

# 37° Flared Tube Fittings



# Contents

## Tube Cap Assembly - TCA



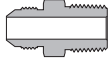
A-96

## Nuts - N



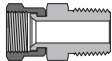
A-96

## Male Connectors - CM



A-96

## Rotatable Male Connectors - CM



A-97

## Female Connectors - CF



A-98

## Rotatable Female Connectors - CF



A-98

## Unions - U



A-99

## Large Hex Unions - HUN



A-99

## Reducing Adapters - RA



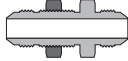
A-99

## Sleeves - SL



A-99

## Bulkhead Unions - BU



A-100

## Bulkhead Lock Nuts - BN



A-100

## Tube Caps - TC



A-100

## Tube Plugs - TP



A-100

## Male Elbows - LM



A-101

## Positionable Male Elbows - LP



A-101

## 45° Male Elbows - VM



A-102

## Female Elbows - LF



A-102

## Union Elbows - LU



A-103

## Rotatable Union Elbows - LU



A-103

## Male Branch Tees - TTM



A-104

## Positionable Male Branch Tees - TTP



A-104

## Male Run Tees - TMT



A-105

## Female Branch Tees - TTF



A-105

## Female Run Tees - TFT



A-106

## Union Tees - TTT



A-106

## Rotatable Run Tees - TTT



A-107

## Rotatable Branch Tees - TTT



A-107

## Union Crosses - C



A-107

## Features

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

## Technical Data

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

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

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

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

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

## Materials

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

## Ordering Information

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

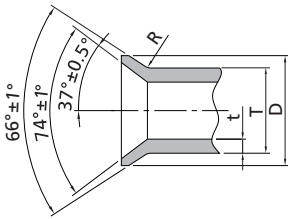
**For example:**

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

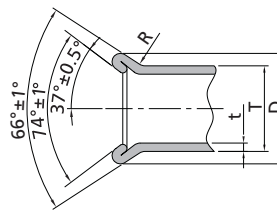
## Flaring Operation

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

### Thick Tubes



### Thin Tubes

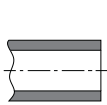


| Fractional Tubing    |            |             |        |
|----------------------|------------|-------------|--------|
| T-Tube<br>O.D.<br>in | Dimensions |             |        |
|                      | D (mm)     | t (in.)     | R (mm) |
| 1/4                  | 8.6-9.1    | 0.020-0.065 | 0.8 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

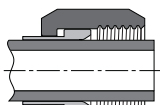
| Metric Tubing          |            |         |        |
|------------------------|------------|---------|--------|
| T-Tube<br>O.D.<br>(mm) | Dimensions |         |        |
|                        | D (mm)     | t (mm)  | R (mm) |
| 6                      | 8.4-9.2    | 0.5-1.5 | 0.8    |
| 8  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

## Installation Instructions

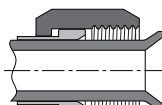
1. Cut the tube to the proper length.
2. Insert the tube into the nut and sleeve.
3. Form the flare to 37° dimension according to SAE J533. See flaring operation.
4. Finger-tighten the nut.
5. Tighten the nut 1/4 turn with wrench while holding steady the body of the fitting.



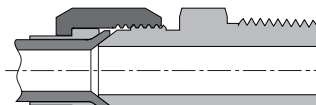
Step 1



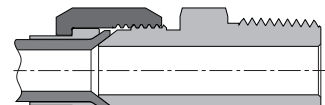
Step 2



Step 3



Step 4



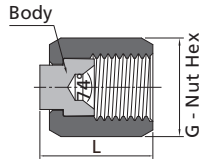
Step 5

## Cautions:

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

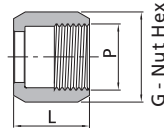
## Dimensions

### Tube cap assembly



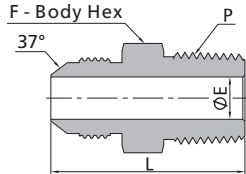
| SAE 070112A |    |                       |                      |             |  |
|-------------|----|-----------------------|----------------------|-------------|--|
| T-Tube O.D. |    | Basic Ordering Number | Dimensions, in. (mm) |             |  |
| in.         | mm |                       | L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

### Nuts



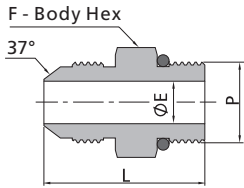
| SAE 070110 |    |                      |                       |                      |             |
|------------|----|----------------------|-----------------------|----------------------|-------------|
| Tube O.D.  |    | P-SAE/MS Thread Size | Basic Ordering Number | Dimensions, in. (mm) |   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

### Male Connectors



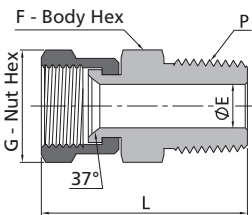
| SAE 070102 |    |            |                       |                      |             |             |
|------------|----|------------|-----------------------|----------------------|-------------|-------------|
| Tube O.D.  |    | P-NPT Size | Basic Ordering Number | Dimensions, in. (mm) |     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

Male Connectors



| SAE 070120 |    |                    |                               |                       |                      |             |             |  |
|------------|----|--------------------|-------------------------------|-----------------------|----------------------|-------------|-------------|--|
| Tube O.D.  |    | P-SAE Nominal Size | P-SAE/MS Thread Specification | Basic Ordering Number | Dimensions, in. (mm) |             |             |  |
| in.        | mm |                    |                               |                       | L                    | E           | F           |  |
| 1/8        | 3  | 2                  | 5/16-24                       | -CM-AN2-ST5           | 1.06 (26.9)          | 0.06 (1.6)  | 0.44 (11.1) |  |
| 3/16       | 4  | 3                  | 3/8-24                        | -CM-AN3-ST6           | 1.10 (27.9)          | 0.13 (3.2)  | 0.50 (12.7) |  |
| 1/4        | 6  | 4                  | 7/16-20                       | -CM-AN4-ST7           | 1.23 (31.2)          | 0.17 (4.4)  | 0.56 (14.3) |  |
| 1/4        | 6  | 5                  | 1/2-20                        | -CM-AN4-ST8           | 1.23 (31.2)          | 0.17 (4.4)  | 0.63 (15.9) |  |
| 1/4        | 6  | 6                  | 9/16-18                       | -CM-AN4-ST9           | 1.30 (33.0)          | 0.17 (4.4)  | 0.69 (17.5) |  |
| 1/4        | 6  | 8                  | 3/4-16                        | -CM-AN4-ST12          | 1.37 (34.8)          | 0.17 (4.4)  | 0.87 (22.2) |  |
| 5/16       | 8  | 5                  | 1/2-20                        | -CM-AN5-ST8           | 1.23 (31.2)          | 0.24 (6.0)  | 0.63 (15.9) |  |
| 3/8        | 10 | 6                  | 9/16-18                       | -CM-AN6-ST9           | 1.30 (33.0)          | 0.30 (7.5)  | 0.69 (17.5) |  |
| 3/8        | 10 | 8                  | 3/4-16                        | -CM-AN6-ST12          | 1.38 (35.1)          | 0.30 (7.5)  | 0.87 (22.2) |  |
| 3/8        | 10 | 10                 | 7/8-14                        | -CM-AN6-ST14          | 1.50 (38.1)          | 0.30 (7.5)  | 1.00 (25.4) |  |
| 1/2        | 12 | 6                  | 9/16-18                       | -CM-AN8-ST9           | 1.44 (36.6)          | 0.30 (7.5)  | 0.81 (20.6) |  |
| 1/2        | 12 | 8                  | 3/4-16                        | -CM-AN8-ST12          | 1.48 (37.6)          | 0.39 (9.9)  | 0.87 (22.2) |  |
| 1/2        | 12 | 10                 | 7/8-14                        | -CM-AN8-ST14          | 1.60 (40.6)          | 0.39 (9.9)  | 1.00 (25.4) |  |
| 1/2        | 12 | 12                 | 1 1/16-12                     | -CM-AN8-ST17          | 1.76 (44.7)          | 0.39 (9.9)  | 1.25 (31.8) |  |
| 5/8        | 16 | 8                  | 3/4-16                        | -CM-AN10-ST12         | 1.60 (40.6)          | 0.42 (10.7) | 0.94 (23.8) |  |
| 5/8        | 16 | 10                 | 7/8-14                        | -CM-AN10-ST14         | 1.70 (43.2)          | 0.48 (12.3) | 1.00 (25.4) |  |
| 5/8        | 16 | 12                 | 1 1/16-12                     | -CM-AN10-ST17         | 1.86 (47.2)          | 0.48 (12.3) | 1.25 (31.8) |  |
| 3/4        | 18 | 8                  | 3/4-16                        | -CM-AN12-ST12         | 1.78 (45.2)          | 0.42 (10.7) | 1.25 (31.7) |  |
| 3/4        | 18 | 10                 | 7/8-14                        | -CM-AN12-ST14         | 1.83 (46.4)          | 0.50 (12.7) | 1.25 (31.7) |  |
| 3/4        | 18 | 12                 | 1 1/16-12                     | -CM-AN12-ST17         | 1.97 (50.0)          | 0.61 (15.5) | 1.25 (31.8) |  |
| 3/4        | 18 | 16                 | 1 5/16-12                     | -CM-AN12-ST21         | 2.00 (50.8)          | 0.61 (15.5) | 1.50 (38.1) |  |
| 7/8        | 22 | 14                 | 1 3/16-12                     | -CM-AN14-ST19         | 1.99 (50.5)          | 0.72 (18.3) | 1.37 (34.9) |  |
| 7/8        | 22 | 16                 | 1 5/16-12                     | -CM-AN14-ST21         | 2.02 (51.3)          | 0.72 (18.3) | 1.50 (38.1) |  |
| 1          | 25 | 12                 | 1 1/16-12                     | -CM-AN16-ST17         | 2.01 (51.1)          | 0.66 (16.7) | 1.37 (34.9) |  |
| 1          | 25 | 14                 | 1 3/16-12                     | -CM-AN16-ST19         | 2.04 (51.8)          | 0.72 (18.3) | 1.37 (34.9) |  |
| 1          | 25 | 16                 | 1 5/16-12                     | -CM-AN16-ST21         | 2.04 (51.8)          | 0.85 (21.5) | 1.50 (38.1) |  |

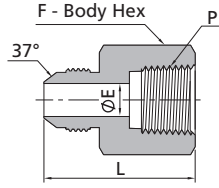
Rotatable Male Connectors



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

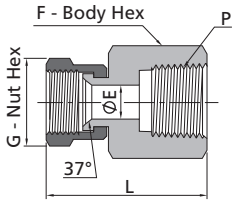
# A-98 37° Flared Tube Fittings

## Female Connectors



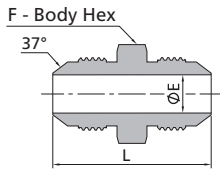
| SAE 070103 |    |            |                       |                      |             |             |  |
|------------|----|------------|-----------------------|----------------------|-------------|-------------|--|
| Tube O.D.  |    | P-NPT Size | Basic Ordering Number | Dimensions, in. (mm) |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

## Rotatable Female Connectors



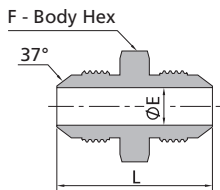
| Tube O.D. |    | P-NPT Size | Basic Ordering Number | Dimensions, in. (mm) |             |             |             |
|-----------|----|------------|-----------------------|----------------------|-------------|-------------|-------------|
| in.       | mm |            |                       | L 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

## Unions



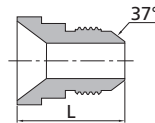
| SAE 070101 |    |                       |                      |             |             |
|------------|----|-----------------------|----------------------|-------------|-------------|
| Tube O.D.  |    | Basic Ordering Number | Dimensions, in. (mm) |             |             |
| in.        | mm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

## Large Hex Unions



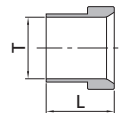
| SAE 070119 |    |                       |                      |             |             |
|------------|----|-----------------------|----------------------|-------------|-------------|
| Tube O.D.  |    | Basic Ordering Number | Dimensions, in. (mm) |             |             |
| in.        | mm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

## Reducing Adapters



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

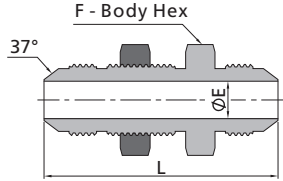
## Sleeves



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

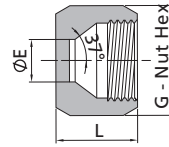


**Bulkhead Unions**



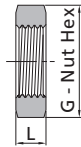
| SAE 070601 |    |                       |                      |             |             |
|------------|----|-----------------------|----------------------|-------------|-------------|
| Tube O.D.  |    | Basic Ordering Number | Dimensions, in. (mm) |             |             |
| in.        | mm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

**Tube Caps**



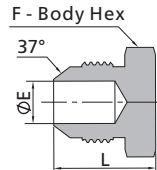
| SAE 070112 |    |                       |                      |             |             |
|------------|----|-----------------------|----------------------|-------------|-------------|
| Tube O.D.  |    | Basic Ordering Number | Dimensions, in. (mm) |             |             |
| in.        | mm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

**Bulkhead Lock Nuts**



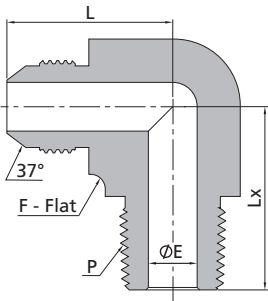
| SAE 070118 |    |                       |                      |             |
|------------|----|-----------------------|----------------------|-------------|
| Tube O.D.  |    | Basic Ordering Number | Dimensions, in. (mm) |             |
| in.        | mm |                       | L            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

**Tube Plugs**



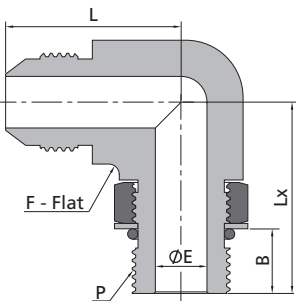
| SAE 070109 |    |                       |                      |             |             |
|------------|----|-----------------------|----------------------|-------------|-------------|
| Tube O.D.  |    | Basic Ordering Number | Dimensions, in. (mm) |             |             |
| in.        | mm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

Male Elbows



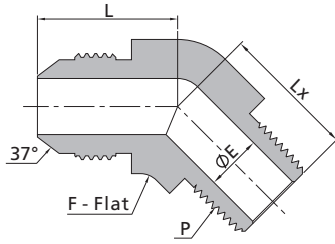
| SAE 070202 |    |            |                       |                      |             |             |             |  |
|------------|----|------------|-----------------------|----------------------|-------------|-------------|-------------|--|
| Tube O.D.  |    | P-NPT Size | Basic Ordering Number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

Positionable Male Elbows



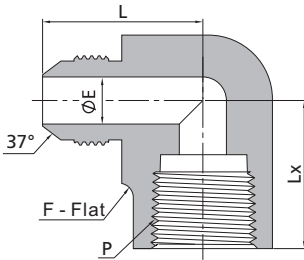
| SAE 070220 |    |                    |                               |                       |                      |             |             |             |             |
|------------|----|--------------------|-------------------------------|-----------------------|----------------------|-------------|-------------|-------------|-------------|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

45° Male Elbows



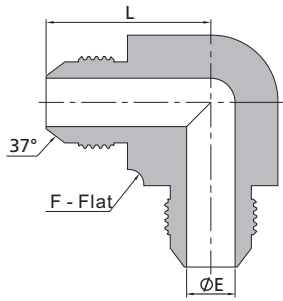
| SAE 070302 |    |            |                       |                      |             |             |             |
|------------|----|------------|-----------------------|----------------------|-------------|-------------|-------------|
| Tube O.D.  |    | P-NPT Size | Basic Ordering Number |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

Female Elbows



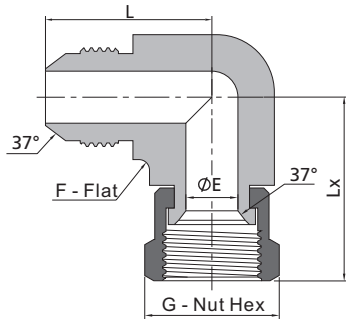
| SAE 070203 |    |            |                       |                      |             |             |             |
|------------|----|------------|-----------------------|----------------------|-------------|-------------|-------------|
| Tube O.D.  |    | P-NPT Size | Basic Ordering Number |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

Union Elbows



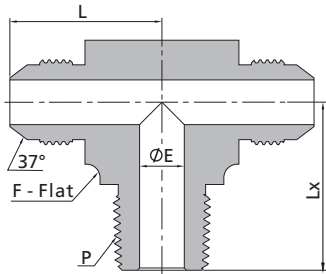
| SAE 070201 |    |                       |                      |             |             |
|------------|----|-----------------------|----------------------|-------------|-------------|
| Tube O.D.  |    | Basic Ordering Number | Dimensions, in. (mm) |             |             |
| in.        | mm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

Rotatable Union Elbows



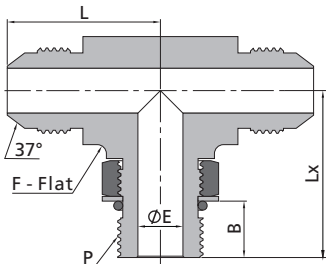
| SAE 070221 |    |                       |                      |             |             |             |             |
|------------|----|-----------------------|----------------------|-------------|-------------|-------------|-------------|
| Tube O.D.  |    | Basic Ordering Number | Dimensions,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

Male Branch Tees



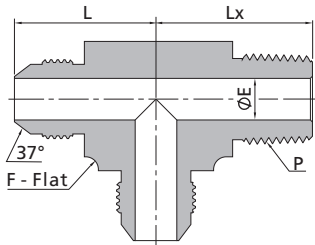
| SAE 070425 |    |            |                       |                      |             |             |             |  |
|------------|----|------------|-----------------------|----------------------|-------------|-------------|-------------|--|
| Tube O.D.  |    | P-NPT Size | Basic Ordering Number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

Positionable Male Branch Tees



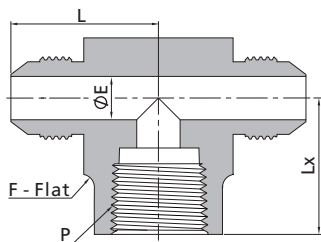
| SAE 070429 |    |                    |                               |                       |                      |             |             |             |             |
|------------|----|--------------------|-------------------------------|-----------------------|----------------------|-------------|-------------|-------------|-------------|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

Male Run Tees



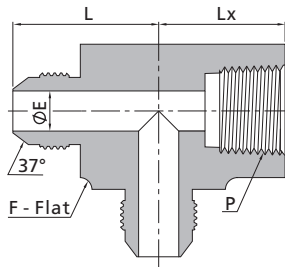
| SAE 070424 |    |            |                       |                      |             |             |             |
|------------|----|------------|-----------------------|----------------------|-------------|-------------|-------------|
| Tube O.D.  |    | P-NPT Size | Basic Ordering Number |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

Female Branch Tees



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

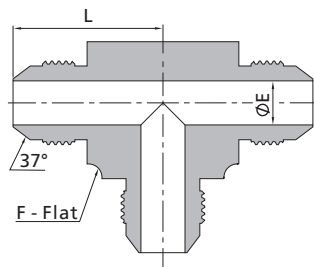
Female Run Tees



SAE 070426

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

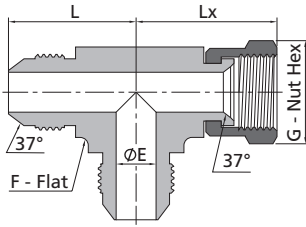
Union Tees



SAE 070401

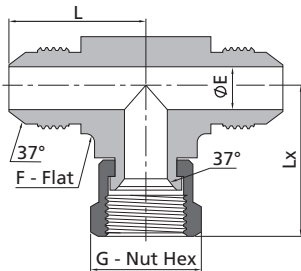
| Tube O.D. |    | Basic Ordering Number | Dimensions, in. (mm) |             |             |
|-----------|----|-----------------------|----------------------|-------------|-------------|
| in.       | mm |                       | L                    | E           | F           |
| 1/8       | 3  |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

Rotatable Run Tees



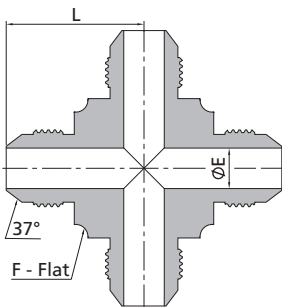
| Tube O.D. |    | Basic Ordering Number | Dimensions, in. (mm) |             |             |             |             |
|-----------|----|-----------------------|----------------------|-------------|-------------|-------------|-------------|
| in.       | mm |                       | L            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

Rotatable Branch Tees



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

Union Crosses



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