QTM2-ML6-S	0.7	51.3 (2.02)	16
6	-QTM4-ML6-S	0.9	66.3 (2.61)	24
8	-QTM2-ML8-S	0.9	53.1 (2.09)	11/16 in.
10	-QTM4-ML10-S	1.7	68.1 (2.68)	24
12	-QTM8-ML12-S	4.2	77.7 (3.06)	35

### Female NPT



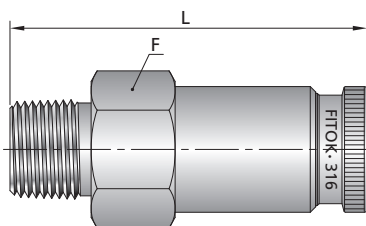
NPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L in. (mm)	F in.
1/8	-QTM2-FNS2-S	0.7	1.73 (43.9)	5/8
1/4	-QTM2-FNS4-S	0.7	2.04 (51.8)	3/4
1/4	-QTM4-FNS4-S	1.4	2.36 (59.9)	15/16
3/8	-QTM2-FNS6-S	0.7	2.14 (54.4)	7/8
3/8	-QTM4-FNS6-S	1.8	2.48 (63.0)	15/16
1/2	-QTM8-FNS8-S	5.1	2.66 (67.6)	1 5/16
3/4	-QTM8-FNS12-S	8.5	2.66 (67.6)	1 5/16
1	-QTM8-FNS16-S	—	3.17 (80.5)	1 5/8

### Female BSPT



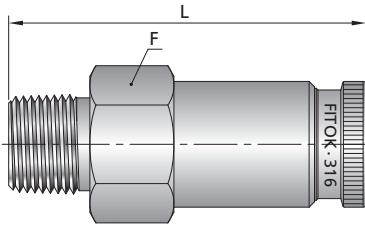
BSPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L in. (mm)	F in.
1/8	-QTM2-FRT2-S	0.7	1.73 (43.9)	5/8
1/4	-QTM2-FRT4-S	0.7	2.04 (51.8)	3/4
1/4	-QTM4-FRT4-S	1.4	2.36 (59.9)	15/16
3/8	-QTM2-FRT6-S	0.7	2.14 (54.4)	7/8
3/8	-QTM4-FRT6-S	1.8	2.48 (63.0)	15/16
1/2	-QTM8-FRT8-S	5.1	2.66 (67.6)	1 5/16
3/4	-QTM8-FRT12-S	8.5	2.66 (67.6)	1 5/16
1	-QTM8-FRT16-S	—	3.17 (80.5)	1 5/8

### Male NPT



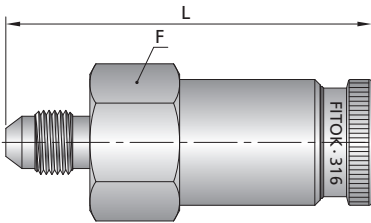
NPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L in. (mm)	F in.
1/4	-QTM2-NS4-S	0.2	1.91 (48.5)	5/8
1/4	-QTM4-NS4-S	1.4	2.46 (62.5)	15/16
3/8	-QTM2-NS6-S	0.7	2.04 (51.8)	3/4
3/8	-QTM4-NS6-S	1.8	2.46 (62.5)	15/16
1/2	-QTM8-NS8-S	5.1	2.78 (70.6)	1 5/16
3/4	-QTM8-NS12-S	8.5	2.78 (70.6)	1 5/16
1	-QTM8-NS16-S	—	3.03 (77.0)	1 3/8

**Male BSPT**



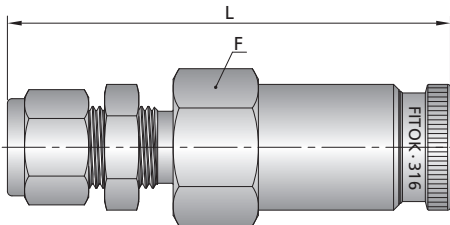
BSPT Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L	F
			in. (mm)	in.
1/4	-QTM2-RT4-S	0.2	1.91 (48.5)	5/8
1/4	-QTM4-RT4-S	1.4	2.46 (62.5)	15/16
3/8	-QTM2-RT6-S	0.7	2.04 (51.8)	3/4
3/8	-QTM4-RT6-S	1.8	2.46 (62.5)	15/16
1/2	-QTM8-RT8-S	5.1	2.78 (70.6)	1 5/16
3/4	-QTM8-RT12-S	8.5	2.78 (70.6)	1 5/16
1	-QTM8-RT16-S	—	3.03 (77.0)	1 3/8

**Male JIC(AN) 37° Flare**



Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions	
			L	F
			in. (mm)	in.
1/4	-QTM4-AN4-S	—	2.52 (64.0)	15/16
1/2	-QTM8-AN8-S	4.2	2.46 (70.6)	1 5/16

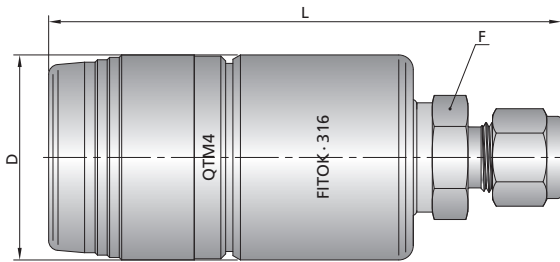
**Bulkhead Tube Fitting**



Fitting Size in.	Basic Ordering Number	Flow Coefficient (Cv)	Dimensions		Min. Panel Orifice in. (mm)	Max. Panel Thickness in. (mm)
			L	F		
			in. (mm)	in.		
1/4	-QTM4-BFL4-S	0.9	3.05 (77.5)	15/16	0.46 (11.7)	0.15 (3.8)
3/8	-QTM4-BFL6-S	1.7	3.05 (77.5)	15/16	0.58 (14.7)	0.15 (3.8)
1/2	-QTM8-BFL8-S	4.2	3.54 (89.9)	1 5/16	0.77 (19.6)	0.19 (4.8)
mm	—	—	mm (in.)	mm	mm (in.)	mm (in.)
6	-QTM4-BML6-S	0.9	77.5 (3.05)	24	11.7 (0.46)	3.8 (0.15)
10	-QTM4-BML10-S	1.7	77.7 (3.06)	24	16.8 (0.66)	3.8 (0.15)
12	-QTM8-BML12-S	4.2	89.9 (3.54)	35	19.6 (0.77)	4.8 (0.19)

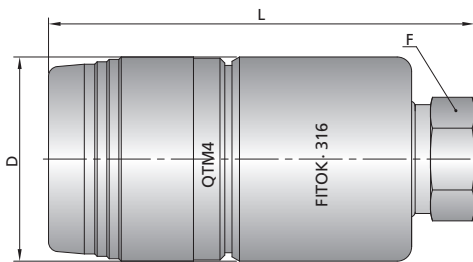
## Bodies

### Tube Fitting



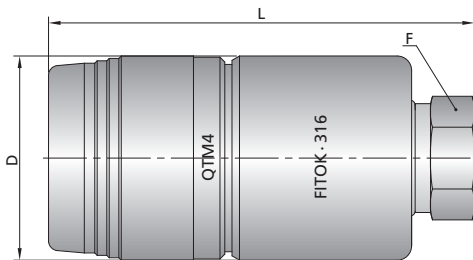
Fitting Size in.	Basic Ordering Number	Dimensions		
		L	D	F
		in. (mm)	in. (mm)	in.
1/4	-QTM2-FL4-B	3.16 (80.3)	1.12 (28.4)	9/16
1/4	-QTM4-FL4-B	4.17 (106)	1.68 (42.7)	7/8
3/8	-QTM2-FL6-B	3.25 (82.6)	1.12 (28.4)	3/4
3/8	-QTM4-FL6-B	4.17 (106)	1.68 (42.7)	7/8
1/2	-QTM8-FL8-B	4.30 (109)	2.00 (50.8)	1 1/8
3/4	-QTM8-FL12-B	4.30 (109)	2.00 (50.8)	1 1/8
1	-QTM8-FL16-B	4.58 (116)	2.00 (50.8)	1 3/8
mm	—	—	mm (in.)	mm
6	-QTM2-ML6-B	80.3 (3.16)	28.4 (1.12)	15
6	-QTM4-ML6-B	106 (4.17)	42.7 (1.68)	24
8	-QTM2-ML8-B	80.3 (3.16)	28.4 (1.12)	15
10	-QTM4-ML10-B	106 (4.17)	42.7 (1.68)	24
12	-QTM8-ML12-B	109 (4.30)	50.8 (2.00)	30

### Female NPT



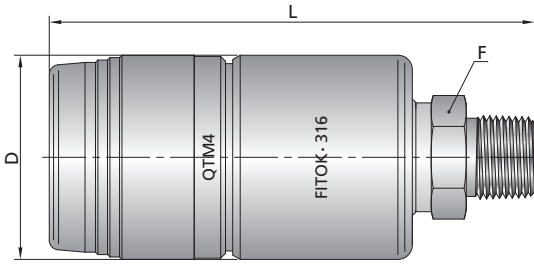
NPT Size in.	Basic Ordering Number	Dimensions		
		L	D	F
		in. (mm)	in. (mm)	in.
1/8	-QTM2-FNS2-B	2.60 (66.0)	1.12 (28.4)	9/16
1/4	-QTM2-FNS4-B	2.99 (75.9)	1.12 (28.4)	3/4
1/4	-QTM4-FNS4-B	3.35 (85.1)	1.68 (42.7)	7/8
3/8	-QTM2-FNS6-B	3.04 (77.2)	1.12 (28.4)	7/8
3/8	-QTM4-FNS6-B	3.35 (85.1)	1.68 (42.7)	7/8
1/2	-QTM8-FNS8-B	3.53 (89.7)	2.00 (50.8)	1 1/8
3/4	-QTM8-FNS12-B	4.02 (102)	2.00 (50.8)	1 5/16
1	-QTM8-FNS16-B	4.40 (112)	2.00 (50.8)	1 5/8

### Female BSPT



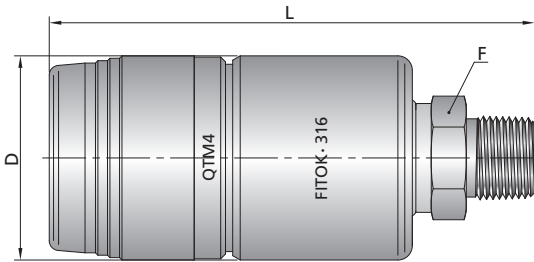
BSPT Size in.	Basic Ordering Number	Dimensions		
		L	D	F
		in. (mm)	in. (mm)	in.
1/8	-QTM2-FRT2-B	2.60 (66.0)	1.12 (28.4)	9/16
1/4	-QTM2-FRT4-B	2.99 (75.9)	1.12 (28.4)	3/4
1/4	-QTM4-FRT4-B	3.35 (85.1)	1.68 (42.7)	7/8
3/8	-QTM2-FRT6-B	3.04 (77.2)	1.12 (28.4)	7/8
3/8	-QTM4-FRT6-B	3.35 (85.1)	1.68 (42.7)	7/8
1/2	-QTM8-FRT8-B	3.53 (89.7)	2.00 (50.8)	1 1/8
3/4	-QTM8-FRT12-B	4.02 (102)	2.00 (50.8)	1 5/16
1	-QTM8-FRT16-B	4.40 (112)	2.00 (50.8)	1 5/8

**Male NPT**



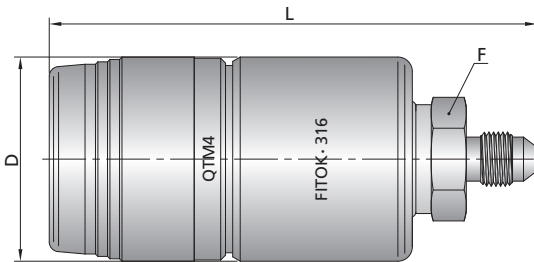
NPT Size in.	Basic Ordering Number	Dimensions		
		L	D	F
		in. (mm)	in. (mm)	in.
1/4	-QTM2-NS4-B	3.02 (76.7)	1.12 (28.4)	9/16
1/4	-QTM4-NS4-B	3.89 (98.8)	1.68 (42.7)	7/8
3/8	-QTM2-NS6-B	3.07 (78.0)	1.12 (28.4)	3/4
3/8	-QTM4-NS6-B	3.97 (100.8)	1.68 (42.7)	7/8
1/2	-QTM8-NS8-B	4.20 (107)	2.00 (50.8)	1 1/8
3/4	-QTM8-NS12-B	4.19 (106)	2.00 (50.8)	1 1/8
1	-QTM8-NS16-B	4.48 (114)	2.00 (50.8)	1 3/8

**Male BSPT**



BSPT Size in.	Basic Ordering Number	Dimensions		
		L	D	F
		in. (mm)	in. (mm)	in.
1/4	-QTM2-RT4-B	3.02 (76.7)	1.12 (28.4)	9/16
1/4	-QTM4-RT4-B	3.89 (98.8)	1.68 (42.7)	7/8
3/8	-QTM2-RT6-B	3.07 (78.0)	1.12 (28.4)	3/4
3/8	-QTM4-RT6-B	3.97 (100.8)	1.68 (42.7)	7/8
1/2	-QTM8-RT8-B	4.20 (107)	2.00 (50.8)	1 1/8
3/4	-QTM8-RT12-B	4.19 (106)	2.00 (50.8)	1 1/8
1	-QTM8-RT16-B	4.48 (114)	2.00 (50.8)	1 3/8

**Male JIC (AN) 37° Flare**

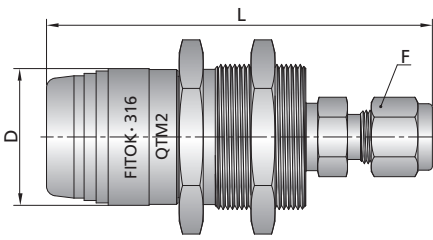
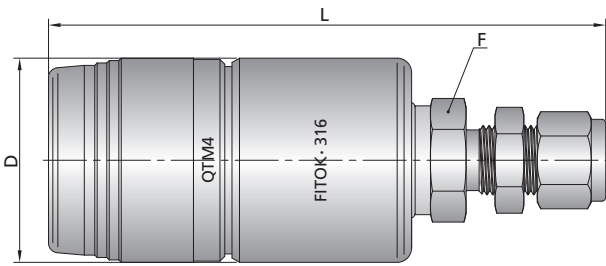


Fitting Size in.	Basic Ordering Number	Dimensions		
		L	D	F
		in. (mm)	in. (mm)	in.
1/4	-QTM4-AN4-B	3.89 (98.8)	1.68 (42.7)	7/8
1/2	-QTM8-AN8-B	4.20 (107)	2.00 (50.8)	1 1/8



## Bulkhead Bodies

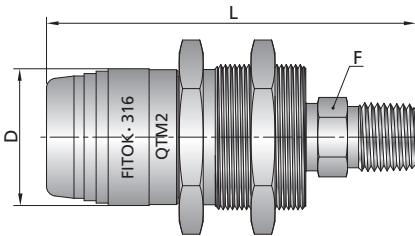
### Bulkhead Tube Fitting



QTM2 Integral Bulkhead

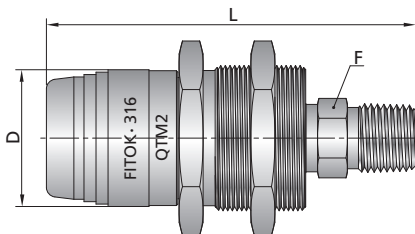
Fitting Size	Basic Ordering Number	Dimensions			Min. Panel Orifice	Max. Panel Thickness
		L	D	F		
1/4 in.	-QTM2-BFL4-B	3.16 (80.3)	1.12 (28.4)	9/16	1.20 (30.6)	0.65 (16.5)
1/4 in.	-QTM4-BFL4-B	4.42 (112)	1.68 (42.7)	7/8	0.46 (11.7)	0.15 (3.8)
3/8 in.	-QTM4-BFL6-B	4.51 (115)	1.68 (42.7)	7/8	0.58 (14.7)	0.15 (3.8)
1/2 in.	-QTM8-BFL8-B	4.78 (121)	2.00 (50.8)	1 1/8	0.77 (19.6)	0.19 (4.8)
mm	—	mm (in.)	mm (in.)	mm	mm (in.)	mm (in.)
6	-QTM2-BML6-B	80.3 (3.16)	28.4 (1.12)	15	30.6 (1.20)	16.5 (0.65)
6	-QTM4-BML6-B	112 (4.42)	42.7 (1.68)	24	11.7 (0.46)	3.8 (0.15)
10	-QTM4-BML10-B	115 (4.52)	42.7 (1.68)	24	16.8 (0.66)	3.8 (0.15)
12	-QTM8-BML12-B	121 (4.77)	50.8 (2.00)	30	19.6 (0.77)	4.8 (0.19)

### Bulkhead Male NPT



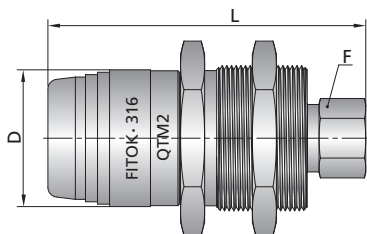
NPT Size	Basic Ordering Number	Dimensions			Min. Panel Orifice	Max. Panel Thickness
		L	D	F		
1/4 in.	-QTM2-BNS4-B	3.02 (76.7)	1.12 (28.4)	9/16	1.20 (30.6)	0.65 (16.5)

### Bulkhead Male BSPT



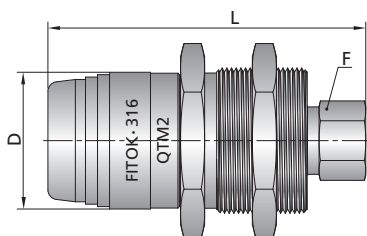
NPT Size	Basic Ordering Number	Dimensions			Min. Panel Orifice	Max. Panel Thickness
		L	D	F		
1/4 in.	-QTM2-BRT4-B	3.02 (76.7)	1.12 (28.4)	9/16	1.20 (30.6)	0.65 (16.5)

**Bulkhead Female NPT**



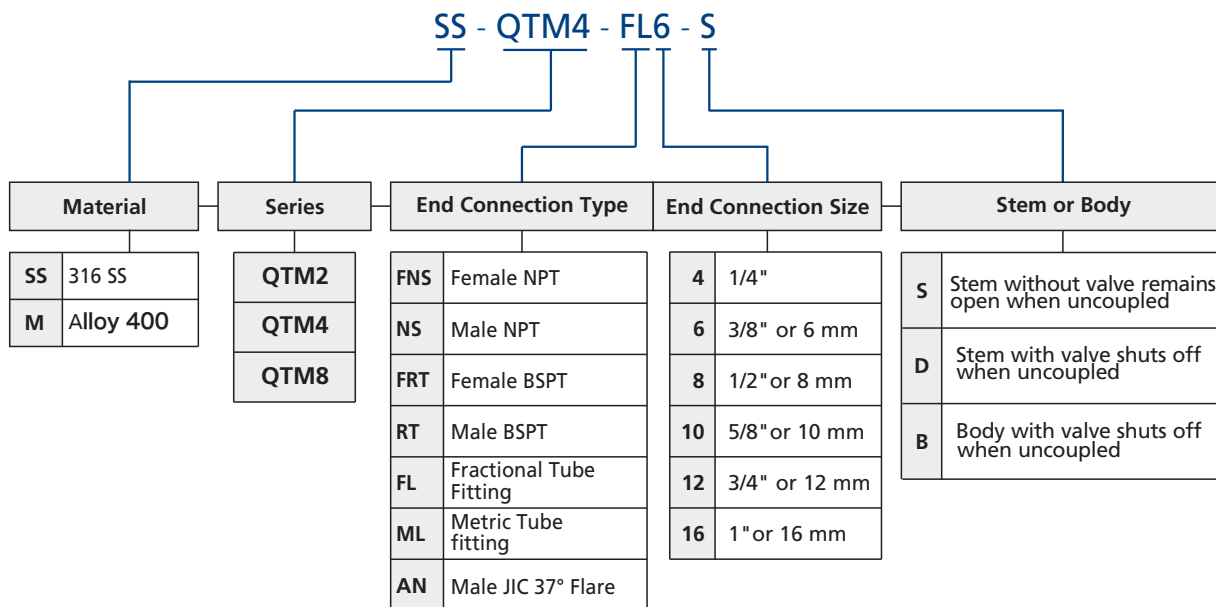
NPT Size in.	Basic Ordering Number	Dimensions			Min. Panel Orifice in. (mm)	Max. Panel Thickness in. (mm)
		L	D	F		
		in. (mm)	in. (mm)	in.		
1/8	-QTM2-BFNS2-B	2.60 (66.0)	1.12 (28.4)	9/16	1.20 (30.6)	0.65 (16.5)
1/4	-QTM2-BFNS4-B	2.96 (75.2)	1.12 (28.4)	3/4	1.20 (30.6)	0.65 (16.5)

**Bulkhead Female BSPT**



BSPT Size in.	Basic Ordering Number	Dimensions			Min. Panel Orifice in. (mm)	Max. Panel Thickness in. (mm)
		L	D	F		
		in. (mm)	in. (mm)	in.		
1/8	-QTM2-BFRT2-B	2.60 (66.0)	1.12 (28.4)	9/16	1.20 (30.6)	0.65 (16.5)
1/4	-QTM2-BFRT4-B	2.96 (75.2)	1.12 (28.4)	3/4	1.20 (30.6)	0.65 (16.5)

**Ordering Number Description**



Note: 1. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.  
 2. Dimensions are for reference only and are subject to change.

# Vessels and Sample Cylinders

Condensate Pots and Vessels



E-02

Sample Cylinders and Accessories



E-09

Sample Cylinders Compliant with TPED



E-21

# Condensate Pots and Vessels



# Condensate Pots

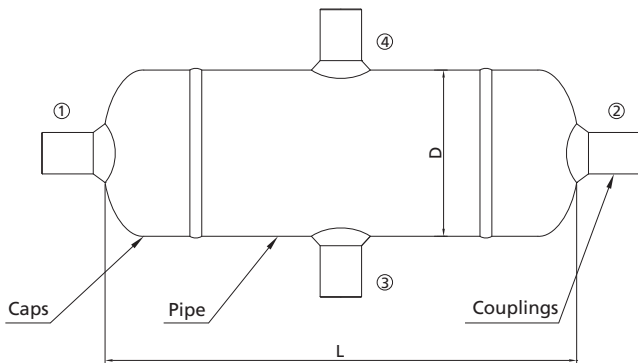
## Features

- ⦿ Suitable for application with water, oil or gas
- ⦿ Chambers are made from seamless pipe and weld caps
- ⦿ Full-penetration gas tungsten arc -weld construction to ensure great strength and leak-tight performance
- ⦿ Five pressure ratings available

## Technical Data

- ⦿ Working pressure up to: Class 2500 as per ASME B16.34
- ⦿ Socket weld connection as per ASME B16.11
- ⦿ Butt welding ends as per ASME B16.9
- ⦿ NPT as per ASME B1.20.1 taper pipe thread
- ⦿ All condensate pots are factory tested fully prior to shipment
- ⦿ Standard material of construction: 316 SS, 304 SS, Carbon steel
- ⦿ Pipe schedule: 40, 80, 160, XXS seamless steel
- ⦿ Variety of end connections available

## Materials of Construction




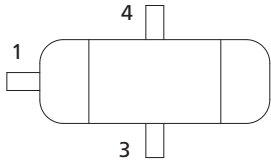
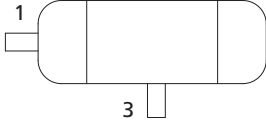
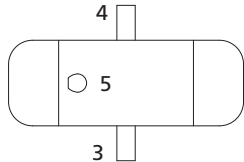
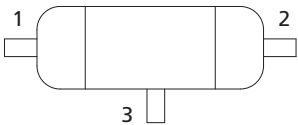
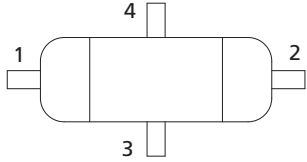
Material	Pipe	Cap
316 SS	TP316/A312	F316/A182
321 SS	TP321/A312	F321/A182
304 SS	304 SS/A312	F304/A182
CS	A106	A105
316L SS	TP316L/A312	F316L/A182
304L SS	TP304L/A312	F304L/A182

## Dimensions

Dimensions are for reference only and are subject to change.

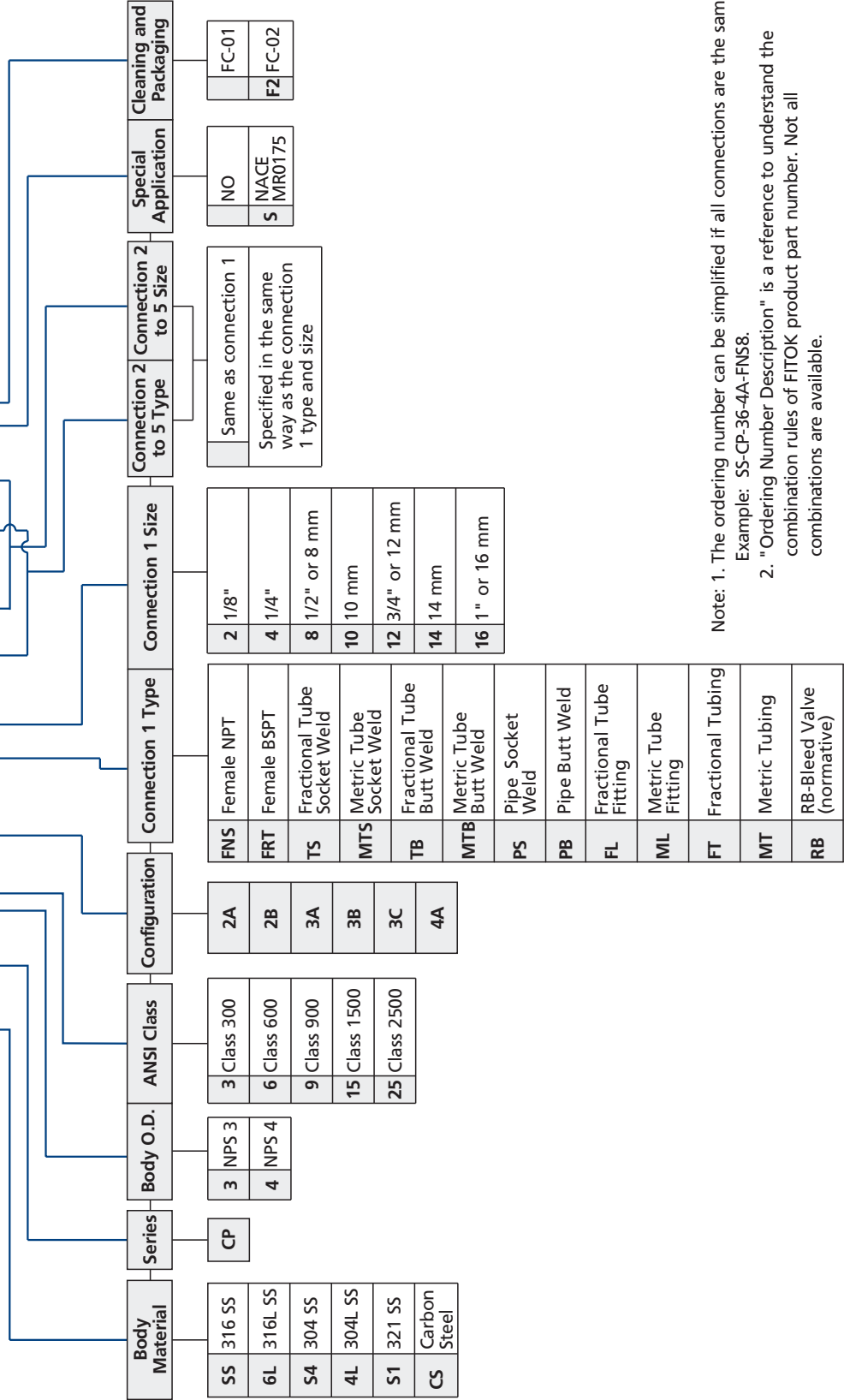
Pipe	Ø D, in (mm)	L, in (mm)	Capacity (L)
NPS 3	3.50 (88.9)	8.46 (215.0)	0.8
NPS 4	4.50 (114.3)	14.2 (360.0)	2.6

## Configuration

Designator	Schematic	Designator	Schematic
2A		3B	
2B		3C	
3A		4A	

# Ordering Number Description

SS - CP - 36 - 4A - FNS8 - MTS14 - MTB12 - SF2



Note: 1. The ordering number can be simplified if all connections are the same.  
 Example: SS-CP-36-4A-FNS8.  
 2. "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

# Vessels

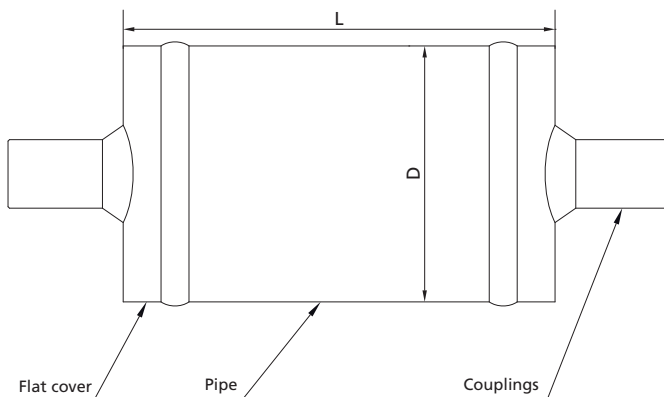
## Features

- ⦿ Suitable for application with water, oil or gas
- ⦿ Chambers are made from seamless pipe and weld flat covers
- ⦿ Full-penetration gas tungsten arc -weld construction to ensure great strength and leak-tight performance
- ⦿ Five pressure ratings available

## Technical Data

- ⦿ Working pressure up to: Class 2500 as per ASME B16.34
- ⦿ Socket weld connection as per ASME B16.11
- ⦿ Butt welding ends as per ASME B16.9
- ⦿ NPT as per ASME B1.20.1 taper pipe thread
- ⦿ All vessels are factory tested fully prior to shipment
- ⦿ Standard material of construction: 316 SS, 304 SS, Carbon steel
- ⦿ Pipe schedule: 40, 80, 160, XXS seamless steel
- ⦿ Variety of end connections available

## Materials of Construction



Material	Pipe	Flat cover
316 SS	TP316/A312	F316/A182
321 SS	TP321/A312	F321/A182
304 SS	304 SS/A312	F304/A182
CS	A106	A105
316L SS	TP316L/A312	F316L/A182
304L SS	TP304L/A312	F304L/A182



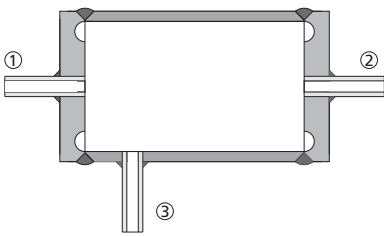
## Dimensions

Dimensions are for reference only and are subject to change.

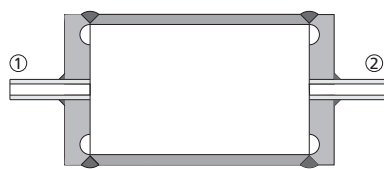
Pipe	Ø D, in (mm)	L, in (mm)
NPS 3	3.50 (88.9)	5.90 (150.0)
NPS 4	4.5 (114.3)	

## Configuration

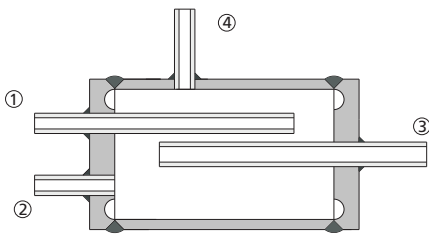
CV1



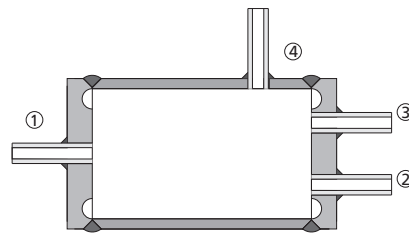
SV1



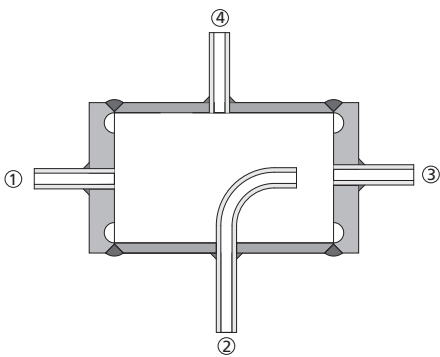
IV1



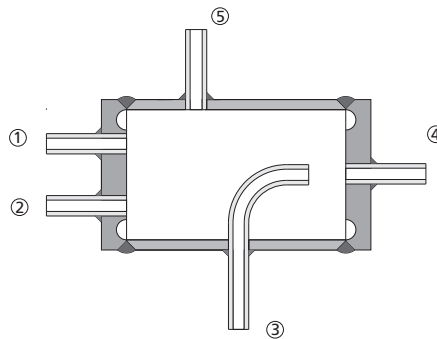
IV2



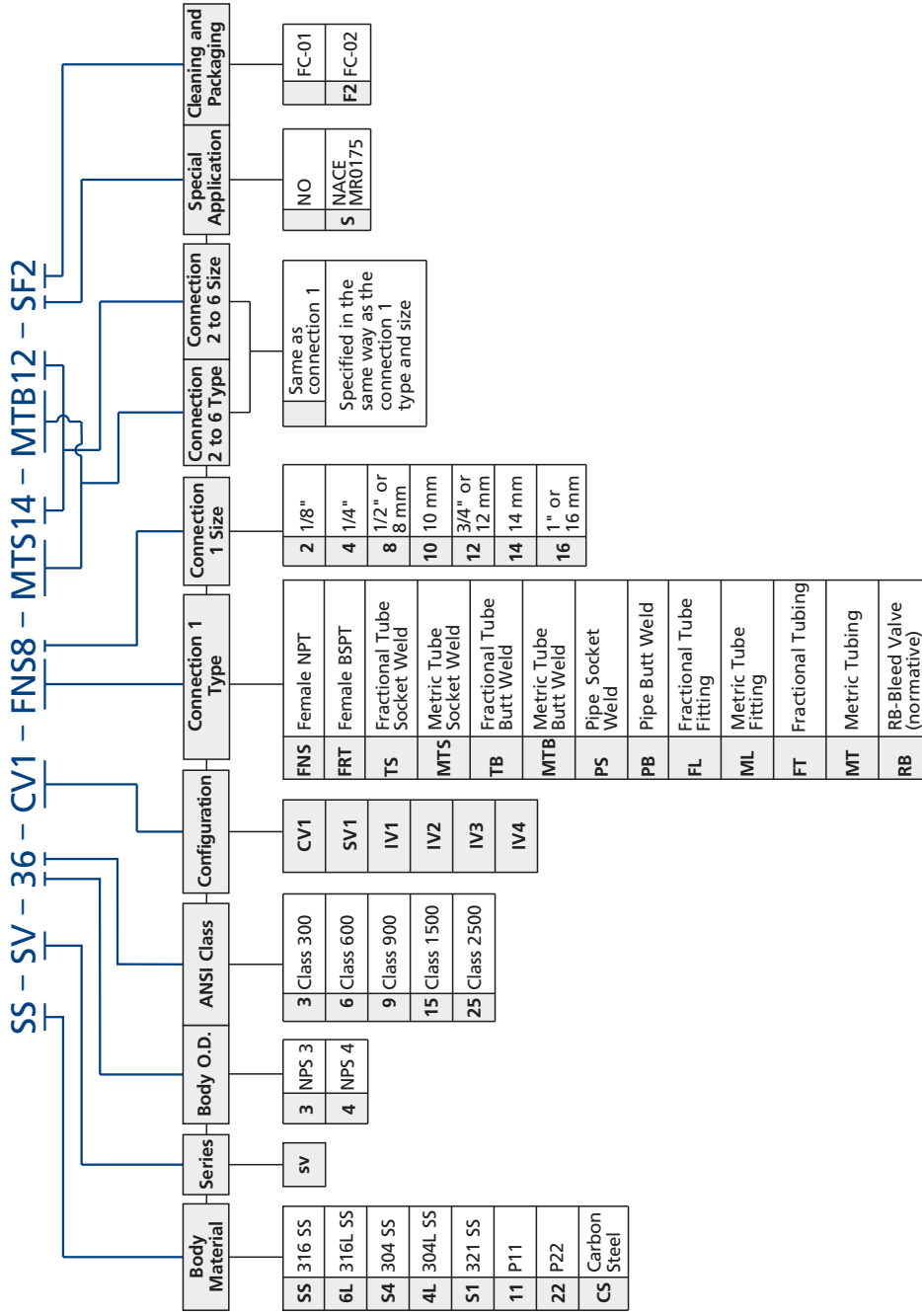
IV3



IV4



# Ordering Number Description



Note: 1. The ordering number can be simplified if all connections are the same.

Example: SS-SV-36-CV1-FNS8.

- "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

# Sample Cylinders and Accessories



## Sample Cylinders

### Application

- ⦿ Hydrocarbon sampling for refineries
- ⦿ Gas sampling for chromatography experiments
- ⦿ Condensate sampling for fossil fuel and nuclear power plants
- ⦿ As surge accumulators or reaction vessels
- ⦿ As snubbers in reactor feed lines



### Features

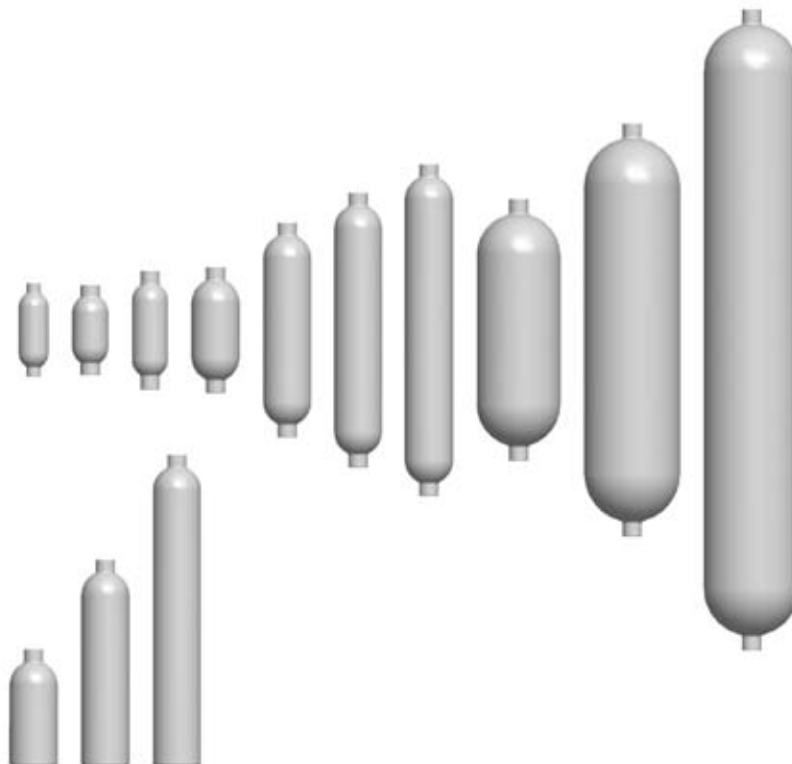
- ⦿ Capacities from 40 cm<sup>3</sup> to 3785 cm<sup>3</sup> (1 gal)
- ⦿ Spinned cylinder body machined from seamless tubing to provide consistent wall thickness, size and capacity
- ⦿ Cold-formed female NPT thread to provide high strength
- ⦿ 1/8", 1/4" and 1/2" female NPT connections
- ⦿ Full-penetration gas tungsten arc-weld construction to ensure no leak for sampling (single-ended cylinder only)
- ⦿ DOT and non-DOT cylinders available
- ⦿ Accessories, such as valves, relief devices, outage tubes, carrying handles, caps and plugs available

### Design

FITOK sample cylinders are designed and manufactured in compliance with 49 CFR, the stringent regulation of U.S. Department of Transportation, to provide high reliability and long service life.

Spinned cylinders are made of seamless tubing to increase the wall thickness of neck transitions and thread areas which provides high strength to reduce the leak risks.

The cylinders are internal sandblasted to ensure smooth surface and minimized remaining particles for easy cleaning.



## Materials

FITOK DOT cylinders are available in 304L SS and 316L SS. FITOK non-DOT cylinders are available in 304L SS, 316 L SS and Alloy 400. For cylinders of other materials, please contact FITOK Group or our authorized distributors.

## Pressure - Temperature

Material	316L SS	316L SS, 304L SS	304L SS	Alloy 400	316 SS	304L SS
DOT Specification	DOT-3A 5000 TC-3ASM 344	DOT-3E 1800 TC-3EM 124	DOT-3A 1800 TC-3ASM 124	—	—	—
Temperature, °F (°C)	Working pressure, psig (bar)					
-65 (-53) to 100 (37)	5000 (344)	1800 (124)	1800 (124)	1800 (124)	1000 (69.0)	500 (34.4)
200 (93)	3960 (272)	1360 (93.7)	1360 (93.7)	1580 (108)	840 (57.8)	500 (34.4)
300 (148)	3570 (245)	1230 (84.7)	1230 (84.7)	1490 (102)	760 (52.3)	500 (34.4)
400 (204)	3290 (226)	1130 (77.8)	1130 (77.8)	1430 (98.5)	700 (48.2)	500 (34.4)
500 (260)	3060 (210)	1050 (72.3)	1050 (72.3)	1420 (97.8)	650 (44.7)	500 (34.4)
600 (315)	2920 (201)	1000 (69.0)	1000 (69.0)	1420 (97.8)	620 (42.7)	500 (34.4)
650 (343)	2870 (197)	980 (67.5)	980 (67.5)	1420 (97.8)	610 (42.0)	500 (34.4)
700 (371)	2810 (193)	970 (66.8)	970 (66.8)	1420 (97.8)	590 (40.6)	500 (34.4)
750 (398)	2750 (189)	950 (65.4)	950 (65.4)	1410 (97.1)	580 (39.9)	500 (34.4)
800 (426)	2700 (186)	930 (64.0)	930 (64.0)	—	570 (39.2)	500 (34.4)
850 (454)	2640 (181)	—	—	—	560 (38.5)	—

### Notes:

1. Working temperature is limited to 300°F (148°C) maximum for cylinders with PTFE internal coating.
2. Working pressure and temperature may be restricted by individual local government regulations.

## Testing

### Single-ended Cylinders

All single-ended cylinders are hydrostatically tested at 1000 psig (69 bar).

### Double-ended Cylinders

All double-ended cylinders are hydrostatically tested to at least 5/3 times the working pressure.

DOT-3A 1800/TC-3ASM 124 cylinders are hydrostatically tested at 3000 psig (206 bar) minimum.

DOT-3E 1800/TC-3EM 124 cylinders are hydrostatically tested at 3050 psig (210 bar).

DOT-3A 5000/TC-3ASM 344 cylinders are hydrostatically tested at 8500 psig (586 bar) minimum.

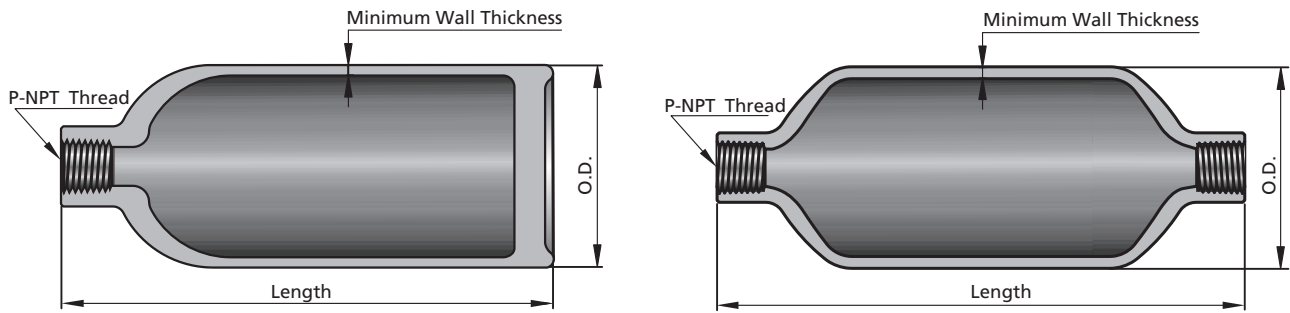
## Transportable Pressure Equipment Directive (TPED)

The Transportable Pressure Equipment Directive (TPED) provides requirements for the design, manufacturing, and testing of transportable pressure vessels and accessories, including sample cylinders and rupture discs. The directive aims to provide a uniform level of product safety throughout the European Union countries.

For information about FITOK TPED-compliant products, please refer to FITOK Catalog *Sample Cylinders Compliant with the Transportable Pressure Equipment Directive (TPED)*.

## Technical Data

Dimensions are for reference only and are subject to change.



Material Grade/Cylinder Specification	Pressure Rating psig (bar)	Cylinder Volume (cm <sup>3</sup> ±10%)	P in.	Dimensions, in. (mm)			Weight lb (kg)
				O.D.	Length	Minimum Wall Thickness	
<b>Single-ended</b>							
304L SS/	500 (34.4)	150	1/4	2.00 (50.8)	4.88 (124)	0.093 (2.4)	1.10 (0.50)
		300			8.62 (219)		1.80 (0.82)
		500			13.6 (345)		2.70 (1.2)
<b>Double-ended</b>							
304L SS/ DOT-3E 1800 TC-3EM 124	1800 (124)	40	1/8	1.25 (31.8)	3.88 (98.6)	0.070 (1.8)	0.31 (0.14)
		50	1/4	1.5 (38.1)	3.75 (95.2)		0.38 (0.17)
		75			4.94 (125)		0.62 (0.28)
		150 <sup>①</sup>	1/4	2.00 (50.8)	5.25 (133)	0.093 (2.4)	0.94 (0.43)
		290			8.86 (225)		1.79 (0.81)
		300 <sup>①</sup>			8.94 (227)		1.80 (0.83)
		400			11.4 (290)		2.10 (0.95)
		500 <sup>①</sup>			13.8 (351)		2.61 (1.20)
304L SS/ DOT-3A 1800 TC-3ASM 124	1800 (124)	1000 <sup>①</sup>	1/4 or 1/2	3.50 (88.9)	10.9 (277)	0.180 (4.6)	6.50 (2.90)
		2250 <sup>①</sup>	1/4 or 1/2	4.00 (102)	17.2 (437)	0.206 (5.2)	14.00 (6.40)
		3785 <sup>①</sup> (1 gal)			26.7 (678)		21.00 (9.50)
316L SS/ DOT-3E 1800 TC-3EM 124	1800 (124)	150 <sup>①</sup>	1/4	2.00 (50.8)	5.25 (133)	0.093 (2.4)	0.94 (0.43)
		290			8.86 (225)		1.79 (0.81)
		300 <sup>①</sup>			8.94 (227)		1.80 (0.83)
		500 <sup>①</sup>			13.8 (351)		2.60 (1.20)
316L SS/ DOT-3A 5000 TC-3ASM 344	5000 (344)	150 <sup>①</sup>	1/4	1.90 (48.2)	8.00 (203)	0.240 (6.1)	3.00 (1.40)
		300 <sup>①</sup>			14.5 (368)		5.60 (2.50)
		500 <sup>①</sup>			23.5 (597)		9.10 (4.10)
Alloy 400	1800 (124)	150	1/4	2.00 (50.8)	5.25 (133)	0.093 (2.4)	0.94 (0.43)
		300			8.94 (227)		1.80 (0.82)
		500			13.8 (351)		2.90 (1.30)

① DOT cylinders are available.

## Options for Internal Cylinder Surface Treatments

### PTFE Coating

The internal cylinder surface can be coated with PTFE to provide a nonstick surface for easy cleaning.

### Electropolishing

Electropolishing can provide a clean internal surface with a high degree of passivation.

### Cleaning and Packaging

All FITOK sample cylinders and cylinder valves are cleaned and packaged in accordance with FITOK *FC-01 Standard Cleaning and Packaging*.

FITOK *FC-02 Special Cleaning and Packaging* in compliance with the requirements of ASTM G93 Level C is optional.

## Overpressure Protection

Cylinders for compressed air must be equipped with pressure relief devices in accordance with US DOT regulations and CGA Pamphlet S-1.1. The CGA Pamphlet lists devices that can be used with specific gases. It also contains information on other types of pressure relief devices.

- ▲ Be sure to use the correct pressure relief device for the gas being used.
- ▲ Proper filling of the cylinder according to DOT specifications or other local regulations, is critical in preventing overpressurization.

## Rupture Disc Kits

Rupture disc kits protect sample cylinder from overpressurization by venting the gas to atmosphere. The rupture disc kits are used to be installed in valves or rupture disc tees and sealed by O-rings. The rupture disc kits can be easily replaced without removing valves or tees from cylinders.

### Materials of Construction

Component	Material Grade/ASTM Specification
Body, inlet ring	316 SS/A479
Rupture disc	Alloy 600/B168
O-ring	Fluorocarbon FKM



### Ordering Information

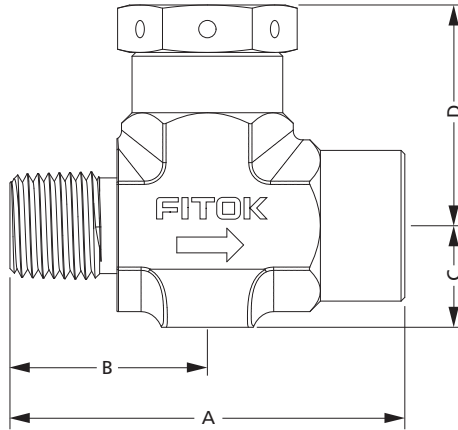
Nominal Burst Pressure at 70°F (20°C)	Ordering Number
2850 psig ± 150 psig 196 bar ± 10.3 bar	SS-RDD-7BS-2850
1900 psig ± 100 psig 130 bar ± 6.8 bar	SS-RDD-7BS-1900

Note: The rupture disc kits should be used with FITOK Rupture Disc Tees.

## Rupture Disc Tees

These compact assemblies are designed for using with FITOK valves. Tees are made of 316 SS. Each tee is supplied with a rupture disc kit.

Ordering Information and Dimensions



End Connections		Ordering Number	Dimensions, in. (mm)			
Inlet	Outlet		A	B	C	D
<b>With 2850 psig (196 bar) Rupture Disc</b>						
1/4 in. Male NPT	1/4 in. Female NPT	SS-TM4-F4-RD28	2.06 (52.4)	1.03 (26.2)	0.53 (13.5)	1.16 (29.4)
1/2 in. Male NPT		SS-TM8-F4-RD28	2.63 (66.7)	1.50 (38.1)	0.75 (19)	1.42 (36)
<b>With 1900 psig (130 bar) Rupture Disc</b>						
1/4 in. Male NPT	1/4 in. Female NPT	SS-TM4-F4-RD19	2.06 (52.4)	1.03 (26.2)	0.53 (13.5)	1.16 (29.4)
1/2 in. Male NPT		SS-TM8-F4-RD19	2.63 (66.7)	1.50 (38.1)	0.75 (19)	1.42 (36)



Nonrotating-stem Needle Valves with Rupture Disc Kits

Ordering Information and Dimensions

End Connections		Flow Pattern	Valve Ordering Number	Orifice in. (mm)
Inlet	Outlet			
<b>With 2850 psig (196 bar) Rupture Disc</b>				
1/4 in. Male NPT	1/4 in. Female NPT	Straight	NDSS-NS4-FNS4-7-SAFE2	0.16 (4.0)
			NDSS-NS4-FNS4-7-A-SAFE2	
1/2 in. Male NPT	1/4 in. Female NPT	Angle	NDSS-NS8-FNS4-8-A-SAFE2	0.22 (5.6)
<b>With 1900 psig (130 bar) Rupture Disc</b>				
1/4 in. Male NPT	1/4 in. Female NPT	Straight	NDSS-NS4-FNS4-7-SAFE1	0.16 (4.0)
			NDSS-NS4-FNS4-7-A-SAFE1	
1/2 in. Male NPT	1/4 in. Female NPT	Angle	NDSS-NS8-FNS4-8-A-SAFE1	0.22 (5.6)



1. Dimensions are for reference only and are subject to change.  
 2. Other FITOK valves are available for using with sample cylinders. Please contact FITOK Group or our authorized distributors for details.



## Spring Relief Devices

### Introduction

- Spring relief devices can be used with FITOK sample cylinders as a safety device.
- When the system pressure reaches the set pressure, the device will open automatically to release the excess pressure in the system. After stabilizing the system pressure, the device will close automatically.



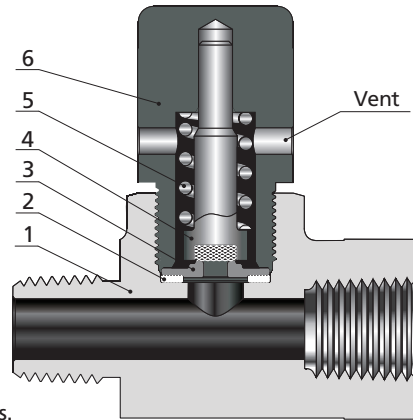
### Working Temperature

-20°F~250°F (-29°C~121°C)

### Materials of Construction

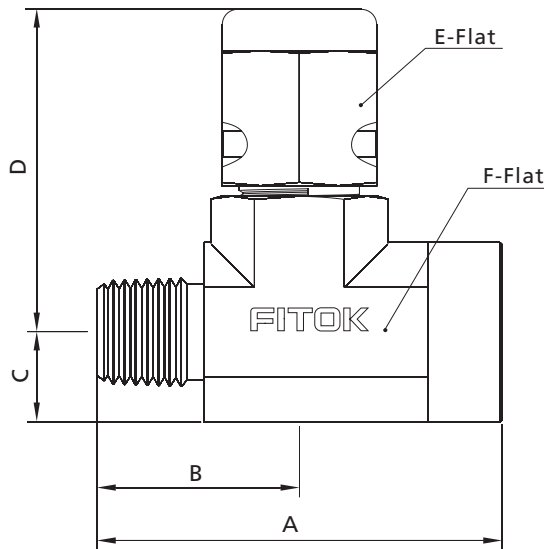
Item	Component	Material Grade/ASTM Specification
1	Body	316 SS/A182
2	Gasket	PCTFE/D1430
3	Seat	316 SS/A479
4	Stem	316 SS/A479+Fluorocarbon FKM
5	Spring	304 SS/A313
6	Bonnet	316 SS/A479

- Lubricant: Silicone-based.
- For other materials, please contact FITOK Group or our authorized distributors.



### Dimensions and Ordering Information

All dimensions are for reference only and are subject to change.



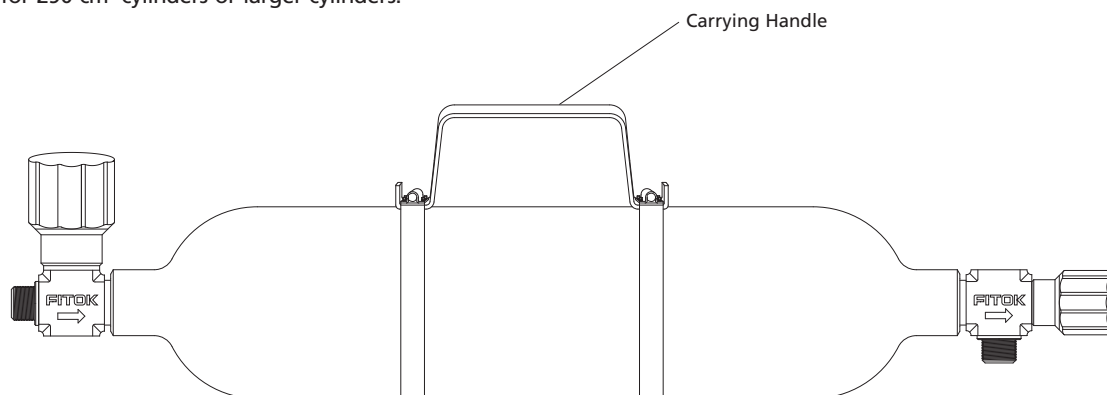
Basic Ordering Number	Connection Type and Size		Dimensions, in. (mm)						Set Pressure, psig (bar)
	Inlet	Outlet	A	B	C	D	E	F	
RTSS-NS4-FNS4-4	1 / 4 Male NPT	1 / 4 Female NPT	2.11 (53.6)	1.05 (26.8)	0.46 (11.7)	1.68 (42.7)	0.81 (20.6)	0.81 (20.6)	350 ~ 400 (24~27)
RTSS-NS4-FNS4-6									540 ~ 600 (37~41)
RTSS-NS4-FNS4-8									700 ~ 800 (48~55)
RTSS-NS6-FNS4-4	3 / 8 Male NPT								350 ~ 400 (24~27)
RTSS-NS6-FNS4-6									540 ~ 600 (37~41)
RTSS-NS6-FNS4-8									700 ~ 800 (48~55)

For other set pressures, please contact FITOK Group or our authorized distributors.

## Sample Cylinder Accessories

### Carrying Handle

The carrying handle provides convenience for transportation of sample cylinders. The handle is made of 304 SS and is available for 290 cm<sup>3</sup> cylinders or larger cylinders.

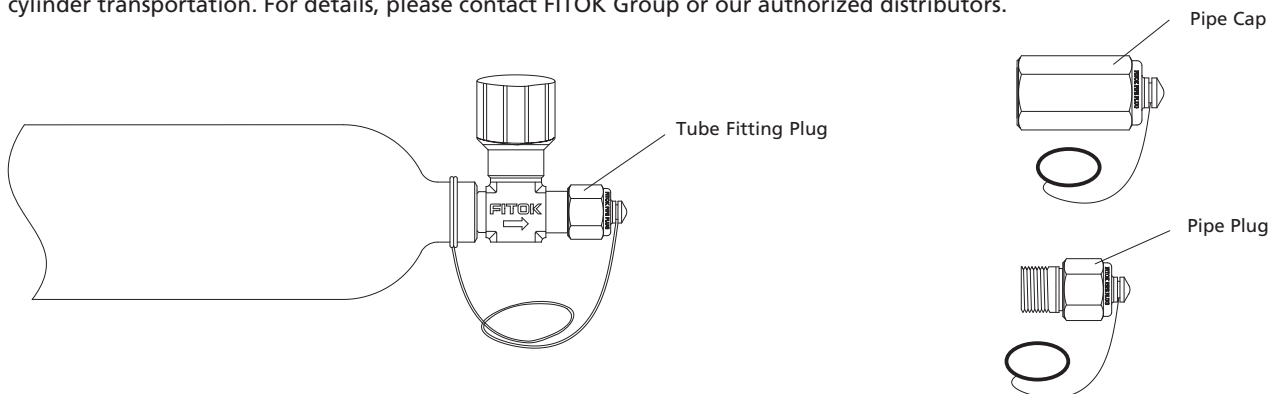


### Ordering Information

Cylinder OD in. (mm)	Cylinder Volume cm <sup>3</sup>	Ordering Number
1.9 (48.2)	290~500	HD-CY2-H2
2.0 (50.8)		
3.5 (88.9)	1000	HD-CY3-H2
4.0 (102)	2250/3785	HD-CY4-H4

### Caps and Plugs

Caps and plugs are used for cylinder valves to protect the connections (tube fitting or NPT thread) from damages during cylinder transportation. For details, please contact FITOK Group or our authorized distributors.



## End Caps

In order to enable users to transport pressurized samples in safety, end caps are offered by FITOK to protect valves from damages. Each end cap is screwed onto a neck ring that has been cold forged to the cylinder neck. End caps are made of carbon steel and are only available for 2250 cm<sup>3</sup> and 3785 cm<sup>3</sup> (1 gal) cylinders. FITOK angle pattern valves can be used for cylinders with end caps.

*Note: Double-ended cylinders with end caps on both ends are standard configurations.*



## Outage Tubes

### Features

- ◎ 316 SS and Alloy 400 available
- ◎ 1/4" and 1/2" NPT connections available

### Construction

Outage tube is welded to the male thread end of an adapter. Screw the adapter with outage tube into the female thread end of a sample cylinder.

### Purpose

The outage tube provides a vapor space of desired volume in a cylinder with liquefied gas. Therefore, liquids can expand when the temperature increases. A small temperature increase can make the liquids expanded and the pressure increased dramatically if there is not enough vapor space.

*Note: For safe filling limits of your application, please refer to local regulations or other guidelines.*

### Usage

Outage tube is used to keep a certain vapor space in a cylinder. The space is determined by the length of outage tube.

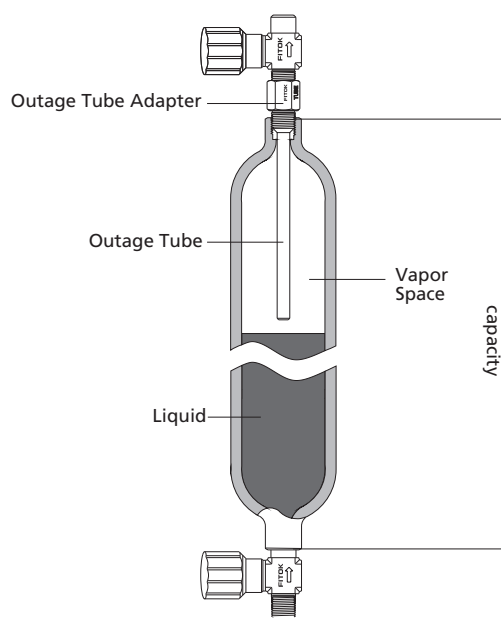
Outage is the vapor space in the cylinder expressed as a percentage of the total volume of the cylinder.

$$\% \text{ outage} = (\text{vapor space} / \text{total volume}) \times 100$$

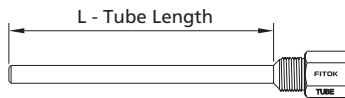
To obtain an exact outage, each outage tube and cylinder assembly should be calibrated by a suitable method.

### Outage Tube Length

The outage tube length (L) is measured from the end of the pipe fitting to the end of the tubing. The table below shows approximate outage tube length for standard sample cylinders.



## E-18 Sample Cylinders and Accessories

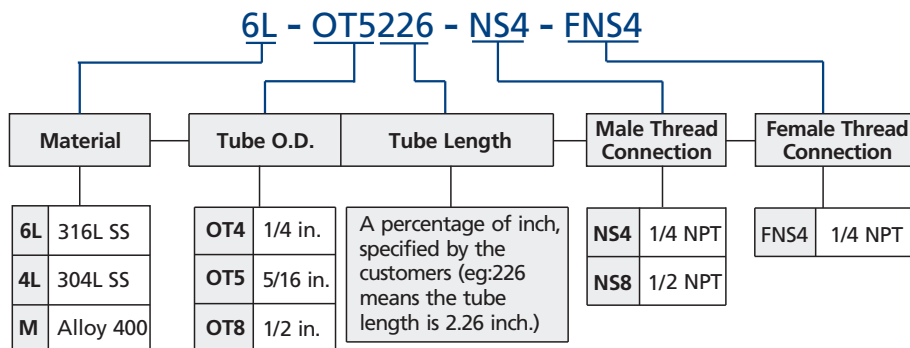


Tube of desired length is available upon request.

Tube O.D.	Cylinder Volume (cm <sup>3</sup> ±10%)	Code	Minimum Outage, %						
			10	20	30	40	50		
			Tube Length, in.						
1/4"	40	Applicable to double-ended cylinders rated to 1800 psig	4087	0.87	1.11	1.35	1.59	1.84	
	50		5085	0.85	1.07	1.28	1.50	1.71	
	75		5102	1.02	1.34	1.66	1.98	2.31	
	150		5112	1.12	1.45	1.79	2.13	2.46	
	300		5165	1.65	2.32	2.99	3.67	4.34	
5/16"	400		5200	2.00	2.90	3.79	4.69	5.59	
	500		5226	2.26	3.38	4.50	5.62	6.74	
	1000		5231	2.31	3.06	3.81	4.56	5.31	
	2250		5717	3.30	4.59	5.88	7.17	8.46	
	3785 (1 gal)		51114	4.62	6.79	8.96	11.14	13.31	
1/2"	1000		8221	2.21	2.96	3.71	4.46	5.21	
	2250		8846	3.30	4.59	5.88	7.17	8.46	
	3785 (1 gal)		8452	4.52	6.69	8.86	11.04	13.21	
5/16"	150		Applicable to single-ended cylinders rated to 500 psig	5109	1.09	1.43	1.77	2.12	2.46
	300			5159	1.59	2.27	2.96	3.65	4.34
	500	5560		2.16	3.30	4.45	5.60	6.74	
5/16"	150	Applicable to double-ended cylinders rated to 5000 psig	5162	1.62	2.17	2.71	3.26	3.81	
	300		5274	2.74	3.84	4.93	6.03	7.12	
	500		5439	4.39	6.21	8.04	9.86	11.68	

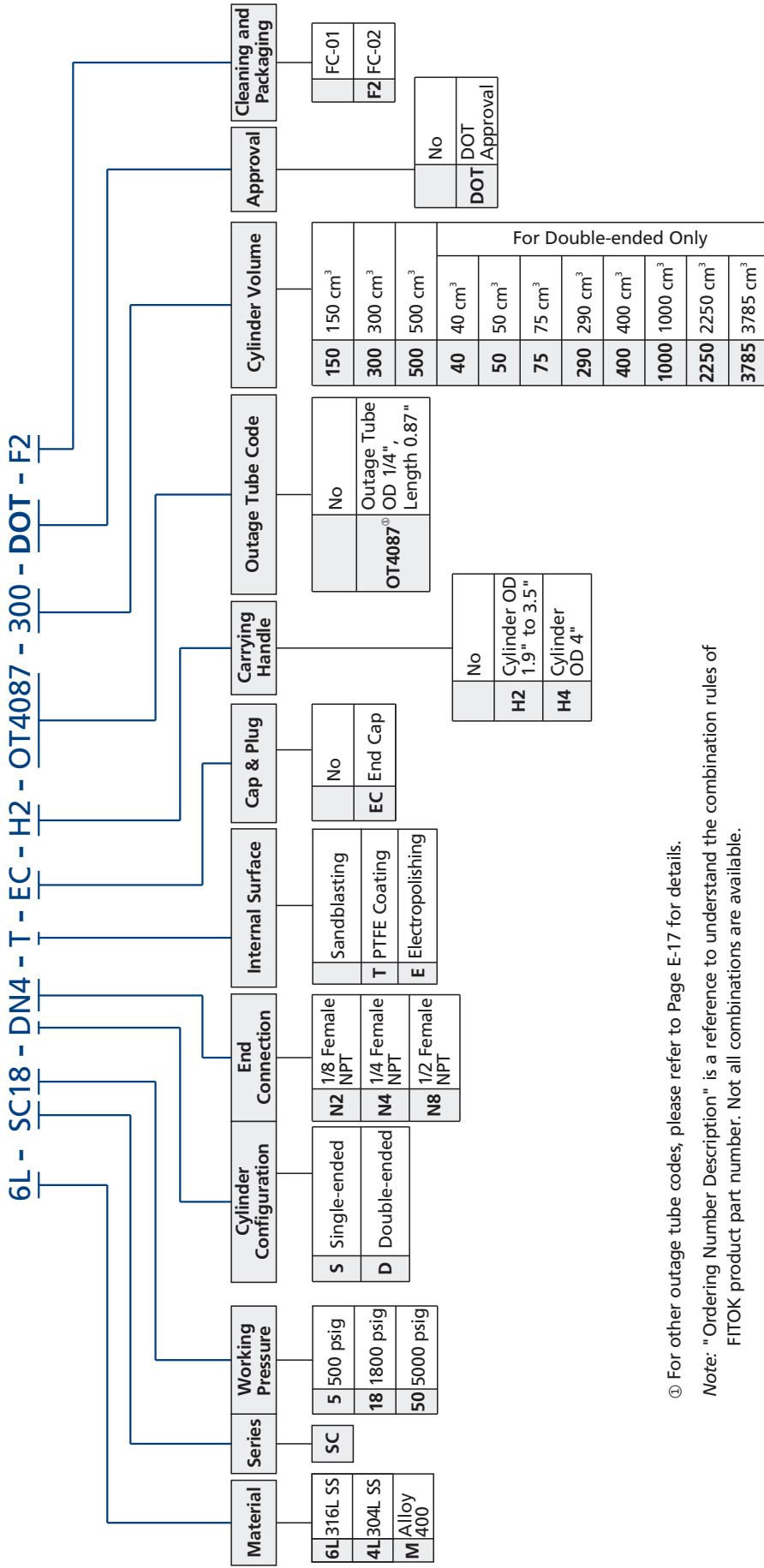
For the use of sample cylinder and outage tube, please refer to ASTM D1265, *Standard Practice for Sampling Liquefied Petroleum (LP) Gases, Manual Method*.

## Ordering Number Description



Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

# Ordering Number Description



① For other outage tube codes, please refer to Page E-17 for details.

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

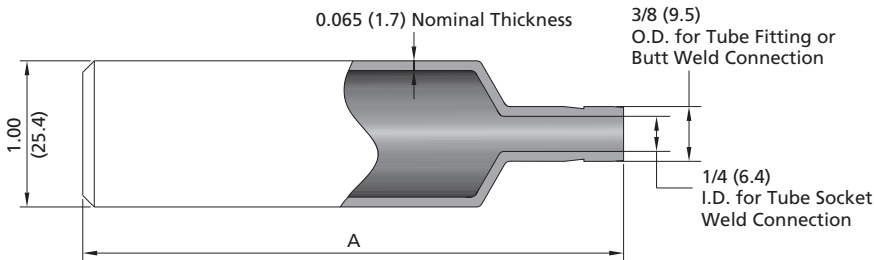
# Miniature Sample Cylinders

## Features

- Maximum working pressure: 1000 psig (69.0 bar)
- Capacities: 10, 25 and 50 cm<sup>3</sup>
- Single-ended and double-ended configurations available
- Smooth internal neck transition for easy cleaning
- Stainless steel construction to ensure high corrosion resistance
- Full-penetration butt weld constructions

## Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.



Cylinder Configuration	Cylinder Volume cm <sup>3</sup>	Volume Tolerance	Working Pressure psig (bar)	A in. (mm)	Average Weight oz (g)
Single-ended	10	±10%	1000 (69.0)	2.19 (55.6)	2.2 (62)
	25	±5%		3.69 (93.7)	3.2 (91)
	50			6.25 (159)	5.6 (159)
Double-ended	10	±10%		2.75 (69.8)	1.9 (54)
	25	±5%		4.25 (108)	3.3 (94)
	50			6.81 (173)	5.1 (145)

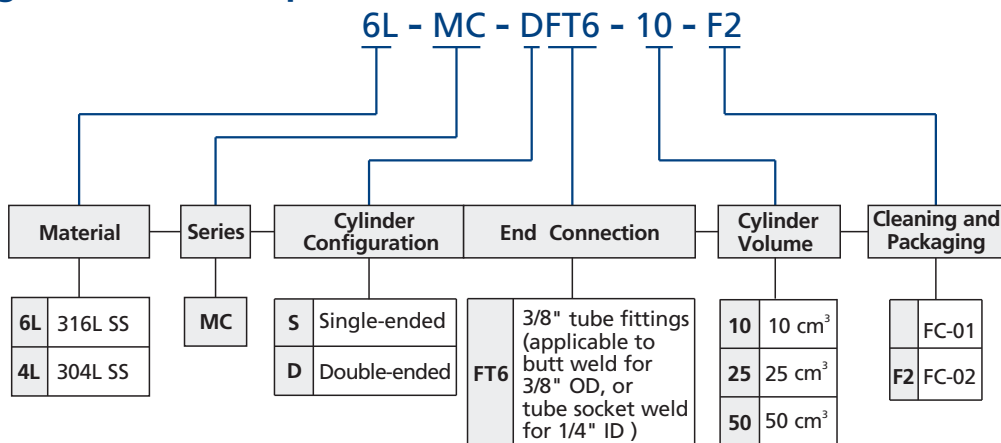
## Testing and Cleaning

Each miniature cylinder is pressure tested at 1667 psig (115 bar) with Nitrogen. Special Cleaning and Packaging in compliance with ASTM G93 Level C is optional.

## Cautions

- No impingement during the usage of the cylinders.
- Don't expose the cylinders in the sun or bake next to the heat source.
- Sample cylinders are strictly prohibited roasting by fire when the cylinders are frozen.
- When using the sample cylinders, the working pressure should not exceed its maximum allowable working pressure.

## Ordering Number Description



# Sample Cylinders Compliant with the Transportable Pressure Equipment Directive (TPED)



## Application

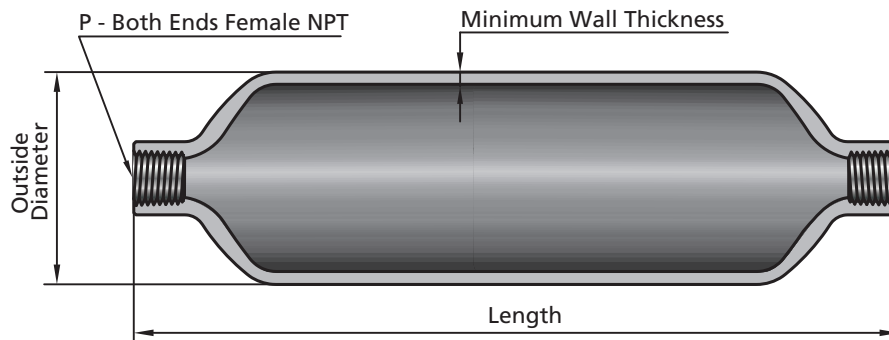
- ⊙ Hydrocarbon sampling for refineries
- ⊙ Gas sampling for chromatography experiments
- ⊙ Condensate sampling for fossil fuel power plants and nuclear power plants
- ⊙ As surge accumulators or reaction vessels
- ⊙ Snubbers in reactor feed lines

## Features

- ⊙ Volumes from 40 to 3785 cm<sup>3</sup> (1 gal)
- ⊙ 1/8", 1/4" and 1/2" female NPT connections
- ⊙ Spinned cylinder body machined from seamless tubing to provide consistent wall thickness, size and capacity
- ⊙ Cold-formed female NPT threads to provide high strength
- ⊙ All models internally sandblasted to ensure smooth surface without foreign particles
- ⊙ 304L SS and 316L SS available
- ⊙ Cylinders compliant with Transportable Pressure Equipment Directive 2010/35/EU

## Technical Data

Dimensions are for reference only and are subject to change.



Basic Ordering No.	Working Pressure psig (bar)	Internal Volume (cm <sup>3</sup> ±10%)	P - Female NPT	Dimensions, in. (mm)			Weight lb (kg)
				Outside Diameter	Length	Minimum Wall Thickness	
4L-SC13-N2-40	1885 (130)	40	1/8"	1.25 (31.80)	3.88 (98.60)	0.070 (1.80)	0.31 (0.14)
4L-SC13-N4-50		50	1/4"	1.50 (38.10)	3.75 (95.20)	0.093 (2.40)	0.38 (0.17)
4L-SC13-N4-75		75			4.94 (125.00)		0.62 (0.28)
4L-SC10-N4-150	1450 (100)	150	1/4"	2.00 (50.80)	5.25 (133.00)		0.093 (2.40)
4L-SC10-N4-300		300			8.94 (227.00)	1.80 (0.83)	
4L-SC10-N4-400		400			11.40 (290.00)	2.10 (0.95)	
4L-SC10-N4-500		500			13.80 (351.00)	2.61 (1.20)	
4L-SC10-N4(8)-1000		1000			1/4" or 1/2"	3.50 (88.90)	
4L-SC10-N4(8)-2250	2250	4.00 (102.00)	17.20 (437.00)	0.206 (5.20)		14.00 (6.40)	
4L-SC10-N4(8)-3785	3785		26.70 (678.00)			21.00 (9.50)	
6L-SC10-N4-300	1450 (100)	300	1/4"	2.00 (50.80)	8.94 (227.00)	0.093 (2.40)	1.80 (0.83)
6L-SC10-N4-500		500	1/4" or 1/2"	3.50 (88.90)	13.80 (351.00)	0.180 (4.60)	2.61 (1.20)
6L-SC10-N4(8)-1000		1000			10.90 (277.00)		6.50 (2.90)
6L-SC30-N4-150	4350 (300)	150	1/4"	1.90 (48.20)	8.00 (203.00)	0.240 (6.10)	3.00 (1.40)
6L-SC30-N4-300		300			14.50 (368.00)		5.60 (2.50)
6L-SC30-N4-500		500			23.50 (597.00)		9.10 (4.10)



## Options of Internal Surface Treatments

### PTFE Coating

The cylinder internal surface can be coated with PTFE to provide nonstick surface for easy cleaning.

### Electropolishing

Electropolishing can provide a clean internal surface with a high degree of passivation.

## Testing

Each TPED-compliant sample cylinder is hydrostatically tested at 1.5 times the working pressure.

## Cleaning and Packaging

All FITOK TPED-compliant sample cylinders are cleaned and packaged in accordance with FITOK *FC-01 Standard Cleaning and Packaging*.

*FITOK FC-02 Special Cleaning and Packaging* compliant with the requirements of ASTM G93 Level C is optional.

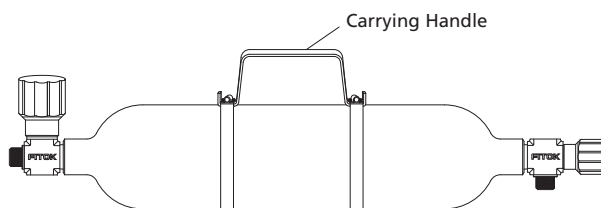
## Sample Cylinder Accessories

### Carrying Handle

The carrying handle provides convenience for transportation of sample cylinders. The handle is made of 304 SS and is available for 300 cm<sup>3</sup> cylinders or larger cylinders.

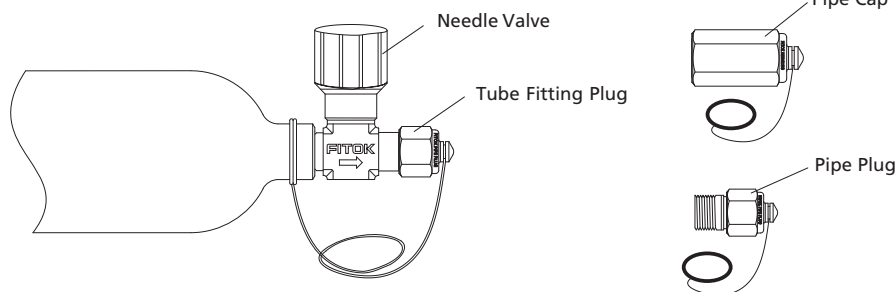
### Ordering Information

Outside Diameter in. (mm)	Internal Volume cm <sup>3</sup>	Basic Ordering No.
1.9 (48.2)	300~500	HD-CY2-H2
2.0 (50.8)		
3.5 (88.9)	1000	HD-CY3-H2
4.0 (102)	2250/3785	HD-CY4-H4

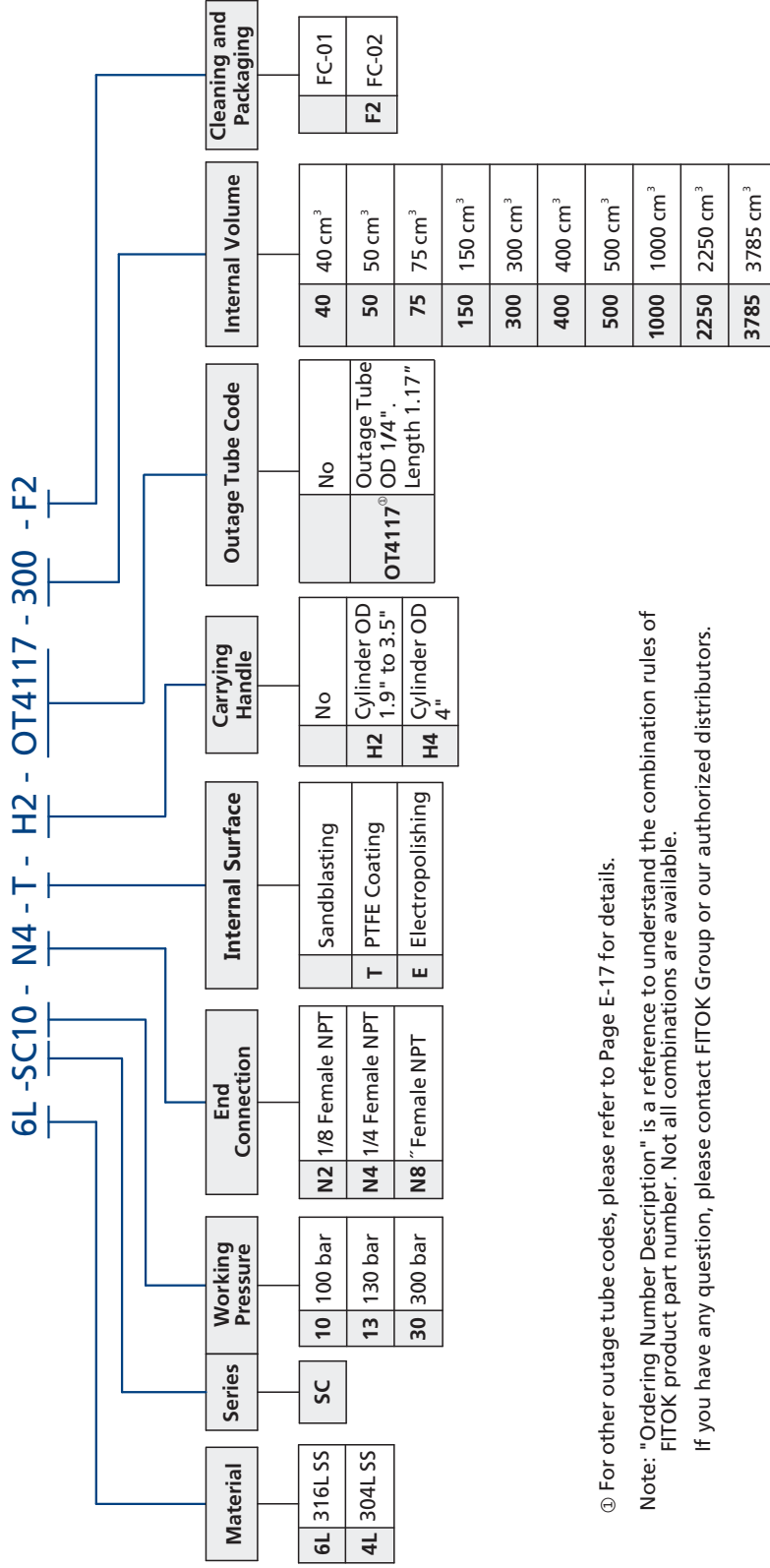


### Caps and Plugs

Caps and plugs are used for cylinder valves to protect the connections (tube fitting or NPT thread) from damages during cylinder transportation. For details, please contact FITOK Group or our authorized distributors.



## Ordering Number Description



① For other outage tube codes, please refer to Page E-17 for details.

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

If you have any question, please contact FITOK Group or our authorized distributors.

# Tubing, Tools and Accessories

Tubing



F-02

Tools and Accessories



F-17

Syphons



F-24

# Tubing



# Contents

Tubing Selection	F-04
Tubing Handling	F-04
Gas Service	F-05
Tubing Installation	F-05
Types of Tubing	F-05
Suggested Allowable Working Pressure for Tubing	
Stainless Steel Tubing	F-06
Carbon Steel Tubing	F-08
Copper Tubing	F-09
Alloy 400 Tubing	F-10
Alloy C-276 Tubing	F-11
Alloy 20 Tubing	F-11
Alloy 600 Tubing	F-12
Grade 2 Titanium Tubing	F-12
SAF 2507 Super Duplex Tubing	F-13
Alloy 825 Tubing	F-13
Alloy 625 Tubing	F-14
Pressure Ratings at Elevated Temperatures	F-14
Basic Ordering Number	F-15
Ordering Number Description	F-16

## Tubing Selection

Proper selection, handling, and installation of tubing, when combined with proper selection of FITOK tube fittings, are essential for reliable tubing systems.

The following variables should be considered when ordering tubing for use with FITOK tube fittings:

- ⦿ Surface finish
- ⦿ Material
- ⦿ Hardness
- ⦿ Wall thickness

### Tubing Surface Finish

Many ASTM specifications cover the above requirements, but they often are not very detailed on surface finish. For example, ASTM A450, a general tubing specification, it is specified as below:

#### 12. Straightness and Finish

12.1 Finished tubes shall be reasonably straight and have smooth ends free of burrs. They shall have a workmanlike finish. Surface imperfections (Note) may be removed by grinding, provided that a smooth curved surface is maintained, and the wall thickness is not decreased to less than that permitted by this or the product specification. The outside diameter at the point of grinding may be reduced by the amount so removed.

*Note: An imperfection is any discontinuity or irregularity found in the tube.*

### Material

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

### Hardness

The key to selecting proper tubing for use with metal FITOK tube fittings is that the tubing must be softer than the fitting material. FITOK tube fittings are designed to work properly with the tubing that is suggested in the ordering instructions.

### Wall Thickness

The accompanying tables show working pressure of tubing in a wide range of wall thicknesses. Allowable working pressure are calculated from S values as specified by ASME B31.3, Process Piping. FITOK tube fittings have been repeatedly tested in both the minimum and maximum wall thicknesses shown. FITOK tube fittings are not recommended for tube wall thicknesses outside the ranges shown in the accompanying tables for each size.

## Tubing Handling

It is important to properly handle the tubing in order to reduce the scratches and protect the surface finish.

- ⦿ Tubing should never be dragged out of a tubing rack or across a rough surface.
- ⦿ Tube cutters or hacksaws should be sharp. Do not take deep cuts with each turn of the cutter or stroke of the saw.
- ⦿ Remove burrs on the tube end which will be helpful for the tubing go through the ferrules without damaging the ferrule sealing edge.

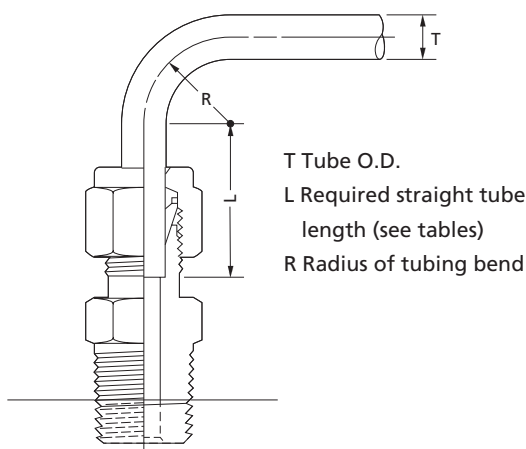
## Gas Service

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 (O.D.) 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 thin-wall tube, allowing the ferrules to coin out minor surface imperfections and grip the tube more firmly. Within the applicable suggested allowable working pressure table, select a tube wall thickness whose working pressure is outside of the shaded areas.

## Tubing Installation



Tubing properly selected and handled, combined with properly installed FITOK 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 FITOK.
- ⦿ FITOK tube fittings assembled in accordance with catalog instructions.

When installing fittings near tube bends, there must be a sufficient straight length of tubing to allow the tube to be bottomed in the FITOK fitting (see tables).

## Types of Tubing

MP tubing and UMP tubing in 316/316L SS are available.

### MP Tubing

- ⦿ Cold-drawn and then mechanically polished to achieve a good surface finish.
  - External surface roughness  $R_a \leq 0.8 \mu\text{m}$ .
  - Internal surface pickled to roughness  $R_a \leq 3.2 \mu\text{m}$
- ⦿ Materials conforming to ASTM A269, A213 or equivalent
- ⦿ Hardness  $\leq \text{HRB90}$

Fractional, in.	
T Tube O.D.	L <sup>Ⓢ</sup>
1/16	1/2
1/8	23/32
3/16	3/4
1/4	13/16
5/16	7/8
3/8	15/16
1/2	1 3/16
5/8	1 1/4
3/4	
7/8	1 5/16
1	1 1/2
1 1/4	2
1 1/2	2 13/32
2	3 1/4

① Required straight tube length.

Metric, mm	
T Tube O.D.	L <sup>Ⓢ</sup>
3	19
6	21
8	23
10	25
12	31
14	32
15	
16	
18	34
20	
22	40
25	46
28	50
30	54
32	63
38	80
50	

### Hydraulic Presetting Tools

A FITOK hydraulic presetting tool **must** be used to install FITOK tube fittings over 1 in. (25 mm). For tube fittings in 1 1/4, 1 1/2, and 2 in. (28, 30, 32, 38, and 50 mm), a presetting tool can be used to preset ferrules onto the tubing tightly. For more information about installation instructions, please contact FITOK or our authorized distributors.

## UMP Tubing

- ⦿ Rolled and bright annealed finish, close dimensional tolerance, hardness ≤ HRB90.  
External surface mechanically polished, roughness Ra ≤ 0.8 μm.  
Internal surface roughness Ra ≤ 0.38 μm
- ⦿ Materials subjected to stricter quality control than ASTM A269, A213 or equivalent

Material	Chemical Composition							
	C	Mn	P	S	Si	Ni	Cr	Mo
316/316L	≤ 0.035	≤ 2.00	≤ 0.045	≤ 0.03	≤ 1.00	<b>12.0-14.0</b>	<b>17.0-18.0</b>	<b>2.60-3.00</b>

- ⦿ With better corrosion resistance compared to stainless seamless tubing.  
Suitable for application in marine or chemically corrosive environment

## Suggested Allowable Working Pressure for Tubing

Figures and tables are for reference only. No implication is made that these values can be used for design work. Applicable codes and practices in industry should be considered. ASME Codes are the successor to and replacement of ASA Piping Codes.

- ⦿ All pressures are calculated from equations in ASME B31.3, Process Piping. See factors for calculating working pressures in accordance with ASME B31.1, Power Piping.
- ⦿ Calculations are based on maximum O.D. and minimum wall thickness, except as noted in individual tables.  
**Example:** 1/2 in. O.D.×0.035 in. wall thickness stainless steel tubing purchased to ASTM A269:  
**O.D. Tolerance ±0.005 in. / Wall Thickness Tolerance ±10%**  
Calculations are based on 0.505 in.O.D.×0.0315 in. wall thickness tubing.
- ⦿ No allowance is made for corrosion or erosion.

## Stainless Steel Tubing

**Table 1 — Fractional Seamless Tubing**

Allowable working pressures are calculated from an S value of 20 000 psig (137.8 MPa) for ASTM A269 tubing at -20 to 100°F (-28 to 37°C), as listed in ASME B31.3 and ASME B31.1.

### For Welded Tubing

For welded and drawn tubing, a derating factor must be applied for weld integrity:

- ⦿ For double-welded tubing, multiply working pressure by 0.85.
- ⦿ For single-welded tubing, multiply working pressure by 0.80.

Tube O.D. (in.)	Tube Wall Thickness, in.															
	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
	Working Pressure, psig															
1/16	5600	6800	8100	9400	12000											
1/8						8500	10900									
3/16						5400	7000	10200								
1/4						4000	5100	7500	10200							
5/16							4000	5800	8000							
3/8							3300	4800	6500							
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

**Note:** For gas service, select a tube thickness outside of the shaded area.



**Suggested Ordering Information**

High-quality, fully annealed (Type 304/304L, 316/316L) (seamless or welded and drawn) stainless steel hydraulic tubing, ASTM A269 or A213, or equivalent. Hardness not to exceed 90 HRB or 200 HV. Tubing to be free of scratches, suitable for bending and flaring. O.D. tolerances not to exceed ±0.003 in. for 1/16 in. O.D. tubing.

**Note:** Certain austenitic stainless tubing has an allowable ovality tolerance double the O.D. tolerance and may not fit into FITOK precision tube fittings. Dual-certified grades such as 304/304L and 316/316L meet the minimum chemistry and the mechanical properties of both alloy grades.

**Table 2—Metric Seamless Tubing**

Allowable working pressures are based on equations from ASME B31.3 for EN ISO 1127 tubing (D4, T4 tolerance for 3 to 12 mm; D4, T3 tolerance 14 to 50 mm), using a stress value of 137.8 MPa (20 000 psig) and tensile strength of 516.4 MPa (74 900 psig), as listed in ASME B31.3 and ASME B31.1.

**For Welded Tubing**

For welded and drawn tubing, a derating factor must be applied for weld integrity:

- ⦿ For double-welded tubing, multiply working pressure by 0.85.
- ⦿ For single-welded tubing, multiply working pressure by 0.80.

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	4.5
	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	

**Note:** For gas service, select a tube thickness outside of the shaded area.

**Suggested Ordering Information**

High-quality, fully annealed (Type 304/304L, 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 and flaring. O.D. tolerances not to exceed ±0.076 mm for 3 mm O.D. tubing.

**Note:** Dual-certified grades such as 304/304L, 316/316L meet the minimum chemistry and the mechanical properties of both alloy grades.

## Carbon Steel Tubing

**Table 3 — Fractional**

Allowable working pressures are calculated from an S value of 15 700 psig (108.2 MPa) for ASTM A179 tubing at -20 to 100°F (-28 to 37°C), as listed in ASME B31.3. For working pressure in accordance with ASME B31.1, multiply by 0.85.

Tube O.D. (in.)	Tube Wall Thickness, in.												
	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120	0.134	0.148	0.165	0.180	0.220
	Working Pressure, psig												
1/8	8000	10200											
3/16	5100	6600	9600										
1/4	3700	4800	7000	9600									
5/16		3700	5500	7500									
3/8		3100	4500	6200									
1/2		2300	3200	4500	5900								
5/8		1800	2600	3500	4600	5300							
3/4			2100	2900	3700	4300	5100						
7/8			1800	2400	3200	3700	4300						
1			1500	2100	2700	3200	3700	4100					
1 1/4				1600	2100	2500	2900	3200	3600	4000	4600	5000	
1 1/2					1800	2000	2400	2600	2900	3300	3700	4100	5100

**Note: For gas service, select a tube thickness outside of the shaded area.**

**Suggested Ordering Information**

High-quality, soft annealed seamless carbon steel hydraulic tubing, ASTM A179 or equivalent. Hardness not to exceed 72 HRB or 130 HV. Tubing to be free of scratches, suitable for bending and flaring.

**Table 4 — Metric**

Allowable working pressures are based on equations from ASME B31.3 for DIN 2391 tubing, using a stress value of 113 MPa (16 300 psig) and tensile strength of 340 MPa (49 300 psig).

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
	Working Pressure, bar												
3	630	790											
6	290	370	460	590									
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						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

**Note: For gas service, select a tube thickness outside of the shaded area.**

**Suggested Ordering Information**

High-quality, soft annealed carbon steel tubing, DIN 2391 or equivalent. Hardness not to exceed 72 HRB or 130 HV. Tubing to be free of scratches, suitable for bending and flaring.

## Copper Tubing

Allowable working pressures are calculated from an S value of 6000 psig (41.3 MPa) for ASTM B75 (B75M) tubing at -20 to 100°F (-28 to 37°C), as listed in ASME B31.3 and ASME B31.1.

**Table 5 — Fractional**

Tube O.D. (in.)	Tube Wall Thickness, in.									
	0.028	0.030	0.035	0.049	0.065	0.083	0.095	0.109	0.120	0.134
	Working Pressure, psig									
1/8	2700	3000	3600							
3/16	1800	1900	2300	3400						
1/4	1300	1400	1600	2500	3500					
5/16			1300	1900	2700					
3/8			1000	1600	2200					
1/2			800	1100	1600	2100				
5/8				900	1200	1600	1900			
3/4				700	1000	1300	1500	1800		
7/8				600	800	1100	1300	1500		
1				500	700	900	1100	1300	1500	
1 1/8					600	800	1000	1100	1300	1400

**Note:** For gas service, select a tube thickness outside of the shaded area.

**Table 6 — Metric**

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
	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	130			
15			60	80	100	110	120			
16				70	90	100	110	120		
18				60	80	90	100	110		
20				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

**Note:** For gas service, select a tube thickness outside of the shaded area.

### Suggested Ordering Information

High-quality, soft annealed seamless copper tubing, ASTM B75 (B75M) or equivalent. Also soft annealed (Temper O) copper water tube, type K or type L to ASTM B88 .

## Alloy 400 Tubing

Allowable working pressures are calculated from an S value of 18 700 psig (128.9 MPa) for ASTM B165 tubing at -20 to 100°F (-28 to 37°C), as listed in ASME B31.3 and ASME B31.1.

**Table 7 — Fractional**

Tube O.D. (in.)	Tube Wall Thickness, in.							
	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120
	Working Pressure, psig							
1/8	7900	10 100						
1/4	3700	4 800	7000	9500				
5/16		3 700	5400	7300				
3/8		3 100	4400	6100				
1/2		2 300	3200	4400				
3/4			2200	3000	4000	4600		
1				2200	2900	3400	3900	4300

**Note: For gas service, select a tube thickness outside of the shaded area.**

**Table 8 — Metric**

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
	Working Pressure, bar									
6	310	390	490	620						
8		290	350	450						
10		220	280	350						
12		180	230	290						
14		160	190	240	270					
18			150	200	240	270	300			
20				180	210	240	270	290		
25					170	190	210	240	270	290

**Note: For gas service, select a tube thickness outside of the shaded area.**

### Suggested Ordering Information

High-quality, fully annealed seamless alloy 400 hydraulic tubing, ASTM B165 or equivalent. Hardness not to exceed 75 HRB or 137 HV. Tubing to be free of scratches, suitable for bending and flaring. O.D. tolerances not to exceed  $\pm 0.005$  in ( $\pm 0.13$  mm).

## Alloy C-276 Tubing

Allowable working pressures are based on equations from ASME B31.3 and ASME B31.1 for a maximum S value of 20 000 psig (137.8 MPa).

**Table 9 — Fractional**

Tube O.D. (in.)	Tube Wall Thickness, in.			
	0.028	0.035	0.049	0.065
	Working Pressure, psig			
1/4	4000	5100	7500	1 0200
5/16		4000	5800	7 800
3/8		3300	4800	6 500
1/2		2600	3700	5 100

**Note: For gas service, select a tube thickness outside of the shaded area.**

**Table 10 — Metric**

Tube O.D. (mm)	Tube Wall Thickness, mm			
	0.8	1.0	1.2	1.5
	Working Pressure, bar			
6	310	420	520	670
8		310	390	500
10		240	300	380
12		200	240	310

**Note: For gas service, select a tube thickness outside of the shaded area.**

### Suggested Ordering Information

High-quality, fully annealed alloy C-276 tubing, ASTM B622 or equivalent. Hardness not to exceed 100 HRB or 248 HV. Tubing to be free of scratches, suitable for bending and flaring. O.D. tolerances not to exceed ±0.005 in (±0.13 mm).

## Alloy 20 Tubing

Allowable working pressures are based on equations from ASME B31.3 and ASME B31.1 for a maximum S value of 20 000 psig (137.8 MPa).

**Table 11 — Fractional**

Tube O.D. (in.)	Tube Wall Thickness, in.			
	0.028	0.035	0.049	0.065
	Working Pressure, psig			
1/4	4000	5100	7500	1 0200
3/8		3300	4800	6 500
1/2		2600	3700	5 100

**Note: For gas service, select a tube thickness outside of the shaded area.**

**Table 12 — Metric**

Tube O.D. (mm)	Tube Wall Thickness, mm			
	0.8	1.0	1.2	1.5
	Working Pressure, bar			
6	310	420	520	670
10		240	300	380
12		200	240	310

**Note: For gas service, select a tube thickness outside of the shaded area.**

### Suggested Ordering Information

High-quality, fully annealed seamless or welded and drawn alloy 20 tubing, ASTM B729, B468 or equivalent. Hardness not to exceed 95 HRB. Tubing to be free of scratches, suitable for bending and flaring. O.D. tolerances not to exceed ±0.005 in (±0.13 mm).

## Alloy 600 Tubing

Allowable working pressures are based on equations from ASME B31.3 and ASME B31.1 for a maximum S value of 20 000 psig (137.8 MPa).

**Table 13 — Fractional**

Tube O.D. (in.)	Tube Wall Thickness, in.			
	0.028	0.035	0.049	0.065
	Working Pressure, psig			
1/4	4000	5100	7500	10200
3/8		3300	4800	6500
1/2		2600	3700	5100

**Note: For gas service, select a tube thickness outside of the shaded area.**

**Table 14 — Metric**

Tube O.D. (mm)	Tube Wall Thickness, mm			
	0.8	1.0	1.2	1.5
	Working Pressure, bar			
6	310	420	520	670
10		240	300	380
12		200	240	310

**Note: For gas service, select a tube thickness outside of the shaded area.**

### Suggested Ordering Information

High-quality, fully annealed, cold drawn #1 temper alloy 600 seamless alloy tubing, ASTM B167 or equivalent. Hardness not to exceed 92 HRB or 198 HV. Tubing to be free of scratches, suitable for bending and flaring. Order to outside diameter and wall thickness only, not to inside diameter, average wall specification. O.D. tolerances not to exceed ±0.005 in (±0.13 mm).

## Grade 2 Titanium Tubing

Allowable working pressures are based on equations from ASME B31.3 and a maximum S value of 16 700 psig (115.1 MPa) for ASTM B338 tubing at -20 to 100°F (-28 to 37°C). For working pressure in accordance with ASME B31.1, multiply by 0.85.

**Table 15 — Fractional**

Tube O.D. (in.)	Tube Wall Thickness, in.			
	0.028	0.035	0.049	0.065
	Working Pressure, psig			
1/4	3500	4500	6700	9100
3/8		2900	4200	5800
1/2		2100	3100	4200

**Note: For gas service, select a tube thickness outside of the shaded area.**

**Table 16 — Metric**

Tube O.D. (mm)	Tube Wall Thickness, mm			
	0.8	1.0	1.2	1.5
	Working Pressure, bar			
6	290	380	470	600
10		210	260	340
12		180	220	280

**Note: For gas service, select a tube thickness outside of the shaded area.**

### Suggested Ordering Information

High-quality, fully annealed seamless or welded and drawn grade 2 titanium tubing, ASTM B338 or equivalent. Tubing to be free of scratches, suitable for bending. O.D. tolerances not to exceed ±0.005 in (±0.13 mm).

## SAF 2507 Super Duplex Tubing

Allowable working pressures are calculated from an S value of 38 700 psig (266.8 MPa) for ASTM A789 tubing at -20 to 100°F (-28 to 37°C), as listed in ASME B31.3.

**Table 17 — Fractional**

Tube O.D. (in.)	Tube Wall Thickness, in.				
	0.035	0.049	0.065	0.083	0.095
	Working Pressure, psig				
1/4	10 000	15 000			
3/8	6 500	10 100	12 700		
1/2	5 000	7 200	10 100	12 900	
5/8		5 800	7 600	10 100	
3/4		4 700	6 300	8 500	10 000

**Note:** For gas service, select a tube thickness outside of the shaded area.

### Suggested Ordering Information

High-quality, fully annealed SAF 2507 super duplex tubing, ASTM A789 or equivalent. Hardness not to exceed 32 HRC. Tubing to be free of scratches, suitable for bending and flaring.

## Alloy 825 Tubing

Allowable working pressures are calculated from an S value of 23 300 psig (160.6 MPa) for ASTM B163 and ASTM B423 seamless tubing at -20 to 100°F (-28 to 37°C), For ASTM B704, Class 1 or equivalent welded and drawn tubing, multiply working pressure by 0.85.

**Table 18 — Fractional**

Tube O.D. (in.)	Tube Wall Thickness, in.		
	0.035	0.049	0.065
	Working Pressure, psig		
1/4	6400	9300	11 600
3/8	4100	5900	8 200
1/2	3000	4300	5 900

**Table 19 — Metric**

Tube O.D. (in.)	Tube Wall Thickness, mm				
	0.8	1.0	1.2	1.5	1.8
	Working Pressure, bar				
6	410	530	660		
10		300	370	480	
12		250	300	390	480

### Suggested Ordering Information

High-quality, fully annealed seamless alloy 825 tubing, ASTM B163, ASTM B423, or equivalent. Fully annealed welded alloy 825 tubing, ASTM B704, class 1 or equivalent. Hardness not to exceed HR15T90 or 201 HV. Tubing to be free of scratches, suitable for bending and flaring. Wall thickness tolerances not to exceed ±10%.

## Alloy 625 Tubing

Allowable working pressures are calculated from an S value of 26 700 psig (184.1 MPa) for ASTM B444 Grade 2 tubing at -20 to 100°F (-28 to 37°C) in accordance with ASME BPV 2001, tubing outside diameter and wall thickness tolerances from ASTM B444 for small-diameter tube.

Table 20 — Fractional

Tube O.D. (in.)	Tube Wall Thickness, in.		
	0.035	0.049	0.065
	Working Pressure, psig		
1/4	7300	10 700	14 600
3/8	4700	6 800	9 400
1/2	3500	5 000	6 800

Table 21 — Metric

Tube O.D. (mm)	Tube Wall Thickness, mm				
	0.8	1.0	1.2	1.5	1.8
	Working Pressure, bar				
6	470	610	750		
10		350	430	550	
12		290	350	450	550

### Suggested Ordering Information

High-quality, fully annealed seamless alloy 625 tubing, ASTM B444, Grade 1 or equivalent. Hardness not to exceed 25 HRC or 266 HV. Tubing to be free of scratches, suitable for bending and flaring.

**Note:** For sizes not listed in the tables above, we recommend that a sample of the tubing and all pertinent information relating to system parameters be provided for evaluation before installation. Give tubing sample and system information to any of authorized FITOK distributors to forward to the factory.

## Pressure Ratings at Elevated Temperatures

Table 22 — Elevated Temperature Factors

Temperature		Tubing Materials											
°F	°C	Copper	Carbon Steel <sup>①</sup>	304/304L <sup>②</sup>	316/316L <sup>②</sup>	Alloy 400	Alloy 20 <sup>③</sup>	Alloy C-276 <sup>③</sup>	Alloy 600 <sup>③</sup>	Ti	SAF 2507	Alloy 825	Alloy 625
200	93	0.80	0.95	1.00	1.00	0.87	1.00	1.00	1.00	0.86	0.90	1.00	0.93
400	204	0.50	0.87 <sup>①</sup>	0.93	0.96	0.79	0.96	0.96	0.96	0.61	0.82	0.90	0.85
600	315			0.82	0.85	0.79	0.85	0.85	0.85	0.45	0.80	0.84	0.79
800	426			0.76	0.79	0.75	0.79	0.79	0.79			0.81	0.75
1000	537			0.69	0.76			0.76	0.35				0.73

① Based on 375°F (190°C) max.

② Dual-certified grades such as 304/304L and 316/316L meet the minimum chemistry and the mechanical properties of both alloy grades.

③ Based on the lower derating factor for stainless steel, in accordance with ASME B31.3.

To determine allowable working pressure at elevated temperatures, multiply allowable working pressures from Tables 1 through 21 by a factor shown in Table 22.

**Example:** Type 316/316L stainless steel 1/2 in. O.D. × 0.035 in. wall at 1000°F

- The allowable working pressure at -20 to 100°F (-28 to 37°C) is 2600 psig (Table 1, page F-06).
- The elevated temperature factor for 1000°F (537°C) is 0.76 (Table 22, above):

$$2600 \text{ psig} \times 0.76 = 1976 \text{ psig}$$

The allowable working pressure for 316/316L 1/2 in. O.D. × 0.035 in. wall tubing at 1000°F (537°C) is 1976 psig.



## Basic Ordering Number

### Fractional Stainless Steel Seamless Tubing

Tube O.D. (in.)	Wall Thickness (in.)	Basic Ordering Number		Weight
		316/316L	304/304L	lb/ft
1/4	0.035	6L-ST4-035-	4L-ST4-035-	0.082
	0.049	6L-ST4-049-	4L-ST4-049-	0.107
3/8	0.049	6L-ST6-049-	4L-ST6-049-	0.173
	0.065	6L-ST6-065-	4L-ST6-065-	0.219
1/2	0.049	6L-ST8-049-	4L-ST8-049-	0.240
	0.065	6L-ST8-065-	4L-ST8-065-	0.307
3/4	0.065	6L-ST12-065-	4L-ST12-065-	0.484
1	0.083	6L-ST16-083-	4L-ST16-083-	0.827
1 1/2	0.134	6L-ST24-134-	4L-ST24-134-	1.989

### Metric Stainless Steel Seamless Tubing

Tube O.D. (mm)	Wall Thickness (mm)	Basic Ordering Number		Weight
		316/316L	304/304L	Kg/m
6	1.0	6L-ST6M-1.0-	4L-ST6M-1.0-	0.125
8	1.0	6L-ST8M-1.0-	4L-ST8M-1.0-	0.175
10	1.0	6L-ST10M-1.0-	4L-ST10M-1.0-	0.226
	1.5	6L-ST10M-1.5-	4L-ST10M-1.5-	0.320
12	1.5	6L-ST12M-1.5-	4L-ST12M-1.5-	0.395
	2.0	6L-ST12M-2.0-	4L-ST12M-2.0-	0.501
14	1.5	6L-ST14M-1.5-	4L-ST14M-1.5-	0.470
	2.0	6L-ST14M-2.0-	4L-ST14M-2.0-	0.602
16	1.5	6L-ST16M-1.5-	4L-ST16M-1.5-	0.545
	2.0	6L-ST16M-2.0-	4L-ST16M-2.0-	0.702
18	1.5	6L-ST18M-1.5-	4L-ST18M-1.5-	0.620
	2.0	6L-ST18M-2.0-	4L-ST18M-2.0-	0.802
20	2.0	6L-ST20M-2.0-	4L-ST20M-2.0-	0.903
25	2.5	6L-ST25M-2.5-	4L-ST25M-2.5-	1.410
28	2.8	6L-ST28M-2.8-	4L-ST28M-2.8-	1.769
30	3.0	6L-ST30M-3.0-	4L-ST30M-3.0-	2.031
32	3.5	6L-ST32M-3.5-	4L-ST32M-3.5-	2.501
38	4.0	6L-ST38M-4.0-	4L-ST38M-4.0-	3.410

Weight unit conversion:

1 lb/ft=1.488 Kg/m 1 Kg/m=0.672 lb/ft

# Ordering Number Description

6L - ST6 - 049 - 20 - MP - A269

Material	Type	Tube O.D.		Wall Thickness <sup>①</sup>		Length		Condition	Standard
		Fractional	Metric	Fractional	Metric	Fractional	Metric		
6L	ST Seamless Tubing	1	2M	028	0.8 mm	1	1 foot	MP Mechanically Polished	A179
4L		2	3M	035	1.0 mm	3	3 feet		A269
CS	Carbon Steel	3	6M	049	1.2 mm	6	6 feet	UMP Finish rolling and high corrosion resistance	A789
CU		4	8M	065	1.5 mm	20	20 feet		B75
M	Alloy 400	5	10M	083	1.8 mm	50C	50 feet Coil <sup>②</sup>		B165
HC		6	12M	095	2.0 mm	100C	100 feet Coil <sup>②</sup>		B622
A20	Alloy 20	8	14M	109	2.2 mm	20MC	20000mm Coil <sup>②</sup>		B729
INC		10	15M	120	2.5 mm	50MC	50000mm Coil <sup>②</sup>		B167
T12	Titanium Grade 2	12	16M	134	2.8 mm				B338
D7		14	18M	156	3.0 mm				B163
A85	Alloy 825	16	20M	188	3.5 mm				B444
A65		20	22M		4.0 mm				
		24	25M		4.5 mm				
			28M						
			30M						
			32M						
			38M						

① : Refer to Table 1 to 21 for tubing wall thickness.

② : ② Standard materials of coil tubing: 6L, 4L, CS, CU;

③ : ③ Coil Tubing O.D. : up to 1/2", 14 mm;

④ : ④ For coil tubing of other materials, O.D. or length, please contact FITOK Group or our authorized distributors.

Note: "Ordering Number Description" is a reference to understand the combination rules of FITOK product part number. Not all combinations are available.

# Tools and Accessories



# Contents

## Hand Tube Benders

F-19

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## Tube Cutters

F-19

---

## Tube Deburring Tools

F-20

---

## Hydraulic Presetting Tools

F-20

---

## Manual Presetting Tools

F-21

---

## Gap Inspection Gauges

F-22

---

## Bulkhead Retainers

F-23

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# Hand Tube Benders

## Features

- ◎ For bending stainless steel and copper tubing from 1/4" to 1/2" and 6 mm to 16 mm outside diameter
- ◎ Roll dies reduce bending force and tube ovality, as compared to conventional slide block design
- ◎ 1° to 180° bending range

## Ordering Information

Ordering Number	Tube O.D.	Bend Radius
HTB-4S	1/4"	0.56"
HTB-4	1/4"	0.75"
HTB-5	5/16"	0.94"
HTB-6	3/8"	
HTB-8	1/2"	1.5"
HTB-6M	6 mm	15 mm
HTB-8M	8 mm	24 mm
HTB-10M	10 mm	
HTB-12M	12 mm	38 mm
HTB-14M-L	14 mm	56 mm
HTB-16M-L	16 mm	



The hand tube bender can not be used for SAF 2507 tubing over 1/4" or for medium-pressure tubing.

# Tube Cutters

## Features

- ◎ For cutting stainless steel, soft copper, and aluminum tubing from 3/16" to 1" and 6 to 25 mm outside diameter
- ◎ Flare-out and work hardening of tube end is reduced

## Ordering Information

Ordering Number	Tube O.D.	Wheel Ordering Number
FTC-03	1/8" to 1" and 3 mm to 25 mm	FTC-03-RR
FTC-04	1/4" to 1 3/8" and 6 mm to 35 mm	FTCW-45
FTC-05	1/4" to 2 5/8" and 6 mm to 65 mm	



# Tube Deburring Tools

## Features

- For deburring stainless steel, carbon steel, copper and aluminum tube ends
- Steel blades for long life



## Ordering Information

Ordering Number	Deburring Position	Size	Tube Material
TDT-01	I.D.	less than 6 mm	Stainless Steel, Carbon Steel, Copper, Aluminum
TDT-03	O.D.	6 mm to 38 mm and 1/4" to 1 1/2"	Copper, Aluminum
	I.D.		
TDT-05	O.D.	6 mm to 36 mm and 1/4" to 1 1/4"	Stainless Steel, Carbon Steel
	I.D.		

# Hydraulic Presetting Tools

## Features

- To preset ferrules onto tubing
- For installing 1/2" to 2" and 12 mm to 50 mm carbon steel, stainless steel, and alloy steel tube fittings
- Manually operated hydraulic pump, without requirement for power or compressed air
- Made of high grade alloy steel for more durable and firmer usage
- Flexible hose connection between the pump and jig to assure easy and comfortable operation
- Reduce assembly and installation time and operator error
- Fit neatly in a rugged plastic carrying case
- Figure dimensions (L x W x H): 12.6 in. x 9.8 in. x 5.9 in. (the height of handle excluded)



## Ordering Information

### HPT-03 Series

Ordering Number	Tube O.D.
HPT-03M	12 mm, 14 mm, 15 mm, 16 mm, 18 mm, 20 mm, 22 mm, 25 mm
HPT-03F	1/2", 5/8", 3/4", 7/8", 1"
HPT-03-U	Choose your needs from Die Heads for HPT-03 Series
HPT-03	Include HPT-03M and HPT-03F

### Die Heads for HPT-03 Series

Ordering Number	Tube O.D.
HPT-ML12	12 mm
HPT-ML14	14 mm
HPT-ML15	15 mm
HPT-ML16	16 mm
HPT-ML18	18 mm
HPT-ML20	20 mm
HPT-ML22	22 mm
HPT-ML25	25 mm
HPT-FL8	1/2"
HPT-FL10	5/8"
HPT-FL12	3/4"
HPT-FL14	7/8"
HPT-FL16	1"

### HPT-05 Series

Ordering Number	Tube O.D. (Dimensions)
HPT-05M	28 mm, 30 mm, 32 mm, 38 mm, 50 mm
HPT-05F	1-1/4", 1-1/2", 2"
HPT-05-U	Choose your needs from Die Heads for HPT-05 Series
HPT-05	Include HPT-05M and HPT-05F

### Die Heads for HPT-05 Series

Ordering Number	Tube O.D.
HPT-ML28	28 mm
HPT-ML30	30 mm
HPT-ML32	32 mm
HPT-ML38	38 mm
HPT-ML50	50 mm
HPT-FL20	1-1/4"
HPT-FL24	1-1/2"
HPT-FL32	2"

## Manual Presetting Tools

### Features

For tube fitting installations in close quarters, the presetting tool can make installation easier and more reliable when paired with the table vice.

- ⦿ For installing 1/4" to 1" and 6 mm to 25 mm carbon steel, stainless steel and alloy steel tube fittings
- ⦿ High grade alloy used for clamp to make the presetting tool reliable and durable
- ⦿ Easy mounting to table vice
- ⦿ Wider and safer work condition



### Ordering Information

Ordering Number	Tube O.D.
MPT-6M	6 mm
MPT-8M	8 mm
MPT-10M	10 mm
MPT-12M	12 mm
MPT-14M	14 mm
MPT-15M	15 mm
MPT-16M	16 mm
MPT-18M	18 mm
MPT-20M	20 mm
MPT-22M	22 mm
MPT-25M	25 mm

Ordering Number	Tube O.D.
MPT-4	1/4"
MPT-6	3/8"
MPT-8	1/2"
MPT-10	5/8"
MPT-12	3/4"
MPT-14	7/8"
MPT-16	1"

*FITOK gap inspection gauge can not be used to check the fittings preset by MPT series presetting tools.*

# Gap Inspection Gauges

## Features

On initial installation, the FITOK gap inspection gauge assures the installer or inspector that a fitting has been sufficiently tightened.

- ⦿ For all metal fittings, sizes from 1/16" to 1" and 2 mm to 25 mm
- ⦿ Simple and consistent operation

## Ordering Information

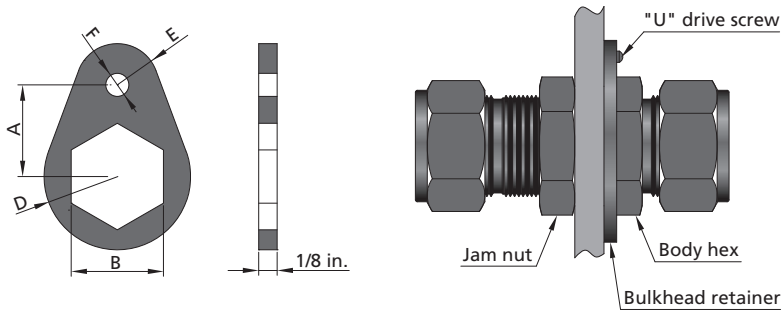
Fitting Size		Ordering Number
in.	mm	
1/16	—	GIG-1
1/8	2, 3	GIG-2
3/16	4	GIG-3
1/4	6	GIG-4
5/16	8	GIG-5
3/8	—	GIG-6
—	10	GIG-10M
1/2	12	GIG-8
5/8	14, 15, 16	GIG-10
3/4	18	GIG-12
7/8	20, 22	GIG-14
1	25	GIG-16
1/4, 3/8, 1/2	6, 12	GIG-468
1/4, 1/2	6, 8, 10, 12	GIG-48





# Bulkhead Retainers

## Features



Bulkhead fitting installation  
utilizing bulkhead retainer

## Ordering Information

Fitting Size		Ordering Number	Dimensions, in.					"U" Drive Screw Size	Drill Number	
in.	mm		A	B	D	E	F			Drill Hole Dia
1/16	—	SS-BR-1	3/8	5/16	5/16	5/32	5/32	0.120	6-3/8	31
1/8	—	SS-BR-2	1/2	1/2	13/32	7/32				
3/16	3,4	SS-BR-3	9/16	9/16	15/32	1/4				
1/4	6	SS-BR-4	5/8	5/8	1/2	9/32				
5/16	—	SS-BR-5	11/16	11/16	9/16	5/16				
—	8	SS-BR-M8	11/16	18mm	9/16	5/16				
3/8	—	SS-BR-6	3/4	3/4	5/8	11/32	7/32	0.161	10-1/2	20
—	10	SS-BR-M10	15/16	22mm	3/4	13/32				
1/2	12	SS-BR-8	15/16	15/16	3/4	13/32				
5/8	14,15,16	SS-BR-10	1	1-1/16	13/16	13/32				
3/4	18	SS-BR-12	1-1/16	1-3/16	29/32	15/32				
7/8	—	SS-BR-14	1-1/8	1-5/16	1-1/32	17/32				
1	25	SS-BR-16	1-9/32	1-5/8	1-5/32	9/16				

# Syphons

WS, LWS and UWS Series



## Features

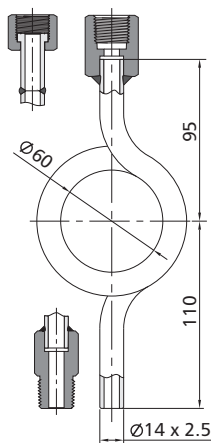
- Maximum working temperature: 850°F (454°C).
- Working pressure up to: 6000 psig (414 bar). Multiply the working pressure by the elevated temperature factors to get the working pressure at elevated temperature. To locate the elevated temperature factor, please refer to the related information on page F-14.
- Standard materials are 316 SS and 304 SS, other materials are available upon request.

## Material Specifications

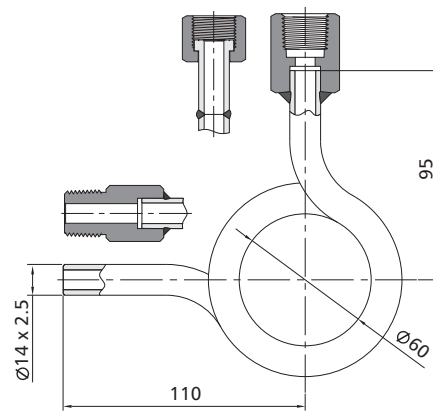
Component	Material Specifications
Tube	316L or 304L/A269
Connector	316 or 304/A276

## Types and Dimensions

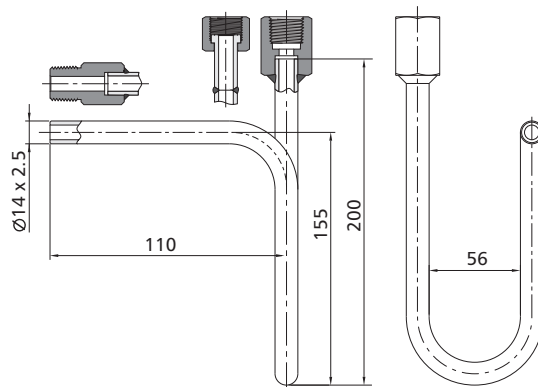
WS Series



LWS Series



UWS Series



Dimensions are in mm unless otherwise specified. They are for reference only and are subject to change.

## Ordering Information

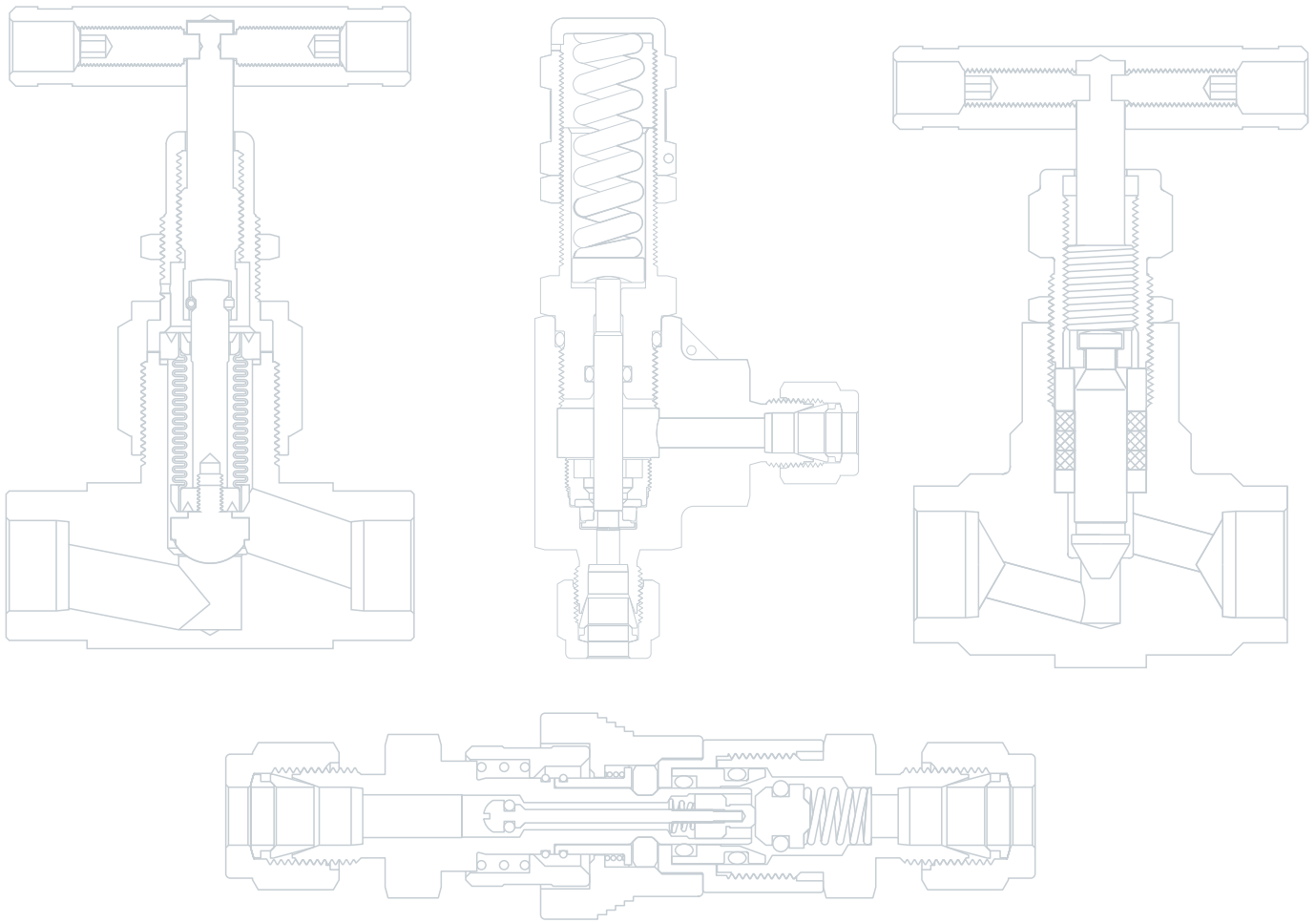
Add the material designator as prefix to the basic ordering number (SS for 316 SS, S4 for 304 SS).

Example: **SS-WS-MTB14**

End Types and Size		Basic Ordering Number		
Cock End	Process End	WS Series	LWS Series	UWS Series
1/2 Female NPT	1/2 Female NPT	-WS-FNS8	-LWS-FNS8	-UWS-FNS8
1/2 Female NPT	1/4 Female NPT	-WS-FNS8-FNS4	-LWS-FNS8-FNS4	-UWS-FNS8-FNS4
1/2 Female NPT	1/2 Female ISO Parallel Thread	-WS-FNS8-RG8	-LWS-FNS8-RG8	-UWS-FNS8-RG8
1/2 Female NPT	1/4 Female ISO Parallel Thread	-WS-FNS8-RG4	-LWS-FNS8-RG4	-UWS-FNS8-RG4
1/2 Female NPT	M20 x 1.5 Female ISO	-WS-FNS8-MG20	-LWS-FNS8-MG20	-UWS-FNS8-MG20
1/2 Female NPT	M14 x 1.5 Female ISO	-WS-FNS8-MG14	-LWS-FNS8-MG14	-UWS-FNS8-MG14
1/2 Female NPT	1/2 Tube Socket Weld	-WS-FNS8-TS8	-LWS-FNS8-TS8	-UWS-FNS8-TS8
1/2 Female NPT	14 mm Tube Socket Weld	-WS-FNS8-MTS14	-LWS-FNS8-MTS14	-UWS-FNS8-MTS14
M20 x 1.5 Female ISO	M20 x 1.5 Female ISO	-WS-MG20	-LWS-MG20	-UWS-MG20
M20 x 1.5 Female ISO	M14 x 1.5 Female ISO	-WS-MG20-MG14	-LWS-MG20-MG14	-UWS-MG20-MG14
M20 x 1.5 Female ISO	∅ 14 x 2.5	-WS-MG20-MTB14	-LWS-MG20-MTB14	-UWS-MG20-MTB14
Rotating M20 x 1.5 Female ISO	M20 x 1.5 Female ISO	-WS-RMG20-MG20	-LWS-RMG20-MG20	-UWS-RMG20-MG20
Rotating M20 x 1.5 Female ISO	M14 x 1.5 Female ISO	-WS-RMG20-MG14	-LWS-RMG20-MG14	-UWS-RMG20-MG14
Rotating M20 x 1.5 Female ISO	∅ 14 x 2.5	-WS-RMG20-MTB14	-LWS-RMG20-MTB14	-UWS-RMG20-MTB14
1/2 Female ISO Parallel Thread	M20 x 1.5 Female ISO	-WS-RG8-MG20	-LWS-RG8-MG20	-UWS-RG8-MG20
1/2 Female ISO Parallel Thread	M14 x 1.5 Female ISO	-WS-RG8-MG14	-LWS-RG8-MG14	-UWS-RG8-MG14
1/2 Female ISO Parallel Thread	∅ 14 x 2.5	-WS-RG8-MTB14	-LWS-RG8-MTB14	-UWS-RG8-MTB14
Rotating 1/2 Female ISO Parallel Thread	M20 x 1.5 Female ISO	-WS-RRG8-MG20	-LWS-RRG8-MG20	-UWS-RRG8-MG20
Rotating 1/2 Female ISO Parallel Thread	M14 x 1.5 Female ISO	-WS-RRG8-MG14	-LWS-RRG8-MG14	-UWS-RRG8-MG14
Rotating 1/2 Female ISO Parallel Thread	∅ 14 x 2.5	-WS-RRG8-MTB14	-LWS-RRG8-MTB14	-UWS-RRG8-MTB14
∅ 14 x 2.5	∅ 14 x 2.5	-WS-MTB14	-LWS-MTB14	-UWS-MTB14
1/2 Male NPT	1/2 Male NPT	-WS-NS8	-LWS-NS8	-UWS-NS8
1/2 Male NPT	1/4 Female NPT	-WS-NS8-FNS4	-LWS-NS8-FNS4	-UWS-NS8-FNS4
1/2 Male ISO Parallel Thread	1/4 Male ISO Parallel Thread	-WS-BP8-BP4	-LWS-BP8-BP4	-UWS-BP8-BP4
1/2 Male ISO Parallel Thread	1/4 Female ISO Parallel Thread	-WS-BP8-RG4	-LWS-BP8-RG4	-UWS-BP8-RG4
M20 x 1.5 Male ISO	M20 x 1.5 Female ISO	-WS-MS20-MG20	-LWS-MS20-MG20	-UWS-MS20-MG20
M20 x 1.5 Male ISO	M14 x 1.5 Female ISO	-WS-MS20-MG14	-LWS-MS20-MG14	-UWS-MS20-MG14
M14 x 1.5 Male ISO	M20 x 1.5 Female ISO	-WS-MS14-MG20	-LWS-MS14-MG20	-UWS-MS14-MG20
M14 x 1.5 Male ISO	M14 x 1.5 Female ISO	-WS-MS14-MG14	-LWS-MS14-MG14	-UWS-MS14-MG14

## **Warranty Information**

FITOK products are backed by the FITOK Limited Lifetime Warranty. For a copy, contact FITOK Group or our authorized distributors.



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