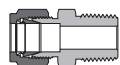


# 6 Series Tube Fittings



# Contents

## Male Connectors - CM



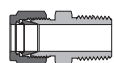
A-14

## Bulkhead Male Connectors - BCM



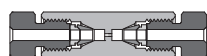
A-26

## Thermocouple Connectors - TCM



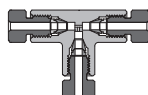
A-27

## Chromatograph Fittings - U



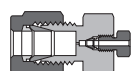
A-28

## Chromatograph Fittings - TTT



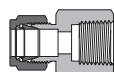
A-28

## Column End Fittings - U



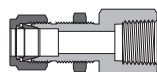
A-29

## Female Connectors - CF



A-29

## Bulkhead Female Connectors - BCF



A-34

## Unions - U



A-35

## Conversion Unions - U



A-36

## Reducing Unions - U



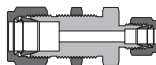
A-37

## Bulkhead Unions - BU



A-38

## Bulkhead Reducing Unions - BU



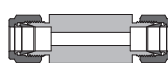
A-38

## Bulkhead Conversion Unions - BU



A-39

## Weld Bulkhead Unions - BU



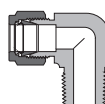
A-40

## Bulkhead Locknuts - BN



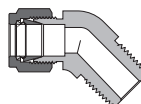
A-40

## Male Elbows - LM



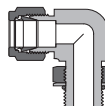
A-41

## 45° Male Elbows - VM



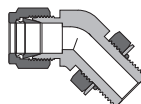
A-44

## Positionable Male Elbows - LP



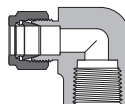
A-45

## 45° Positionable Male Elbows - VP



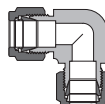
A-47

## Female Elbows - LF



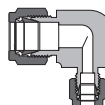
A-48

## Union Elbows - LU



A-49

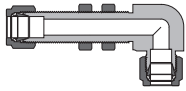
## Union Reducing Elbows - LU



A-50

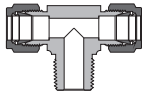
# Contents

## Bulkhead Union Elbows - BBLU



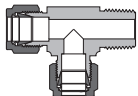
A-51

## Male Branch Tees - TTM



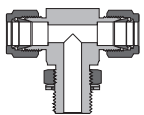
A-52

## Male Run Tees - TMT



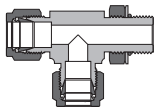
A-53

## Positionable Male Branch Tees - TTP



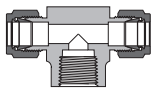
A-54

## Positionable Male Run Tees - TPT



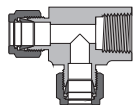
A-55

## Female Branch Tees - TTF



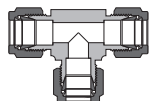
A-56

## Female Run Tees - TFT



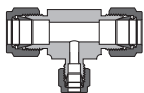
A-57

## Union Tees - TTT



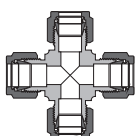
A-58

## Reducing Union Tees - TTT



A-59

## Union Crosses - C



A-61

## Caps - TC



A-61

## Plugs - TP



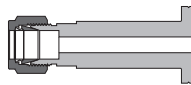
A-62

## Vent Protectors - VPF



A-62

## Lapped Flange Connectors - LFC



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## Female Nuts - N



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## Knurled Nuts



A-63

## Male Nuts - MN



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## Front Ferrules - FF



A-64

## Rear Ferrules - RF



A-64

## Nut-Ferrule Sets - NFS



A-65

## Ferrule Sets - FRS



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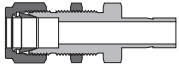
## Reducers - R



A-66

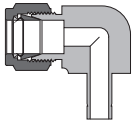
# Contents

## Bulkhead Reducers - BR



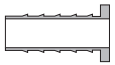
A-68

## Reducer Elbows - LR



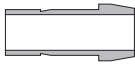
A-68

## Insert for Soft Plastic Tubings - IN



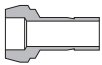
A-69

## Port Connectors - P



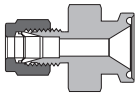
A-69

## Reducing Port Connectors - P



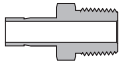
A-70

## Sanitary Flange Fittings - SFF



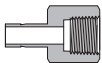
A-71

## Male Adapters - AM



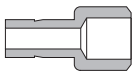
A-72

## Female Adapters - AF



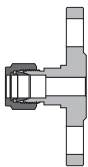
A-77

## Weld Adapters - AW



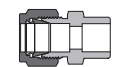
A-80

## Flange Adapters - FA



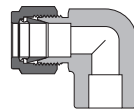
A-81

## Weld Connectors - CW



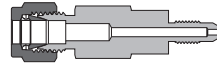
A-83

## Weld Elbows - LW



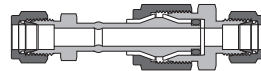
A-84

## Calibration Fittings - FC



A-85

## Dielectric Fittings - DF



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## RS, RSD Gaskets - RS, RSD



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## RP Gaskets - RP



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## RG Gaskets - RG

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## RJ Gaskets - RJ

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## O-rings - VI, BN

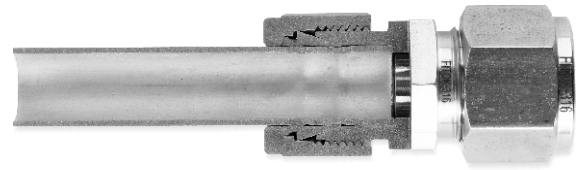


A-89

## Ordering Number Description A-91

## 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
- 1/8" to 5/8", 3 mm to 16 mm fittings available with EC-79 certification



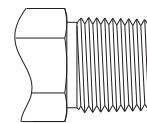
## Technical Data

### 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

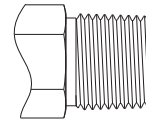
| Working Pressures of NPT Thread Ends |                                      |     |        |     |       |     |        |     |
|--------------------------------------|--------------------------------------|-----|--------|-----|-------|-----|--------|-----|
| Thread Size                          | 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

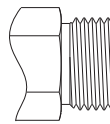
### Working Pressures of ISO Tapered Thread Ends

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.

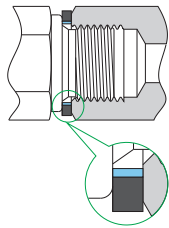
| Thread Data |             |                 |            |           |
|-------------|-------------|-----------------|------------|-----------|
| Thread Size | Thread/ in. | Basic Dia. (mm) |            |           |
|             |             | Max. Dia.       | Pitch Dia. | Min. Dia. |
| 1/16        | 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

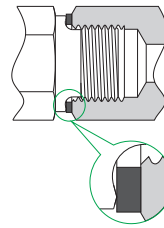
## Types of Sealing for ISO Parallel Threads

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



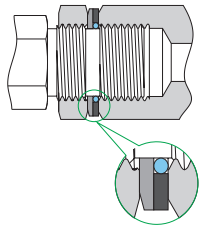
- ☐ RS stud end complies with DIN 3852-2 type A
- ☐ For RS gasket, see page A-87
- ☐ RP port complies with DIN 3852-2 type X

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



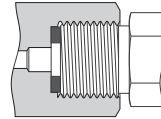
- ☐ RP stud end complies with DIN 3852-2 type B
- ☐ For RP gasket, see page A-87
- ☐ RP port complies with DIN 3852-2 type X

## 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-88

## Working Pressures of Positionable ISO Parallel Thread Ends (PP)

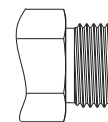
| Thread Size | 316 Stainless Steel and Carbon Steel |     |
|-------------|--------------------------------------|-----|
|             | psig                                 | bar |
| 1/8         | 4568                                 | 315 |
| 1/4         |                                      |  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

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

☉ Comply with ASME B1.1, ISO R725.

## Thread Data

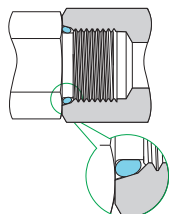
| Thread Size | Thread/in. | Basic Dia. (mm) |            |           |
|-------------|------------|-----------------|------------|-----------|
|             |            | Max. Dia.       | Pitch Dia. | Min. Dia. |
| 5/16-24     | 24         | 7.938           | 7.249      | 6.792     |
| 3/8-24      | 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

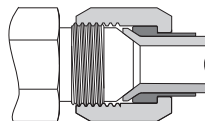
## Types of Sealing for SAE/MS Threads

## 1. ST Stud End and SAE J1926-1 Port



- ☐ ST stud end complies with SAE J1926-3
- ☐ For O-ring, see page A-89

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



- ☐ The type of sealing complies with SAE J514
- ☐ Pressures refer to 37° Flared Tube Fittings Catalog

## Working Pressures of SAE/MS Thread Ends

| SAE<br>Nominal<br>Size | Thread<br>Size | 316 Stainless Steel and Carbon Steel |     |              |     |
|------------------------|----------------|--------------------------------------|-----|--------------|-----|
|                        |                | Non-Positionable                     |     | Positionable |     |
|                        |                | psig                                 | bar | psig         | bar |
| 2                      | 5/16-24        | 5075                                 | 350 | 5075         | 350 |
| 3                      | 3/8-24         |                                      |     | 4568         | 315 |
| 4                      | 7/16-20        |                                      |     |              |     |
| 5                      | 1/2-20         |                                      |     | 4060         | 280 |
| 6                      | 9/16-18        |                                      |     |              |     |
| 8                      | 3/4-16         | 4568                                 | 315 | 3045         | 210 |
| 10                     | 7/8-14         | 3626                                 | 250 |              |     |
| 12                     | 1 1/16-12      |                                      |     |              |     |
| 14                     | 1 3/16-12      | 3045                                 | 210 | 2538         | 175 |
| 16                     | 1 5/16-12      |                                      |     |              |     |
| 20                     | 1 5/8-12       | 2538                                 | 175 | 2030         | 140 |
| 24                     | 1 7/8-12       |                                      |     |              |     |
| 32                     | 2 1/2-12       | 2030                                 | 140 | 1523         | 105 |

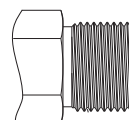
Working pressures are based on SAE J1926-3 at ambient temperature.

## 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    |

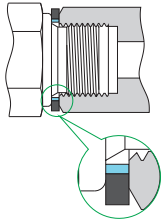


- ☐ 60° thread angle
- ☐ Pitch measured in mm
- ☐ Truncation of root and crest are parallel



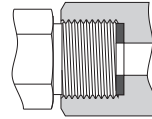
## Types of Sealing for Metric Threads

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



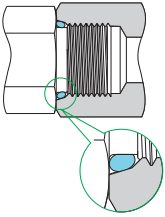
- ☐ MRS stud end complies with DIN 3852-1 type A
- ☐ For RS-M gasket, see page A-87

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



- ☐ For RG-M gasket, see page A-88

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



- ☐ MST stud end complies with ISO 6149-3
- ☐ For O-ring, see page A-89

## Working Pressures for MST Stud Ends

| Thread Size | Stainless Steel and Carbon Steel |     |              |     |
|-------------|----------------------------------|-----|--------------|-----|
|             | Non-Positionable                 |     | Positionable |     |
|             | psig                             | bar | psig         | bar |
| M8 x 1      | 5800                             | 400 | 4568         | 315 |
| M10 x 1     |                                  |     |              |     |
| M12 x 1.5   |                                  |     |              |     |
| M14 x 1.5   |                                  |     |              |     |
| M16 x 1.5   | 4568                             | 315 | 3626         | 250 |
| M18 x 1.5   |                                  |     |              |     |
| M22 x 1.5   |                                  |     |              |     |
| M27 x 2     |                                  |     |              |     |
| M30 x 2     | 2900                             | 200 | 2320         | 160 |
| M33 x 2     |                                  |     |              |     |
| M42 x 2     |                                  |     |              |     |
| M48 x 2     |                                  |     |              |     |
| M60 x 2     | 2320                             | 160 | 1450         | 100 |

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 |
|----------------------------|----------------------------------------|----------------------------------------|------------|
| <b>316 stainless steel</b> | ASTM A479,<br>ASME SA479,<br>EN 1.4401 | ASTM A182,<br>ASME SA182,<br>EN 1.4401 | SS         |
| 316L stainless steel       | ASTM A479,<br>ASME SA479,<br>EN 1.4404 | ASTM A182,<br>ASME SA182,<br>EN 1.4404 | 6L         |
| 304 stainless steel        | ASTM A479,<br>ASME SA479,<br>EN 1.4301 | ASTM A182,<br>ASME SA182,<br>EN 1.4301 | S4         |
| 321 stainless steel        | ASTM A479,<br>ASME SA479,<br>EN 1.4541 | ASTM A182,<br>ASME SA182,<br>EN 1.4541 | S1         |
| 316Ti stainless steel      | ASTM A479,<br>ASME SA479,<br>EN 1.4571 | ASTM A182,<br>ASME SA182,<br>EN 1.4571 | 6T         |
| <b>6Mo (S31254)</b>        | ASTM A479                              | ASTM A182                              | S12        |
| 904L stainless steel       | ASTM A479                              | ASTM A182                              | 904L       |
| Titanium (grade 4)         | ASTM B348                              | ASTM B381                              | TI         |
| Duplex 2205                | ASTM A479                              | ASTM A182                              | D5         |
| <b>Super duplex 2507</b>   | ASTM A479                              | ASTM A182                              | D7         |
| Alloy 20                   | ASTM A479                              | ASTM B462                              | A20        |
| <b>Alloy 400</b>           | ASTM B164,<br>ASME SB164               | ASTM B564,<br>ASME SB564               | M          |
| Alloy 600                  | ASTM B166,<br>ASME SB166               | ASTM B564,<br>ASME SB564               | INC        |
| <b>Alloy 625</b>           | ASTM B446                              | ASTM B564,<br>ASME SB564               | A65        |
| Alloy 718                  | ASTM B637                              | ASTM B637                              | A78        |
| <b>Alloy 825</b>           | ASTM B425                              | ASTM B564                              | A85        |
| <b>Alloy C-276</b>         | ASTM B574                              | ASTM B564                              | HC         |
| Carbon steel               | ASTM A108                              | ASTM A105                              | CS         |
| <b>Brass</b>               | ASTM B16/B453                          | ASTM B283                              | B          |
| Nylon                      | ASTM D4066                             | /                                      | PA         |
| PTFE                       | ASTM D1710                             | /                                      | T          |

Note: Normal materials in boldface letter can be supplied rapidly; other materials need make to order, for lead time please contact FITOK Group.

## Installation Instructions

### FITOK Tube Fittings up to 1" or 25 mm

#### Manual Installation

##### Initial installation

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).

##### Re-installation

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. Hold the fitting body steady, 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.

#### Installation with Manual Presetting Tool

##### Initial installation

1. Hold the presetting tool steady.
2. Install the nut and ferrules onto the presetting tool.
3. Insert tubing into the presetting tool, and make sure the tube rests firmly on the shoulder of the presetting tool.
4. Finger-tighten the nut.
5. Tighten the nut clockwise 1 1/4 turns with wrench (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).
6. Mark the tubing at the back of the nut before disassembling the fitting.
7. Loosen the nut and insert the tubing with preset ferrules into the fitting body until the front ferrule seats against the fitting body.
8. Hold the fitting body steady, then rotate the nut with a wrench to the previous tightening position as indicated by the mark on the tubing.
9. When you feel a significant increase in resistance, further tighten the nut slightly.

##### Re-installation

Same as the re-installation steps for manual installation for fittings up to 1" or 25 mm.

#### Installation with Hydraulic Presetting Tool

Only applicable for tube fittings from 1/2" to 1" and 12 mm - 25 mm.

##### Initial installation

1. Preset the ferrules onto the tubing using FITOK Hydraulic Presetting Tool. For details, refer to Instructions of Hydraulic Presetting Tool.
2. Install the preset assembly (tubing, nut, front and back ferrules) into the fitting body. Finger tight the nut.
3. Further tighten the nut 1/2 turn with a wrench while holding the fitting body steady.

##### Re-installation

Same as the re-installation steps for manual installation for fittings up to 1" or 25 mm.

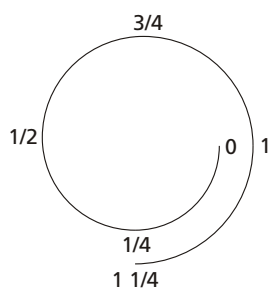


Fig.1

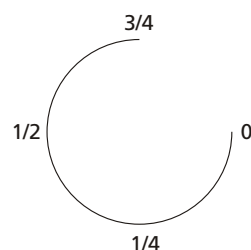


Fig.2

## FITOK Tube Fittings over 1" or 25 mm

### Initial installation

1. Preset the ferrules onto the tubing using FITOK Hydraulic Presetting Tool. For details, refer to Instructions of Hydraulic Presetting Tool.
2. Install the preset assembly (tubing, nut, front and back ferrules) into the fitting body. Finger tight the nut.
3. Further tighten the nut 1/2 turn with a wrench while holding the fitting body steady.

### Re-installation

Same as the re-installation steps for manual installation for fittings up to 1" or 25 mm.

## Plugs

### Initial installation

Tighten the plug 1/4 turn from finger-tight position with wrench 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.

### Re-installation

Tighten the plug slightly with wrench from finger-tight position.

## Port Connectors

The initial installation and re-installation for the tube end is the same as those of tube fittings and the non-tube end same as those of the plug.

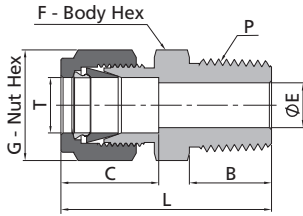
## Cautions:

1. Do not loosen or tighten fittings when the system is pressurized.
2. Make sure that the tubing rests firmly on the shoulder of the port.
3. Always leave enough straight length of the tubing for the fittings.
4. Always use an insert for extremely soft plastic tubing.
5. 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.
6. 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.
7. Keep the tubing end and surface clean and smooth.
8. Always use proper thread sealants on tapered pipe threads. Make sure that its working temperature does not exceed that of the sealants.
9. When assembling the tube fitting, hold the body with a wrench and turn the nut instead of holding the nut.
10. When installing a valve with tube fitting end, hold the valve body with a wrench and turn the nut.
11. When assembling the fitting to a valve with thread, hold the valve body with a wrench and turn the body of the fitting.
12. Gap Inspection Gauge is ONLY accurate for initial installation by manual operation.

## Dimensions

Dimensions are for reference only and are subject to change; Dimensions are shown with FITOK nuts finger-tight.

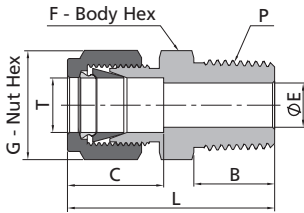
### Male Connectors



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

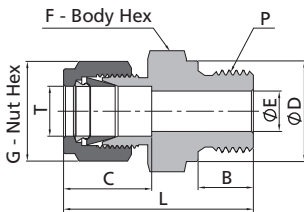
| Fractional Tube   |            |                       | NPT Thread           |            |            |            |            |            |
|-------------------|------------|-----------------------|----------------------|------------|------------|------------|------------|------------|
| T-Tube 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



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

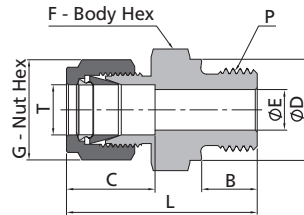
| Fractional Tube   |           |                       | ISO Tapered Thread (RT) |            |            |            |            |            |
|-------------------|-----------|-----------------------|-------------------------|------------|------------|------------|------------|------------|
| T-Tube 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) |



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

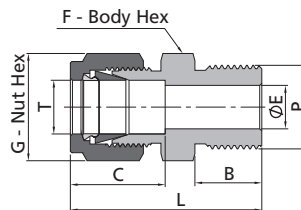
| Fractional Tube         |              |                             | ISO Parallel Thread (RS) |            |            |            |            |            |            |
|-------------------------|--------------|-----------------------------|--------------------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-RS<br>Size | Basic<br>Ordering<br>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



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

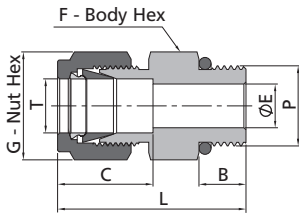
| Fractional Tube         |              |                             | ISO Parallel Thread (RP) |            |            |            |            |            |            |
|-------------------------|--------------|-----------------------------|--------------------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-RP<br>Size | Basic<br>Ordering<br>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) |



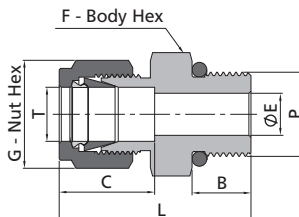
The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| Fractional Tube         |              |                             | ISO Parallel Thread (BP) |            |            |           |            |            |  |
|-------------------------|--------------|-----------------------------|--------------------------|------------|------------|-----------|------------|------------|--|
| T-Tube<br>O.D.<br>(in.) | P-BP<br>Size | Basic<br>Ordering<br>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) |  |

## Male Connectors



1. The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.
2. Adapt to straight thread boss of SAE J1926-1, ISO 11926-1 and MS 16142.



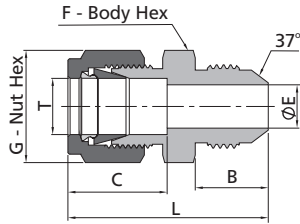
The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| Fractional Tube         |                          |                                     |                             | SAE/MS Straight Threads (ST) |            |            |            |            |            |
|-------------------------|--------------------------|-------------------------------------|-----------------------------|------------------------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-SAE<br>Nominal<br>Size | P-SAE/MS<br>Thread<br>Specification | Basic<br>Ordering<br>Number | Dimensions, in. (mm)         |            |            |            |            |            |
|                         |                          |                                     |                             | L                            | B          | C          | E          | G          | F          |
| 1/16                    | 2                        | 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                     | 2                        | 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                     | 4                        | 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                     | 6                        | 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                        | 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                     | 2                        | 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                     | 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                     | 6                        | 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                     | 8                        | 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                     | 10                       | 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                    | 5                        | 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                     | 4                        | 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                     | 6                        | 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                     | 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                     | 10                       | 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                     | 6                        | 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                     | 8                        | 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                     | 10                       | 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                     | 12                       | 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                     | 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                     | 10                       | 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                     | 8                        | 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                     | 12                       | 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                     | 16                       | 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                     | 14                       | 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                       | 12                       | 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                       | 16                       | 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                   | 20                       | 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                   | 24                       | 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) |

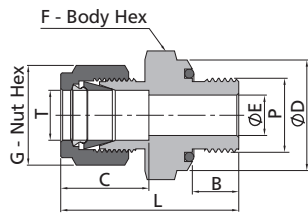
| Fractional Tube         |                          |                                     |                             | SAE/MS Straight Threads (ST) |            |            |            |            |            |
|-------------------------|--------------------------|-------------------------------------|-----------------------------|------------------------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-SAE<br>Nominal<br>Size | P-SAE/MS<br>Thread<br>Specification | Basic<br>Ordering<br>Number | Dimensions, in. (mm)         |            |            |            |            |            |
|                         |                          |                                     |                             | L                            | B          | C          | E          | G          | F          |
| 1/4                     | 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                     | 8                        | 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) |



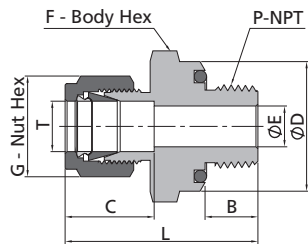
## Male Connectors



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.



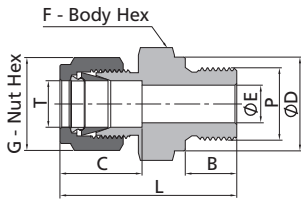
The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| Fractional Tube         |                          |                             | 37° Flare (AN)       |            |            |            |            |            |
|-------------------------|--------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | AN Tube<br>Flare<br>Size | Basic<br>Ordering<br>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) |

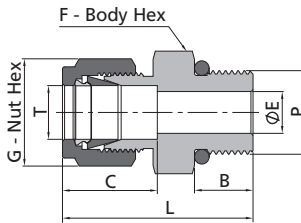
| Fractional Tube         |                          |                                     |                             | SAE/MS Straight Threads (OST) |            |            |            |            |            |            |
|-------------------------|--------------------------|-------------------------------------|-----------------------------|-------------------------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-SAE<br>Nominal<br>Size | P-SAE/MS<br>Thread<br>Specification | Basic<br>Ordering<br>Number | Dimensions, in. (mm)          |            |            |            |            |            |            |
|                         |                          |                                     |                             | L                             | B          | C          | E          | G          | F          | D          |
| 1/16                    | 2                        | 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                     | 2                        | 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                        | 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                     | 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                    | 5                        | 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                     | 6                        | 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                     | 8                        | 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                     | 12                       | 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                       | 16                       | 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<br>O.D.<br>(in.) | P-NPT<br>Size | Basic<br>Ordering<br>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) |

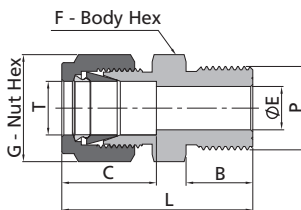
## Male Connectors



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.



1. The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.
2. Adapt to straight thread boss of ISO 6149-1.



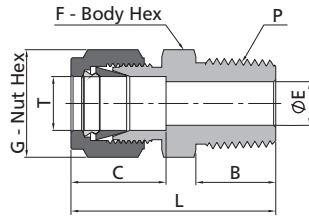
The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| Fractional Tube         |                            |                             | Metric Thread (MRS)  |            |            |            |            |            |            |  |
|-------------------------|----------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|--|
| T-Tube<br>O.D.<br>(in.) | P-Metric<br>Thread<br>Size | Basic<br>Ordering<br>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) |  |

| Fractional Tube         |                            |                             | Metric Thread (MST)  |            |            |            |            |            |
|-------------------------|----------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-Metric<br>Thread<br>Size | Basic<br>Ordering<br>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<br>O.D.<br>(in.) | P-Metric<br>Thread<br>Size | Basic<br>Ordering<br>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) |

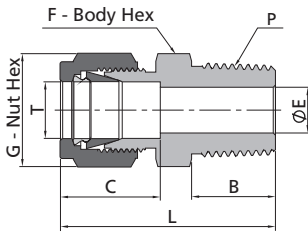
## Male Connectors



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| 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) |  |

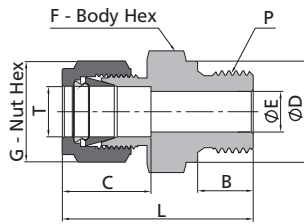
## Male Connectors



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| 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) |

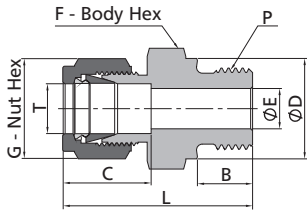
## Male Connectors



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

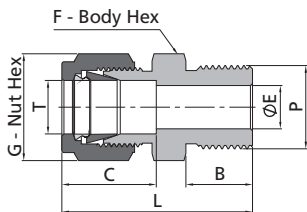
| Metric Tube            |              |                             | ISO Parallel Thread (RS) |            |            |            |            |            |            |
|------------------------|--------------|-----------------------------|--------------------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(mm) | P-RS<br>Size | Basic<br>Ordering<br>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



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| 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) |

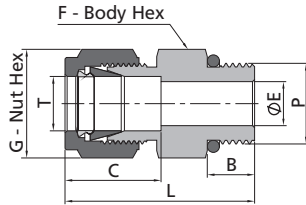


The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

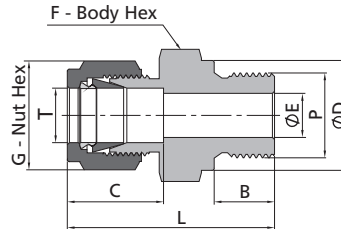
| Metric Tube      |           |                       | ISO Parallel Thread (BP) |            |            |           |            |            |  |
|------------------|-----------|-----------------------|--------------------------|------------|------------|-----------|------------|------------|--|
| 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



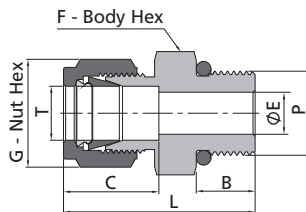
1. The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.
2. Adapt to straight thread boss of SAE J1926-1, ISO 11926-1 and MS 16142.



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| Metric Tube      |                    |                               |                       | SAE/MS Straight Threads (ST) |            |            |           |            |            |
|------------------|--------------------|-------------------------------|-----------------------|------------------------------|------------|------------|-----------|------------|------------|
| T-Tube O.D. (mm) | P-SAE Nominal Size | P-SAE/MS Thread Specification | Basic Ordering Number | Dimensions, mm (in.)         |            |            |           |            |            |
|                  |                    |                               |                       | L                            | B          | C          | E         | G          | F          |
| 6                | 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               | 6                  | 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               | 8                  | 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               | 4                  | 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               | 6                  | 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) |

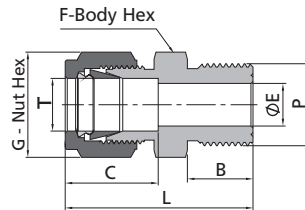
| Metric Tube      |                      |                       | Metric Thread (MRS)  |            |            |            |            |            |            |
|------------------|----------------------|-----------------------|----------------------|------------|------------|------------|------------|------------|------------|
| 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) |



1. The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.
2. Adapt to straight thread boss of ISO 6149-1.

| 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) |

## Male Connectors

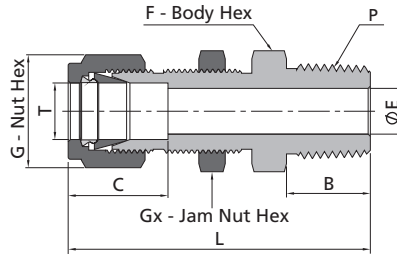


The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| 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

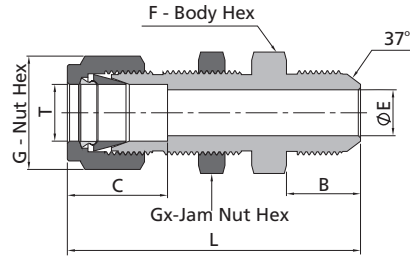


The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| 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)                    |

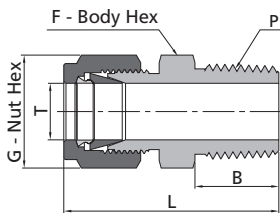
## Bulkhead Male Connectors



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| Fractional Tube         |                          |                             |                      |            |            |            |            |            |            | 37° Flare (AN)                 |                                     |
|-------------------------|--------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|--------------------------------|-------------------------------------|
| T-Tube<br>O.D.<br>(in.) | AN Tube<br>Flare<br>Size | Basic<br>Ordering<br>Number | Dimensions, in. (mm) |            |            |            |            |            |            | Panel Hole<br>Size<br>in. (mm) | Max. Panel<br>Thickness<br>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)                      | 0.50(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



1. The T dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

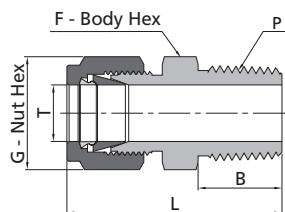
2. To order single-ferrule thermocouple connector with only the ferrule material being non-metallic, the basic ordering number is -TCM-SF□-NS4-□F.

Example: SS-TCM-SFL6-NS4-TF

Note: "6" means 3/8 in. tube OD and "T" means PTFE ferrule material.

| 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) |

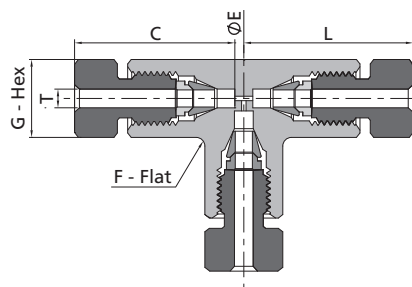
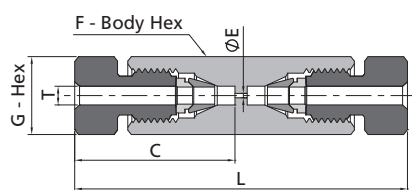
## Thermocouple Connectors



The T dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| 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) |

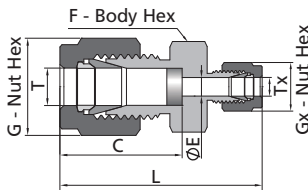
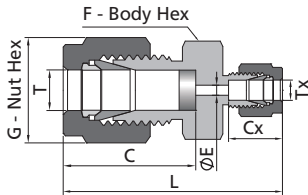
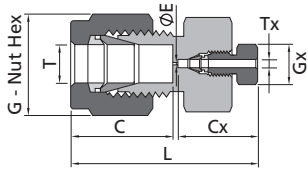
## Chromatograph Fittings



| Fractional Tube  |                       |                      |            |           |           |           |                                   |
|------------------|-----------------------|----------------------|------------|-----------|-----------|-----------|-----------------------------------|
| T-Tube O.D (in.) | Basic Ordering Number | Dimensions, in. (mm) |            |           |           |           | Dead Volume                       |
|                  |                       | L                    | C          | E         | G         | F         |                                   |
| 1/16             | -U-NFL1-LV            | 1.26(32.0)           | 0.61(15.5) | 0.01(0.3) | 0.25(6.4) | 0.25(6.4) | $6.6 \times 10^{-5} \text{ cm}^3$ |

| Fractional Tube  |                       |                      |            |           |           |           |                                   |
|------------------|-----------------------|----------------------|------------|-----------|-----------|-----------|-----------------------------------|
| T-Tube O.D (in.) | Basic Ordering Number | Dimensions, in. (mm) |            |           |           |           | Dead Volume                       |
|                  |                       | L                    | C          | E         | G         | F         |                                   |
| 1/16             | -TTT-NFL1-LV          | 0.66(16.8)           | 0.61(15.5) | 0.01(0.3) | 0.25(6.4) | 0.37(9.5) | $2.8 \times 10^{-4} \text{ cm}^3$ |

## Column End Fittings



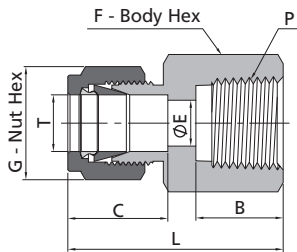
| Fractional Tube         |                          |                             |                      |            |            |           |            |           |                                   |
|-------------------------|--------------------------|-----------------------------|----------------------|------------|------------|-----------|------------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

| Fractional Tube         |                          |                             |                      |            |           |            |            |           |                                   |
|-------------------------|--------------------------|-----------------------------|----------------------|------------|-----------|------------|------------|-----------|-----------------------------------|
| T-Tube<br>O.D.<br>(in.) | Tx-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>Number | Dimensions, in. (mm) |            |           |            |            |           | Dead<br>Volume                    |
|                         |                          |                             | L                    | C          | Cx        | G          | F          | E         |                                   |
| 1/8                     | 1/16                     | -U-FL2SN7-FL1-LV            | 1.22(31.0)           | 0.72(18.3) | 0.34(8.6) | 0.44(11.1) | 0.44(11.1) | 0.05(1.3) | $5.4 \times 10^{-3} \text{ cm}^3$ |
| 1/4                     | 1/16                     | -U-FL4SN7-FL1-LV            | 1.35(34.3)           | 0.82(20.8) | 0.34(8.6) | 0.56(14.3) | 0.50(12.7) | 0.05(1.3) | $6.7 \times 10^{-3} \text{ cm}^3$ |
| 3/8                     | 1/16                     | -U-FL6SN7-FL1-LV            | 1.44(36.6)           | 0.91(23.1) | 0.34(8.6) | 0.69(17.5) | 0.63(15.9) | 0.05(1.3) | $6.5 \times 10^{-3} \text{ cm}^3$ |

| Fractional Tube         |                          |                             |                      |            |            |           |            |           |                |
|-------------------------|--------------------------|-----------------------------|----------------------|------------|------------|-----------|------------|-----------|----------------|
| T-Tube<br>O.D.<br>(in.) | Tx-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>Number | Dimensions, in. (mm) |            |            |           |            |           | Dead<br>Volume |
|                         |                          |                             | L                    | C          | G          | Gx        | F          | E         |                |
| 1/8                     | 1/16                     | -U-FL2SN7-TFL1-ZV           | 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-FL4SN7-TFL1-ZV           | 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-FL6SN7-TFL1-ZV           | 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-FL8SN7-TFL1-ZV           | 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              |

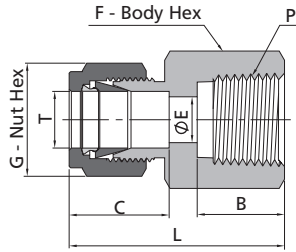
Nominal pore size of SN7 Stainless steel sinter is 7  $\mu\text{m}$ , and other nominal pore sizes are available. Stainless steel sinters are loosely installed to facilitate removal and replacement.

## Female Connectors



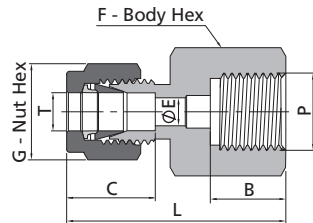
| Fractional Tube         |               |                             | NPT Thread           |            |            |            |            |            |
|-------------------------|---------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-NPT<br>Size | Basic<br>Ordering<br>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) | 0.19(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) | 0.19(4.8)  | 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) | 0.28(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

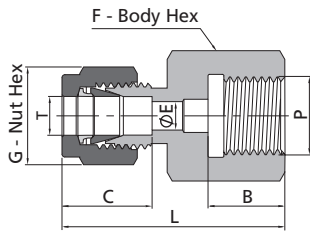


| Fractional Tube         |               |                             | NPT Thread           |            |            |            |            |            |
|-------------------------|---------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-NPT<br>Size | Basic<br>Ordering<br>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) |

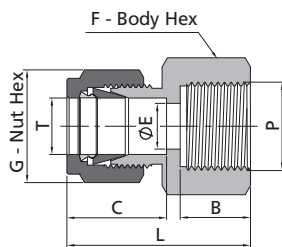
| Fractional Tube         |              |                             | ISO Tapered Thread (RT) |            |            |            |            |            |
|-------------------------|--------------|-----------------------------|-------------------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-RT<br>Size | Basic<br>Ordering<br>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) |



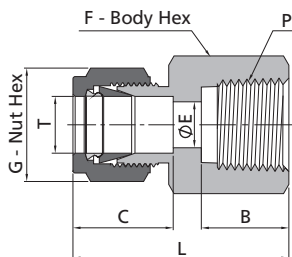
| Fractional Tube         |              |                             | ISO Parallel Thread (RG) |            |            |           |            |            |
|-------------------------|--------------|-----------------------------|--------------------------|------------|------------|-----------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-RG<br>Size | Basic<br>Ordering<br>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)



## Female Connectors

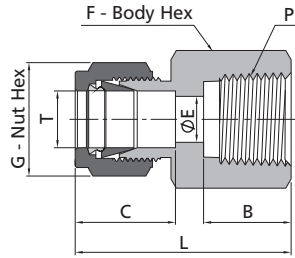


| Fractional Tube         |              |                             | ISO Parallel Thread (RJ) |            |            |           |            |            |  |
|-------------------------|--------------|-----------------------------|--------------------------|------------|------------|-----------|------------|------------|--|
| T-Tube<br>O.D.<br>(in.) | P-RJ<br>Size | Basic<br>Ordering<br>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<br>O.D.<br>(in.) | P-Metric<br>Thread<br>Size | Basic<br>Ordering<br>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) |  |

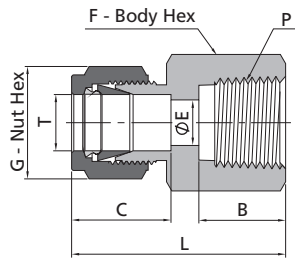
| Metric Tube            |               |                             | NPT Thread           |            |            |           |            |            |  |
|------------------------|---------------|-----------------------------|----------------------|------------|------------|-----------|------------|------------|--|
| T-Tube<br>O.D.<br>(mm) | P-NPT<br>Size | Basic<br>Ordering<br>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<br>O.D.<br>(mm) | P-NPT<br>Size | Basic<br>Ordering<br>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) |

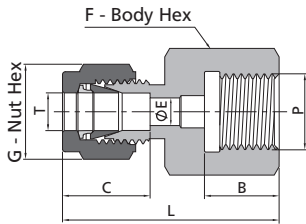
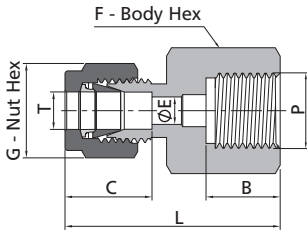
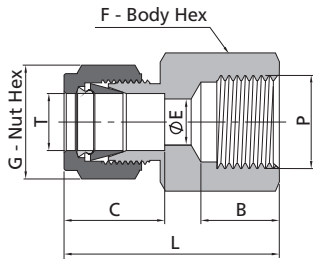
## Female Connectors



| Metric Tube            |              |                             | ISO Tapered Thread (RT) |            |            |            |            |            |
|------------------------|--------------|-----------------------------|-------------------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(mm) | P-RT<br>Size | Basic<br>Ordering<br>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



Adapt to Japanese Gauge stud  
(JIS B7505)

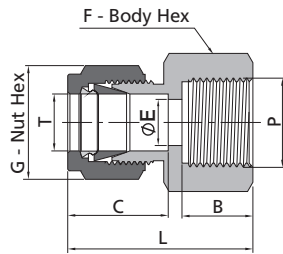
| Metric Tube            |              |                             | ISO Parallel Thread (RP) |            |            |            |            |            |
|------------------------|--------------|-----------------------------|--------------------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(mm) | P-RP<br>Size | Basic<br>Ordering<br>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<br>O.D.<br>(mm) | P-RG<br>Size | Basic<br>Ordering<br>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) |

| Metric Tube            |              |                             | ISO Parallel Thread (RJ) |            |            |           |            |            |
|------------------------|--------------|-----------------------------|--------------------------|------------|------------|-----------|------------|------------|
| T-Tube<br>O.D.<br>(mm) | P-RJ<br>Size | Basic<br>Ordering<br>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) |

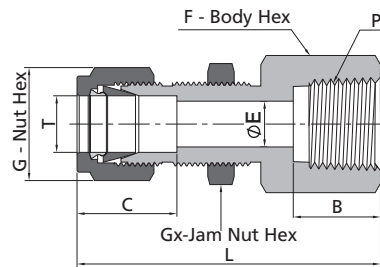


## A-34 6 Series Tube Fittings



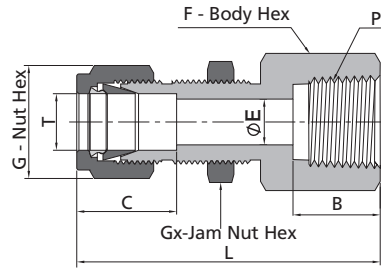
| Metric Tube      |                      |                       | Metric Thread        |            |            |            |            |            |  |
|------------------|----------------------|-----------------------|----------------------|------------|------------|------------|------------|------------|--|
| 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<br>O.D.<br>(in.) | P-NPT<br>Size | Basic<br>Ordering<br>Number | Dimensions, in. (mm) |            |            |            |            |            |            | Panel Hole<br>Size<br>in. (mm) | Max. Panel<br>Thickness<br>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)                          |

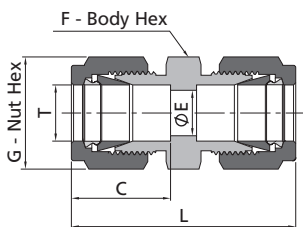
## Bulkhead Female Connectors



| Fractional Tube         |               |                             |                      |            |            |            |            |            |            | NPT Thread                     |                                     |
|-------------------------|---------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|--------------------------------|-------------------------------------|
| T-Tube<br>O.D.<br>(in.) | P-NPT<br>Size | Basic<br>Ordering<br>Number | Dimensions, in. (mm) |            |            |            |            |            |            | Panel Hole<br>Size<br>in. (mm) | Max. Panel<br>Thickness<br>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)                          |

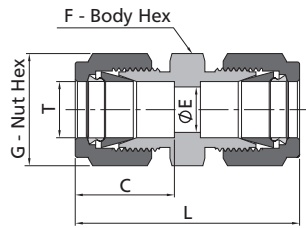
| Metric Tube            |               |                             |                      |            |            |           |            |            |            | NPT Thread                     |                                     |
|------------------------|---------------|-----------------------------|----------------------|------------|------------|-----------|------------|------------|------------|--------------------------------|-------------------------------------|
| T-Tube<br>O.D.<br>(mm) | P-NPT<br>Size | Basic<br>Ordering<br>Number | Dimensions, mm (in.) |            |            |           |            |            |            | Panel Hole<br>Size<br>mm (in.) | Max. Panel<br>Thickness<br>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



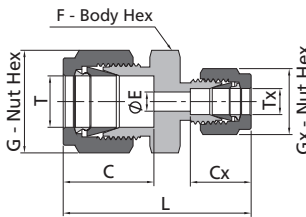
| Fractional Tube         |                             |                      |            |            |            |            |
|-------------------------|-----------------------------|----------------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>Number | Dimensions, in. (mm) |            |            |            |            |
|                         |                             | L                    | C          | G          | F          | E          |
| 1/16                    | -U-FL1                      | 0.99(25.1)           | 0.34(8.6)  | 0.31(7.9)  | 0.31(7.9)  | 0.05(1.3)  |
| 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            |                             |                      |            |            |            |            |
|------------------------|-----------------------------|----------------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>Number | Dimensions, mm (in.) |            |            |            |            |
|                        |                             | 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) |

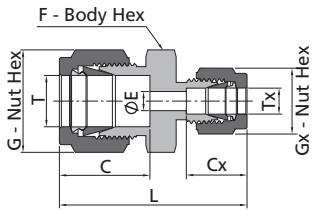
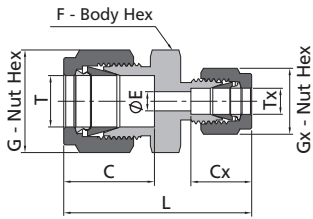
## Conversion Unions



| Fractional Tube         |                         |                             |                      |            |            |            |            |            |            |
|-------------------------|-------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | Tx-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>Number | Dimensions, in. (mm) |            |            |            |            |            |            |
|                         |                         |                             | 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<br>O.D.<br>(mm) | Tx-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>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



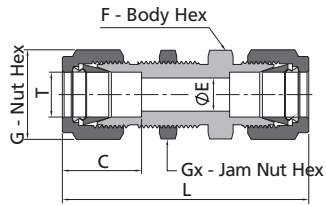
## Fractional Tube

| T-Tube<br>O.D.<br>(in.) | Tx-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>Number | Dimensions, in. (mm) |            |            |            |            |            |            |
|-------------------------|--------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|
|                         |                          |                             | 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

| T-Tube<br>O.D.<br>(mm) | Tx-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>Number | Dimensions, mm (in.) |            |            |            |            |            |            |
|------------------------|-------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|
|                        |                         |                             | 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) |

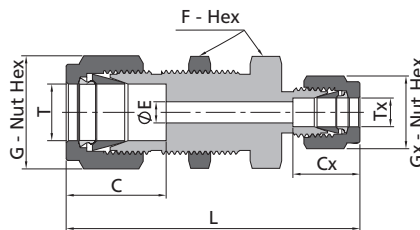
## Bulkhead Unions



| Fractional Tube          |                             |                      |            |            |            |            |            |                                |                                     |
|--------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|--------------------------------|-------------------------------------|
| Tx-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>Number | Dimensions, in. (mm) |            |            |            |            |            | Panel Hole<br>Size<br>in. (mm) | Max. Panel<br>Thickness<br>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)                          |

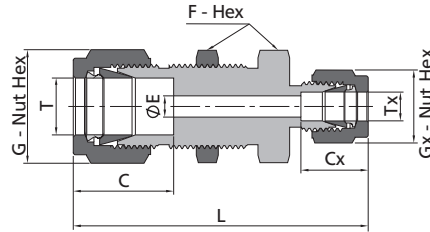
| Metric Tube             |                             |                      |            |            |            |            |            |                                |                                     |
|-------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|--------------------------------|-------------------------------------|
| Tx-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>Number | Dimensions, mm (in.) |            |            |            |            |            | Panel Hole<br>Size<br>mm (in.) | Max. Panel<br>Thickness<br>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         |                          |                             |                      |            |           |            |            |            |            |                                |                                     |
|-------------------------|--------------------------|-----------------------------|----------------------|------------|-----------|------------|------------|------------|------------|--------------------------------|-------------------------------------|
| T-Tube<br>O.D.<br>(in.) | Tx-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>Number | Dimensions, in. (mm) |            |           |            |            |            |            | Panel Hole<br>Size<br>in. (mm) | Max. Panel<br>Thickness<br>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



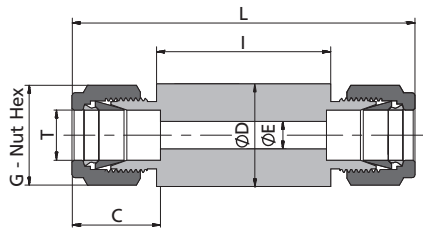
| Metric Tube            |                         |                             |                      |            |           |            |            |            |            |                                |                                     |
|------------------------|-------------------------|-----------------------------|----------------------|------------|-----------|------------|------------|------------|------------|--------------------------------|-------------------------------------|
| T-Tube<br>O.D.<br>(mm) | Tx-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>Number | Dimensions, mm (in.) |            |           |            |            |            |            | Panel Hole<br>Size<br>mm (in.) | Max. Panel<br>Thickness<br>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<br>O.D.<br>(in.) | Tx-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>Number | Dimensions, in. (mm) |            |           |            |            |            |            | Panel Hole<br>Size<br>in. (mm) | Max. Panel<br>Thickness<br>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<br>O.D.<br>(mm) | Tx-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>Number | Dimensions, mm (in.) |            |           |            |            |           |            | Panel Hole<br>Size<br>mm (in.) | Max. Panel<br>Thickness<br>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)                          |

## Weld Bulkhead Unions



| Fractional Tube          |                             | Dimensions, in. (mm) |            |            |            |            |            |  |
|--------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|--|
| Tx-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>Number | Dimensions, in. (mm) |            |            |            |            |            |  |
|                          |                             | L                    | C          | E          | G          | D          | I          |  |
| 1/8                      | -BU-FL2-OD12                | 3.16(80.2)           | 0.50(12.7) | 0.09(2.3)  | 0.44(11.1) | 0.47(12.0) | 1.97(50.0) |  |
| 3/16                     | -BU-FL3-OD12                | 3.24(82.2)           | 0.54(13.7) | 0.12(3.0)  | 0.50(12.7) | 0.47(12.0) | 1.97(50.0) |  |
| 1/4                      | -BU-FL4-OD14                | 3.35(85.2)           | 0.60(15.2) | 0.19(4.8)  | 0.56(14.3) | 0.55(14.0) | 1.97(50.0) |  |
| 5/16                     | -BU-FL5-OD16                | 3.43(87.2)           | 0.64(16.2) | 0.25(6.4)  | 0.63(15.9) | 0.63(16.0) | 1.97(50.0) |  |
| 3/8                      | -BU-FL6-OD19                | 3.49(88.6)           | 0.66(16.8) | 0.28(7.1)  | 0.69(17.5) | 0.75(19.0) | 1.97(50.0) |  |
| 1/2                      | -BU-FL8-OD23                | 3.69(93.8)           | 0.90(22.9) | 0.41(10.4) | 0.87(22.2) | 0.91(23.0) | 1.97(50.0) |  |
| 5/8                      | -BU-FL10-OD28               | 3.69(93.6)           | 0.96(24.4) | 0.50(12.7) | 1.00(25.4) | 1.10(28.0) | 1.97(50.0) |  |
| 3/4                      | -BU-FL12-OD32               | 3.72(94.4)           | 0.96(24.4) | 0.62(15.7) | 1.13(28.6) | 1.26(32.0) | 1.97(50.0) |  |
| 7/8                      | -BU-FL14-OD32               | 3.72(94.4)           | 1.02(25.9) | 0.72(18.3) | 1.25(31.8) | 1.26(32.0) | 1.97(50.0) |  |
| 1                        | -BU-FL16-OD35               | 4.06(103.2)          | 1.23(31.2) | 0.88(22.4) | 1.50(38.1) | 1.38(35.0) | 1.97(50.0) |  |
| 1-1/4                    | -BU-FL20-OD50               | 5.05(128.2)          | 1.62(41.1) | 1.09(27.7) | 1.87(47.6) | 1.97(50.0) | 1.97(50.0) |  |
| 1-1/2                    | -BU-FL24-OD55               | 5.54(140.8)          | 1.97(50.0) | 1.34(34.0) | 2.25(57.2) | 2.17(55.0) | 1.97(50.0) |  |
| 2                        | -BU-FL32-OD80               | 6.93(176.0)          | 2.67(67.8) | 1.81(46.0) | 3.00(76.2) | 3.15(80.0) | 1.97(50.0) |  |

| Metric Tube             |                             | Dimensions, mm (in.) |            |            |            |            |            |  |
|-------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|--|
| Tx-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>Number | Dimensions, mm (in.) |            |            |            |            |            |  |
|                         |                             | L                    | C          | E          | G          | D          | I          |  |
| 3                       | -BU-ML3-OD12                | 80.8(3.18)           | 12.9(0.51) | 2.4(0.09)  | 12.0(0.47) | 12.0(0.47) | 50.0(1.97) |  |
| 4                       | -BU-ML4-OD12                | 82.4(3.24)           | 13.7(0.54) | 2.4(0.09)  | 12.0(0.47) | 12.0(0.47) | 50.0(1.97) |  |
| 6                       | -BU-ML6-OD12                | 86.0(3.39)           | 15.3(0.60) | 4.8(0.19)  | 14.0(0.55) | 12.0(0.47) | 50.0(1.97) |  |
| 8                       | -BU-ML8-OD16                | 87.4(3.44)           | 16.2(0.64) | 6.4(0.25)  | 16.0(0.63) | 16.0(0.63) | 50.0(1.97) |  |
| 10                      | -BU-ML10-OD19               | 89.0(3.50)           | 17.2(0.68) | 7.9(0.31)  | 19.0(0.75) | 19.0(0.75) | 50.0(1.97) |  |
| 12                      | -BU-ML12-OD23               | 94.2(3.71)           | 22.8(0.90) | 9.5(0.37)  | 22.0(0.87) | 23.0(0.91) | 50.0(1.97) |  |
| 15                      | -BU-ML15-OD25               | 93.8(3.69)           | 24.4(0.96) | 11.9(0.47) | 25.0(0.98) | 25.0(0.98) | 50.0(1.97) |  |
| 16                      | -BU-ML16-OD28               | 94.4(3.72)           | 24.4(0.96) | 12.7(0.50) | 25.0(0.98) | 28.0(1.10) | 50.0(1.97) |  |
| 18                      | -BU-ML18-OD28               | 94.0(3.70)           | 24.4(0.96) | 15.1(0.59) | 30.0(1.18) | 28.0(1.10) | 50.0(1.97) |  |
| 20                      | -BU-ML20-OD32               | 94.0(3.70)           | 26.0(1.02) | 15.9(0.63) | 32.0(1.26) | 32.0(1.26) | 50.0(1.97) |  |
| 22                      | -BU-ML22-OD32               | 94.0(3.70)           | 26.0(1.02) | 18.3(0.72) | 32.0(1.26) | 32.0(1.26) | 50.0(1.97) |  |
| 25                      | -BU-ML25-OD38               | 103.2(4.06)          | 31.3(1.23) | 21.8(0.86) | 38.0(1.50) | 38.0(1.50) | 50.0(1.97) |  |
| 28                      | -BU-ML28-OD45               | 123.2(4.85)          | 36.6(1.44) | 21.8(0.86) | 46.0(1.81) | 45.0(1.77) | 50.0(1.97) |  |
| 32                      | -BU-ML32-OD50               | 133.2(5.24)          | 42.0(1.65) | 28.6(1.13) | 50.0(1.97) | 50.0(1.97) | 50.0(1.97) |  |
| 38                      | -BU-ML38-OD60               | 146.2(5.76)          | 49.4(1.94) | 33.7(1.33) | 60.0(2.36) | 60.0(2.36) | 50.0(1.97) |  |

For specified length, add "-\*\*\*" (metric length) as a suffix to the basic ordering number.  
Example: 55-BU-ML12-OD23-100

## Bulkhead Locknuts

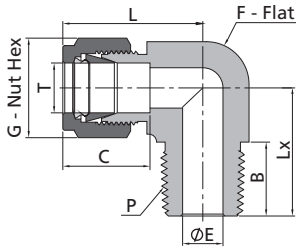


| Fractional Tube         |                             |
|-------------------------|-----------------------------|
| T-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>Number |
| 1/16                    | -BN-FL1                     |
| 1/8                     | -BN-FL2                     |
| 3/16                    | -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<br>O.D.<br>(mm) | Basic<br>Ordering<br>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



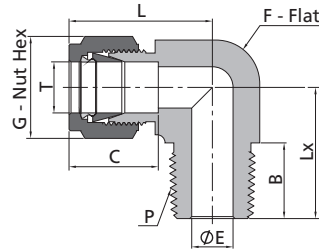
The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| 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) |  |



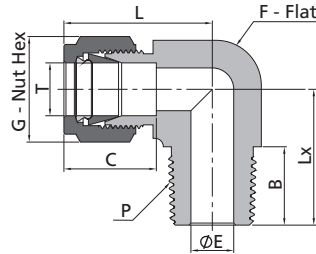
## Male Elbows



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| 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) |  |

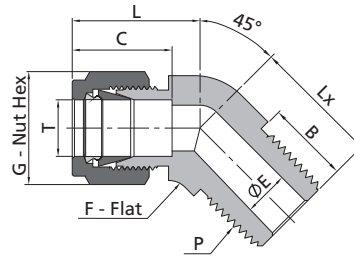
## Male Elbows



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| Metric Tube            |              |                             | ISO Tapered Thread (RT) |            |            |            |            |            |            |
|------------------------|--------------|-----------------------------|-------------------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(mm) | P-RT<br>Size | Basic<br>Ordering<br>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



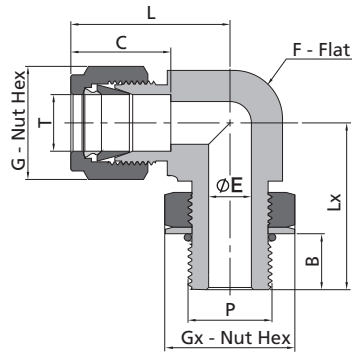
The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| Fractional Tube         |               |                             | NPT Thread           |            |            |            |            |            |            |
|-------------------------|---------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-NPT<br>Size | Basic<br>Ordering<br>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                | 1.20(30.4)           | 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<br>O.D.<br>(mm) | P-NPT<br>Size | Basic<br>Ordering<br>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                | 30.4(1.20)           | 24.4(0.96) | 25.0(0.98) | 23.8(0.94) | 11.9(0.47) | 19.1(0.75) | 29.7(1.17) |

## Positionable Male Elbows

## SAE/MS Straight Thread

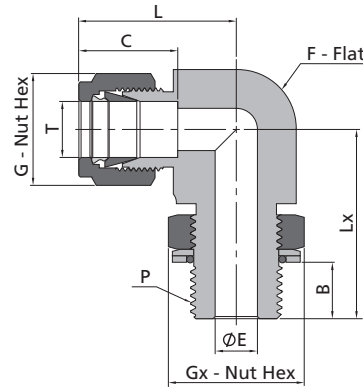


1. The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.
2. Adapt to straight thread boss of SAE J1926-1, ISO 11926-1 and MS 16142.

| Fractional Tube   |                    |                               |                       | SAE/MS Straight Thread |            |            |            |            |            |            |            |  |
|-------------------|--------------------|-------------------------------|-----------------------|------------------------|------------|------------|------------|------------|------------|------------|------------|--|
| T-Tube O.D. (in.) | P-SAE Nominal Size | P-SAE/MS Thread Specification | Basic Ordering Number | Dimensions, in. (mm)   |            |            |            |            |            |            |            |  |
|                   |                    |                               |                       | L                      | B          | C          | G          | E          | F          | Lx         | Gx         |  |
| 1/4               | 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               | 6                  | 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              | 5                  | 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               | 4                  | 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               | 6                  | 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               | 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               | 6                  | 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               | 8                  | 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               | 10                 | 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               | 12                 | 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               | 14                 | 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                 | 16                 | 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             | 20                 | 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             | 24                 | 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) |  |

## Positionable Male Elbows

## ISO Parallel Thread



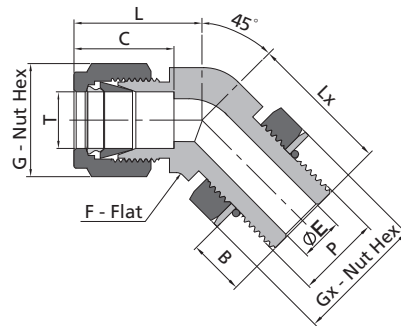
The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| Fractional Tube         |                                  |                             | ISO Parallel Thread (PP) |            |            |            |            |            |            |            |
|-------------------------|----------------------------------|-----------------------------|--------------------------|------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-ISO Parallel<br>Thread<br>Size | Basic<br>Ordering<br>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<br>O.D.<br>(mm) | P-ISO Parallel<br>Thread<br>Size | Basic<br>Ordering<br>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° Positionable Male Elbows

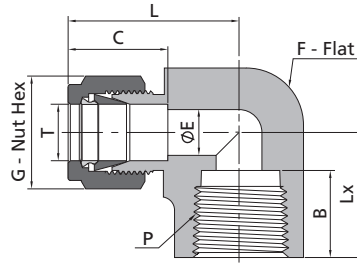
## SAE/MS Straight Thread



1. The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.
2. Adapt to straight thread boss of SAE J1926-1, ISO 11926-1 and MS 16142.

| Fractional Tube         |                          |                                     |                             | SAE/MS Straight Thread |            |            |            |            |            |            |            |
|-------------------------|--------------------------|-------------------------------------|-----------------------------|------------------------|------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-SAE<br>Nominal<br>Size | P-SAE/MS<br>Thread<br>Specification | Basic<br>Ordering<br>Number | Dimensions, in. (mm)   |            |            |            |            |            |            |            |
|                         |                          |                                     |                             | L                      | B          | C          | G          | E          | F          | Lx         | Gx         |
| 1/4                     | 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                     | 6                        | 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                     | 8                        | 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                     | 12                       | 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                       | 16                       | 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) |

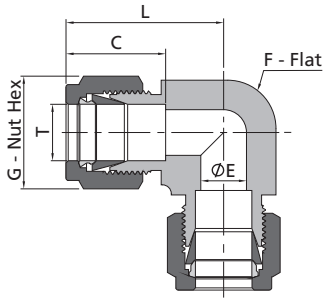
## Female Elbows



| Fractional Tube         |               |                             | NPT Thread           |            |            |            |            |            |            |
|-------------------------|---------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-NPT<br>Size | Basic<br>Ordering<br>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)           | 1.00(25.4) | 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<br>O.D.<br>(mm) | P-NPT<br>Size | Basic<br>Ordering<br>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

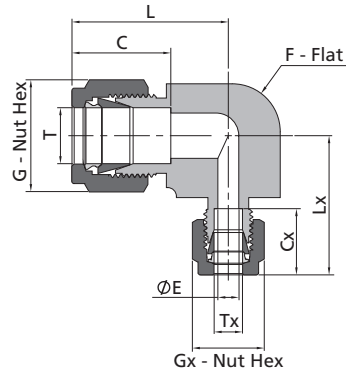


| Fractional Tube         |                             |                      |            |            |            |            |
|-------------------------|-----------------------------|----------------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>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<br>O.D.<br>(mm) | Basic<br>Ordering<br>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) |



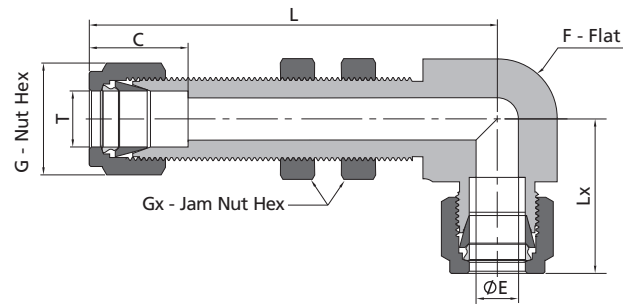
## Union Reducing Elbows



| Fractional Tube         |                          |                             |                      |            |            |            |            |            |            |            |
|-------------------------|--------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | Tx-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>Number | Dimensions, in. (mm) |            |            |            |            |            |            |            |
|                         |                          |                             | 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) |

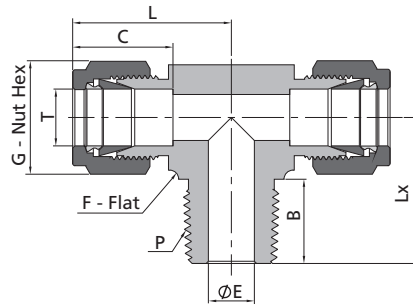
| Metric Tube            |                         |                             |                      |            |            |            |           |            |            |            |
|------------------------|-------------------------|-----------------------------|----------------------|------------|------------|------------|-----------|------------|------------|------------|
| T-Tube<br>O.D.<br>(mm) | Tx-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>Number | Dimensions, mm (in.) |            |            |            |           |            |            |            |
|                        |                         |                             | 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



| Fractional Tube         |                             |                      |            |            |            |            |            |            |                                |                                     |
|-------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|--------------------------------|-------------------------------------|
| T-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>Number | Dimensions, in. (mm) |            |            |            |            |            |            | Panel Hole<br>Size<br>in. (mm) | Max. Panel<br>Thickness<br>in. (mm) |
|                         |                             | L                    | C          | E          | G          | F          | Lx         | Gx         |                                |                                     |
| 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(25.8)                     | 0.66(16.8)                          |

## Male Branch Tees

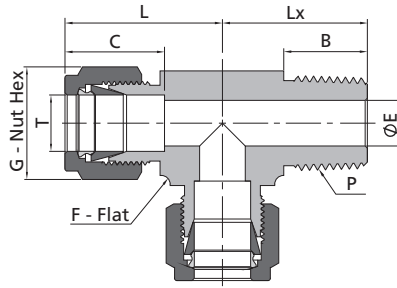


The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| 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



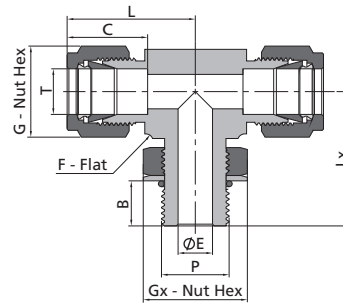
The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| Fractional Tube         |               |                             | NPT Thread           |            |            |            |            |            |            |
|-------------------------|---------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-NPT<br>Size | Basic<br>Ordering<br>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<br>O.D.<br>(mm) | P-NPT<br>Size | Basic<br>Ordering<br>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) |

## Positionable Male Branch Tees

## SAE/MS Straight Thread



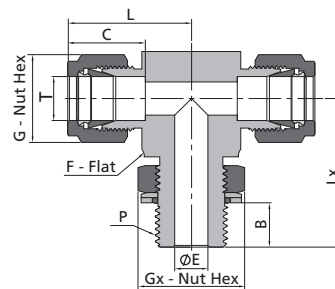
1. The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

2. 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 Nominal Size | P-SAE/MS Thread Specification | Basic Ordering Number | Dimensions, in. (mm)   |            |            |            |            |            |            |            |
|                   |                    |                               |                       | L                      | B          | C          | E          | G          | F          | Lx         | Gx         |
| 1/4               | 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               | 6                  | 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               | 8                  | 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               | 12                 | 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                 | 16                 | 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             | 20                 | 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             | 24                 | 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) |

## Positionable Male Branch Tees

## ISO Parallel Thread



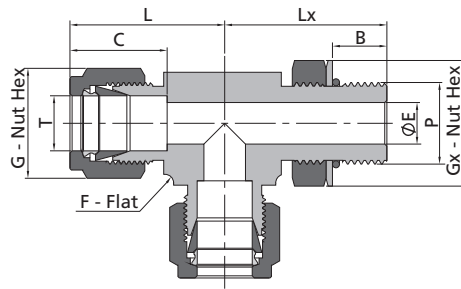
The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end and welding end.

| 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) |

## Positionable Male Run Tees

## SAE/MS Straight Thread

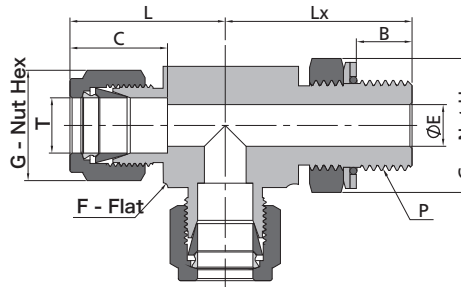


1. The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.
2. Adapt to straight thread boss of SAE J1926-1, ISO 11926-1 and MS 16142.

| Fractional Tube   |                    |                               |                       | SAE/MS Straight Thread |            |            |            |             |            |            |            |
|-------------------|--------------------|-------------------------------|-----------------------|------------------------|------------|------------|------------|-------------|------------|------------|------------|
| T-Tube O.D. (in.) | P-SAE Nominal Size | P-SAE/MS Thread Specification | Basic Ordering Number | Dimensions, in. (mm)   |            |            |            |             |            |            |            |
|                   |                    |                               |                       | L                      | B          | C          | E          | G           | F          | Lx         | Gx         |
| 1/4               | 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               | 6                  | 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               | 8                  | 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               | 12                 | 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                 | 16                 | 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             | 20                 | 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             | 24                 | 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) |

## Positionable Male Run Tees

## ISO Parallel Thread

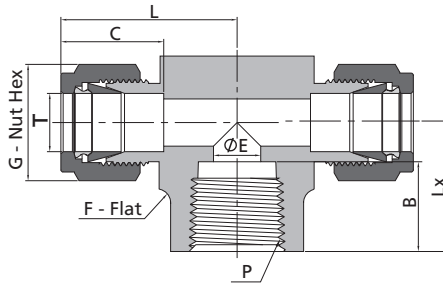


The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| 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) |

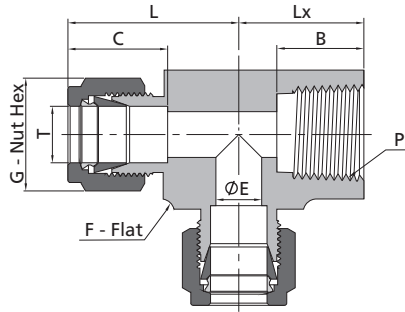
## Female Branch Tees



| Fractional Tube         |               |                             | NPT Thread           |            |            |            |            |            |            |
|-------------------------|---------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-NPT<br>Size | Basic<br>Ordering<br>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<br>O.D.<br>(mm) | P-NPT<br>Size | Basic<br>Ordering<br>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

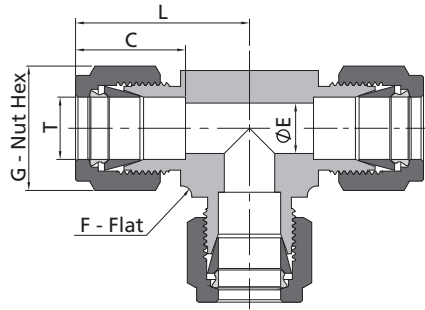


| Fractional Tube         |               |                             | NPT Thread           |            |            |            |            |            |            |
|-------------------------|---------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-NPT<br>Size | Basic<br>Ordering<br>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<br>O.D.<br>(mm) | P-NPT<br>Size | Basic<br>Ordering<br>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) |



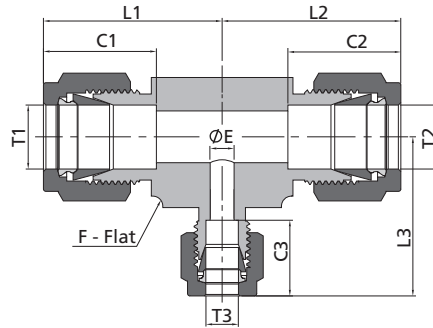
## Union Tees



| Fractional Tube         |                             |                      |            |            |            |            |
|-------------------------|-----------------------------|----------------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>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                   | 2.63(66.9)           | 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) |

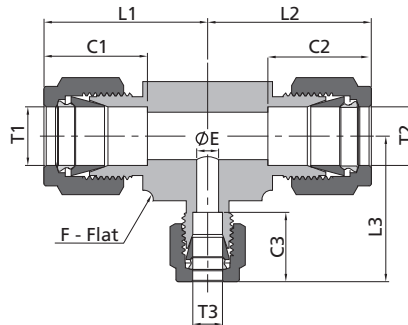
| Metric Tube            |                             |                      |            |            |            |            |
|------------------------|-----------------------------|----------------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>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



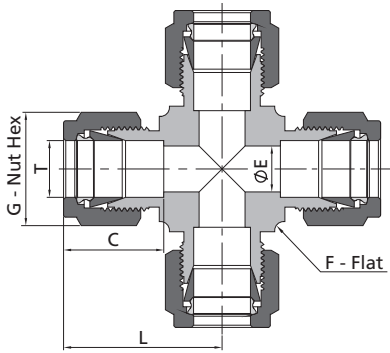
| Fractional Tube          |                          |                          |                             | Dimensions, in. (mm) |            |            |            |            |            |            |            |
|--------------------------|--------------------------|--------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|------------|
| T1-Tube<br>O.D.<br>(in.) | T2-Tube<br>O.D.<br>(in.) | T3-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>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<br>O.D.<br>(mm) | T2-Tube<br>O.D.<br>(mm) | T3-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>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)  |

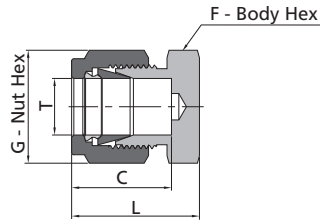
## Union Crosses



| Fractional Tube         |                             |                      |            |            |            |            |
|-------------------------|-----------------------------|----------------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>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<br>O.D.<br>(mm) | Basic<br>Ordering<br>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) |

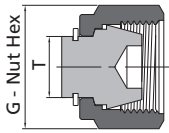
## Caps



| Fractional Tube         |                             |                      |            |            |            |
|-------------------------|-----------------------------|----------------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>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<br>O.D.<br>(mm) | Basic<br>Ordering<br>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) |

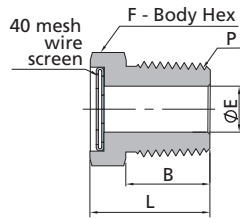
## Plugs



| Fractional Tube   |                       |                           |
|-------------------|-----------------------|---------------------------|
| T-Tube O.D. (in.) | Basic Ordering Number | Dimensions, in. (mm)<br>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.)<br>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



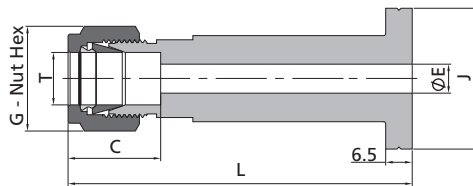
40 mesh 300 series stainless steel wire screen assembly

| 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

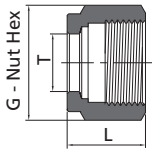


- Standard material is 316 or Monel.
- The flange ends are used with NPS 1/2 lap joint pipe flanges.
- The flange ends are dimensioned to meet "ASME B16.5 Class 2500" flange specifications.
- The Flange Seal A means surface finish Ra 3.2-6.3  $\mu\text{m}$ , the flange Seal B means Ra 6.3-12.5  $\mu\text{m}$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

| Fractional Tube         |                |                             |                      |            |            |           |            |
|-------------------------|----------------|-----------------------------|----------------------|------------|------------|-----------|------------|
| T-Tube<br>O.D.<br>(in.) | Flange<br>Seal | Basic<br>Ordering<br>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<br>O.D.<br>(mm) | Flange<br>Seal | Basic<br>Ordering<br>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) |

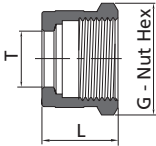
## Female Nuts



| Fractional Tube         |                             |                      |            |
|-------------------------|-----------------------------|----------------------|------------|
| T-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>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) |

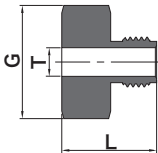
| Metric Tube            |                             |                      |            |
|------------------------|-----------------------------|----------------------|------------|
| T-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>Number | Dimensions, mm (in.) |            |
|                        |                             | 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

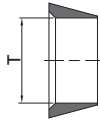
## Male Nuts



| Fractional Tube         |                             |                      |            |
|-------------------------|-----------------------------|----------------------|------------|
| T-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>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<br>O.D.<br>(mm) | Basic<br>Ordering<br>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) |

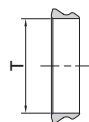
## Front Ferrules



| 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              |

## Rear Ferrules



| 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              |

## Notes:

1. Stainless steel front ferrules over 1 in. or 25 mm are silver plated.
2. In addition to the metal ferrules, PTFE and nylon ferrules are also available, please contact FITOK Group or our authorized distributors.

Nut-Ferrule Sets



The nut-ferrule set contains 1 nut, 1 rear ferrule and 1 front ferrule.

| Fractional Tube         |                             |
|-------------------------|-----------------------------|
| T-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>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<br>O.D.<br>(mm) | Basic<br>Ordering<br>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                   |

Please order nut-ferrule sets in multiples of 5.  
Figure below shows nut-ferrule sets with the arbor.  
One arbor holds 5 nut-ferrule sets.



Ferrule Sets

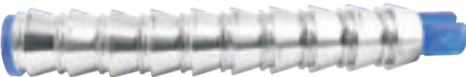


The ferrule set contains 1 rear ferrule and 1 front ferrule.

| Fractional Tube         |                             |
|-------------------------|-----------------------------|
| T-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>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                   |

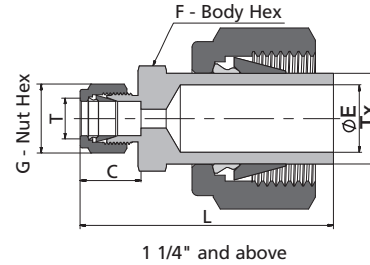
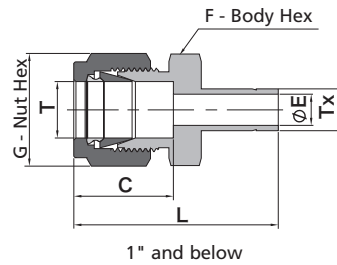
| Metric Tube            |                             |
|------------------------|-----------------------------|
| T-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>Number |
| 2                      | -FRS-ML2                    |
| 3                      | -FRS-ML3                    |
| 4                      | -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                   |

Please order ferrule sets in multiples of 10.  
Figure below shows ferrule sets with the arbor.  
One arbor holds 10 ferrule sets.



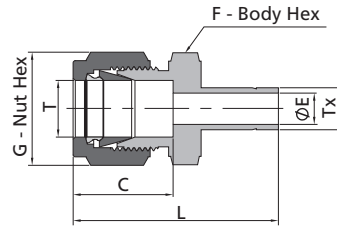


## Reducers

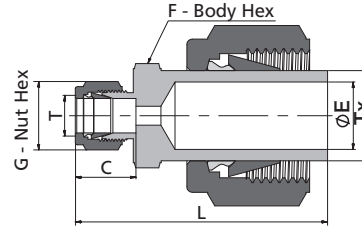


| Fractional Tube         |                          |                             | Dimensions, in. (mm) |            |            |            |            |
|-------------------------|--------------------------|-----------------------------|----------------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | Tx-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>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



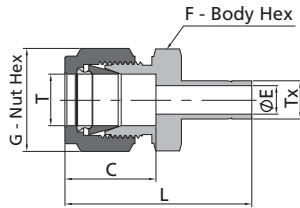
25 mm and below



28 mm and above

| Metric Tube            |                         |                             | Dimensions, mm (in.) |            |            |            |            |
|------------------------|-------------------------|-----------------------------|----------------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(mm) | Tx-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>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) |

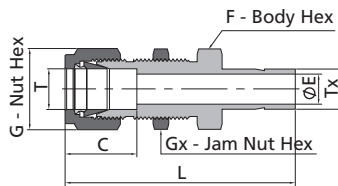
## Reducers



| Metric Tube            |                          |                             | Fractional Tube      |            |            |            |            |
|------------------------|--------------------------|-----------------------------|----------------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(mm) | Tx-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>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) |

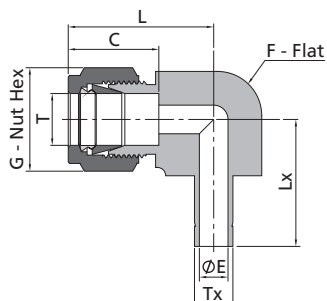
| Fractional Tube         |                         |                             | Metric Tube          |            |            |            |           |
|-------------------------|-------------------------|-----------------------------|----------------------|------------|------------|------------|-----------|
| T-Tube<br>O.D.<br>(in.) | Tx-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>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



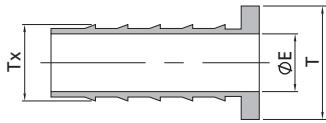
| Fractional Tube         |                          |                             |                      |            |            |            |            |            |
|-------------------------|--------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | Tx-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>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            |                         |                             |                      |            |            |            |            |
|------------------------|-------------------------|-----------------------------|----------------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(mm) | Tx-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>Number | Dimensions, mm (in.) |            |            |            |            |
|                        |                         |                             | L                    | C          | G          | F          | Lx         |
| 6                      | 6                       | -LR-ML6-MT6                 | 27.0(1.06)           | 15.3(0.60) | 14.0(0.55) | 12.7(0.50) | 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) | 39.2(1.54) |

## Insert for Soft Plastic Tubings



Insert for soft plastic tubing is used to protect soft plastic tubing used with tube fittings. To determine the correct size of the insert for soft plastic tubing, the outside and inside diameter of the soft plastic tubing should be determined first.

| Fractional Tube         |                          |                             |               |
|-------------------------|--------------------------|-----------------------------|---------------|
| T-Tube<br>O.D.<br>(in.) | Tx-Tube<br>I.D.<br>(in.) | Basic<br>Ordering<br>Number | E<br>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<br>O.D.<br>(mm) | Tx-Tube<br>I.D.<br>(mm) | Basic<br>Ordering<br>Number | E<br>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)     |

### Ordering Information

Add the material designator in front of the basic ordering number to form a complete ordering number.

Material                      Material Designator

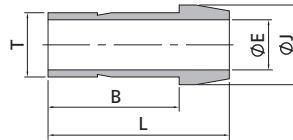
316 SS                              SS

Brass                                B

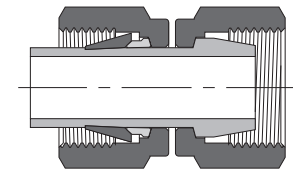
Alloy 400                          M

Example: SS-IN-3-2

## Port Connectors



1" / 25 mm and below



1 1/4" / 28 mm and above

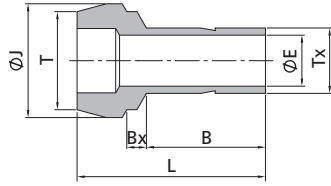
| Fractional Tube         |                             |                      |            |            |            |
|-------------------------|-----------------------------|----------------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>Number | Dimensions, 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                     | 3.48(88.4)           | 2.5(63.6)  | 1.24(31.5) | 1.85(47.0) |

| Metric Tube            |                             |                      |            |            |            |
|------------------------|-----------------------------|----------------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>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) |

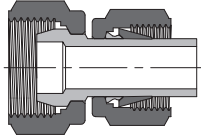
## A-70 6 Series Tube Fittings

### Reducing Port Connectors

Tube Fittings



1" / 25mm and below



1 1/4" / 28 mm and above

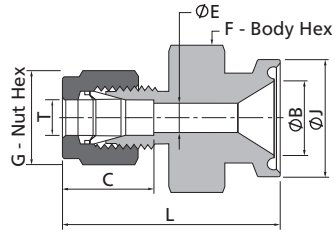
#### Fractional Tube

| T-Tube<br>O.D.<br>(in.) | Tx-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>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

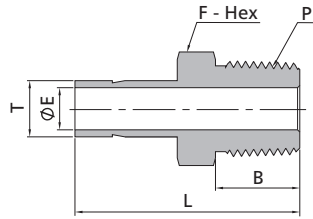
| T-Tube<br>O.D.<br>(mm) | Tx-Tube<br>O.D.<br>(mm) | Basic<br>Ordering<br>Number | Dimensions, mm (in.) |            |            |            |            |
|------------------------|-------------------------|-----------------------------|----------------------|------------|------------|------------|------------|
|                        |                         |                             | 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

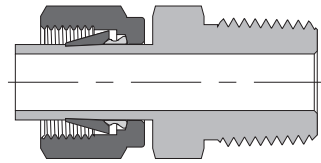


| Fractional Tube         |                         |                             |                      |            |            |            |            |            |            |
|-------------------------|-------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | Flange<br>Size<br>(in.) | Basic<br>Ordering<br>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



1" and below



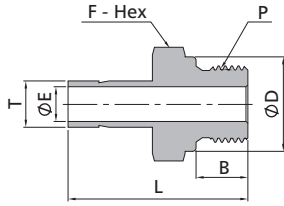
1 1/4" and above

The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

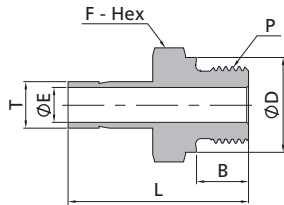
| Fractional Tube         |               |                             | NPT Thread           |            |            |            |
|-------------------------|---------------|-----------------------------|----------------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-NPT<br>Size | Basic<br>Ordering<br>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<br>O.D.<br>(in.) | P-RT<br>Size | Basic<br>Ordering<br>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



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.



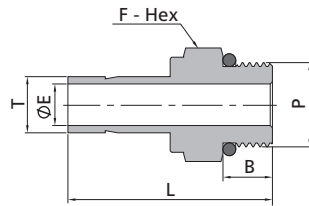
The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| 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) |

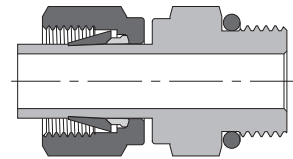
| Fractional Tube   |           |                       | ISO Parallel Thread (RP) |            |            |            |            |
|-------------------|-----------|-----------------------|--------------------------|------------|------------|------------|------------|
| T-Tube O.D. (in.) | P-RP 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) |



## Male Adapters

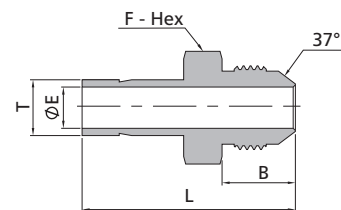


1" and below

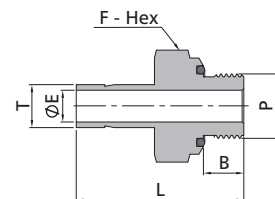


1 1/4" and above

1. The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.
2. Adapt to straight thread boss of SAE J1926-1, ISO 11926-1 and MS 16142.



The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.



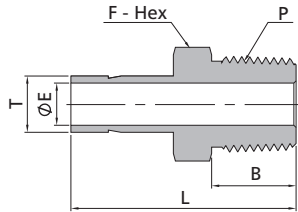
The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

| Fractional Tube   |                    |                               |                       | SAE/MS Straight Threads (ST) |            |            |            |
|-------------------|--------------------|-------------------------------|-----------------------|------------------------------|------------|------------|------------|
| T-Tube O.D. (in.) | P-SAE Nominal Size | P-SAE/MS Thread Specification | Basic Ordering Number | Dimensions, in. (mm)         |            |            |            |
|                   |                    |                               |                       | L                            | B          | E          | F          |
| 1/8               | 2                  | 5/16-24                       | -AM-FT2-ST5           | 1.20(30.5)                   | 0.30(7.6)  | 0.08(2.0)  | 0.44(11.1) |
| 1/4               | 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               | 4                  | 7/16-20                       | -AM-FT6-ST7           | 1.46(37.1)                   | 0.36(9.1)  | 0.20(5.1)  | 0.56(14.3) |
| 3/8               | 6                  | 9/16-18                       | -AM-FT6-ST9           | 1.52(38.6)                   | 0.39(9.9)  | 0.27(6.9)  | 0.69(17.5) |
| 3/8               | 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               | 6                  | 9/16-18                       | -AM-FT8-ST9           | 1.74(44.2)                   | 0.39(9.9)  | 0.28(7.1)  | 0.69(17.5) |
| 1/2               | 8                  | 3/4-16                        | -AM-FT8-ST12          | 1.82(46.2)                   | 0.44(11.2) | 0.37(9.4)  | 0.87(22.2) |
| 5/8               | 10                 | 7/8-14                        | -AM-FT10-ST14         | 1.94(49.3)                   | 0.50(12.7) | 0.47(11.9) | 1.00(25.4) |
| 3/4               | 12                 | 1 1/16-12                     | -AM-FT12-ST17         | 2.10(53.3)                   | 0.59(15.0) | 0.58(14.7) | 1.25(31.8) |
| 1                 | 16                 | 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             | 20                 | 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             | 24                 | 1 7/8-12                      | -AM-FT24-ST30         | 3.28(83.3)                   | 0.59(15.0) | 1.25(31.8) | 2.13(54.0) |

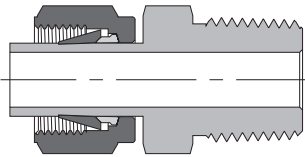
| Fractional Tube   |                    |                       | 37° Flare (AN)       |            |            |            |
|-------------------|--------------------|-----------------------|----------------------|------------|------------|------------|
| T-Tube O.D. (in.) | AN Tube Flare Size | 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   |                    |                               |                       | SAE/MS Straight Threads (OST) |            |           |            |
|-------------------|--------------------|-------------------------------|-----------------------|-------------------------------|------------|-----------|------------|
| T-Tube O.D. (in.) | P-SAE Nominal Size | P-SAE/MS Thread Specification | Basic Ordering Number | Dimensions, in. (mm)          |            |           |            |
|                   |                    |                               |                       | L                             | B          | E         | F          |
| 1/8               | 2                  | 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                  | 3/8-24                        | -AM-FT3-OST6          | 1.38(35.1)                    | 0.38(9.7)  | 0.12(3.0) | 0.63(15.9) |
| 1/4               | 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              | 5                  | 1/2-20                        | -AM-FT5-OST8          | 1.64(41.7)                    | 0.44(11.2) | 0.22(5.6) | 0.87(22.2) |
| 3/8               | 6                  | 9/16-18                       | -AM-FT6-OST9          | 1.70(43.2)                    | 0.47(11.9) | 0.27(6.9) | 0.94(23.8) |
| 1/2               | 8                  | 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



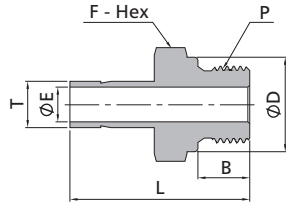
28 mm and above

The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end.

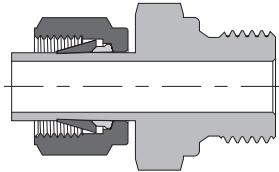
| Metric Tube      |            |                       | NPT Thread           |            |            |            |
|------------------|------------|-----------------------|----------------------|------------|------------|------------|
| T-Tube O.D. (mm) | P-NPT Size | Basic Ordering Number | Dimensions, 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

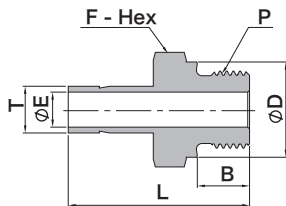


25 mm and below

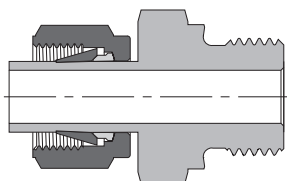


28 mm and above

The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.



25 mm and below



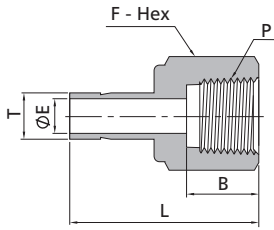
28 mm and above

The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

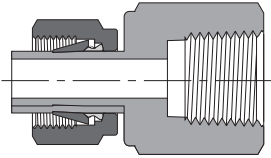
| Metric Tube      |           |                       | ISO Parallel Thread (RS) |            |            |            |            |
|------------------|-----------|-----------------------|--------------------------|------------|------------|------------|------------|
| T-Tube O.D. (mm) | P-RS Size | 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

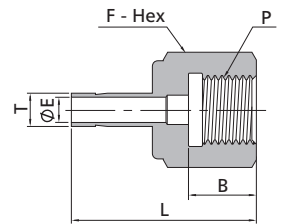
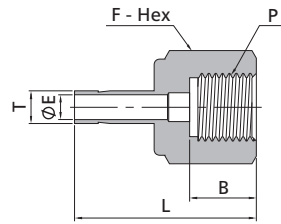
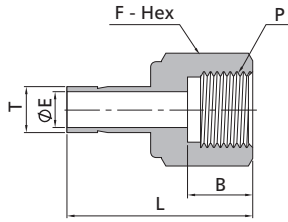


1 1/4" and above

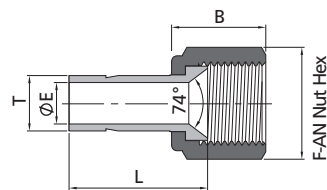
| Fractional Tube         |               |                             | NPT Thread           |            |            |            |
|-------------------------|---------------|-----------------------------|----------------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-NPT<br>Size | Basic<br>Ordering<br>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<br>O.D.<br>(in.) | P-RT<br>Size | Basic<br>Ordering<br>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) |

## Female Adapters



Adapt to Japanese gauge stud.



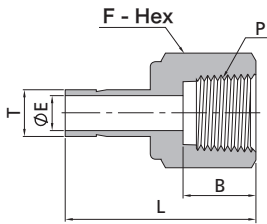
| Fractional Tube         |              |                             | ISO Parallel Thread (RP) |            |           |            |
|-------------------------|--------------|-----------------------------|--------------------------|------------|-----------|------------|
| T-Tube<br>O.D.<br>(in.) | P-RP<br>Size | Basic<br>Ordering<br>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<br>O.D.<br>(in.) | P-RG<br>Size | Basic<br>Ordering<br>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) |

| Fractional Tube         |              |                             | ISO Parallel Thread (RJ) |            |           |            |
|-------------------------|--------------|-----------------------------|--------------------------|------------|-----------|------------|
| T-Tube<br>O.D.<br>(in.) | P-RJ<br>Size | Basic<br>Ordering<br>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) |

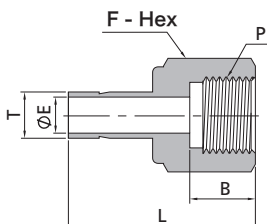
| Fractional Tube         |                               |                             | AN Thread            |            |            |             |
|-------------------------|-------------------------------|-----------------------------|----------------------|------------|------------|-------------|
| T-Tube<br>O.D.<br>(in.) | AN Tube<br>Flare<br>Size(in.) | Basic<br>Ordering<br>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



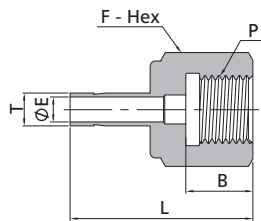
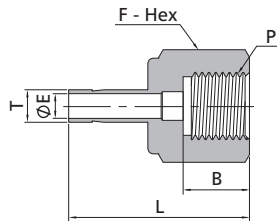
| Metric Tube            |               |                             | NPT Thread           |            |            |            |
|------------------------|---------------|-----------------------------|----------------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(mm) | P-NPT<br>Size | Basic<br>Ordering<br>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<br>O.D.<br>(mm) | P-RT<br>Size | Basic<br>Ordering<br>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<br>O.D.<br>(mm) | P-RP<br>Size | Basic<br>Ordering<br>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

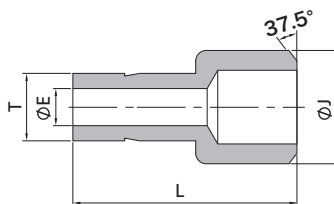


Adapt to Japanese gauge stud.

| Metric Tube            |              |                             | ISO Parallel Thread (RG) |            |           |            |
|------------------------|--------------|-----------------------------|--------------------------|------------|-----------|------------|
| T-Tube<br>O.D.<br>(mm) | P-RG<br>Size | Basic<br>Ordering<br>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) |

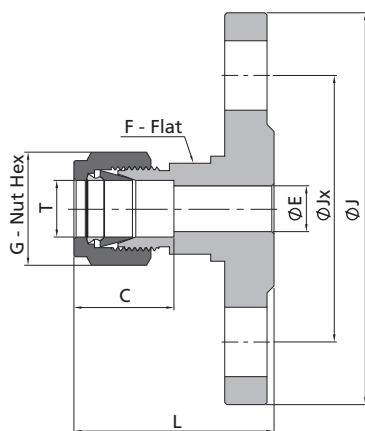
| Metric Tube            |              |                             | ISO Parallel Thread (RJ) |            |           |            |
|------------------------|--------------|-----------------------------|--------------------------|------------|-----------|------------|
| T-Tube<br>O.D.<br>(mm) | P-RJ<br>Size | Basic<br>Ordering<br>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<br>O.D.<br>(in.) | Pipe Weld<br>Size | Basic<br>Ordering<br>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



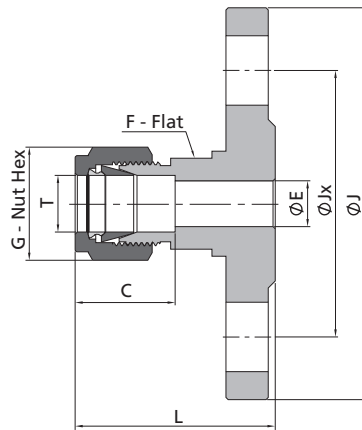
- ⊙ Integrally forged body.
- ⊙ ASME flanges comply with ASME B16.5.
- ⊙ DIN flanges comply with DIN 2501/2526.
- ⊙ GB flanges comply with GB/T 9123.1.
- ⊙ EN flanges comply with EN 1092-1.
- ⊙ JIS flanges comply with JIS B 2220.

| ASME Flanges      |                 |       |                                          | Dimensions, in. (mm) |             |             |            |            |            |            |
|-------------------|-----------------|-------|------------------------------------------|----------------------|-------------|-------------|------------|------------|------------|------------|
| T-Tube O.D. (in.) | ASME 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)                     | DIN 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



- ◎ Integrally forged body.
- ◎ ASME flanges comply with ASME 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.

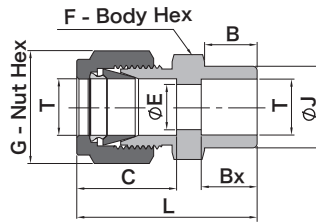
## EN Flanges, Pressure Class PN 40

| T-Tube<br>O.D.<br>(mm) | EN<br>Flange<br>Size DN | Basic Ordering<br>Number Raised<br>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) |

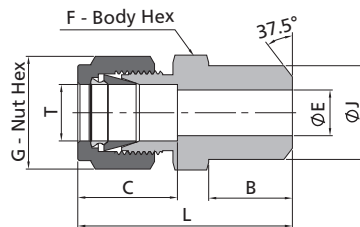
## JIS Flanges, Pressure Class 10K

| T-Tube<br>O.D. | JIS<br>Flange<br>Size DN | Basic Ordering<br>Number Raised<br>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



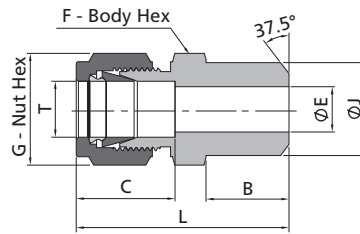
| Fractional Tube         |                             |                      |            |            |            |            |            | Tube Socket Weld |            |
|-------------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------------|------------|
| T-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>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) |



The E dimension refers to the smallest nominal orifice. It might be larger at welding end.

| Fractional Tube         |                      |                             | Pipe Butt Weld       |            |            |            |            |            |            |
|-------------------------|----------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | Pipe<br>Weld<br>Size | Basic<br>Ordering<br>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) |

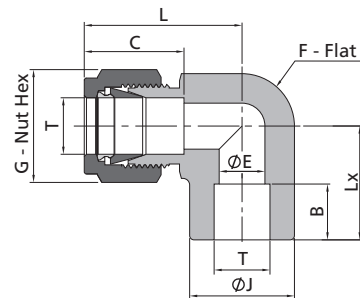
## Weld Connectors



The E dimension refers to the smallest nominal orifice. It might be larger at welding end.

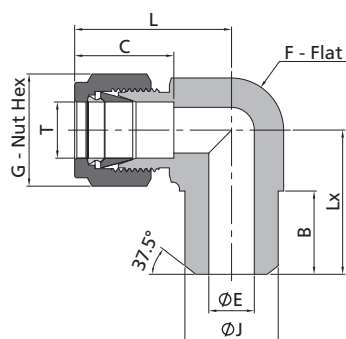
| Metric Tube            |                      |                             | Pipe Butt Weld       |            |            |            |            |            |            |  |
|------------------------|----------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|--|
| T-Tube<br>O.D.<br>(mm) | Pipe<br>Weld<br>Size | Basic<br>Ordering<br>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<br>O.D.<br>(in.) | Basic<br>Ordering<br>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) |

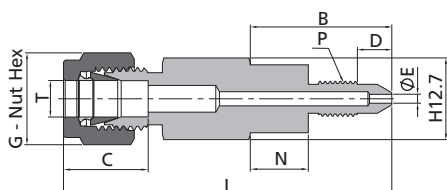
## Weld Elbows



The E dimension refers to the smallest nominal orifice. It might be larger at welding end.

| Fractional Tube         |                      |                             | Pipe Butt Weld       |            |            |            |            |            |            |            |
|-------------------------|----------------------|-----------------------------|----------------------|------------|------------|------------|------------|------------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | Pipe<br>Weld<br>Size | Basic<br>Ordering<br>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) |

## 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<br>O.D.<br>(in.) | P-SAE/MS<br>Thread<br>Size | Basic<br>Ordering<br>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) |

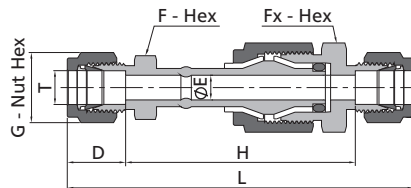
## Dielectric Fittings

## Materials

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

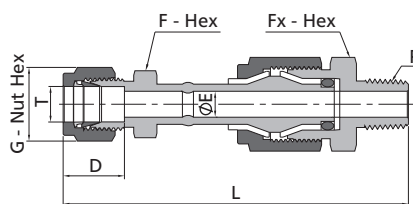
## Technical Data

- Electrical Resistance of Insulators at 70°F (20°C):  $10 \times 10^5 \Omega$  at 10 V
- Maximum working pressure: 5000 psig (344 bar) at 70°F (21°C)
- Temperature range: -4°F (-20°C) to 200°F (93°C)



| Fractional Tube         |                             |                      |            |            |            |           |            |            |
|-------------------------|-----------------------------|----------------------|------------|------------|------------|-----------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | Basic<br>Ordering<br>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<br>O.D.<br>(mm) | Basic<br>Ordering<br>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) |

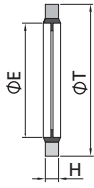


The E dimension refers to the smallest nominal orifice. It might be larger at tapered thread end, straight thread end.

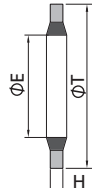
| Fractional Tube         |               |                             | NPT Thread           |            |            |           |            |            |
|-------------------------|---------------|-----------------------------|----------------------|------------|------------|-----------|------------|------------|
| T-Tube<br>O.D.<br>(in.) | P-NPT<br>Size | Basic<br>Ordering<br>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) | 3.0(0.12) |
| M48 x 2            | -RS-M48               | 59.0(2.20)           | 48.7(1.90) |           |

## 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) | 2.0(0.08) |
| M18 x 1.5          | -RP-M18               | 24.2(0.87)           | 18.2(0.72) |           |
| 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) | 2.5(0.10) |
| M30 x 2            | -RP-M30               | 37.3(1.30)           | 30.2(1.20) |           |
| 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) |           |
| 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) |           |
| M27 x 2                  | -RG-M27               | 24.0(0.90)           | 13.9(0.50) | 2.5(0.10) |
| 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            | VI9-902         | 90 Durometer<br>Fluorocarbon<br>FKM |
| 3/8-24             | VI9-903         |                                     |
| 7/16-20            | VI9-904         |                                     |
| 1/2-20             | VI9-905         |                                     |
| 9/16-18            | VI9-906         |                                     |
| 3/4-16             | VI9-908         |                                     |
| 7/8-14             | VI9-910         |                                     |
| 1 1/16-12          | VI9-912         |                                     |
| 1 3/16-12          | VI9-914         |                                     |
| 1 5/16-12          | VI9-916         |                                     |
| 1 5/8-12           | VI9-920         |                                     |
| 1 7/8-12           | VI9-924         |                                     |

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

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



## A-90 6 Series Tube Fittings

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

| ISO Parallel Thread Size | Ordering Number | Material                            |
|--------------------------|-----------------|-------------------------------------|
| 1/8                      | VI9-502         | 90 Durometer<br>Fluorocarbon<br>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<br>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<br>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                         |      | Special Application |                     | Cleaning and Packaging |       |
|----------|--------|--------------|-------------------------|---------|--------------------|---------|---------------|----------------------------------------------------|------------------------|----------------------------------------------------|---------------------|-----------------------------------|------|---------------------|---------------------|------------------------|-------|
| SS       | 316 SS | CM           | Male Connector          | ML      | Metric Ferrule     | 1       | 1/16"         | Except the same as the P1, the other type follows: |                        | Except the same as the P1, the other size follows: |                     | Specify in the same way as the P2 | None | EC79                | EC-79 Certification | F2                     | FC-01 |
| S4       | 304 SS | BCM          | Bulkhead Male Connector | FL      | Fractional Ferrule | 2       | 1/8" or 2 mm  | NS                                                 | NPT Thread             | 5                                                  | M5 x 0.8 or 5/16-24 |                                   |      |                     |                     |                        |       |
|          |        | TCM          | Thermocouple Connector  |         |                    | 3       | 3/16" or 3 mm | ONS                                                | O-ring with NPT Thread | 6                                                  | M6 x 1 or 3/8-24    |                                   |      |                     |                     |                        |       |
|          |        | CF           | Female Connector        | MT      | Metric Tube        | 4       | 1/4" or 4 mm  |                                                    |                        |                                                    |                     |                                   |      |                     |                     |                        |       |
| S1       | 321 SS |              |                         |         |                    |         |               |                                                    |                        |                                                    |                     |                                   |      |                     |                     |                        |       |

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

Special Application:

Wetted metal components SilcoNert® 2000 (Sulfinert®) coated.

**FITOK**

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