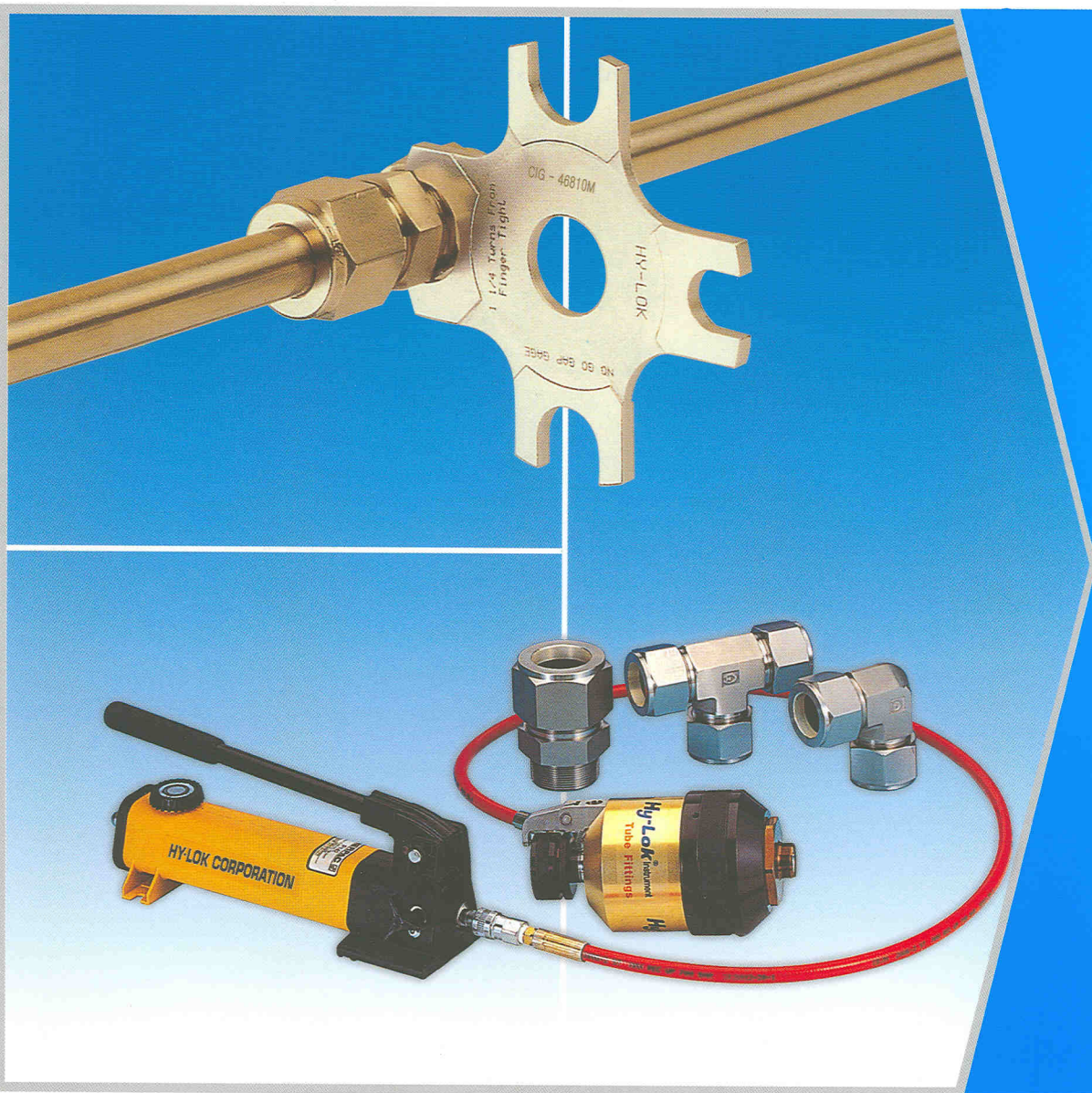


# Hy-Lok<sup>®</sup> Tube Fittings

Tube Size from 1/16" thru 2" (2mm thru 38mm)



Catalog No. H - 200TF  
Jan. 2002



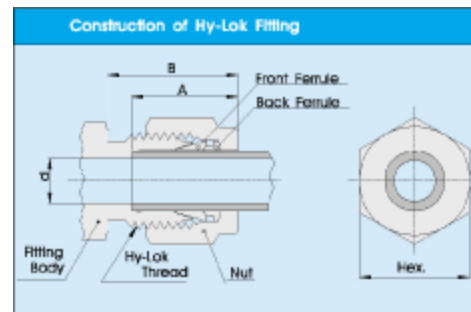
## HY-LOK CORPORATION

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## Design and Manufacture

Hy - Lok flareless tube fittings have been designed and manufactured with great care to meet the specifications required for wide range of applications in chemical, petro - chemical, oil refinery, power generation, shipbuilding, pulp and papers, micro - electronics, etc. Each Hy-Lok tube fitting consists of four parts; body, front ferrule, back ferrule, and nut. The two - ferrule design, front and back, compensates for any tolerances in tube O.D., wall thickness, material hardness and always ensures outstanding leak - tight connections.

Hy-Lok tube fittings are manufactured under Hy-Lok Corporation's strict quality control program covering A to Z, which enabled Hy-Lok to obtain ASME certificate for quality system and ISO 9001.



## Torque and Distortion during Installation

When the nut is tightened, the back and front ferrules move axially. This axial movement does not allow any torque transfer from the fitting to the tubing, and the mechanical properties of tubing is maintained.

During makeup, the back ferrule moves in such a controlled manner that the tubing is not overstressed and the tubing ID is not excessively reduced, resulting in safe operation under high pressure or vibration. The front ferrule does not force the body to expand, which allows the nut to be back off easily for disassembly and allows remakes many times.

| Table 1. Hy-Lok Fractional Tube End Dimensions |           |               |       |        |       | Unit : mm |
|------------------------------------------------|-----------|---------------|-------|--------|-------|-----------|
| Size No.                                       | Tube O.D. | Hy-Lok Thread | A     | B      | d     | Hex.      |
| 1                                              | 1/16      | 10-32UNF      | 8.63  | 10.92  | 1.27  | 7.90      |
| 2                                              | 1/8       | 5/16-20UN     | 12.70 | 15.24  | 2.28  | 11.10     |
| 3                                              | 3/16      | 3/8-20UN      | 13.70 | 16.00  | 3.04  | 12.70     |
| 4                                              | 1/4       | 7/16-10UNF    | 15.24 | 17.78  | 4.80  | 14.20     |
| 5                                              | 5/16      | 1/2-20UNF     | 16.25 | 18.54  | 6.35  | 15.80     |
| 6                                              | 3/8       | 9/16-20UN     | 16.76 | 19.30  | 7.10  | 17.40     |
| 8                                              | 1/2       | 3/4-20UNEF    | 22.86 | 21.84  | 10.40 | 22.20     |
| 10                                             | 5/8       | 7/8-20UNEF    | 24.38 | 21.84  | 12.70 | 25.40     |
| 12                                             | 3/4       | 1-20UNEF      | 24.38 | 21.84  | 15.70 | 28.60     |
| 14                                             | 7/8       | 1 1/8-20UN    | 25.90 | 21.84  | 18.20 | 31.80     |
| 16                                             | 1         | 1 5/16-20UN   | 31.24 | 26.61  | 22.40 | 38.10     |
| 20                                             | 1 1/4     | 1 5/8-20UN    | 41.14 | 38.86  | 27.70 | 47.62     |
| 24                                             | 1 1/2     | 1 15/16-20UN  | 50.03 | 453.21 | 34.00 | 57.15     |
| 32                                             | 2         | 2 5/8-20UN    | 67.73 | 62.73  | 46.00 | 76.20     |

## Construction and Tube End Dimensions

The construction and tube end dimensions of both fractional and metric sizes are shown below with nut in finger tight position. These dimensions are applicable to all the fittings throughout this catalogue and also to all Hy-Lok ends used as end connections of Hy-Pro ball valves, needle valves, valve manifolds, check valves. and relief valves, etc.

## Easy Reference

Heads of tables are differentiated with color ;

Shows Metric

Shows Fractional

| Table 2. Hy-Lok Metric Tube End Dimensions |           |               |      |      |      | Unit : mm |
|--------------------------------------------|-----------|---------------|------|------|------|-----------|
| Size No.                                   | Tube O.D. | Hy-Lok Thread | A    | B    | d    | Hex.      |
| 2 M                                        | 2 mm      | 5/16-20UN     | 12.9 | 15.3 | 1.7  | 12.0      |
| 3 M                                        | 3 mm      | 5/16-20UN     | 12.9 | 15.3 | 2.4  | 12.0      |
| 4 M                                        | 4 mm      | 3/8-20UN      | 13.7 | 16.1 | 2.4  | 12.0      |
| 6 M                                        | 6 mm      | 7/16-20UN     | 15.3 | 17.7 | 4.8  | 14.0      |
| 8 M                                        | 8 mm      | 1/2-20UN      | 16.2 | 18.6 | 6.4  | 16.0      |
| 10 M                                       | 10 mm     | 5/8-20UN      | 17.2 | 19.5 | 7.9  | 19.0      |
| 12 M                                       | 12 mm     | 3/4-20UN      | 22.8 | 22.0 | 9.5  | 22.0      |
| 15 M                                       | 15 mm     | 7/8-20UNEF    | 24.4 | 22.0 | 11.9 | 25.0      |
| 16 M                                       | 16 mm     | 7/8-20UNEF    | 24.4 | 22.0 | 12.7 | 25.0      |
| 18 M                                       | 18 mm     | 1-20UNEF      | 24.4 | 22.0 | 15.1 | 30.0      |
| 20 M                                       | 20 mm     | 1 1/8-20UN    | 26.0 | 22.0 | 15.9 | 32.0      |
| 22 M                                       | 22 mm     | 1 1/8-20UN    | 26.0 | 22.0 | 18.3 | 32.0      |
| 25 M                                       | 25 mm     | 1 5/16-20UN   | 31.3 | 26.5 | 21.8 | 38.0      |
| 28 M                                       | 28 mm     | M37×1.5P      | 36.6 | 36.6 | 21.8 | 46.0      |
| 32 M                                       | 32 mm     | M42×1.5P      | 42.0 | 41.6 | 28.6 | 50.0      |
| 38 M                                       | 38 mm     | M50×1.5P      | 49.4 | 47.9 | 33.7 | 60.0      |

**Note :** Dimensions A and B in tabel 1 and in table 2 are shown with Hy-Lok nut in finger tight position.

## Materials

Hy-Lok tube fittings are available as standard in stainless steel, brass and monel. Straight fittings are machined from cold finished bar stock and shaped bodies from forgings. Specifications for fitting materials and tubings are listed below. For special applications, contact your local distributors.

**Table 3. Typical Material Specification**

| Fitting Material    | Bar Stock                                                                                | Forging                                        | Tubing                                                                                |
|---------------------|------------------------------------------------------------------------------------------|------------------------------------------------|---------------------------------------------------------------------------------------|
| S.Stell<br>Type 316 | ASTM A479<br>ASME SA479<br>ASTM A276<br>Project 70 - ASTM A276<br>ASTM A479<br>JIS G4303 | ASTM A182 F316<br>ASME SA182 F316<br>JIS G3214 | ASTM A269<br>ASTM A213<br>ASTM A249<br>ASME SA213<br>MIL - T - 8504<br>MIL - T - 8506 |
| Brass               | ASTM B16 Alloy 360<br>ASTM B453 Alloy 345<br>QQ - b626 Alloy 360                         | ASTM B124 Alloy 377<br>QQ - B626 Alloy 377     | ASTM B68<br>ASTM B75<br>ASTM B88<br>ASTM SB75                                         |
| Monel<br>400        | QQ - N - 281 Alloy 405<br>QQ - N - 286 Alloy K500<br>ASTM B164                           | QQ - N281 - Alloy 400<br>ASTM B 164            | ASTM B165                                                                             |

(1) Project 70 is a trade mark of Carpenter Technology Corporation.

(2) Monel is a trademark of international Nickel.

(3) Shaped body may be constructed from plate stock.

## Pressure Ratings

Hy-Lok tube fittings are rated to the maximum working pressure of tubings recommended for use with Hy-Lok tube fittings. The maximum working pressure of tubings are listed in **MAWP Table** on the following pages.

**Note** : Material strength and allowable working pressure decrease as the temperature increases.

## Temperature Ratings

The following temperature ratings are applicable.

- 316 Stainless Steel : -321 to 1200  
(-196 to 649 )
- Brass : -65 to 400  
(-54 to 204 )
- Monel : -65 to 800  
(-54 to 427 )

## Tubing

Variety of tubing materials and wide range of wall thickness can be used with Hy-Lok fittings. However, it is essential to specify, select, and handle the tubing with care in order to ensure reliable, safe, leak tight installation using Hy-Lok tube fittings.

Some general rules are shown below.

- 1.The tubing material must be compatible with process fluid.
- 2.Temperature, pressure, vibration and shock conditions must be considered when selecting the wall thickness. Further, extremely thick wall may not be properly deformed and extremely thin wall may be collapsed by ferrule action.
- 3.The metal tubing must be softer than the fitting materials. When tubing and fitting are of the same material, the tubing must be fully annealed.
- 4.For leak tight installation, the tubing surface finish must be smooth and free from weld seam, scratches and draw marks.
- 5.The tubing with high tolerance in ovality or OD may not fit in the fitting or may cause improper performance.
- 6.Best performance is achieved when the tubing ends are of square cut and deburred properly.

The followings are the most recommendable tubing specifications for best performance with Hy-Lok fittings.

## Stainless Steel Tubing

Fully annealed seamless type SS 304, 316 to ASTM A269 or equivalent with hardness Rockwell Rb80 or less.

## Copper Tubing

Seamless soft annealed temper O60 with hardness 60 max to ASTM B76, or seamless water tubing type K or type L annealed temper O06 with hardness 50 max in coils or annealed tempr O50 with hardness 55 max in straight lengths to ASTM B88, or equivalent.

## Monel Tubing

Fully annealed seamless Alloy 400 to ASTM B165 or equivalent with hardness Rb75 max.

## Gas service

Gases have very small molecules and can escape through the minute leak path due to surface imperfections. These imperfections can be coined out when heavy wall tubing is used as it resists the ferrule action more than thin wall does. The minimum wall thickness for gas service is shown below.

**Fractional Tubing**

| Tubing O.D. | Nominal Min. Wall Thickness | Tubing O.D. | Nominal Min. Wall Thickness |
|-------------|-----------------------------|-------------|-----------------------------|
| 1/8"        | .028"                       | 3/4"        | .065"                       |
| 3/16"       | .028"                       | 7/8"        | .083"                       |
| 1/4"        | .028"                       | 1"          | .083"                       |
| 5/16"       | .035"                       | 1 1/4"      | .109"                       |
| 3/8"        | .035"                       | 1 1/2"      | .134"                       |
| 1/2"        | .046"                       | 2"          | .180"                       |
| 5/8"        | .065"                       |             |                             |

**Metric Tubing**

| Tubing O.D. | Nominal Min. Wall Thickness | Tubing O.D. | Nominal Min. Wall Thickness |
|-------------|-----------------------------|-------------|-----------------------------|
| 3mm         | .8mm                        | 18mm        | 1.5mm                       |
| 6mm         | .8mm                        | 20mm        | 1.8mm                       |
| 8mm         | 1.0mm                       | 22mm        | 2.0mm                       |
| 10mm        | 1.0mm                       | 25mm        | 2.2mm                       |
| 12mm        | 1.0mm                       | 28mm        | 2.8mm                       |
| 14mm        | 1.2mm                       | 32mm        | 3.0mm                       |
| 16mm        | 1.5mm                       | 38mm        | 3.5mm                       |

## Temperature Derating

The working pressure varies depending upon the temperature. The working pressure at various temperatures can be obtained by multiplying the working pressure at ambient temperature (-20 to 100 or -29 to 37 ) by the temperature derating factor in the table shown below.

**Table 4. Temperature Derating Factors**

| Temperature( ) | 316SS | 304SS | Copper | Monel 400 |
|----------------|-------|-------|--------|-----------|
| 100            | 1.00  | 1.00  | 1.00   | 1.00      |
| 200            | 1.00  | 0.84  | 0.80   | 0.88      |
| 300            | 1.00  | 0.75  | 0.78   | 0.82      |
| 400            | 0.96  | 0.69  | 0.50   | 0.79      |
| 500            | 0.90  | 0.65  | -      | 0.79      |
| 600            | 0.85  | 0.61  | -      | 0.79      |
| 700            | 0.82  | 0.59  | -      | 0.76      |
| 800            | 0.79  | 0.56  | -      | 0.76      |
| 900            | 0.78  | 0.54  | -      | -         |
| 1000           | 0.76  | 0.52  | -      | -         |
| 1100           | 0.62  | 0.47  | -      | -         |
| 1200           | 0.37  | 0.31  | -      | -         |

## Example

To obtain the working pressure of 316SS 3/8" OD × 0.035" wall tube at 1,200

- Working pressure of the above tubing at ambient temperature :3,300 ;psig
- Temperature derating factor at 1,200 : 0.37
- Working pressure at 1,200 : 1,221 psig  
(from 3,300 psig multiplied by 0.37)

## Tube Bends near Fitting

For leak tight installation, tube bends must not be too close to the fitting. The following is the recommended minimum straight length of tube measured from the tube end to the bend.

| Tube O.D.   | 1/8"   | 1/4"   | 3/8"   | 1/2"    | 3/4"   | 1"     | 1 1/4" | 1 1/2"   | 2"     |
|-------------|--------|--------|--------|---------|--------|--------|--------|----------|--------|
| Min. Length | 23/32" | 13/16" | 15/16" | 1 3/16" | 1 1/4" | 1 1/2" | 2"     | 2 13/32" | 3 1/4" |

Also, the bending radius should not be too short as too short bending radius may affect the working pressure and may cause insufficient flow. Minimum bending radius is usually recommended by the tube bender manufacturer.

## Tube Selection and Handling

Hy-Lok fittings can be best performed when good quality tubings are used. Please note tubing should be considered a fitting component. Tubing selection by relying only on ASTM or other equivalent specifications is not enough. Here are some points to be considered.

1. Materials and manufacturing method
2. Material hardness
3. Surface finish
4. Outside diameter and its tolerance
5. Wall thickness and its tolerance
6. Ovality
7. Concentricity
8. Packing and transportation

Always try to use good quality tubing for best performance.

Tubings must be handled with great care in transportation and in storage. They must not be dragged in any circumstances to avoid any damage on the surface. Copper tubings must not be crushed or lose its circularity. If necessary, the tubing must be covered and tubing ends must be plugged to be kept from dirt.

## Maximum Allowable Working Pressure Table

Working pressure calculated in accordance with ASME B31.3, Chemical Plant and Petroleum Refinery Piping 1993 Edition

Code,

### Table 5. Stainless Steel Tubing

Fully annealed 304 or 316 high quality seamless stainless steel tube to ASTM A269 or equivalent.

Hardness : Rb80 or less

| Stainless Steel Fractional Tubing |                               |       |       |       |        |       |        |        |        |       |       |       |       |       |       |       |
|-----------------------------------|-------------------------------|-------|-------|-------|--------|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|
| Tube<br>O.D.<br>(Inches)          | Tube Wall Thickness in inches |       |       |       |        |       |        |        |        |       |       |       |       |       |       |       |
|                                   | 0.010                         | 0.012 | 0.014 | 0.016 | 0.0250 | 0.028 | 0.035  | 0.049  | 0.065  | 0.083 | 0.095 | 0.109 | 0.120 | 0.134 | 0.156 | 0.18  |
| 1/6"                              | 5,600                         | 6,800 | 8,100 | 9,400 | 12,000 |       |        |        |        |       |       |       |       |       |       |       |
| 1/8"                              |                               |       |       |       |        | 8,500 | 10,800 |        |        |       |       |       |       |       |       |       |
| 3/16"                             |                               |       |       |       |        | 5,400 | 7,000  | 10,200 |        |       |       |       |       |       |       |       |
| 1/4"                              |                               |       |       |       |        | 4,000 | 5,100  | 7,500  | 10,200 |       |       |       |       |       |       |       |
| 5/16"                             |                               |       |       |       |        |       | 4,000  | 5,800  | 8,000  |       |       |       |       |       |       |       |
| 3/8"                              |                               |       |       |       |        |       | 3,300  | 4,800  | 6,500  |       |       |       |       |       |       |       |
| 1/2"                              |                               |       |       |       |        |       | 2,600  | 3,700  | 5,100  | 6,700 |       |       |       |       |       |       |
| 5/8"                              |                               |       |       |       |        |       |        | 2,900  | 4,000  | 5,200 | 6,000 |       |       |       |       |       |
| 3/4"                              |                               |       |       |       |        |       |        | 2,400  | 3,300  | 4,200 | 4,900 | 5,800 |       |       |       |       |
| 7/8"                              |                               |       |       |       |        |       |        | 2,000  | 2,800  | 3,600 | 4,200 | 4,700 |       |       |       |       |
| 1"                                |                               |       |       |       |        |       |        |        | 2,400  | 3,100 | 3,600 | 4,200 | 4,700 |       |       |       |
| 1 1/4"                            |                               |       |       |       |        |       |        |        |        | 2,400 | 2,800 | 3,300 | 3,600 | 4,100 | 4,900 |       |
| 1 1/2"                            |                               |       |       |       |        |       |        |        |        |       | 2,300 | 2,700 | 3,000 | 3,400 | 4,000 | 4,900 |
| 2"                                |                               |       |       |       |        |       |        |        |        |       |       | 2,000 | 2,200 | 2,500 | 2,900 | 3,600 |

| Stainless Steel Metric Tubing |                                             |                 |        |                 |        |                 |       |                 |                 |       |                 |       |       |       |       |  |
|-------------------------------|---------------------------------------------|-----------------|--------|-----------------|--------|-----------------|-------|-----------------|-----------------|-------|-----------------|-------|-------|-------|-------|--|
| Tube<br>O.D.<br>(mm)          | Tube Wall Thickness in Millimeters (inches) |                 |        |                 |        |                 |       |                 |                 |       |                 |       |       |       |       |  |
|                               | 0.71<br>(0.028)                             | 0.89<br>(0.035) | 1.00   | 1.25<br>(0.049) | 1.50   | 1.65<br>(0.065) | 2.0   | 2.11<br>(0.083) | 2.41<br>(0.095) | 2.50  | 2.77<br>(0.109) | 3.00  | 3.05  | 3.50  | 4.00  |  |
| 3                             | 10,800                                      | 13,800          | 15,300 |                 |        |                 |       |                 |                 |       |                 |       |       |       |       |  |
| 4                             | 7,900                                       | 10,100          | 11,500 | 14,400          |        |                 |       |                 |                 |       |                 |       |       |       |       |  |
| 6                             | 5,000                                       | 6,500           | 7,400  | 9,400           | 11,500 | 12,700          |       |                 |                 |       |                 |       |       |       |       |  |
| 8                             |                                             | 4,700           | 5,800  | 6,800           | 8,400  | 9,300           |       |                 |                 |       |                 |       |       |       |       |  |
| 10                            |                                             | 3,700           | 4,200  | 5,300           | 6,500  | 7,300           |       |                 |                 |       |                 |       |       |       |       |  |
| 12                            |                                             | 3,000           | 3,400  | 4,400           | 5,300  | 5,900           | 6,600 | 7,000           |                 |       |                 |       |       |       |       |  |
| 16                            |                                             |                 | 2,500  | 3,200           | 3,900  | 4,300           | 5,300 | 5,700           | 6,600           | 6,800 |                 |       |       |       |       |  |
| 18                            |                                             |                 |        | 2,800           | 3,400  | 3,800           | 4,700 | 5,000           | 5,800           | 6,000 | 6,700           |       |       |       |       |  |
| 20                            |                                             |                 |        | 2,500           | 3,000  | 3,400           | 4,200 | 4,400           | 5,100           | 5,300 | 6,000           |       |       |       |       |  |
| 22                            |                                             |                 |        | 2,300           | 2,800  | 3,000           | 3,800 | 4,000           | 4,600           | 4,800 | 5,400           |       |       |       |       |  |
| 25                            |                                             |                 |        | 2,000           | 2,400  | 2,700           | 3,300 | 3,500           | 4,000           | 4,200 | 4,700           | 5,100 | 5,200 |       |       |  |
| 38                            |                                             |                 |        |                 |        |                 |       |                 | 2,300           | -     | 2,900           | -     | 3,400 | 3,900 | 4,400 |  |

Allowable stress of 20,000psi(137,800kPa) between -20 and 100 (-29 and 37 ) based on ultimate tensile strength 75,000psi(516,700kPa)

Based on minimum wall thickness and maximum O.D. allowable by ASTM A269

For welded tubing, the following derating rate to be applied for weld integrity. (ASME B31.3 - 1993 Edition, Table A-1B)

for double welded tubing :0.85

for single welded tubing : 0.80

To determine bar, multiply psig by 0.0689 and to determine kPa by 6.89

#### Note:

1. All calculations are based on maximum outside diameter and minimum wall thickness without allowance for corrosion and erosion
2. Care should be taken for temperature rating if tubings are coated or plated.
3. Figures shown are not for design purpose but for reference only and the accuracy of information here is not liability of our company.

**Table 6. Copper Tubing**

High quality soft annealed seamless copper tube to ASTM B-75 or equivalent.  
Hardness : Rb 60 or less

| Copper Fractional Tubing |                               |       |       |       |       |       |       |       |       |       |
|--------------------------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Tube O.D. (Inches)       | Tube Wall Thickness in inches |       |       |       |       |       |       |       |       |       |
|                          | 0.010                         | 0.012 | 0.028 | 0.035 | 0.049 | 0.065 | 0.083 | 0.095 | 0.109 | 0.120 |
| 1/6"                     | 1,700                         | 3,800 | 5,400 | 6,000 |       |       |       |       |       |       |
| 1/8"                     |                               |       | 2,700 | 3,400 |       |       |       |       |       |       |
| 3/16"                    |                               |       | 1,800 | 2,300 | 3,400 |       |       |       |       |       |
| 1/4"                     |                               |       | 1,300 | 1,600 | 2,500 | 3,500 |       |       |       |       |
| 5/16"                    |                               |       |       | 1,300 | 1,900 | 2,700 |       |       |       |       |
| 3/8"                     |                               |       |       | 1,000 | 1,600 | 2,200 |       |       |       |       |
| 1/2"                     |                               |       |       | 800   | 1,100 | 1,600 | 2,200 |       |       |       |
| 5/8"                     |                               |       |       |       | 900   | 1,200 | 1,600 | 1,900 |       |       |
| 3/4"                     |                               |       |       |       | 700   | 1,000 | 1,300 | 1,500 | 1,800 |       |
| 7/8"                     |                               |       |       |       | 600   | 800   | 1,100 | 1,300 | 1,500 |       |
| 1"                       |                               |       |       |       | 500   | 700   | 900   | 1,100 | 1,300 | 1,500 |

| Stainless Steel Metric Tubing |                                             |                 |       |                 |       |                 |       |                 |                 |       |                 |       |                 |
|-------------------------------|---------------------------------------------|-----------------|-------|-----------------|-------|-----------------|-------|-----------------|-----------------|-------|-----------------|-------|-----------------|
| Tube O.D. (mm)                | Tube Wall Thickness in Millimeters (inches) |                 |       |                 |       |                 |       |                 |                 |       |                 |       |                 |
|                               | 0.71<br>(0.028)                             | 0.89<br>(0.035) | 1.0   | 1.25<br>(0.049) | 1.5   | 1.65<br>(0.065) | 2.0   | 2.11<br>(0.083) | 2.41<br>(0.095) | 2.5   | 2.77<br>(0.109) | 3.0   | 3.05<br>(0.120) |
| 3                             | 3,465                                       | 4,400           |       |                 |       |                 |       |                 |                 |       |                 |       |                 |
| 4                             | 2,520                                       | 3,230           | 4,900 |                 |       |                 |       |                 |                 |       |                 |       |                 |
| 6                             | 1,610                                       | 2,070           | 3,670 | 4,610           |       |                 |       |                 |                 |       |                 |       |                 |
| 8                             |                                             | 1,510           | 2,350 | 3,020           | 3,670 | 4,060           |       |                 |                 |       |                 |       |                 |
| 10                            |                                             | 1,190           | 1,710 | 2,790           | 2,680 | 2,990           |       |                 |                 |       |                 |       |                 |
| 12                            |                                             | 970             | 1,350 | 1,710           | 2,090 | 2,320           |       |                 |                 |       |                 |       |                 |
| 16                            |                                             |                 | 1,100 | 1,410           | 1,710 | 1,900           | 2,350 | 2,500           |                 |       |                 |       |                 |
| 18                            |                                             |                 | 810   | 1,030           | 1,260 | 1,390           | 1,710 | 1,810           | 2,100           | 2,190 |                 |       |                 |
| 20                            |                                             |                 |       | 915             | 1,100 | 1,220           | 1,510 | 1,600           | 1,840           | 1,930 | 2,160           |       |                 |
| 22                            |                                             |                 |       | 810             | 990   | 1,090           | 1,350 | 1,420           | 1,650           | 1,710 | 1,920           |       |                 |
| 25                            |                                             |                 |       | 740             | 900   | 990             | 1,200 | 1,290           | 1,480           | 1,550 | 1,730           |       |                 |
| 38                            |                                             |                 |       | 640             | 780   | 780             | 1,060 | 1,120           | 1,290           | 1,350 | 1,490           | 1,640 | 1,670           |

- Allowable stress of 6,000psi(41,300kPa) between -20 and 100 (-29 and 37 ) based on ultimate tensile strength 30,000psi(206,700kPa)
- Based on minimum wall thickness and maximum O.D. allowable by ASTM B75
- To determine bar, multiply psig by 0.0689 and to determine kPa by 6.89

**Table 7. Monel 400 Tubing**

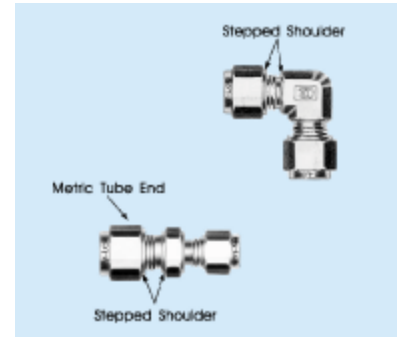
Fully annealed seamless Monel 400 to ASTM B165 or equivalent.  
Hardness : Rb 75

| Monel 400 Fractional Tubing |                               |       |       |        |       |       |       |       |       |       |
|-----------------------------|-------------------------------|-------|-------|--------|-------|-------|-------|-------|-------|-------|
| Tube O.D. (Inches)          | Tube Wall Thickness in inches |       |       |        |       |       |       |       |       |       |
|                             | 0.010                         | 0.012 | 0.028 | 0.035  | 0.049 | 0.065 | 0.083 | 0.095 | 0.109 | 0.120 |
| 1/8"                        |                               |       | 7,900 | 10,100 |       |       |       |       |       |       |
| 1/4"                        |                               |       | 3,700 | 4,800  | 7,000 | 9,500 |       |       |       |       |
| 3/8"                        |                               |       |       | 3,100  | 4,500 | 6,100 |       |       |       |       |
| 1/2"                        |                               |       |       | 2,300  | 3,200 | 4,400 |       |       |       |       |
| 3/4"                        |                               |       |       |        | 2,200 | 3,000 | 4,000 | 4,600 |       |       |
| 1"                          |                               |       |       |        |       | 2,200 | 2,900 | 3,400 | 3,900 | 4,300 |

- Allowable stress of 18,700psi(128,800kPa) between -20 and 100 (-29 and 37 ) based on ultimate tensile strength 70,000psi(482,300kPa)
- Based on minimum wall thickness and maximum O.D. allowable by ASTM B165
- To determine bar, multiply psig by 0.0689 and to determine kPa by 6.89

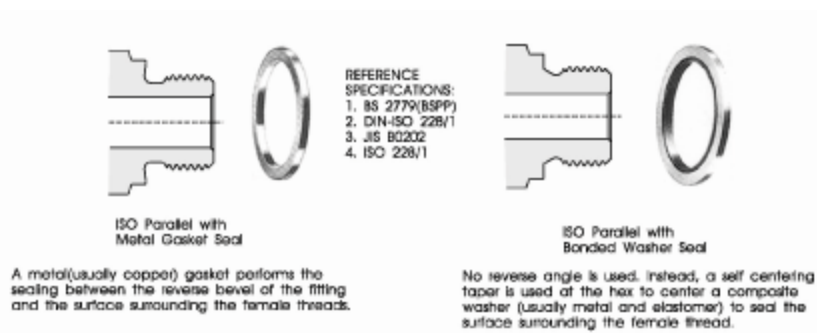
## Identification of Hy-Lok Metric Tube Fittings from Fractional

These two are similar in appearance. To avoid any confusion and for ready identification, the stepped shoulders are machined on the body and on the hex nut of metric size tube fittings as shown. The metric tube nut must not be used on fractional body, and vice versa

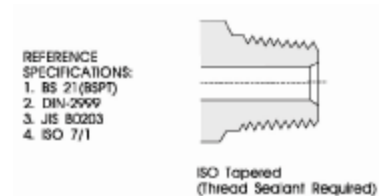


## ISO Parallel and Tapered Pipe Thread

International Standards Organization(ISO) standardized the nomenclature of some international pipe threads. ISO 228/1 is a parallel thread and ISO 7/1 is a tapered thread. With 228/1 parallel thread, the seal is usually made by metal - to - metal contact against the female port or with a gasket. Shown below are two different seals. There are several different descriptions as listed below.



ISO 7/1 tapered thread looks similar to NPT thread. However, ISO 7/1 has 55° thread angle while NPT has 60°, and ISO 7/1 pitch is measured in millimeters while NPT pitch is measured in inches. There are several different descriptions as listed on the right.



## Ordering Information

## Tube Fittings

Hy-Lok fittings part numbers are easily understandable and basically composed of 3 groups as shown below.

| Designator | First Group                     | Second Group | Third Group        |
|------------|---------------------------------|--------------|--------------------|
| Example 1  | <b>CTA</b>                      | <b>-8</b>    | <b>-BRAS</b>       |
| Example 2  | <b>CMC4</b>                     | <b>-4N</b>   | <b>-S316</b>       |
| Exam 1     | Union tee                       | 1/2" Hy-Lok  | Brass              |
| Exam 2     | Male Connector With 1/4" Hy-Lok | 1/4" NPT     | 316 Stainless S316 |

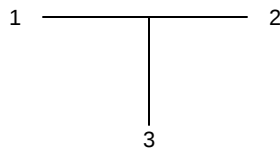
1.The first group in example 1 or former part of first group in example 2 designates the fitting type.

2.The second group in example 1 designates either Hy-Lok tube end size of unions, union tees, crosses, etc. Where all Hy-Lok tube end sizes are the same or size of plugs, caps, nuts, etc where only single end exists.

3.The latter part of first group in example 2 designates the Hy-Lok tube end size and the second group designates pipe thread / size, or Hy-Lok tube end size, or tube size of fittings other than the fittings applicable to example 1.

4.The third group designates the fitting material.

5.In tees shown below, "2" is referred to as run and "3" is referred to as branch.



**Table 8. Fitting Type Designator**

| IDENTIFIER | DESCRIPTION                    | IDENTIFIER | DESCRIPTION                      |
|------------|--------------------------------|------------|----------------------------------|
| CUA        | Union                          | CPR        | Reducing Port Connector          |
| CUR        | Reducing Union                 | CFTC       | Lapped Flange Connector          |
| CLA        | Union Elbow                    | CFU        | AN Union                         |
| CTA        | Union Tee                      | CBFU       | AN Bulkhead Union                |
| CXA        | Union Cross                    | CFA        | AN Adapter                       |
| CBU        | Bulkhead Union                 | CSC        | SAE Male Connector               |
| CMC        | Male Connector                 | CSLA       | SAE Male Elbow                   |
| CMCT       | Thermocouple Male Connector    | CSLB       | SAE 45°Male Elbow                |
| CMC-G      | Male Connector For Bonded Seal | CSRT       | SAE Male Run Tee                 |
| COM        | Male Connector For Metal Seal  | CSBT       | SAE Male Branch Tee              |
| CBMC       | Bulkhead Male Connector        | COS        | O-Seal Straight Thread Connector |
| CLMA       | Male Elbow                     | COP        | O-Seal Pipe Thread Connector     |
| CLMB       | 45°Male Elbow                  | CWC        | Male Pipe Weld Connector         |
| CRTM       | Male Run Tee                   | CLW        | Male Pipe Weld                   |
| CBTM       | Male Branch Tee                | CSWC       | Tube Socket Weld Connector       |
| CFC        | Female Connector               | CLSW       | Tube Socket Weld Elbow           |
| CGC        | Gauge Connector                | CPA        | Plug                             |
| CBFC       | Bulkhead Female Connector      | CCA        | Cap                              |
| CLF        | Female Elbow                   | CN         | Nut                              |
| CRTF       | Female Run Tee                 | CFF        | Front Ferrule                    |
| CBTF       | Female Branch                  | CFB        | Back Ferrule                     |
| CR         | Reducer                        | CFS        | Ferrule Set                      |
| CBR        | Bulkhead Reducer               | CI         | Tube Insert                      |
| CAM        | Male Adapter                   | CCL        | Sure Ring                        |
| CAF        | Female Adapter                 | CIG        | Gap Gauge                        |
| CPC        | Port Connector                 | EZY-MAT    | Preswaging Tool                  |

**Hy-Lok Tube End Designator**

| Fractional Tube | O.D. | 1/16" | 1/8" | 3/16" | 1/4" | 5/16" | 3/8" | 1/2" | 5/8" | 3/4" | 7/8" | 1"   | 1 1/4" | 1 1/2" | 2"   |
|-----------------|------|-------|------|-------|------|-------|------|------|------|------|------|------|--------|--------|------|
| Designator      |      | 1     | 2    | 3     | 4    | 5     | 6    | 8    | 10   | 12   | 14   | 16   | 20     | 24     | 32   |
| Metric Tube     | O.D. | 2mm   | 3mm  | 4mm   | 6mm  | 8mm   | 10mm | 12mm | 16mm | 20mm | 22mm | 25mm | 28mm   | 32mm   | 38mm |
| Designator      |      | 2M    | 3M   | 4M    | 6M   | 8M    | 10M  | 12M  | 16M  | 20M  | 22M  | 25M  | 28M    | 32M    | 38M  |

**Pipe Thread Designator**

| Nom. Size     | 1/8" | 1/4" | 3/8" | 1/2" | 3/4" | 1"  | 1 1/4" | 1 1/2" | 2"  | Applicable Specifications                    |
|---------------|------|------|------|------|------|-----|--------|--------|-----|----------------------------------------------|
| ISO Tapered   | 2R   | 4R   | 6R   | 8R   | 12R  | 16R | 20R    | 24R    | 32R | JIS B02003(PT), DIN2999, ISO 7/1.BS 21(BSPT) |
| NPT           | 2N   | 4N   | 6N   | 8N   | 12N  | 16N | 20N    | 24N    | 32N | ANSI B1 .20. 1 (NPT)                         |
| ISO Parallel  | 2G   | 4G   | 6G   | 8G   | 12G  | 16G | 20G    | 24G    | 32G | JIS B0202(PF), DIN ISO 228/1, BS 2779(BSPP)  |
| Unified Screw | 2U   | 4U   | 6U   | 8U   | 12U  | 16U | 20U    | 24U    | 32U | Americal Standard unified Screw Thread       |

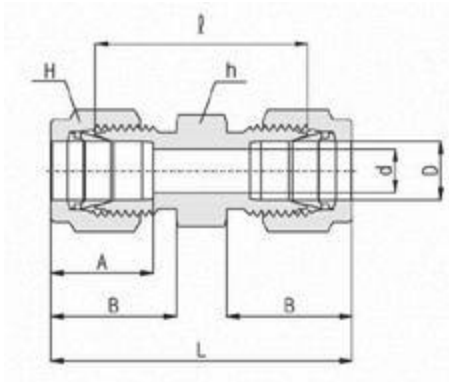
**Material Designator**

| Material   | SS 316 | Brass | Monel |
|------------|--------|-------|-------|
| Designator | S316   | BRAS  | MONE  |

**Tube To Tube Union**Union  
**CUA**Reducing Union  
**CUR**Union Elbow  
**CLA**Union Tee  
**CTA**Union Cross  
**CXA**Bulkhead Union  
**CBU****Tube To Male Pipe**Male Connector  
**CMC**Thermocouple  
Connector  
**CMCT**Male Connector For  
Metal Gasket Seal  
**CMC-G**Male Connector For  
Metal Gasket Seal  
**COM**Bulkhead  
Male Connector  
**CBMC**Male Elbow  
**CLMA**45° Male Elbow  
**CLMB**Male Run Tee  
**CRTM**Male Branch Tee  
**CBTM****Tube To Female Pipe**Female connector  
**CFC**Gauge Connector  
**CGC**Bulkhead  
Female Connector  
**CBFC**Female Elbow  
**CLF**Female Run Tee  
**CRTF**Female Branch Tee  
**CBTF****Stub Tube Connector**Reducer  
**CBR**Bulkhead Reducer  
**CBR**Male Adapter  
**CAM**Female Adapter  
**CAF**Port Connector  
**CPC**Reducing  
Port Connector  
**CPR**Flange Lapped  
Tube Connector  
**CFTC****Tube To An Tube**An Union  
**CFU**An Bulkhead Union  
**CBFU**An Adapter  
**CFA****Tube To SAE/MS O-Ring**SAE/MS Male Connector  
**CSC**SAE/MS Male Elbow  
**CSLA**SAE/MS 45° Male Elbow  
**CSLB**SAE/MS Male Run Tee  
**CSRT**SAE/MS Male Run Tee  
**CSBT**O-Seal Straight  
Thread Connector  
**COS**O-Seal Pipe  
Thread Connector  
**COP****Tube To Weld End**Male Pipe Weld  
Connector  
**CWC**Male Pipe Weld Elbow  
**CLW**Tube Socket Weld  
Connector  
**CSWC**Tube Socket Weld  
Elbow  
**CLSW****Plug and Cap**Plug  
**CPA**Cap  
**CCA****Spare Parts**Tube Insert  
**CI**Sure Ring  
**CCL**Gap Gauge  
**CIG**Nut  
**CN**Front Ferrule  
**CFF**Back Ferrule  
**CFB**Ferrule Set  
**CFS**Preswaging Tool  
**EZY-MAT**

# Tube Fittings

## Union CUA



### Fractional Tubes

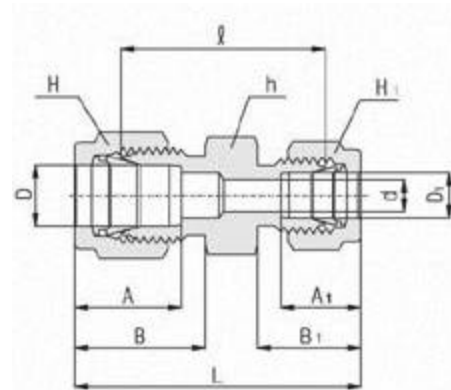
| Part No. | Tube O.D.<br>D |        | d<br>Min. | Width across flat |         |       |         | A      | B      |        | L       |
|----------|----------------|--------|-----------|-------------------|---------|-------|---------|--------|--------|--------|---------|
|          | in             | mm     |           | h                 |         | H     |         |        |        |        |         |
|          |                |        |           | in                | mm      | in    | mm      |        |        |        |         |
| CUA— 1   | 1/16           | 1.58   | 1. 27     | 5/16              | 7. 93   | 5/6   | 7. 93   | 8. 63  | 10. 92 | 17. 50 | 25. 15  |
| CUA—2    | 1/8            | 3.17   | 2. 28     | 7/16              | 11. 11  | 7/16  | 11. 11  | 12. 70 | 15. 24 | 22. 35 | 35. 56  |
| CUA—3    | 3/16           | 4. 76  | 3. 04     | 7/16              | 11. 11  | 1/2   | 12. 70  | 13. 71 | 16. 00 | 24. 13 | 37. 33  |
| CUA—4    | 1/4            | 6. 35  | 4. 82     | 1/2               | 12. 70  | 9/16  | 14. 28  | 15. 24 | 17. 78 | 26. 16 | 40. 89  |
| CUA—5    | 5/16           | 7. 93  | 6. 35     | 9/16              | 14. 28  | 5/8   | 15. 87  | 16. 25 | 18. 54 | 28. 19 | 42. 92  |
| CUA—6    | 3/8            | 9. 52  | 7. 11     | 5/8               | 15. 87  | 11/16 | 17. 46  | 16. 76 | 19. 30 | 30. 22 | 44. 95  |
| CUA—8    | 1/2            | 12. 70 | 10. 41    | 13/16             | 20. 63  | 7/8   | 22. 22  | 22. 86 | 21. 84 | 30. 98 | 51. 30  |
| CUA—10   | 5/8            | 15. 87 | 12. 70    | 15/16             | 23. 81  | 1     | 25. 340 | 24. 38 | 21. 84 | 31. 75 | 52. 07  |
| CUA—12   | 3/4            | 19. 05 | 15. 74    | 1—1/16            | 26. 98  | 1—1/8 | 28. 57  | 24. 38 | 21. 84 | 33. 27 | 53. 59  |
| CUA—14   | 7/8            | 22. 22 | 18. 28    | 1—3/16            | 30. 16  | 1—1/4 | 31. 75  | 25. 90 | 21. 84 | 35. 05 | 55. 37  |
| CUA—16   | 1              | 25. 40 | 22. 35    | 1—3/8             | 34. 92  | 1—1/2 | 38. 10  | 31. 24 | 26. 41 | 40. 38 | 64. 77  |
| CUA—20   | 1 1/4          | 31. 75 | 27. 68    | 1—3/4             | 44. 455 | 1—7/8 | 47. 62  | 41. 14 | 38. 86 | 48. 00 | 92. 20  |
| CUA—24   | 1 1/2          | 38. 10 | 34. 03    | 2—1/8             | 53. 97  | 2—1/4 | 57. 15  | 50. 03 | 45. 21 | 53. 60 | 107. 95 |
| CUA—32   | 2              | 50. 8  | 45. 97    | 2—3/4             | 69. 85  | 3     | 76. 250 | 67. 56 | 62. 73 | 74. 70 | 149. 35 |

### Metric Tubes

| Part No.  | Tube<br>O.D.<br>D | d<br>Min. | Width across flat |    | A    | B    |      | L     |
|-----------|-------------------|-----------|-------------------|----|------|------|------|-------|
|           |                   |           | h                 | H  |      |      |      |       |
| CUA - 2M  | 2                 | 1.7       | 12                | 12 | 12.9 | 15.3 | 22.4 | 35.6  |
| CUA - 3M  | 3                 | 2.4       | 12                | 12 | 12.9 | 15.3 | 22.1 | 35.3  |
| CUA - 4M  | 4                 | 2.4       | 12                | 12 | 13.7 | 16.1 | 24.1 | 37.3  |
| CUA - 6M  | 6                 | 4.8       | 14                | 14 | 15.3 | 17.7 | 26.2 | 41.0  |
| CUA - 8M  | 8                 | 6.4       | 15                | 16 | 16.2 | 18.6 | 28.2 | 43.2  |
| CUA - 10M | 10                | 7.9       | 18                | 19 | 17.2 | 19.5 | 31.0 | 46.2  |
| CUA - 12M | 12                | 9.5       | 22                | 22 | 22.8 | 22.0 | 31.0 | 51.2  |
| CUA - 15M | 15                | 11.9      | 24                | 25 | 24.4 | 22.0 | 31.8 | 52.0  |
| CUA - 16M | 16                | 12.7      | 24                | 25 | 24.4 | 22.0 | 31.8 | 52.0  |
| CUA - 18M | 18                | 15.1      | 27                | 30 | 24.4 | 22.0 | 33.3 | 53.5  |
| CUA - 20M | 20                | 15.9      | 30                | 32 | 26.0 | 22.0 | 34.8 | 55.0  |
| CUA - 22M | 22                | 18.3      | 30                | 32 | 26.0 | 22.0 | 34.8 | 55.0  |
| CUA - 25M | 25                | 21.8      | 35                | 38 | 31.3 | 26.5 | 40.4 | 65.0  |
| CUA - 28M | 28                | 21.8      | 41                | 46 | 36.6 | 36.6 | 43.4 | 85.0  |
| CUA - 32M | 32                | 28.6      | 46                | 50 | 42.0 | 41.6 | 51.3 | 97.3  |
| CUA - 38M | 38                | 33.7      | 55                | 60 | 49.4 | 47.9 | 58.4 | 113.6 |

# Tube Fittings

## Reducing Union CUR



### Fractional Tubes

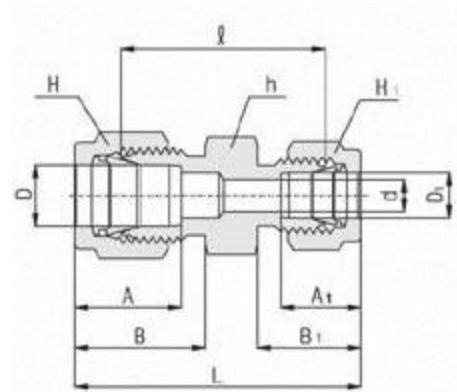
| Part No.    | Tube O.D. |       |                |       | d Min. | Width across flat |       |       |       |                |       | A     | A <sub>1</sub> | B     | B <sub>1</sub> |       | L     |
|-------------|-----------|-------|----------------|-------|--------|-------------------|-------|-------|-------|----------------|-------|-------|----------------|-------|----------------|-------|-------|
|             | D         |       | D <sub>1</sub> |       |        | h                 |       | H     |       | H <sub>1</sub> |       |       |                |       |                |       |       |
|             | in        | mm    | in             | mm    |        | in                | mm    | in    | mm    | in             | mm    |       |                |       |                |       |       |
| CUR 2 - 1   | 1/8       | 3.17  | 1/16           | 1.58  | 1.27   | 7/16              | 11.11 | 7/16  | 11.11 | 5/16           | 7.93  | 12.7  | 8.63           | 15.24 | 10.92          | 20.60 | 30.91 |
| CUR 3 - 1   | 3/16      | 4.76  | 1/16           | 1.58  | 1.27   | 7/16              | 11.11 | 1/2   | 12.70 | 5/16           | 7.93  | 13.71 | 8.63           | 16.00 | 10.92          | 21.84 | 32.25 |
| CUR 3 - 2   | 3/16      | 4.76  | 1/8            | 3.17  | 2.28   | 7/16              | 11.11 | 1/2   | 12.70 | 7/16           | 11.11 | 13.71 | 12.70          | 16.00 | 15.24          | 23.36 | 36.57 |
| CUR 4 - 1   | 1/4       | 6.35  | 1/16           | 1.58  | 1.27   | 1/2               | 12.70 | 9/16  | 14.28 | 5/16           | 7.93  | 15.24 | 8.63           | 17.78 | 10.92          | 23.11 | 34.29 |
| CUR 4 - 2   | 1/4       | 6.35  | 1/8            | 3.17  | 2.28   | 1/2               | 12.70 | 9/16  | 14.28 | 7/16           | 11.11 | 15.24 | 12.70          | 17.78 | 15.24          | 24.63 | 38.60 |
| CUR 4 - 3   | 1/4       | 6.35  | 3/16           | 4.76  | 3.04   | 1/2               | 12.70 | 9/16  | 14.28 | 1/2            | 12.70 | 15.24 | 13.71          | 17.78 | 16.00          | 25.40 | 39.37 |
| CUR 5 - 2   | 5/16      | 7.93  | 1/8            | 3.17  | 2.28   | 9/16              | 14.28 | 5/8   | 15.87 | 7/16           | 11.11 | 16.25 | 12.70          | 18.54 | 15.24          | 25.90 | 39.87 |
| CUR 5 - 4   | 5/16      | 7.93  | 1/4            | 6.35  | 4.82   | 9/16              | 14.28 | 5/8   | 15.87 | 9/16           | 14.28 | 16.25 | 15.324         | 18.54 | 17.78          | 27.43 | 42.16 |
| CUR 6 - 1   | 3/8       | 9.52  | 1/16           | 1.58  | 1.27   | 5/8               | 15.87 | 11/16 | 17.46 | 5/16           | 7.93  | 16.76 | 8.63           | 19.30 | 10.92          | 25.40 | 36.57 |
| CUR 6 - 2   | 3/8       | 9.52  | 1/8            | 3.17  | 2.28   | 5/8               | 15.87 | 11/16 | 17.46 | 7/16           | 11.11 | 16.76 | 12.70          | 19.30 | 15.24          | 26.92 | 40.89 |
| CUR 6 - 4   | 3/8       | 9.52  | 1/4            | 6.35  | 4.82   | 5/8               | 15.87 | 11/16 | 17.46 | 9/16           | 14.28 | 16.76 | 15.24          | 19.30 | 17.78          | 28.44 | 43.18 |
| CUR 6 - 5   | 3/8       | 9.52  | 5/16           | 7.93  | 6.35   | 5/8               | 15.87 | 11/16 | 17.46 | 5/8            | 15.87 | 16.76 | 16.25          | 19.30 | 18.54          | 29.46 | 44.19 |
| CUR 8 - 2   | 1/2       | 12.70 | 1/             | 3.17  | 2.28   | 13/16             | 20.63 | 7/8   | 22.22 | 7/16           | 11.11 | 22.86 | 12.70          | 21.84 | 15.24          | 28.44 | 45.21 |
| CUR 8 - 4   | 1/2       | 12.70 | 1/4            | 6.35  | 4.82   | 13/16             | 20.63 | 7/8   | 22.22 | 9/16           | 14.28 | 22.86 | 15.24          | 21.84 | 17.78          | 29.46 | 46.99 |
| CUR 8 - 6   | 1/2       | 12.70 | 3/8            | 9.52  | 7.11   | 13/16             | 20.63 | 7/8   | 22.22 | 11/16          | 17.46 | 22.86 | 16.76          | 17.78 | 19.30          | 30.98 | 48.51 |
| CUR 10 - 6  | 5/8       | 15.87 | 3/8            | 9.52  | 7.11   | 15/16             | 23.81 | 1     | 25.40 | 11/16          | 17.46 | 24.38 | 16.76          | 21.84 | 19.30          | 31.75 | 49.27 |
| CUR 10 - 8  | 5/8       | 15.87 | 1/2            | 12.70 | 10.41  | 15/16             | 23.81 | 1     | 25.40 | 7/8            | 22.22 | 24.38 | 22.86          | 21.84 | 21.84          | 31.75 | 52.07 |
| CUR 12 - 4  | 3/4       | 19.05 | 1/4            | 6.35  | 4.82   | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 9/16           | 14.28 | 24.38 | 15.24          | 21.84 | 17.78          | 31.75 | 49.27 |
| CUR 12 - 6  | 3/4       | 19.05 | 3/8            | 9.52  | 7.11   | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 11/16          | 17.46 | 24.38 | 16.76          | 21.84 | 19.30          | 33.27 | 50.80 |
| CUR 12 - 8  | 3/4       | 19.05 | 1/2            | 12.70 | 10.41  | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 7/8            | 22.22 | 24.38 | 22.86          | 21.84 | 21.84          | 33.27 | 53.59 |
| CUR 12 - 10 | 3/4       | 19.05 | 5/8            | 15.87 | 12.70  | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 1              | 25.40 | 24.38 | 24.38          | 21.84 | 21.84          | 33.27 | 53.59 |
| CUR 16 - 8  | 1         | 25.40 | 1/2            | 12.70 | 10.41  | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 7/8            | 22.22 | 31.24 | 22.86          | 26.41 | 21.84          | 40.89 | 63.24 |
| CUR 16 - 12 | 1         | 25.40 | 3/4            | 19.05 | 15.74  | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 1-1/8          | 28.57 | 31.24 | 24.38          | 26.41 | 21.84          | 40.89 | 62.73 |

### Metric Tubes

| Part No.      | Tube O.D. |                | d<br>Min. | Width across flat |    |                | A    | A <sub>1</sub> | B    | B <sub>1</sub> | L    |
|---------------|-----------|----------------|-----------|-------------------|----|----------------|------|----------------|------|----------------|------|
|               | D         | D <sub>1</sub> |           | h                 | H  | H <sub>1</sub> |      |                |      |                |      |
| CUR 3M - 2M   | 3         | 2              | 1.7       | 12                | 12 | 12             | 12.9 | 12.9           | 15.3 | 15.3           | 35.3 |
| CUR 6M - 2M   | 6         | 2              | 1.7       | 14                | 14 | 12             | 15.3 | 12.9           | 17.7 | 15.3           | 38.6 |
| CUR 6M - 3M   | 6         | 3              | 2.4       | 14                | 14 | 12             | 15.3 | 12.9           | 17.7 | 15.3           | 38.6 |
| CUR 6M - 4M   | 6         | 4              | 2.4       | 14                | 14 | 12             | 15.3 | 13.7           | 17.7 | 16.1           | 39.4 |
| CUR 8M - 6M   | 8         | 6              | 4.8       | 15                | 16 | 14             | 16.2 | 15.3           | 18.6 | 17.7           | 42.3 |
| CUR 10M - 6M  | 10        | 6              | 4.8       | 18                | 19 | 14             | 17.2 | 15.3           | 19.5 | 17.7           | 44.5 |
| CUR 10M - 8M  | 10        | 8              | 6.4       | 18                | 19 | 16             | 17.2 | 16.2           | 19.5 | 18.6           | 45.1 |
| CUR 12M - 6M  | 12        | 6              | 4.8       | 22                | 22 | 14             | 22.8 | 15.3           | 22.0 | 17.7           | 47.0 |
| CUR 12M - 8M  | 12        | 8              | 6.4       | 22                | 22 | 16             | 22.8 | 16.2           | 22.0 | 18.6           | 47.8 |
| CUR 12M - 10M | 12        | 10             | 7.9       | 22                | 22 | 19             | 22.8 | 17.2           | 22.0 | 19.5           | 48.7 |
| CUR 16M - 10M | 16        | 10             | 7.9       | 24                | 25 | 19             | 24.4 | 17.2           | 22.0 | 19.5           | 49.5 |
| CUR 16M - 12M | 16        | 12             | 9.5       | 24                | 25 | 22             | 24.4 | 22.8           | 22.0 | 22.0           | 52.0 |
| CUR 18M - 12M | 18        | 12             | 9.5       | 27                | 30 | 22             | 24.4 | 22.8           | 22.0 | 22.0           | 53.5 |
| CUR 25M - 18M | 25        | 18             | 15.1      | 35                | 38 | 30             | 31.3 | 24.4           | 26.5 | 22.0           | 61.0 |
| CUR 25M - 20M | 25        | 20             | 15.9      | 35                | 38 | 32             | 31.3 | 26.0           | 26.5 | 22.0           | 62.3 |

## Tube Fittings

### Reducing Union CUR

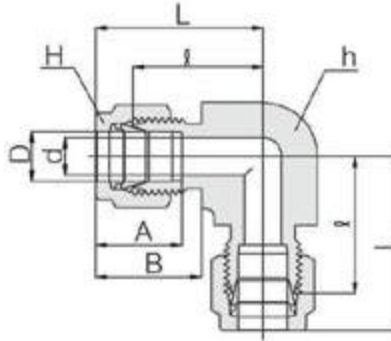


### Metric Tube To Fractional Tube

| Part No.    | Tube O.D. |                |       | d<br>Min. | Width across flat |    |                | A    | A <sub>1</sub> | B    | B <sub>1</sub> | I    | L    |
|-------------|-----------|----------------|-------|-----------|-------------------|----|----------------|------|----------------|------|----------------|------|------|
|             | D         | D <sub>1</sub> |       |           | h                 | H  | H <sub>1</sub> |      |                |      |                |      |      |
|             |           | in             | mm    |           |                   |    |                |      |                |      |                |      |      |
| CUR 3M - 2  | 3         | 1/8            | 3.17  | 2.4       | 12                | 12 | 11.1           | 12.9 | 12.8           | 15.3 | 15.2           | 22.1 | 35.2 |
| CUR 3M - 2  | 4         | 1/8            | 3.17  | 2.4       | 12                | 12 | 11.1           | 13.7 | 12.8           | 16.1 | 15.2           | 23.4 | 36.5 |
| CUR 3M - 4  | 4         | 1/4            | 6.35  | 2.4       | 14                | 12 | 14.3           | 13.7 | 15.3           | 16.1 | 17.7           | 25.4 | 39.4 |
| CUR 3M - 2  | 6         | 1/8            | 3.17  | 2.4       | 14                | 14 | 11.1           | 15.3 | 12.8           | 17.7 | 15.2           | 24.6 | 38.5 |
| CUR 3M - 4  | 6         | 1/4            | 6.35  | 4.8       | 14                | 14 | 14.3           | 15.3 | 15.8           | 17.7 | 17.7           | 26.2 | 41.0 |
| CUR 3M - 5  | 6         | 5/16           | 7.93  | 4.8       | 14                | 14 | 15.9           | 15.3 | 16.2           | 17.7 | 18.6           | 27.4 | 42.3 |
| CUR 3M - 4  | 8         | 1/4            | 6.35  | 4.8       | 15                | 16 | 14.3           | 16.2 | 15.3           | 18.6 | 17.7           | 27.4 | 42.3 |
| CUR 3M - 2  | 10        | 1/8            | 3.17  | 2.4       | 18                | 19 | 11.1           | 17.2 | 12.8           | 19.5 | 15.2           | 27.7 | 41.8 |
| CUR 3M - 4  | 10        | 1/4            | 6.35  | 4.8       | 18                | 19 | 14.3           | 17.2 | 15.3           | 19.5 | 17.7           | 29.5 | 44.5 |
| CUR 3M - 5  | 10        | 5/16           | 7.93  | 6.4       | 18                | 19 | 15.9           | 17.2 | 16.2           | 19.5 | 18.6           | 30.3 | 45.1 |
| CUR 3M - 6  | 10        | 3/8            | 9.52  | 7.1       | 18                | 19 | 17.5           | 17.2 | 16.9           | 19.5 | 18.6           | 31.0 | 45.9 |
| CUR 3M - 5  | 12        | 5/16           | 7.93  | 6.4       | 22                | 22 | 15.9           | 22.8 | 16.2           | 22.0 | 18.6           | 30.2 | 47.8 |
| CUR 3M - 6  | 12        | 3/8            | 9.52  | 7.1       | 22                | 22 | 17.5           | 22.8 | 16.9           | 22.0 | 19.2           | 31.0 | 48.4 |
| CUR 3M - 8  | 12        | 1/2            | 12.70 | 9.5       | 22                | 22 | 22.2           | 22.8 | 22.8           | 22.0 | 22.0           | 31.0 | 51.2 |
| CUR 3M - 8  | 15        | 1/2            | 12.70 | 10.3      | 24                | 25 | 22.2           | 24.4 | 22.8           | 22.0 | 22.0           | 31.8 | 52.0 |
| CUR 3M - 10 | 16        | 5/8            | 15.87 | 12.7      | 24                | 25 | 25.4           | 24.4 | 24.4           | 22.0 | 22.0           | 31.8 | 52.0 |
| CUR 3M - 12 | 18        | 3/4            | 19.05 | 15.1      | 27                | 30 | 28.6           | 24.4 | 24.4           | 22.0 | 22.0           | 33.3 | 53.5 |
| CUR 3M - 12 | 20        | 3/4            | 19.05 | 15.9      | 30                | 32 | 28.6           | 26.0 | 24.4           | 22.0 | 22.0           | 34.8 | 54.9 |
| CUR 3M - 16 | 20        | 1              | 25.4  | 15.9      | 34.9              | 32 | 38.1           | 26.0 | 31.2           | 22.0 | 26.4           | 38   | 60.3 |
| CUR 3M - 16 | 20        | 1              | 25.4  | 15.9      | 34.9              | 32 | 38.1           | 26.0 | 31.2           | 22.0 | 26.4           | 38.2 | 60.3 |

# Tube Fittings

## Union Elbow CLA



### Fractional Tubes

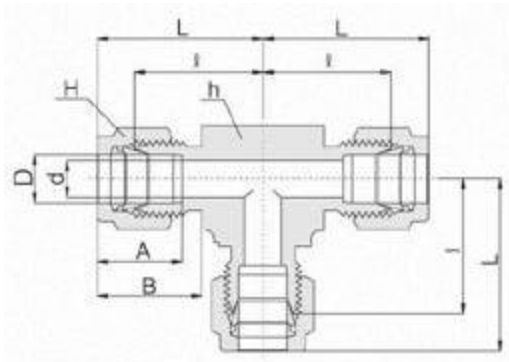
| Part No. | Tube O.D.<br>D |       | d<br>Min. | Width across flat |       |       |       | A     | B     | I     | L      |
|----------|----------------|-------|-----------|-------------------|-------|-------|-------|-------|-------|-------|--------|
|          | in             | mm    |           | h                 |       | H     |       |       |       |       |        |
|          |                |       |           | in                | mm    | in    | mm    |       |       |       |        |
| CLA - 1  | 1/16           | 1.58  | 1.27      | 3/8               | 9.52  | 5/16  | 7.93  | 8.63  | 10.92 | 14.00 | 17.88  |
| CLA - 2  | 1/8            | 3.17  | 2.28      | 3/8               | 9.52  | 7/16  | 11.11 | 12.70 | 15.24 | 15.74 | 22.35  |
| CLA - 3  | 3/16           | 4.76  | 3.04      | 1/2               | 12.70 | 1/2   | 12.70 | 13.71 | 16.00 | 17.78 | 24.38  |
| CLA - 4  | 1/4            | 6.35  | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 19.55 | 26.92  |
| CLA - 5  | 5/16           | 7.93  | 6.35      | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 18.54 | 21.33 | 28.70  |
| CLA - 6  | 3/8            | 9.52  | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 23.11 | 30.48  |
| CLA - 8  | 1/2            | 12.70 | 10.4      | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 36.06  |
| CLA - 10 | 5/8            | 15.87 | 12.70     | 15/16             | 23.80 | 1     | 25.40 | 24.38 | 21.84 | 28.70 | 38.80  |
| CLA - 12 | 3/4            | 19.05 | 15.74     | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 29.71 | 39.87  |
| CLA - 14 | 7/8            | 22.22 | 18.28     | 1-3/8             | 34.92 | 1-1/4 | 31.75 | 25.90 | 21.84 | 34.54 | 44.70  |
| CLA - 16 | 1              | 25.40 | 22.35     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 36.83 | 49.02  |
| CLA - 20 | 1-1/4          | 31.75 | 27.68     | 1-11/16           | 42.86 | 1-7/8 | 47.62 | 41.14 | 38.86 | 44.50 | 66.54  |
| CLA - 24 | 1-1/2          | 38.10 | 34.03     | 2                 | 50.80 | 2-1/4 | 57.15 | 50.03 | 45.21 | 50.80 | 77.97  |
| CLA - 32 | 2              | 50.80 | 45.97     | 2-3/4             | 69.85 | 3     | 76.20 | 67.56 | 62.73 | 69.80 | 107.18 |

### Metric Tubes

| Part No.  | Tube O.D.<br>D | d<br>Min. | Width across flat |    | A    | B    | I    | L    |
|-----------|----------------|-----------|-------------------|----|------|------|------|------|
|           |                |           | h                 | H  |      |      |      |      |
| CLA - 2M  | 2              | 1.7       | 9.5               | 12 | 12.9 | 15.3 | 15.7 | 22.3 |
| CLA - 3M  | 3              | 2.4       | 9.5               | 12 | 12.9 | 15.3 | 15.7 | 22.3 |
| CLA - 4M  | 4              | 2.4       | 12.7              | 12 | 13.7 | 16.4 | 18.8 | 25.4 |
| CLA - 6M  | 6              | 4.8       | 12.7              | 14 | 15.3 | 17.7 | 19.6 | 27.0 |
| CLA - 8M  | 8              | 6.4       | 14.3              | 16 | 16.2 | 18.6 | 21.3 | 28.8 |
| CLA - 10M | 10             | 7.9       | 17.5              | 19 | 17.2 | 19.5 | 23.9 | 31.5 |
| CLA - 12M | 12             | 9.5       | 20.6              | 22 | 22.8 | 22.0 | 25.9 | 36.0 |
| CLA - 15M | 15             | 11.9      | 25.4              | 25 | 24.4 | 22.0 | 28.7 | 38.8 |
| CLA - 16M | 16             | 12.7      | 25.4              | 25 | 24.4 | 22.0 | 28.7 | 38.8 |
| CLA - 18M | 18             | 15.1      | 27.0              | 30 | 24.4 | 22.0 | 29.7 | 39.8 |
| CLA - 20M | 20             | 15.9      | 34.0              | 32 | 26.0 | 22.0 | 32.5 | 42.6 |
| CLA - 22M | 22             | 18.3      | 34.9              | 32 | 26.0 | 22.0 | 32.5 | 42.6 |
| CLA - 25M | 25             | 21.8      | 34.9              | 38 | 31.3 | 26.5 | 36.8 | 49.1 |
| CLA - 28M | 28             | 21.8      | 41.0              | 46 | 36.6 | 36.6 | 43.2 | 64.0 |
| CLA - 32M | 32             | 28.6      | 46.0              | 50 | 42.0 | 41.6 | 49.3 | 72.3 |
| CLA - 38M | 38             | 33.7      | 55.0              | 60 | 49.4 | 47.9 | 56.4 | 84.0 |

## Tube Fittings

### Union Tee CTA



### Fractional Tubes

| Part No. | Tube O.D.<br>D |       | d<br>Min. | Width across flat |       |       |       | A     | B     | I     | L      |
|----------|----------------|-------|-----------|-------------------|-------|-------|-------|-------|-------|-------|--------|
|          | in             | mm    |           | h                 |       | H     |       |       |       |       |        |
|          |                |       |           | in                | mm    | in    | mm    |       |       |       |        |
| CTA - 1  | 1/16           | 1.58  | 1.27      | 3/8               | 9.52  | 5/16  | 7.93  | 8.63  | 10.92 | 14.00 | 17.88  |
| CTA - 2  | 1/8            | 3.17  | 2.28      | 3/8               | 9.52  | 7/16  | 11.11 | 12.70 | 15.24 | 15.74 | 22.35  |
| CTA - 3  | 3/16           | 4.76  | 3.04      | 1/2               | 12.70 | 1/2   | 12.70 | 13.71 | 16.00 | 17.78 | 24.38  |
| CTA - 4  | 1/4            | 6.35  | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 19.55 | 26.92  |
| CTA - 5  | 5/16           | 7.93  | 6.35      | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 18.54 | 21.33 | 28.70  |
| CTA - 6  | 3/8            | 9.52  | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 23.11 | 30.48  |
| CTA - 8  | 1/2            | 12.70 | 10.4      | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 36.06  |
| CTA - 10 | 5/8            | 15.87 | 12.70     | 15/16             | 23.80 | 1     | 25.40 | 24.38 | 21.84 | 28.70 | 38.80  |
| CTA - 12 | 3/4            | 19.05 | 15.74     | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 29.71 | 39.87  |
| CTA - 14 | 7/8            | 22.22 | 18.28     | 1-3/8             | 34.92 | 1-1/4 | 31.75 | 25.90 | 21.84 | 34.54 | 44.70  |
| CTA - 16 | 1              | 25.40 | 22.35     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 36.83 | 49.02  |
| CTA - 20 | 1-1/4          | 31.75 | 27.68     | 1-11/16           | 42.86 | 1-7/8 | 47.62 | 41.14 | 38.86 | 44.50 | 66.54  |
| CTA - 24 | 1-1/2          | 38.10 | 34.03     | 2                 | 50.80 | 2-1/4 | 57.15 | 50.03 | 45.21 | 50.80 | 77.97  |
| CTA - 32 | 2              | 50.80 | 45.97     | 2-3/4             | 69.85 | 3     | 76.20 | 67.56 | 62.73 | 69.80 | 107.18 |

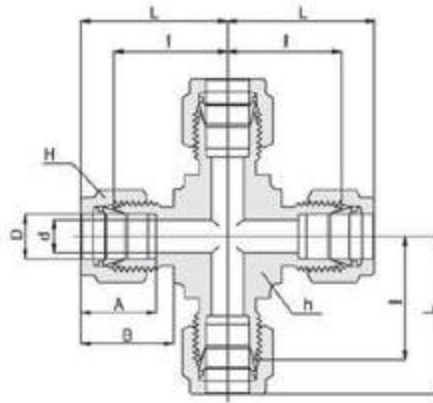
### Metric Tubes

| Part No.  | Tube O.D.<br>D | d<br>Min. | Width across flat |    | A    | B    | I    | L    |
|-----------|----------------|-----------|-------------------|----|------|------|------|------|
|           |                |           | h                 | H  |      |      |      |      |
| CTA - 2M  | 2              | 1.7       | 9.5               | 12 | 12.9 | 15.3 | 15.7 | 22.3 |
| CTA - 3M  | 3              | 2.4       | 9.5               | 12 | 12.9 | 15.3 | 15.7 | 22.3 |
| CTA - 4M  | 4              | 2.4       | 12.7              | 12 | 13.7 | 16.4 | 18.8 | 25.4 |
| CTA - 6M  | 6              | 4.8       | 12.7              | 14 | 15.3 | 17.7 | 19.6 | 27.0 |
| CTA - 8M  | 8              | 6.4       | 14.3              | 16 | 16.2 | 18.6 | 21.3 | 28.8 |
| CTA - 10M | 10             | 7.9       | 17.5              | 19 | 17.2 | 19.5 | 23.9 | 31.5 |
| CTA - 12M | 12             | 9.5       | 20.6              | 22 | 22.8 | 22.0 | 25.9 | 36.0 |
| CTA - 15M | 15             | 11.9      | 25.4              | 25 | 24.4 | 22.0 | 28.7 | 38.8 |
| CTA - 16M | 16             | 12.7      | 25.4              | 25 | 24.4 | 22.0 | 28.7 | 38.8 |
| CTA - 18M | 18             | 15.1      | 27.0              | 30 | 24.4 | 22.0 | 29.7 | 39.8 |
| CTA - 20M | 20             | 15.9      | 34.0              | 32 | 26.0 | 22.0 | 32.5 | 42.6 |
| CTA - 22M | 22             | 18.3      | 34.9              | 32 | 26.0 | 22.0 | 32.5 | 42.6 |
| CTA - 25M | 25             | 21.8      | 34.9              | 38 | 31.3 | 26.5 | 36.8 | 49.1 |
| CTA - 28M | 28             | 21.8      | 41.0              | 46 | 36.6 | 36.6 | 43.2 | 64.0 |
| CTA - 32M | 32             | 28.6      | 46.0              | 50 | 42.0 | 41.6 | 49.3 | 72.3 |
| CTA - 38M | 38             | 33.7      | 55.0              | 60 | 49.4 | 47.9 | 56.4 | 84.0 |

\* Reducing union tees are available upon request. (Refer to catalog No. H-201TF)

## Tube Fittings

### Union Cross CXA



### Fractional Tubes

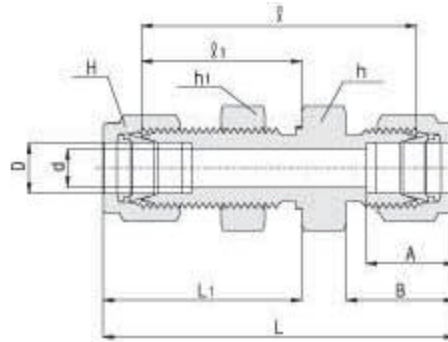
| Part No. | Tube O.D.<br>D |       | d<br>Min. | Width across flat |       |       |       | A     | B     | I     | L     |
|----------|----------------|-------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|
|          | in             | mm    |           | h                 |       | H     |       |       |       |       |       |
|          |                |       |           | in                | mm    | in    | mm    |       |       |       |       |
| CXA - 1  | 1/16           | 1.58  | 1.27      | 3/8               | 9.52  | 5/16  | 7.93  | 8.63  | 10.92 | 14.00 | 17.88 |
| CXA - 2  | 1/8            | 3.17  | 2.28      | 3/8               | 9.52  | 7/16  | 11.11 | 12.70 | 15.24 | 15.74 | 22.35 |
| CXA - 3  | 3/16           | 4.76  | 3.04      | 1/2               | 12.70 | 1/2   | 12.70 | 13.71 | 16.00 | 17.78 | 24.38 |
| CXA - 4  | 1/4            | 6.35  | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 19.55 | 26.92 |
| CXA - 5  | 5/16           | 7.93  | 6.35      | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 18.54 | 21.33 | 28.70 |
| CXA - 6  | 3/8            | 9.52  | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 23.11 | 30.48 |
| CXA - 8  | 1/2            | 12.70 | 10.4      | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 36.06 |
| CXA - 10 | 5/8            | 15.87 | 12.70     | 15/16             | 23.80 | 1     | 25.40 | 24.38 | 21.84 | 28.70 | 38.80 |
| CXA - 12 | 3/4            | 19.05 | 15.74     | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 29.71 | 39.87 |
| CXA - 14 | 7/8            | 22.22 | 18.28     | 1-3/8             | 34.92 | 1-1/4 | 31.75 | 25.90 | 21.84 | 34.54 | 44.70 |
| CXA - 16 | 1              | 25.40 | 22.35     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 36.83 | 49.02 |

### Metric Tubes

| Part No.  | Tube O.D.<br>D | d<br>Min. | Width across flat |    | A    | B    | I    | L    |
|-----------|----------------|-----------|-------------------|----|------|------|------|------|
|           |                |           | h                 | H  |      |      |      |      |
| CXA - 3M  | 3              | 2.4       | 9.5               | 12 | 12.9 | 15.3 | 15.7 | 22.3 |
| CXA - 6M  | 6              | 4.8       | 12.7              | 14 | 15.3 | 17.7 | 19.6 | 27.0 |
| CXA - 8M  | 8              | 6.4       | 14.3              | 16 | 16.2 | 18.6 | 21.3 | 28.8 |
| CXA - 10M | 10             | 7.9       | 17.5              | 19 | 17.2 | 19.5 | 23.9 | 31.5 |
| CXA - 12M | 12             | 9.5       | 20.6              | 22 | 22.8 | 22.0 | 25.9 | 36.0 |
| CXA - 16M | 16             | 12.7      | 25.4              | 25 | 24.4 | 22.0 | 28.7 | 38.8 |
| CXA - 18M | 18             | 15.1      | 27.0              | 30 | 24.4 | 22.0 | 29.7 | 39.8 |
| CXA - 20M | 20             | 15.9      | 34.9              | 32 | 26.0 | 22.0 | 32.5 | 42.6 |
| CXA - 25M | 25             | 21.8      | 34.9              | 38 | 31.3 | 22.0 | 36.8 | 49.1 |

# Tube Fittings

## Bulkhead Union CBU



### Fractional Tubes

| Part No. | Tube O.D.<br>D |       | d<br>Min. | Width across flat |       |       |       | A     | B     | I      | I <sub>1</sub> | L      | L <sub>1</sub> | Panel<br>Hole<br>Drill Size | Pannel<br>Max.<br>Thickness |
|----------|----------------|-------|-----------|-------------------|-------|-------|-------|-------|-------|--------|----------------|--------|----------------|-----------------------------|-----------------------------|
|          | in             | mm    |           | h                 |       | H     |       |       |       |        |                |        |                |                             |                             |
|          |                |       |           | in                | mm    | in    | mm    |       |       |        |                |        |                |                             |                             |
| CBU - 1  | 1/16           | 1.58  | 1.27      | 5/16              | 7.93  | 5/16  | 7.93  | 8.63  | 10.92 | 23.87  | 13.46          | 31.50  | 17.27          | 5.16                        | 3.05                        |
| CBU - 2  | 1/8            | 3.17  | 2.28      | 1/2               | 12.70 | 7/16  | 11.11 | 12.70 | 15.24 | 38.10  | 24.63          | 51.30  | 31.24          | 8.33                        | 12.70                       |
| CBU - 3  | 3/16           | 4.76  | 3.04      | 9/16              | 14.28 | 1/2   | 12.70 | 13.71 | 16.00 | 40.38  | 25.40          | 53.59  | 32.00          | 9.92                        | 12.70                       |
| CBU - 4  | 1/4            | 6.35  | 4.82      | 5/8               | 15.87 | 9/16  | 14.28 | 15.24 | 17.78 | 42.92  | 26.16          | 57.65  | 33.52          | 11.50                       | 10.16                       |
| CBU - 5  | 5/16           | 7.93  | 6.35      | 11/16             | 17.46 | 5/8   | 15.87 | 16.25 | 18.54 | 45.97  | 28.44          | 60.70  | 35.81          | 13.09                       | 11.17                       |
| CBU - 6  | 3/8            | 9.52  | 7.11      | 3/4               | 19.05 | 11/16 | 17.46 | 16.76 | 19.30 | 47.49  | 29.46          | 62.23  | 36.83          | 14.68                       | 11.17                       |
| CBU - 8  | 1/2            | 12.70 | 10.41     | 15/16             | 23.81 | 7/8   | 22.22 | 22.86 | 21.84 | 50.80  | 31.75          | 71.12  | 41.91          | 19.44                       | 12.70                       |
| CBU - 10 | 5/8            | 15.87 | 12.70     | 1-1/16            | 26.98 | 1     | 25.40 | 24.38 | 21.84 | 52.32  | 32.51          | 72.64  | 42.67          | 22.62                       | 12.70                       |
| CBU - 12 | 3/4            | 19.05 | 15.74     | 1-3/16            | 30.16 | 1-1/8 | 28.57 | 24.38 | 21.84 | 58.67  | 37.33          | 78.99  | 47.49          | 25.79                       | 16.76                       |
| CBU - 14 | 7/8            | 22.22 | 18.28     | 1-3/8             | 34.92 | 1-1/4 | 31.75 | 25.90 | 21.84 | 64.26  | 42.92          | 4.58   | 53.08          | 28.97                       | 19.05                       |
| CBU - 16 | 1              | 25.40 | 22.35     | 1-5/8             | 41.27 | 1-1/2 | 38.10 | 31.24 | 26.41 | 71.37  | 45.21          | 95.75  | 57.40          | 33.73                       | 19.05                       |
| CBU - 20 | 1-1/4          | 31.75 | 27.68     | 1-7/8             | 47.62 | 1-7/8 | 47.62 | 41.14 | 38.86 | 78.99  | 47.75          | 123.19 | 69.85          | 41.67                       | 19.05                       |
| CBU - 24 | 1-1/2          | 38.10 | 34.03     | 2-1/4             | 57.15 | 2-1/4 | 57.15 | 50.03 | 45.21 | 84.83  | 49.27          | 139.19 | 76.45          | 49.61                       | 19.05                       |
| CBU - 32 | 2              | 50.80 | 45.97     | 2-3/4             | 69.85 | 3     | 76.20 | 67.56 | 62.73 | 105.66 | 56.38          | 80.34  | 93.72          | 16.27                       | 19.05                       |

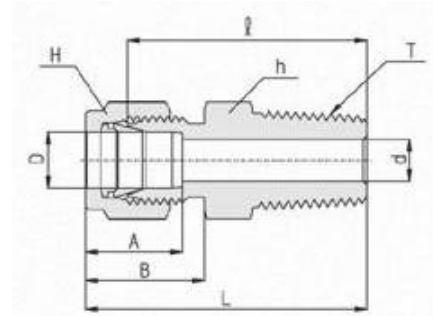
### Metric Tubes

| Part No.  | Tube<br>O.D.<br>D | d<br>Min. | Width across flat |                |    | A    | B    | I    | I <sub>1</sub> | L     | L <sub>1</sub> | Panel<br>Hole<br>Drill Size | Pannel<br>Max.<br>Thickness |
|-----------|-------------------|-----------|-------------------|----------------|----|------|------|------|----------------|-------|----------------|-----------------------------|-----------------------------|
|           |                   |           | h                 | h <sub>1</sub> | H  |      |      |      |                |       |                |                             |                             |
| CBU - 3M  | 3                 | 2.4       | 14                | 12.7           | 12 | 12.9 | 15.3 | 38.1 | 24.6           | 51.3  | 31.2           | 8.3                         | 3.05                        |
| CBU - 4M  | 4                 | 2.4       | 14                | 14.3           | 12 | 13.7 | 16.1 | 40.4 | 25.4           | 53.6  | 32.0           | 9.9                         | 12.70                       |
| CBU - 6M  | 6                 | 4.8       | 16                | 15.9           | 14 | 15.3 | 17.7 | 42.9 | 26.2           | 57.7  | 33.6           | 11.5                        | 12.70                       |
| CBU - 8M  | 8                 | 6.4       | 18                | 17.5           | 16 | 16.2 | 18.6 | 46.0 | 28.6           | 61.0  | 36.1           | 13.1                        | 10.16                       |
| CBU - 10M | 10                | 7.9       | 22                | 22.0           | 19 | 17.2 | 19.5 | 48.5 | 29.4           | 63.7  | 37.0           | 16.2                        | 11.17                       |
| CBU - 12M | 12                | 9.5       | 24                | 23.8           | 22 | 22.8 | 22.0 | 50.8 | 31.8           | 71.0  | 41.9           | 19.5                        | 11.17                       |
| CBU - 15M | 15                | 11.9      | 27                | 27.0           | 25 | 24.4 | 22.0 | 52.3 | 32.5           | 72.5  | 42.6           | 22.8                        | 12.70                       |
| CBU - 16M | 16                | 12.7      | 27                | 27.0           | 25 | 24.4 | 22.0 | 52.3 | 32.5           | 72.5  | 42.6           | 22.8                        | 12.70                       |
| CBU - 18M | 18                | 15.1      | 30                | 30.0           | 30 | 24.4 | 22.0 | 58.7 | 37.3           | 78.9  | 47.4           | 26.0                        | 16.76                       |
| CBU - 20M | 20                | 15.9      | 35                | 35.0           | 32 | 26.0 | 22.0 | 64.3 | 42.9           | 84.5  | 53.0           | 29.0                        | 19.05                       |
| CBU - 22M | 22                | 18.3      | 35                | 35.0           | 32 | 26.0 | 22.0 | 64.3 | 42.9           | 84.5  | 53.0           | 29.0                        | 19.05                       |
| CBU - 25M | 25                | 21.8      | 41.3              | 41.3           | 38 | 31.3 | 26.5 | 71.4 | 45.2           | 95.9  | 57.5           | 33.7                        | 19.05                       |
| CBU - 32M | 32                | 28.6      | 50                | 50             | 50 | 42.0 | 41.6 | 82.3 | 49.5           | 128.3 | 72.5           | 42.5                        | 19.05                       |
| CBU - 38M | 38                | 33.7      | 60                | 60             | 60 | 49.4 | 47.9 | 89.4 | 51.5           | 144.6 | 79.1           | 50.5                        | 19.05                       |

\* h<sub>1</sub> : Applicable to metric Tube bulkhead hexagon only.

## Tube Fittings

### Male Connector CMC-N



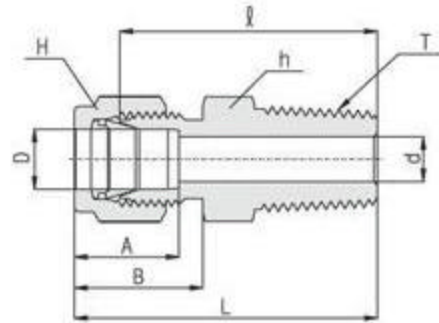
### Fractional Tubes To Female NPT Thread

| Part No.     | Tue O.D.<br>D |       | T<br>(NPT) | d<br>Min. | Width across flat |       |       |       | A     | B      | I     | L      |
|--------------|---------------|-------|------------|-----------|-------------------|-------|-------|-------|-------|--------|-------|--------|
|              | in            | mm    |            |           | h                 |       | H     |       |       |        |       |        |
|              |               |       |            |           | in                | mm    | in    | mm    |       |        |       |        |
| CMC 1 - 1N   | 1/16          | 1.58  | 1/16       | 1.27      | 5/16              | 7.93  | 5/16  | 7.93  | 8.63  | 10.92  | 20.00 | 23.83  |
| CMC 1 - 2N   | 1/16          | 1.58  | 1/8        | 1.27      | 7/16              | 11.11 | 7/16  | 11.11 | 8.63  | 10.92  | 22.35 | 26.23  |
| CMC 1 - 4N   | 1/16          | 1.58  | 1/4        | 1.27      | 9/16              | 14.28 | 5/16  | 7.93  | 8.63  | 10.92  | 27.17 | 30.98  |
| CMC 2 - 1N   | 1/8           | 3.17  | 1/16       | 2.28      | 7/16              | 11.11 | 7/16  | 11.11 | 12.7  | 15.24  | 23.11 | 29.71  |
| CMC 2 - 2N   | 1/8           | 3.17  | 1/8        | 2.28      | 7/16              | 11.11 | 7/16  | 11.11 | 12.70 | 15.24  | 23.87 | 30.48  |
| CMC 2 - 4N   | 1/8           | 3.17  | 1/4        | 2.28      | 9/16              | 14.28 | 7/16  | 11.11 | 12.70 | 15.24  | 28.95 | 35.56  |
| CMC 2 - 6N   | 1/8           | 3.17  | 3/8        | 2.28      | 11/16             | 17.46 | 7/16  | 11.11 | 12.70 | 15.24  | 29.21 | 35.81  |
| CMC 2 - 8N   | 1/8           | 3.17  | 1/2        | 2.28      | 7/8               | 22.22 | 7/16  | 11.11 | 12.70 | 15.24  | 35.56 | 42.16  |
| CMC 3 - 2N   | 3/16          | 4.76  | 1/8        | 3.04      | 7/16              | 11.11 | 1/2   | 12.70 | 13.71 | 16.00  | 24.63 | 31.24  |
| CMC 3 - 4N   | 3/16          | 4.76  | 1/4        | 3.04      | 9/16              | 14.28 | 1/2   | 12.70 | 13.71 | 16.00  | 29.71 | 36.32  |
| CMC 4 - 1N   | 1/4           | 6.35  | 1/16       | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78  | 25.40 | 32.76  |
| CMC 4 - 2N   | 1/4           | 6.35  | 1/8        | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78  | 25.40 | 32.76  |
| CMC 4 - 4N   | 1/4           | 6.35  | 1/4        | 4.82      | 9/16              | 14.28 | 9/16  | 14.28 | 15.24 | 17.78  | 30.48 | 37.84  |
| CMC 4 - 6N   | 1/4           | 6.35  | 3/8        | 4.82      | 11/16             | 17.46 | 9/16  | 14.28 | 15.24 | 17.78  | 30.98 | 38.35  |
| CMC 4 - 8N   | 1/4           | 6.35  | 1/2        | 4.82      | 7/8               | 22.22 | 9/16  | 14.28 | 15.24 | 17.78  | 37.33 | 44.70  |
| CMC 4 - 12N  | 1/4           | 6.35  | 3/4        | 4.82      | 1-1/16            | 26.98 | 9/16  | 14.28 | 15.24 | 17.78  | 38.86 | 46.22  |
| CMC 5 - 2N   | 5/16          | 7.93  | 1/8        | 4.82      | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 18.54  | 26.67 | 34.03  |
| CMC 5 - 4N   | 5/16          | 7.93  | 1/4        | 6.35      | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 148.54 | 31.24 | 38.60  |
| CMC 5 - 6N   | 5/16          | 7.93  | 3/8        | 6.35      | 11/16             | 17.46 | 5/8   | 15.87 | 16.25 | 18.54  | 31.75 | 39.11  |
| CMC 6 - 2N   | 3/8           | 9.52  | 1/8        | 4.82      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30  | 27.94 | 35.30  |
| CMC 6 - 4N   | 3/8           | 9.52  | 1/4        | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30  | 32.51 | 39.87  |
| CMC 6 - 6N   | 3/8           | 9.52  | 3/8        | 7.11      | 11/16             | 17.46 | 11/16 | 17.46 | 16.76 | 19.30  | 32.51 | 39.87  |
| CMC 6 - 8N   | 3/8           | 9.52  | 1/2        | 7.11      | 7/8               | 22.22 | 11/16 | 17.46 | 16.76 | 19.30  | 38.86 | 46.22  |
| CMC 6 - 12N  | 3/8           | 9.52  | 3/4        | 7.11      | 1-1/16            | 26.98 | 11/16 | 17.46 | 16.76 | 19.30  | 40.38 | 47.75  |
| CMC 8 - 2N   | 1/2           | 12.70 | 1/8        | 4.82      | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84  | 28.70 | 38.86  |
| CMC 8 - 4N   | 1/2           | 12.70 | 1/4        | 7.11      | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84  | 33.27 | 43.43  |
| CMC 8 - 6N   | 1/2           | 12.70 | 3/8        | 9.65      | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84  | 33.27 | 43.43  |
| CMC 8 - 8N   | 1/2           | 12.70 | 1/2        | 10.41     | 7/8               | 22.22 | 7/8   | 22.22 | 22.86 | 21.84  | 38.86 | 49.02  |
| CMC 8 - 12N  | 1/2           | 12.70 | 3/4        | 10.41     | 1-1/16            | 26.98 | 7/8   | 22.22 | 22.86 | 21.84  | 40.38 | 50.54  |
| CMC 8 - 16N  | 1/2           | 12.70 | 1          | 10.41     | 1-3/8             | 34.92 | 7/8   | 22.22 | 22.86 | 21.84  | 46.99 | 57.15  |
| CMC 10 - 6N  | 5/8           | 15.87 | 3/8        | 9.65      | 15/16             | 23.81 | 1     | 25.40 | 24.38 | 21.84  | 34.04 | 44.19  |
| CMC 10 - 8N  | 5/8           | 15.87 | 1/2        | 11.93     | 15/16             | 23.81 | 1     | 25.40 | 24.38 | 21.84  | 38.86 | 49.02  |
| CMC 10 - 12N | 5/8           | 15.87 | 3/4        | 12.70     | 1-1/16            | 26.98 | 1     | 25.40 | 24.38 | 21.84  | 40.38 | 50.54  |
| CMC 12 - 8N  | 3/4           | 19.05 | 1/2        | 11.93     | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84  | 40.38 | 50.54  |
| CMC 12 - 12N | 3/4           | 19.05 | 3/4        | 15.74     | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84  | 40.38 | 50.54  |
| CMC 12 - 16N | 3/4           | 19.05 | 1          | 15.74     | 1-3/8             | 34.92 | 1-1/8 | 28.57 | 24.38 | 21.84  | 46.99 | 57.15  |
| CMC 14 - 12N | 7/8           | 22.22 | 3/4        | 15.74     | 1-3/16            | 30.16 | 1-1/4 | 31.75 | 25390 | 21.84  | 40.38 | 50.54  |
| CMC 14 - 16N | 7/8           | 22.22 | 1          | 18.28     | 1-3/8             | 34.92 | 1-1/4 | 31.75 | 25.90 | 21.84  | 46.99 | 57.15  |
| CMC 16 - 8N  | 1             | 25.40 | 1/2        | 11.93     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41  | 45.21 | 57.40  |
| CMC 16 - 12N | 1             | 25.40 | 3/4        | 15.74     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41  | 45.21 | 57.40  |
| CMC 16 - 16N | 1             | 25.40 | 1          | 22.35     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41  | 50.03 | 62.23  |
| CMC 20 - 16N | 1-1/4         | 31.75 | 1          | 22.35     | 1-3/4             | 44.45 | 1-7/8 | 47.62 | 41.14 | 38.86  | 55.11 | 77.21  |
| CMC 20 - 20N | 1-1/4         | 31.75 | 1-1/4      | 27.68     | 1-3/4             | 44.45 | 1-7/8 | 47.62 | 41.14 | 38.86  | 55.11 | 77.21  |
| CMC 24 - 24N | 1-1/2         | 38.10 | 1-1/2      | 34.03     | 2-1/8             | 53.97 | 2-1/4 | 57.15 | 50.03 | 45.21  | 61.72 | 88.90  |
| CMC 32 - 32N | 2             | 50.80 | 2          | 45.97     | 2-3/4             | 69.85 | 3     | 76.20 | 67.56 | 62.73  | 76.20 | 113.53 |

\* ISO Tapered Threads are available upon request.

## Tube Fittings

### Male Connector CMC - R



### Metric Tube To Female ISO Tapered Thread

| Part No.      | Tube<br>O.D.<br>D | T*<br>R(PT) | d<br>Min. | Width across flat |    | A    | B    |      | L    |
|---------------|-------------------|-------------|-----------|-------------------|----|------|------|------|------|
|               |                   |             |           | h                 | H  |      |      |      |      |
| CMC 2M - 2R   | 2                 | 1/8         | 1.7       | 12                | 12 | 12.9 | 15.3 | 23.9 | 30.5 |
| CMC 3M - 2R   | 3                 | 1/8         | 2.4       | 12                | 12 | 12.9 | 15.3 | 23.9 | 30.5 |
| CMC 3M - 4R   | 3                 | 1/4         | 2.4       | 14                | 12 | 12.9 | 15.3 | 29.0 | 35.6 |
| CMC 4M - 2R   | 4                 | 1/8         | 2.4       | 12                | 12 | 13.7 | 16.1 | 24.6 | 31.2 |
| CMC 4M - 4R   | 4                 | 1/4         | 2.4       | 14                | 12 | 13.7 | 16.1 | 29.7 | 36.3 |
| CMC 6M - 2R   | 6                 | 1/8         | 4.8       | 14                | 14 | 15.3 | 17.7 | 25.4 | 32.8 |
| CMC 6M - 4R   | 6                 | 1/4         | 4.8       | 14                | 14 | 15.3 | 17.7 | 30.5 | 37.9 |
| CMC 6M - 6R   | 6                 | 3/8         | 4.8       | 18                | 14 | 15.3 | 17.7 | 31.0 | 38.4 |
| CMC 6M - 8R   | 6                 | 1/2         | 4.8       | 22                | 14 | 15.3 | 17.7 | 37.3 | 44.7 |
| CMC 8M - 2R   | 8                 | 1/8         | 4.8       | 15                | 16 | 16.2 | 18.6 | 26.7 | 34.2 |
| CMC 8M - 4R   | 8                 | 1/4         | 6.4       | 15                | 16 | 16.2 | 18.6 | 31.2 | 38.7 |
| CMC 8M - 6R   | 8                 | 3/8         | 6.4       | 17                | 16 | 16.2 | 18.6 | 31.8 | 39.2 |
| CMC 8M - 8R   | 8                 | 1/2         | 6.4       | 22                | 16 | 16.2 | 18.6 | 38.1 | 45.6 |
| CMC 10M - 2R  | 10                | 1/8         | 4.8       | 18                | 19 | 17.2 | 19.5 | 28.7 | 36.3 |
| CMC 10M - 4R  | 10                | 1/4         | 7.1       | 18                | 19 | 17.2 | 19.5 | 33.3 | 40.9 |
| CMC 10M - 6R  | 10                | 3/8         | 7.9       | 18                | 19 | 17.2 | 19.5 | 33.3 | 40.9 |
| CMC 10M - 8R  | 10                | 1/2         | 7.9       | 22                | 19 | 17.2 | 19.5 | 38.9 | 46.5 |
| CMC 12M - 4R  | 12                | 1/4         | 7.1       | 22                | 22 | 22.8 | 22.0 | 33.3 | 43.4 |
| CMC 12M - 6R  | 12                | 3/8         | 9.5       | 22                | 22 | 22.8 | 22.0 | 33.3 | 43.4 |
| CMC 12M - 8R  | 12                | 1/2         | 9.5       | 22                | 22 | 22.8 | 22.0 | 38.9 | 49.0 |
| CMC 12M - 12R | 12                | 3/4         | 9.5       | 27                | 22 | 22.8 | 22.0 | 40.4 | 50.5 |
| CMC 15M - 8R  | 15                | 1/2         | 11.9      | 24                | 25 | 24.4 | 22.0 | 38.9 | 49.0 |
| CMC 16M - 4R  | 16                | 1/4         | 7.1       | 24                | 25 | 24.4 | 22.0 | 34.0 | 44.1 |
| CMC 16M - 6R  | 16                | 3/8         | 9.5       | 24                | 25 | 24.4 | 22.0 | 34.0 | 44.1 |
| CMC 16M - 8R  | 16                | 1/2         | 11.9      | 24                | 25 | 24.4 | 22.0 | 38.9 | 49.0 |
| CMC 16M - 12R | 16                | 3/4         | 12.7      | 27                | 25 | 24.4 | 22.0 | 38.9 | 49.0 |
| CMC 18M - 8R  | 18                | 1/2         | 11.9      | 27                | 30 | 24.4 | 22.0 | 40.4 | 50.5 |
| CMC 18M - 12R | 18                | 3/4         | 15.1      | 27                | 30 | 24.4 | 22.0 | 40.4 | 50.5 |
| CMC 20M - 8R  | 20                | 1/2         | 11.9      | 30                | 32 | 26.0 | 22.0 | 42.2 | 52.3 |
| CMC 20M - 12R | 20                | 3/4         | 15.9      | 30                | 32 | 26.0 | 22.0 | 42.2 | 52.3 |
| CMC 22M - 12R | 22                | 3/4         | 15.9      | 30                | 32 | 26.0 | 22.0 | 42.2 | 52.3 |
| CMC 22M - 16R | 22                | 1           | 18.3      | 35                | 32 | 26.0 | 22.0 | 47.0 | 57.0 |
| CMC 25M - 12R | 25                | 3/4         | 15.9      | 35                | 38 | 31.3 | 26.5 | 45.2 | 57.5 |
| CMC 25M - 16R | 25                | 1           | 21.8      | 35                | 38 | 31.3 | 26.5 | 50.0 | 62.3 |
| CMC 28M - 16R | 28                | 1           | 21.8      | 41                | 46 | 36.6 | 36.6 | 51.6 | 72.4 |
| CMC 28M - 20R | 28                | 1-1/4       | 21.8      | 46                | 46 | 36.6 | 36.6 | 52.3 | 73.1 |
| CMC 32M - 20R | 32                | 1-1/4       | 28.6      | 46                | 50 | 42.0 | 41.6 | 56.6 | 79.6 |
| CMC 32M - 24R | 38                | 1-1/2       | 33.7      | 55                | 60 | 49.4 | 47.9 | 64.0 | 91.6 |

\* NPT Threads are available upon request.

### Thermocouple Male Connector CMCT

Bore-through male connectors handle thermocouples or dip tubes with ease. For correct part number, just add "T" as a suffix to CMC, the male connector designator.

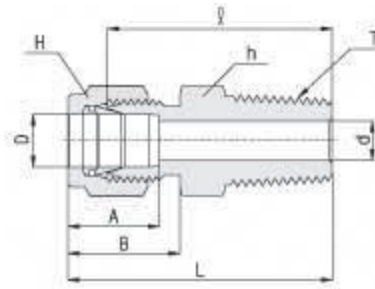
Example : CMCT 12M-8R-S316 12mm tube O.D. × 1/2" ISO tapered stainless Steel 316  
CMCT 8-8N-S316 1/2" tube O.D. × 1/2" NPT stainless steel 316



**Note :** There are some limitations in size available as it is impractical to bore through all male connectors. For availability, contact your local distributor.

## Tube Fittings

### Male Connector For Bonded Washer Seal CMC - G



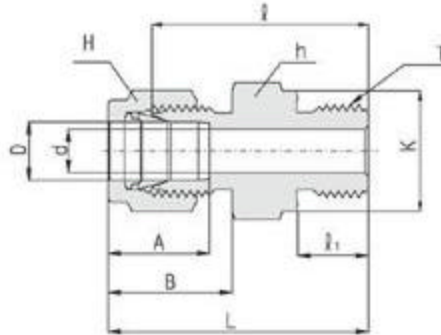
#### Metric Tube To Female ISO Parallel Thread

| Part No.      | Tube<br>O.D.<br>D | T<br>G(PF) | d<br>Min. | Width across flat |    | A    | B    |      | 1    | L    | K    |
|---------------|-------------------|------------|-----------|-------------------|----|------|------|------|------|------|------|
|               |                   |            |           | h                 | H  |      |      |      |      |      |      |
| CMC 2M - 2G   | 2                 | 1/8        | 1.7       | 14                | 12 | 12.9 | 15.3 | 23.4 | 7.1  | 30.0 | 13.8 |
| CMC 3M - 2G   | 3                 | 1/8        | 2.4       | 14                | 12 | 12.9 | 15.3 | 23.4 | 7.1  | 30.0 | 13.8 |
| CMC 3M - 4G   | 3                 | 1/4        | 2.4       | 19                | 12 | 12.9 | 15.3 | 28.7 | 11.2 | 35.3 | 18.0 |
| CMC 4M - 2G   | 4                 | 1/8        | 2.4       | 14                | 12 | 13.7 | 16.1 | 24.1 | 7.1  | 30.7 | 13.8 |
| CMC 6M - 2G   | 6                 | 1/8        | 4.0       | 14                | 14 | 15.3 | 17.7 | 24.9 | 7.1  | 32.3 | 13.8 |
| CMC 6M - 4G   | 6                 | 1/4        | 4.8       | 19                | 14 | 15.3 | 17.7 | 30.2 | 11.2 | 37.6 | 18.0 |
| CMC 6M - 6G   | 6                 | 3/8        | 4.8       | 22                | 14 | 15.3 | 17.7 | 31.5 | 11.2 | 38.9 | 21.8 |
| CMC 6M - 8G   | 6                 | 1/2        | 4.8       | 27                | 14 | 15.3 | 17.7 | 37.3 | 14.2 | 44.7 | 26.0 |
| CMC 8M - 2G   | 8                 | 1/8        | 4.0       | 15                | 16 | 16.2 | 18.6 | 25.7 | 7.1  | 33.2 | 13.8 |
| CMC 8M - 4G   | 8                 | 1/4        | 6.4       | 19                | 16 | 16.2 | 18.6 | 31.0 | 11.2 | 38.5 | 13.8 |
| CMC 8M - 6G   | 8                 | 3/8        | 6.4       | 22                | 16 | 16.2 | 18.6 | 32.3 | 11.2 | 39.8 | 21.8 |
| CMC 8M - 8G   | 8                 | 1/2        | 6.4       | 27                | 16 | 16.2 | 18.6 | 38.1 | 14.2 | 45.6 | 26.0 |
| CMC 10M - 4G  | 10                | 1/4        | 6.4       | 19                | 19 | 17.2 | 19.5 | 31.8 | 11.2 | 39.4 | 18.0 |
| CMC 10M - 6G  | 10                | 3/8        | 7.9       | 22                | 19 | 17.2 | 19.5 | 33.0 | 11.2 | 40.6 | 21.8 |
| CMC 10M - 8G  | 10                | 1/2        | 7.9       | 27                | 19 | 17.2 | 19.5 | 38.9 | 14.2 | 46.5 | 26.0 |
| CMC 12M - 4G  | 12                | 1/4        | 5.9       | 22                | 22 | 22.8 | 22.0 | 32.5 | 11.2 | 42.6 | 18.0 |
| CMC 12M - 6G  | 12                | 3/8        | 7.9       | 22                | 22 | 22.8 | 22.0 | 33.0 | 11.2 | 43.1 | 21.8 |
| CMC 12M - 8G  | 12                | 1/2        | 9.5       | 27                | 22 | 22.8 | 22.0 | 38.9 | 14.2 | 49.0 | 26.0 |
| CMC 12M - 12G | 12                | 3/4        | 9.5       | 35                | 22 | 22.8 | 22.0 | 42.7 | 15.7 | 52.8 | 32.0 |
| CMC 16M - 6G  | 16                | 3/8        | 7.9       | 24                | 25 | 24.4 | 22.0 | 33.8 | 11.2 | 43.9 | 21.8 |
| CMC 16M - 8G  | 16                | 1/2        | 11.9      | 27                | 25 | 24.4 | 22.0 | 38.9 | 14.2 | 49.0 | 26.0 |
| CMC 18M - 8G  | 18                | 1/2        | 11.9      | 27                | 30 | 24.4 | 22.0 | 38.9 | 14.2 | 49.0 | 26.0 |
| CMC 18M - 12G | 18                | 3/4        | 15.1      | 35                | 30 | 24.4 | 22.0 | 42.7 | 15.7 | 52.8 | 32.0 |
| CMC 20M - 8G  | 20                | 1/2        | 11.9      | 30                | 32 | 26.0 | 22.0 | 40.4 | 14.2 | 50.5 | 26.0 |
| CMC 20M - 12G | 20                | 3/4        | 15.9      | 35                | 32 | 26.0 | 22.0 | 42.7 | 15.7 | 52.8 | 32.0 |
| CMC 22M - 12G | 22                | 3/4        | 15.9      | 35                | 32 | 26.0 | 22.0 | 42.7 | 15.7 | 52.8 | 32.0 |
| CMC 22M - 16G | 22                | 1          | 18.3      | 41                | 32 | 26.0 | 22.0 | 45.2 | 18.3 | 55.3 | 39.0 |
| CMC 25M - 12G | 25                | 3/4        | 15.9      | 35                | 38 | 31.3 | 26.5 | 45.2 | 15.7 | 57.5 | 32.0 |
| CMC 25M - 16G | 25                | 1          | 19.8      | 41                | 38 | 31.3 | 26.5 | 47.8 | 18.3 | 60.1 | 39.0 |
| CMC 28M - 16G | 28                | 1          | 19.8      | 41                | 46 | 36.6 | 36.6 | 49.3 | 18.3 | 70.1 | 39.0 |
| CMC 28M - 20G | 28                | 1-1/4      | 21.8      | 50                | 46 | 36.6 | 36.6 | 53.1 | 19.8 | 73.9 | 49.0 |
| CMC 32M - 20G | 32                | 1-1/4      | 25.0      | 50                | 50 | 42.0 | 41.6 | 55.9 | 19.8 | 78.9 | 49.0 |
| CMC 38M - 24G | 38                | 1-1/2      | 31.8      | 55                | 60 | 49.4 | 47.9 | 63.2 | 22.1 | 90.8 | 54.7 |

For leak tight installation, see ISO Parallel and Tapered Pipe Thread on page 6.

## Tube Fittings

### Male Connector For Metal Gasket Seal COM



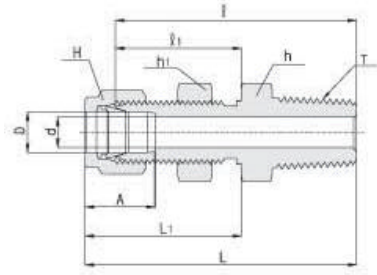
### Metric Tube To Female ISO Parallel Thread

| Part No.      | Tube<br>O.D.<br>D | T<br>G(PF) | d<br>Min. | Width across flat |    | A    | B    |      | 1    | L    | K    |
|---------------|-------------------|------------|-----------|-------------------|----|------|------|------|------|------|------|
|               |                   |            |           | h                 | H  |      |      |      |      |      |      |
| CMC 3M - 2G   | 3                 | 1/8        | 2.4       | 14                | 12 | 12.9 | 15.3 | 23.4 | 7.1  | 30.0 | 13.8 |
| CMC 3M - 4G   | 3                 | 1/4        | 2.4       | 19                | 12 | 12.9 | 15.3 | 28.7 | 11.2 | 35.3 | 18.0 |
| CMC 4M - 2G   | 4                 | 1/8        | 2.4       | 14                | 12 | 13.7 | 16.1 | 24.1 | 7.1  | 30.7 | 13.8 |
| CMC 6M - 2G   | 6                 | 1/8        | 4.0       | 14                | 14 | 15.3 | 17.7 | 24.9 | 7.1  | 32.3 | 13.8 |
| CMC 6M - 4G   | 6                 | 1/4        | 4.8       | 19                | 14 | 15.3 | 17.7 | 30.2 | 11.2 | 37.6 | 18.0 |
| CMC 6M - 6G   | 6                 | 3/8        | 4.8       | 22                | 14 | 15.3 | 17.7 | 31.5 | 11.2 | 38.9 | 21.8 |
| CMC 6M - 8G   | 6                 | 1/2        | 4.8       | 27                | 14 | 15.3 | 17.7 | 37.3 | 14.2 | 44.7 | 26.0 |
| CMC 8M - 2G   | 8                 | 1/8        | 4.0       | 15                | 16 | 16.2 | 18.6 | 25.7 | 7.1  | 33.2 | 13.8 |
| CMC 8M - 4G   | 8                 | 1/4        | 6.4       | 19                | 16 | 16.2 | 18.6 | 31.0 | 11.2 | 38.5 | 13.8 |
| CMC 8M - 6G   | 8                 | 3/8        | 6.4       | 22                | 16 | 16.2 | 18.6 | 32.3 | 11.2 | 39.8 | 21.8 |
| CMC 8M - 8G   | 8                 | 1/2        | 6.4       | 27                | 16 | 16.2 | 18.6 | 38.1 | 14.2 | 45.6 | 26.0 |
| CMC 10M - 4G  | 10                | 1/4        | 5.9       | 19                | 19 | 17.2 | 19.5 | 31.8 | 11.2 | 39.4 | 18.0 |
| CMC 10M - 6G  | 10                | 3/8        | 7.9       | 22                | 19 | 17.2 | 19.5 | 33.0 | 11.2 | 40.6 | 21.8 |
| CMC 10M - 8G  | 10                | 1/2        | 7.9       | 27                | 19 | 17.2 | 19.5 | 38.9 | 14.2 | 46.5 | 26.0 |
| CMC 12M - 4G  | 12                | 1/4        | 5.9       | 22                | 22 | 22.8 | 22.0 | 32.5 | 11.2 | 42.6 | 18.0 |
| CMC 12M - 6G  | 12                | 3/8        | 7.9       | 22                | 22 | 22.8 | 22.0 | 33.0 | 11.2 | 43.1 | 21.8 |
| CMC 12M - 8G  | 12                | 1/2        | 9.5       | 27                | 22 | 22.8 | 22.0 | 38.9 | 14.2 | 49.0 | 26.0 |
| CMC 12M - 12G | 12                | 3/4        | 9.5       | 35                | 22 | 22.8 | 22.0 | 42.7 | 15.7 | 52.8 | 32.0 |
| CMC 15M - 8G  | 15                | 1/2        | 11.9      | 27                | 25 | 24.4 | 22.0 | 38.9 | 14.2 | 49.0 | 26.0 |
| CMC 16M - 6G  | 16                | 3/8        | 7.9       | 24                | 25 | 24.4 | 22.0 | 33.8 | 11.2 | 43.9 | 21.8 |
| CMC 16M - 8G  | 16                | 1/2        | 11.9      | 27                | 25 | 24.4 | 22.0 | 38.9 | 14.2 | 49.0 | 26.0 |
| CMC 18M - 8G  | 18                | 1/2        | 11.9      | 27                | 30 | 24.4 | 22.0 | 38.9 | 14.2 | 49.0 | 26.0 |
| CMC 18M - 12G | 18                | 3/4        | 15.1      | 35                | 30 | 24.4 | 22.0 | 42.7 | 15.7 | 52.8 | 32.0 |
| CMC 20M - 8G  | 20                | 1/2        | 11.9      | 30                | 32 | 26.0 | 22.0 | 40.4 | 14.2 | 50.5 | 26.0 |
| CMC 20M - 12G | 20                | 3/4        | 15.9      | 35                | 32 | 26.0 | 22.0 | 42.7 | 15.7 | 52.8 | 32.0 |
| CMC 22M - 12G | 22                | 3/4        | 15.9      | 35                | 32 | 26.0 | 22.0 | 42.7 | 15.7 | 52.8 | 32.0 |
| CMC 22M - 16G | 22                | 1          | 18.3      | 41                | 32 | 26.0 | 22.0 | 45.2 | 18.3 | 55.3 | 39.0 |
| CMC 25M - 12G | 25                | 3/4        | 15.9      | 35                | 38 | 31.3 | 26.5 | 45.2 | 15.7 | 57.5 | 32.0 |
| CMC 25M - 16G | 25                | 1          | 19.8      | 41                | 38 | 31.3 | 26.5 | 47.8 | 18.3 | 60.1 | 39.0 |
| CMC 28M - 16G | 28                | 1          | 19.8      | 41                | 46 | 36.6 | 36.6 | 49.3 | 18.3 | 70.1 | 39.0 |
| CMC 28M - 20G | 28                | 1-1/4      | 21.8      | 50                | 46 | 36.6 | 36.6 | 53.1 | 19.8 | 73.9 | 49.0 |
| CMC 32M - 20G | 32                | 1-1/4      | 28.6      | 50                | 50 | 42.0 | 41.6 | 55.9 | 19.8 | 78.9 | 49.0 |
| CMC 38M - 24G | 38                | 1-1/2      | 31.8      | 55                | 60 | 49.4 | 47.9 | 61.7 | 20.6 | 89.3 | 54.7 |

For leak tight installation, see ISO Parallel and Tapered Pipe Thread on page 6.

## Tube Fittings

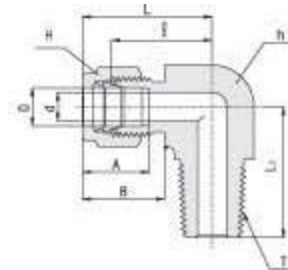
### Bulkhead Male Connector CBMC



#### Fractional Tube To Female NPT Thread

| Part No.     | Tube O.D. |       | T*<br>(NPT) | d<br>Min. | Width across flat |       |                |       |       |       | A     | 1     | L     | L <sub>1</sub> | Panel<br>Hole<br>Drill Size | Panel<br>Max.<br>Thickness |       |
|--------------|-----------|-------|-------------|-----------|-------------------|-------|----------------|-------|-------|-------|-------|-------|-------|----------------|-----------------------------|----------------------------|-------|
|              | D         |       |             |           | h                 |       | h <sub>1</sub> |       | H     |       |       |       |       |                |                             |                            |       |
|              | in        | mm    |             |           | in                | mm    | in             | mm    | in    | mm    |       |       |       |                |                             |                            |       |
| CBMC 2 - 2N  | 1/8       | 3.17  | 1/8         | 2.28      | 1/2               | 12.70 | 1/2            | 12.70 | 7/16  | 11.11 | 12.70 | 39.87 | 24.63 | 46.48          | 31.24                       | 8.33                       | 12.70 |
| CBMC 4 - 2N  | 1/4       | 6.35  | 1/8         | 4.82      | 5/8               | 15.87 | 5/8            | 15.87 | 9/16  | 14.28 | 15.24 | 42.16 | 26.16 | 49.53          | 33.52                       | 11.50                      | 10.16 |
| CBMC 4 - 4N  | 1/4       | 6.35  | 1/4         | 4.82      | 5/8               | 15.87 | 5/8            | 15.87 | 9/16  | 14.28 | 15.24 | 45.97 | 26.16 | 53.34          | 33.52                       | 11.50                      | 10.16 |
| CBMC 6 - 4N  | 3/8       | 9.52  | 1/4         | 7.11      | 3/4               | 19.05 | 3/4            | 19.05 | 11/16 | 17.46 | 16.76 | 50.03 | 29.46 | 57.40          | 36.83                       | 14.68                      | 11.17 |
| CBMC 6 - 6N  | 3/8       | 9.52  | 3/8         | 7.11      | 3/4               | 19.05 | 3/4            | 19.05 | 11/16 | 17.46 | 16.76 | 50.03 | 29.46 | 57.40          | 36.83                       | 14.68                      | 11.17 |
| CBMC 6 - 8N  | 3/8       | 9.52  | 1/2         | 7.11      | 7/8               | 22.22 | 3/4            | 19.05 | 11/16 | 17.46 | 16.76 | 56.38 | 29.46 | 63.75          | 36.83                       | 14.68                      | 11.17 |
| CBMC 8 - 6N  | 1/2       | 12.70 | 3/8         | 9.39      | 15/16             | 23.81 | 15/16          | 23.81 | 7/8   | 22.22 | 22.86 | 53.08 | 31.75 | 63.24          | 41.91                       | 19.44                      | 12.70 |
| CBMC 8 - 8N  | 1/2       | 12.70 | 1/2         | 10.41     | 15/16             | 23.81 | 15/16          | 23.81 | 7/8   | 22.22 | 22.86 | 58.67 | 31.75 | 68.83          | 41.91                       | 19.44                      | 12.70 |
| CBMC12 - 12N | 3/4       | 19.05 | 3/4         | 15.74     | 1-3/16            | 30.16 | 1-3/16         | 30.16 | 1-1/8 | 28.57 | 24.38 | 66.04 | 37.33 | 76.20          | 47.49                       | 25.76                      | 16.76 |
| CBMC16 - 16N | 1         | 25.4  | 1           | 22.35     | 1-5/8             | 41.27 | 1-5/8          | 41.27 | 1-1/2 | 38.10 | 31.24 | 81.02 | 45.21 | 93.21          | 57.40                       | 33.73                      | 19.05 |

### Male Elbow CLMA



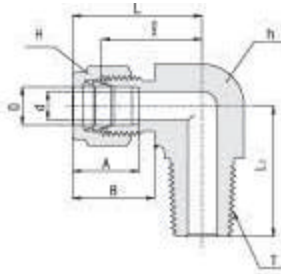
#### Fractional tube Female NPT Thread

| Part No.      | Tube O.D.<br>D |       | T*<br>(NPT) | d<br>Min. | Width across flat |       |       |       | A     | B     |       | L      | L <sub>1</sub> |
|---------------|----------------|-------|-------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|--------|----------------|
|               | in             | mm    |             |           | h                 |       | H     |       |       |       |       |        |                |
|               |                |       |             |           | in                | mm    | in    | mm    |       |       |       |        |                |
| CLMA 1 - 1N   | 1/16           | 1.58  | 1/16        | 1.27      | 7/16              | 11.11 | 5/16  | 7.93  | 8.63  | 10.92 | 15.24 | 19.05  | 17.78          |
| CLMA 1 - 2N   | 1/16           | 1.58  | 1/8         | 1.27      | 7/16              | 11.11 | 5/16  | 7.93  | 8.63  | 10.92 | 15.24 | 19.05  | 17.78          |
| CLMA 2 - 2N   | 1/8            | 3.17  | 1/8         | 2.28      | 1/2               | 12.70 | 7/16  | 11.11 | 12.70 | 15.24 | 18.30 | 24.91  | 18.90          |
| CLMA 2 - 4N   | 1/8            | 3.17  | 1/4         | 2.28      | 1/2               | 12.70 | 7/16  | 11.11 | 12.70 | 15.24 | 18.30 | 24.91  | 23.36          |
| CLMA 3 - 2N   | 3/16           | 4.76  | 1/8         | 3.04      | 1/2               | 12.70 | 1/2   | 12.70 | 13.71 | 16.00 | 18.79 | 25.40  | 18.79          |
| CLMA 3 - 4N   | 3/16           | 4.76  | 1/4         | 3.04      | 1/2               | 12.70 | 1/2   | 12.70 | 13.71 | 16.00 | 18.79 | 25.40  | 23.36          |
| CLMA 4 - 1N   | 1/4            | 6.35  | 1/16        | 3.04      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 19.55 | 26.90  | 18.79          |
| CLMA 4 - 2N   | 1/4            | 6.35  | 1/8         | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 19.10 | 26.47  | 19.10          |
| CLMA 4 - 4N   | 1/4            | 6.35  | 1/4         | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 19.81 | 27.18  | 23.87          |
| CLMA 4 - 6N   | 1/4            | 6.35  | 3/8         | 4.82      | 11/16             | 17.46 | 9/16  | 14.28 | 15.24 | 17.78 | 22.35 | 29.71  | 28.40          |
| CLMA 4 - 8N   | 1/4            | 6.35  | 1/2         | 4.82      | 13/16             | 20.63 | 9/16  | 14.28 | 15.24 | 17.78 | 24.60 | 31.97  | 35.10          |
| CLMA 5 - 2N   | 5/16           | 7.93  | 1/8         | 4.82      | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 18.54 | 21.33 | 28.70  | 19.81          |
| CLMA 5 - 4N   | 5/16           | 7.93  | 1/4         | 6.35      | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 18.54 | 22.40 | 29.77  | 24.50          |
| CLMA 5 - 6N   | 5/16           | 7.93  | 3/8         | 6.35      | 11/16             | 17.46 | 5/8   | 15.87 | 16.25 | 18.54 | 23.11 | 30.48  | 28.40          |
| CLMA 6 - 2N   | 3/8            | 9.52  | 1/8         | 4.82      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 23.11 | 30.48  | 20.60          |
| CLMA 6 - 4N   | 3/8            | 9.52  | 1/4         | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 23.11 | 30.48  | 25.40          |
| CLMA 6 - 6N   | 3/8            | 9.52  | 3/8         | 7.11      | 11/16             | 17.46 | 11/16 | 17.46 | 16.76 | 19.30 | 23.87 | 31.24  | 28.44          |
| CLMA 6 - 8N   | 3/8            | 9.52  | 1/2         | 7.11      | 13/16             | 20.63 | 11/16 | 17.46 | 16.76 | 19.30 | 23.80 | 31.42  | 33.02          |
| CLMA 6 - 12N  | 3/8            | 9.52  | 3/4         | 7.11      | 1-1/16            | 26.98 | 11/16 | 17.46 | 16.76 | 19.30 | 29.71 | 37.08  | 36.83          |
| CLMA 8 - 4N   | 1/2            | 12.70 | 1/4         | 7.11      | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 36.06  | 28.30          |
| CLMA 8 - 6N   | 1/2            | 12.70 | 3/8         | 9.65      | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 36.06  | 28.30          |
| CLMA 8 - 8N   | 1/2            | 12.70 | 1/2         | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 36.06  | 33.02          |
| CLMA 8 - 12N  | 1/2            | 12.70 | 3/4         | 10.41     | 1-1/16            | 26.98 | 7/8   | 22.22 | 22.86 | 21.84 | 29.71 | 39.87  | 36.83          |
| CLMA 10 - 6N  | 5/8            | 15.87 | 3/8         | 9.65      | 15/16             | 23.80 | 1     | 25.40 | 24.38 | 21.84 | 26.90 | 37.06  | 29.40          |
| CLMA 10 - 8N  | 5/8            | 15.87 | 1/2         | 11.93     | 15/16             | 23.80 | 1     | 25.40 | 24.38 | 21.84 | 26.90 | 37.06  | 34.00          |
| CLMA 10 - 12N | 5/8            | 15.87 | 3/4         | 12.70     | 1-1/16            | 26.98 | 1     | 25.40 | 24.38 | 21.84 | 29.71 | 39.87  | 36.83          |
| CLMA 12 - 8N  | 3/4            | 19.05 | 1/2         | 11.93     | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 29.71 | 39.87  | 37.00          |
| CLMA 12 - 12N | 3/4            | 19.05 | 3/4         | 15.74     | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 29.71 | 39.87  | 36.83          |
| CLMA 14 - 12N | 7/8            | 22.22 | 3/4         | 15.74     | 1-3/8             | 34.92 | 1-1/4 | 31.75 | 25.90 | 21.84 | 34.54 | 44.70  | 41.65          |
| CLMA 16 - 12N | 1              | 25.40 | 3/4         | 15.74     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 36.83 | 49.02  | 42.20          |
| CLMA 16 - 16N | 1              | 25.40 | 1           | 22.35     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 36.83 | 49.02  | 46.70          |
| CLMA 20 - 20N | 1-1/4          | 31.75 | 1-1/4       | 27.68     | 1-11/16           | 42.86 | 1-7/8 | 47.62 | 41.14 | 38.86 | 44.50 | 66.54  | 47.75          |
| CLMA 24 - 24N | 1-1/2          | 38.10 | 1-1/2       | 34.03     | 2                 | 50.80 | 2-1/4 | 57.15 | 50.03 | 45.21 | 50.80 | 77.97  | 60.45          |
| CLMA 32 - 32N | 2              | 50.80 | 2           | 45.97     | 2-3/4             | 69.85 | 3     | 76.20 | 67.56 | 62.73 | 69.80 | 107.18 | 70.61          |

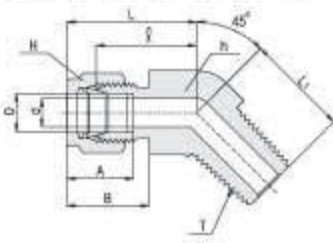
\*ISO Tapered Threads are available upon request.

## Tube Fittings

### Male Elbow CLMA



### 45o Male Elbow CRTM



### Metric Tube To Female ISO Tapered Thread

| Part No.       | Tube<br>O.D.<br>D | T<br>R(PT) | d<br>Min. | Width across<br>flat |    | A    | B    |      | L    | L <sub>1</sub> |
|----------------|-------------------|------------|-----------|----------------------|----|------|------|------|------|----------------|
|                |                   |            |           | h                    | H  |      |      |      |      |                |
| CLMA 3M - 2R   | 3                 | 1/8        | 2.4       | 12.7                 | 12 | 12.9 | 15.3 | 17.0 | 23.6 | 17.8           |
| CLMA 3M - 4R   | 3                 | 1/4        | 2.4       | 12.7                 | 12 | 12.9 | 15.3 | 18.0 | 24.6 | 23.4           |
| CLMA 4M - 2R   | 4                 | 1/8        | 2.4       | 12.7                 | 12 | 13.7 | 16.1 | 18.8 | 25.4 | 18.8           |
| CLMA 4M - 4R   | 4                 | 1/4        | 2.4       | 12.7                 | 12 | 13.7 | 16.1 | 18.8 | 25.4 | 23.4           |
| CLMA 6M - 2R   | 6                 | 1/8        | 4.8       | 12.7                 | 14 | 15.3 | 17.7 | 19.6 | 27.0 | 18.8           |
| CLMA 6M - 4R   | 6                 | 1/4        | 4.8       | 12.7                 | 14 | 15.3 | 17.7 | 19.6 | 27.0 | 23.4           |
| CLMA 6M - 6R   | 6                 | 3/8        | 4.8       | 17.5                 | 14 | 15.3 | 17.7 | 22.4 | 29.8 | 26.2           |
| CLMA 6M - 8R   | 6                 | 1/2        | 4.8       | 20.6                 | 14 | 15.3 | 17.7 | 24.4 | 31.8 | 33.0           |
| CLMA 8M - 2R   | 8                 | 1/8        | 4.8       | 14.3                 | 16 | 16.2 | 18.6 | 21.3 | 28.8 | 19.8           |
| CLMA 8M - 4R   | 8                 | 1/4        | 6.4       | 14.3                 | 16 | 16.2 | 18.6 | 21.3 | 28.8 | 24.4           |
| CLMA 8M - 6R   | 8                 | 3/8        | 6.4       | 17.5                 | 16 | 16.2 | 18.6 | 23.9 | 31.4 | 28.5           |
| CLMA 8M - 8R   | 8                 | 1/2        | 6.4       | 20.6                 | 16 | 16.2 | 18.6 | 25.1 | 32.6 | 33.0           |
| CLMA 10M - 2R  | 10                | 1/8        | 4.8       | 17.5                 | 19 | 17.2 | 19.5 | 23.9 | 31.5 | 23.6           |
| CLMA 10M - 4R  | 10                | 1/4        | 7.1       | 17.5                 | 19 | 17.2 | 19.5 | 23.9 | 31.5 | 28.2           |
| CLMA 10M - 6R  | 10                | 3/8        | 7.9       | 17.5                 | 19 | 17.2 | 19.5 | 23.9 | 31.5 | 28.2           |
| CLMA 10M - 8R  | 10                | 1/2        | 7.9       | 20.6                 | 19 | 17.2 | 19.5 | 25.9 | 33.5 | 33.0           |
| CLMA 12M - 2R  | 12                | 1/8        | 4.8       | 20.6                 | 22 | 22.8 | 22.0 | 25.9 | 36.0 | 23.6           |
| CLMA 12M - 4R  | 12                | 1/4        | 7.1       | 20.6                 | 22 | 22.8 | 22.0 | 25.9 | 36.0 | 28.2           |
| CLMA 12M - 6R  | 12                | 3/8        | 9.5       | 20.6                 | 22 | 22.8 | 22.0 | 25.9 | 36.0 | 28.2           |
| CLMA 12M - 8R  | 12                | 1/2        | 9.5       | 20.6                 | 22 | 22.8 | 22.0 | 25.9 | 36.0 | 33.0           |
| CLMA 12M - 12R | 12                | 3/4        | 9.5       | 27.0                 | 22 | 22.8 | 22.0 | 29.7 | 39.8 | 36.8           |
| CLMA 16M - 6R  | 16                | 3/8        | 9.5       | 25.4                 | 25 | 24.4 | 22.0 | 27.9 | 38.0 | 30.2           |
| CLMA 16M - 8R  | 16                | 1/2        | 11.9      | 25.4                 | 25 | 24.4 | 22.0 | 27.9 | 38.0 | 35.1           |
| CLMA 16M - 12R | 16                | 3/4        | 12.7      | 27.0                 | 25 | 24.4 | 22.0 | 29.7 | 39.8 | 36.8           |
| CLMA 18M - 8R  | 18                | 1/2        | 11.9      | 27.0                 | 30 | 24.4 | 22.0 | 29.7 | 39.8 | 36.8           |
| CLMA 18M - 12R | 18                | 3/4        | 15.1      | 27.0                 | 30 | 24.4 | 22.0 | 29.7 | 44.6 | 36.8           |
| CLMA 20M - 8R  | 20                | 1/2        | 11.9      | 34.9                 | 32 | 26.0 | 22.0 | 34.5 | 44.6 | 41.7           |
| CLMA 20M - 12R | 20                | 3/4        | 15.9      | 34.9                 | 32 | 26.0 | 22.0 | 34.5 | 44.6 | 41.7           |
| CLMA 22M - 12R | 22                | 3/4        | 15.9      | 34.9                 | 32 | 26.0 | 22.0 | 34.5 | 44.6 | 41.7           |
| CLMA 22M - 16R | 22                | 1          | 18.3      | 34.9                 | 32 | 26.0 | 22.0 | 34.5 | 44.6 | 46.5           |
| CLMA 25M - 12R | 25                | 3/4        | 15.9      | 34.9                 | 38 | 31.3 | 26.5 | 36.8 | 49.1 | 41.7           |
| CLMA 25M - 16R | 25                | 1          | 21.8      | 34.9                 | 38 | 31.3 | 26.5 | 36.8 | 49.1 | 46.5           |

\*NPT Threads are available upon request

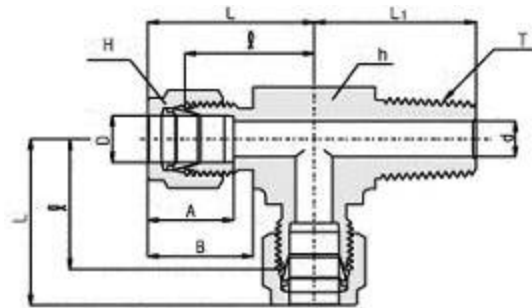
### Fractional Tube To Female NPT Thread

| Part No.      | Tube O.D.<br>D |       | T*<br>(NPT) | d<br>Min. | Width across flat |       |       |       | A     | B     |       | L     | L <sub>1</sub> |
|---------------|----------------|-------|-------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|----------------|
|               | in             | mm    |             |           | h                 |       | H     |       |       |       |       |       |                |
|               |                |       |             |           | in                | mm    | in    | mm    |       |       |       |       |                |
| CLMB 4 - 2N   | 1/4            | 6.35  | 1/8         | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 17.27 | 24.63 | 16.51          |
| CLMB 4 - 4N   | 1/4            | 6.35  | 1/4         | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 17.27 | 24.63 | 21.08          |
| CLMB 6 - 2N   | 3/8            | 9.52  | 1/8         | 4.82      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 20.57 | 27.94 | 18.28          |
| CLMB 6 - 4N   | 3/8            | 9.52  | 1/4         | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 20.57 | 27.94 | 22.86          |
| CLMB 6 - 6N   | 3/8            | 9.52  | 3/8         | 7.11      | 13/16             | 20.63 | 11/16 | 17.46 | 16.76 | 19.30 | 21.84 | 29.21 | 24.13          |
| CLMB 8 - 6N   | 1/2            | 12.70 | 3/8         | 9.65      | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 21.84 | 32.00 | 24.13          |
| CLMB 8 - 8N   | 1/2            | 12.70 | 1/2         | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 21.84 | 32.00 | 28.95          |
| CLMB 12 - 12N | 3/4            | 19.05 | 3/4         | 15.74     | 1-1/8             | 28.57 | 1-1/8 | 28.57 | 24.38 | 21.84 | 23.87 | 34.03 | 30.98          |
| CLMB 16 - 16N | 1              | 25.4  | 1           | 22.35     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 28.19 | 40.38 | 37.84          |

\*ISO Tapered Threads are available upon request.

## Tube Fittings

### Male Run Tee CRTM



#### Fractional Tube To Female NPT Thread

| Part No.      | Tube O.D.<br>D |       | T*<br>(NPT) | d<br>Min. | Width across flat |       |       |       | A     | B     |       | L     | L <sub>1</sub> |
|---------------|----------------|-------|-------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|----------------|
|               | in             | mm    |             |           | h                 |       | H     |       |       |       |       |       |                |
|               |                |       |             |           | in                | mm    | in    | mm    |       |       |       |       |                |
| CRTM 2 - 2N   | 1/8            | 3.17  | 1/8         | 2.28      | 1/2               | 12.70 | 7/16  | 11.11 | 12.70 | 15.24 | 18.30 | 24.91 | 18.90          |
| CRTM 2 - 4N   | 1/8            | 3.17  | 1/4         | 2.28      | 1/2               | 12.70 | 7/16  | 11.11 | 12.70 | 15.24 | 18.03 | 24.91 | 23.36          |
| CRTM 3 - 2N   | 3/16           | 4.76  | 1/8         | 3.04      | 1/2               | 12.70 | 1/2   | 12.70 | 13.71 | 16.00 | 17.78 | 24.38 | 17.78          |
| CRTM 4 - 2N   | 1/4            | 6.35  | 1/8         | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 19.55 | 26.92 | 18.79          |
| CRTM 4 - 4N   | 1/4            | 6.35  | 1/4         | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 19.71 | 27.08 | 23.87          |
| CRTM 5 - 2N   | 5/16           | 7.93  | 1/8         | 4.82      | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 18.54 | 22.35 | 29.71 | 20.82          |
| CRTM 6 - 4N   | 3/8            | 9.52  | 1/4         | 7.11      | 5/8               | 15.87 | 1/16  | 17.46 | 16.76 | 19.30 | 23.11 | 30.48 | 25.40          |
| CRTM 6 - 6N   | 3/8            | 9.52  | 3/8         | 7.11      | 11/16             | 17.46 | 11/16 | 17.46 | 16.76 | 19.30 | 23.87 | 31.24 | 26.20          |
| CRTM 8 - 6N   | 1/2            | 12.70 | 3/8         | 9.65      | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 36.06 | 28.19          |
| CRTM 8 - 8N   | 1/2            | 12.70 | 1/2         | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 36.06 | 33.02          |
| CRTM 10 - 8N  | 5/8            | 15.87 | 1/2         | 11.93     | 15/16             | 23.80 | 1     | 25.40 | 24.38 | 21.84 | 27.94 | 38.10 | 35.05          |
| CRTM 12 - 12N | 3/4            | 19.05 | 3/4         | 15.74     | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 28.19 | 38.35 | 35.30          |

\*ISO Tapered Threads are available upon request.

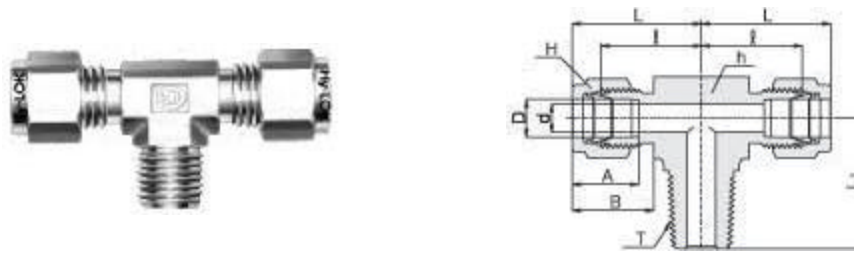
#### Metric Tube To Female ISO Tapered Thread

| Part No.       | Tube<br>O.D.<br>D | T<br>R(PT) | d<br>Min. | Width across flat |    | A    | B    |      | L    | L <sub>1</sub> |
|----------------|-------------------|------------|-----------|-------------------|----|------|------|------|------|----------------|
|                |                   |            |           | h                 | H  |      |      |      |      |                |
| CRTM 3M - 2R   | 3                 | 1/8        | 2.4       | 12.7              | 12 | 12.9 | 15.3 | 17.0 | 23.6 | 17.8           |
| CRTM 3M - 4R   | 3                 | 1/4        | 2.4       | 12.7              | 12 | 12.9 | 15.3 | 18.0 | 24.6 | 23.4           |
| CRTM 4M - 2R   | 4                 | 1/8        | 2.4       | 12.7              | 12 | 13.7 | 16.1 | 18.8 | 25.4 | 18.8           |
| CRTM 6M - 2R   | 6                 | 1/8        | 4.8       | 12.7              | 14 | 15.3 | 17.7 | 19.6 | 27.0 | 18.8           |
| CRTM 6M - 4R   | 6                 | 1/4        | 4.8       | 14.2              | 14 | 15.3 | 17.7 | 19.6 | 27.0 | 23.4           |
| CRTM 8M - 2R   | 8                 | 1/8        | 4.8       | 14.3              | 16 | 16.2 | 18.6 | 21.3 | 28.8 | 19.8           |
| CRTM 8M - 4R   | 8                 | 1/4        | 6.4       | 14.3              | 16 | 16.2 | 18.6 | 21.3 | 28.8 | 24.4           |
| CRTM 10M - 4R  | 10                | 1/4        | 7.1       | 17.5              | 19 | 17.2 | 19.5 | 23.9 | 31.5 | 28.2           |
| CRTM 10M - 6R  | 10                | 3/8        | 7.9       | 17.5              | 19 | 17.2 | 19.5 | 23.9 | 31.5 | 28.2           |
| CRTM 12M - 4R  | 12                | 1/4        | 7.1       | 20.6              | 22 | 22.8 | 22.0 | 25.9 | 36.0 | 28.2           |
| CRTM 12M - 6R  | 12                | 3/8        | 9.5       | 20.6              | 22 | 22.8 | 22.0 | 25.9 | 36.0 | 28.2           |
| CRTM 12M - 8R  | 12                | 1/2        | 9.5       | 20.6              | 22 | 22.8 | 22.0 | 25.9 | 36.0 | 33.0           |
| CRTM 16M - 6R  | 16                | 3/8        | 9.5       | 25.4              | 25 | 24.4 | 22.0 | 27.9 | 38.0 | 30.2           |
| CRTM 16M - 8R  | 16                | 1/2        | 11.9      | 25.4              | 25 | 24.4 | 22.0 | 27.9 | 38.0 | 35.1           |
| CRTM 20M - 12R | 20                | 3/4        | 15.9      | 34.9              | 32 | 26.0 | 22.0 | 34.5 | 44.6 | 41.7           |

\*NPT Threads are available upon request.

## Tube Fittings

### Male Branch Tee CBTM



#### Fractional Tube To Female NPT Thread

| Part No.      | Tube O.D.<br>D |       | T*<br>(NPT) | d<br>Min. | Width across flat |       |       |       | A     | B     |       | L     | L <sub>1</sub> |
|---------------|----------------|-------|-------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|----------------|
|               |                |       |             |           | h                 |       | H     |       |       |       |       |       |                |
|               | in             | mm    |             |           | in                | mm    | in    | mm    |       |       |       |       |                |
| CRTM 2 - 2N   | 1/8            | 3.17  | 1/8         | 2.28      | 1/2               | 12.70 | 7/16  | 11.11 | 12.70 | 15.24 | 18.30 | 24.91 | 18.90          |
| CRTM 2 - 4N   | 1/8            | 3.17  | 1/4         | 2.28      | 1/2               | 12.70 | 7/16  | 11.11 | 12.70 | 15.24 | 18.30 | 24.91 | 23.36          |
| CRTM 3 - 2N   | 3/16           | 4.76  | 1/8         | 3.04      | 1/2               | 12.70 | 1/2   | 12.70 | 13.71 | 16.00 | 17.78 | 24.38 | 17.78          |
| CRTM 4 - 2N   | 1/4            | 6.35  | 1/8         | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 19.55 | 26.92 | 18.79          |
| CRTM 4 - 4N   | 1/4            | 6.35  | 1/4         | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 19.71 | 27.08 | 23.87          |
| CRTM 5 - 2N   | 5/16           | 7.93  | 1/8         | 4.82      | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 18.54 | 22.35 | 29.71 | 20.82          |
| CRTM 6 - 4N   | 3/8            | 9.52  | 1/4         | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 23.11 | 30.48 | 25.40          |
| CRTM 6 - 6N   | 3/8            | 9.52  | 3/8         | 7.11      | 11/16             | 17.46 | 11/16 | 17.46 | 16.76 | 19.30 | 23.87 | 31.24 | 26.20          |
| CRTM 8 - 6N   | 1/2            | 12.70 | 3/8         | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 36.06 | 28.19          |
| CRTM 8 - 8N   | 1/2            | 12.70 | 1/2         | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 36.06 | 33.02          |
| CRTM 10 - 8N  | 5/8            | 15.87 | 1/2         | 11.93     | 15/16             | 23.80 | 1     | 25.40 | 24.38 | 21.84 | 27.94 | 38.10 | 35.05          |
| CRTM 12 - 12N | 3/4            | 19.05 | 3/4         | 15.74     | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 28.19 | 38.35 | 35.30          |

\*ISO Tapered Threads are available upon request.

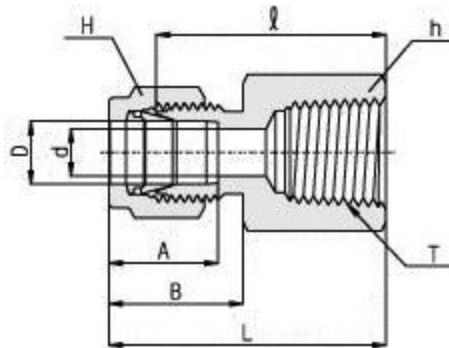
#### Metric Tube To Female ISO Tapered Thread

| Part No.       | Tube<br>O.D.<br>D | T<br>R(PT) | d<br>Min. | Width across flat |    | A    | B    |      | L    | L <sub>1</sub> |
|----------------|-------------------|------------|-----------|-------------------|----|------|------|------|------|----------------|
|                |                   |            |           | h                 | H  |      |      |      |      |                |
| CRTM 3M - 2R   | 3                 | 1/8        | 2.4       | 12.7              | 12 | 12.9 | 15.3 | 17.0 | 23.6 | 17.8           |
| CRTM 3M - 4R   | 3                 | 1/4        | 2.4       | 12.7              | 12 | 12.9 | 15.3 | 18.0 | 24.6 | 23.4           |
| CRTM 4M - 2R   | 4                 | 1/8        | 2.4       | 12.7              | 12 | 13.7 | 16.1 | 18.8 | 25.4 | 18.8           |
| CRTM 6M - 2R   | 6                 | 1/8        | 4.8       | 12.7              | 14 | 15.3 | 17.7 | 19.6 | 27.0 | 18.8           |
| CRTM 6M - 4R   | 6                 | 1/4        | 4.8       | 14.2              | 14 | 15.3 | 17.7 | 19.6 | 27.0 | 23.4           |
| CRTM 8M - 2R   | 8                 | 1/8        | 4.8       | 14.3              | 16 | 16.2 | 18.6 | 21.3 | 28.8 | 19.8           |
| CRTM 8M - 4R   | 8                 | 1/4        | 6.4       | 14.3              | 16 | 16.2 | 18.6 | 21.3 | 28.8 | 24.4           |
| CRTM 10M - 4R  | 10                | 1/4        | 7.1       | 17.5              | 19 | 17.2 | 19.5 | 23.9 | 31.5 | 28.2           |
| CRTM 10M - 6R  | 10                | 3/8        | 7.9       | 17.5              | 19 | 17.2 | 19.5 | 23.9 | 31.5 | 28.2           |
| CRTM 12M - 4R  | 12                | 1/4        | 7.1       | 20.6              | 22 | 22.8 | 22.0 | 25.9 | 36.0 | 28.2           |
| CRTM 12M - 6R  | 12                | 3/8        | 9.5       | 20.6              | 22 | 22.8 | 22.0 | 25.9 | 36.0 | 28.2           |
| CRTM 12M - 8R  | 12                | 1/2        | 9.5       | 20.6              | 22 | 22.8 | 22.0 | 25.9 | 36.0 | 33.0           |
| CRTM 16M - 6R  | 16                | 3/8        | 9.5       | 25.4              | 25 | 24.4 | 22.0 | 27.9 | 38.0 | 30.2           |
| CRTM 16M - 8R  | 16                | 1/2        | 11.9      | 25.4              | 25 | 24.4 | 22.0 | 27.9 | 38.0 | 35.1           |
| CRTM 20M - 12R | 20                | 3/4        | 15.9      | 34.9              | 32 | 26.0 | 22.0 | 34.5 | 44.6 | 41.7           |

\*NPT Threads are available upon request.

## Tube Fittings

### Female Connector CFC



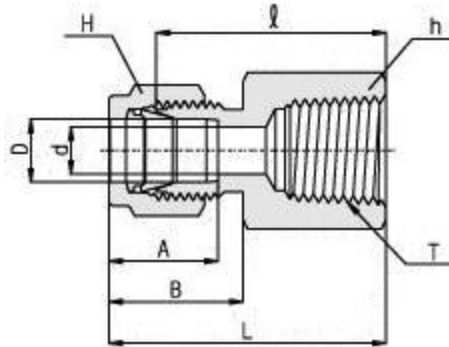
### Fractional Tube To Male NPT Thread

| Part No.     | Tube O.D. |       | T*<br>(NPT) | d<br>Min. | Width across flat |       |       |       | A     | B     |       | L      |
|--------------|-----------|-------|-------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|--------|
|              | D         |       |             |           | h                 |       | H     |       |       |       |       |        |
|              | in        | mm    |             |           | in                | mm    | in    | mm    |       |       |       |        |
| CFC 1 - 1N   | 1/16      | 1.58  | 1/16        | 1.27      | 7/16              | 11.11 | 5/16  | 7.93  | 8.63  | 10.92 | 19.81 | 23.62  |
| CFC 1 - 2N   | 1/16      | 1.58  | 1/8         | 1.27      | 9/16              | 14.28 | 5/16  | 7.93  | 8.63  | 10.92 | 20.57 | 24.38  |
| CFC 2 - 2N   | 1/8       | 3.17  | 1/8         | 2.28      | 9/16              | 14.28 | 7/16  | 11.11 | 12.70 | 15.24 | 22.09 | 28.70  |
| CFC 2 - 4N   | 1/8       | 3.17  | 1/4         | 2.28      | 3/4               | 19.05 | 7/16  | 11.11 | 12.70 | 15.24 | 26.92 | 33.52  |
| CFC 3 - 2N   | 3/16      | 4.76  | 1/8         | 3.04      | 9/16              | 14.28 | 1/2   | 12.70 | 13.71 | 16.00 | 23.11 | 29.71  |
| CFC 4 - 2N   | 1/4       | 6.35  | 1/8         | 4.82      | 9/16              | 14.28 | 9/16  | 14.28 | 15.24 | 17.78 | 23.87 | 31.24  |
| CFC 4 - 4N   | 1/4       | 6.35  | 1/4         | 4.82      | 3/4               | 19.05 | 9/16  | 14.28 | 15.24 | 17.78 | 28.44 | 35.81  |
| CFC 4 - 6N   | 1/4       | 6.35  | 3/8         | 4.82      | 7/8               | 22.22 | 9/16  | 14.28 | 15.24 | 17.78 | 30.22 | 37.59  |
| CFC 4 - 8N   | 1/4       | 6.35  | 1/2         | 4.82      | 1-1/16            | 26.98 | 9/16  | 14.28 | 15.24 | 17.78 | 35.05 | 42.41  |
| CFC 5 - 2N   | 5/16      | 7.93  | 1/8         | 6.35      | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 18.54 | 24.63 | 32.00  |
| CFC 5 - 4N   | 5/16      | 7.93  | 1/4         | 6.35      | 3/4               | 19.05 | 5/8   | 15.87 | 16.25 | 18.54 | 29.46 | 36.83  |
| CFC 6 - 2N   | 3/8       | 9.52  | 1/8         | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 25.40 | 32.76  |
| CFC 6 - 4N   | 3/8       | 9.52  | 1/4         | 7.11      | 3/4               | 19.05 | 11/16 | 17.46 | 16.76 | 19.30 | 30.22 | 37.59  |
| CFC 6 - 6N   | 3/8       | 9.52  | 3/8         | 7.11      | 7/8               | 22.22 | 11/16 | 17.46 | 16.76 | 19.30 | 31.75 | 39.11  |
| CFC 6 - 8N   | 3/8       | 9.52  | 1/2         | 7.11      | 1-1/16            | 26.98 | 11/16 | 17.46 | 16.76 | 19.30 | 36.57 | 43.94  |
| CFC 6 - 12N  | 3/8       | 9.52  | 3/4         | 7.11      | 1-5/16            | 33.33 | 11/16 | 17.46 | 16.76 | 19.30 | 40.38 | 47.75  |
| CFC 8 - 4N   | 1/2       | 12.70 | 1/4         | 10.41     | 1-3/16            | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 30.22 | 40.38  |
| CFC 8 - 6N   | 1/2       | 12.70 | 3/8         | 10.41     | 7/8               | 22.22 | 7/8   | 22.22 | 22.86 | 21.84 | 31.75 | 41.914 |
| CFC 8 - 8N   | 1/2       | 12.70 | 1/2         | 10.41     | 1-1/16            | 26.98 | 7/8   | 22.22 | 22.86 | 21.84 | 36.57 | 46.73  |
| CFC 8 - 12N  | 1/2       | 12.70 | 3/4         | 10.41     | 1-5/16            | 33.33 | 7/8   | 22.22 | 22.86 | 21.84 | 38.10 | 48.26  |
| CFC 10 - 6N  | 5/8       | 15.87 | 3/8         | 12.70     | 15/16             | 23.80 | 1     | 25.40 | 24.38 | 21.84 | 31.75 | 41.91  |
| CFC 10 - 8N  | 5/8       | 15.87 | 1/2         | 12.70     | 1-1/16            | 26.98 | 1     | 25.40 | 24.38 | 21.84 | 36.57 | 46.73  |
| CFC 10 - 12N | 5/8       | 15.87 | 3/4         | 12.70     | 1-5/16            | 33.33 | 1     | 25.40 | 24.38 | 21.84 | 38.10 | 48.26  |
| CFC 12 - 8N  | 3/4       | 19.05 | 1/2         | 15.74     | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 36.57 | 46.73  |
| CFC 12 - 12N | 3/4       | 19.05 | 3/4         | 15.74     | 1-5/16            | 33.33 | 1-1/8 | 28.57 | 24.38 | 21.84 | 38.10 | 48.26  |
| CFC 14 - 12N | 7/8       | 22.22 | 3/4         | 18.28     | 1-5/16            | 33.33 | 1-1/4 | 31.75 | 25.90 | 21.84 | 39.62 | 49.78  |
| CFC 16 - 12N | 1         | 25.40 | 3/4         | 22.35     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 41.14 | 53.34  |
| CFC 16 - 16N | 1         | 25.40 | 1           | 22.35     | 1-5/8             | 41.27 | 1-1/2 | 38.10 | 31.24 | 26.41 | 50.03 | 62.23  |
| CFC 20 - 20N | 1-1/4     | 31.75 | 1-1/4       | 27.68     | 2-1/8             | 53.97 | 1-7/8 | 47.62 | 41.14 | 38.86 | 52.57 | 74.67  |
| CFC 24 - 24N | 1-1/2     | 38.10 | 1-1/2       | 34.03     | 2-3/8             | 60.32 | 2-1/4 | 57.15 | 50.03 | 45.21 | 56.13 | 83.31  |
| CFC 32 - 32N | 2         | 50.80 | 2           | 45.97     | 2-7/8             | 70.03 | 3     | 76.20 | 67.56 | 62.73 | 64.26 | 101.60 |

\*ISO Tapered Threads are available upon request.

## Tube Fittings

### Female Connector CFC



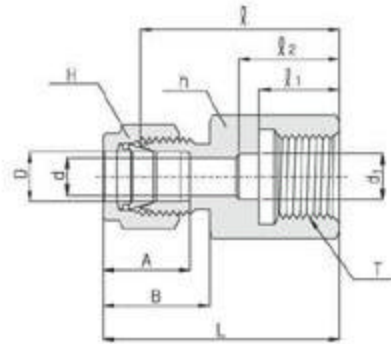
### Metric Tube To Female ISO Tapered Thread

| Part No.   | Tube<br>O.D.<br>D | T*<br>R(PT) | d<br>Min. | Width across flat |    | A    | B    | Z    | L    |
|------------|-------------------|-------------|-----------|-------------------|----|------|------|------|------|
|            |                   |             |           | h                 | H  |      |      |      |      |
| CFC3M-2R   | 3                 | 1/8         | 2.4       | 14                | 12 | 12.9 | 15.3 | 22.1 | 28.7 |
| CFC3M-4R   | 3                 | 1/4         | 2.4       | 19                | 12 | 12.9 | 15.3 | 26.9 | 33.5 |
| CFC4M-2R   | 4                 | 1/8         | 2.4       | 14                | 12 | 13.7 | 16.1 | 23.1 | 29.7 |
| CFC6M-2R   | 6                 | 1/8         | 4.8       | 14                | 14 | 15.3 | 17.7 | 23.9 | 31.3 |
| CFC6M-4R   | 6                 | 1/4         | 4.8       | 19                | 14 | 15.3 | 17.7 | 28.4 | 35.8 |
| CFC6M-6R   | 6                 | 3/8         | 4.8       | 22                | 14 | 15.3 | 17.7 | 29.5 | 36.9 |
| CFC6M-8R   | 6                 | 1/2         | 4.8       | 27                | 14 | 15.3 | 17.7 | 35.1 | 42.5 |
| CFC8M-2R   | 8                 | 1/8         | 6.4       | 15                | 16 | 16.2 | 18.6 | 24.6 | 32.1 |
| CFC8M-4R   | 8                 | 1/4         | 6.4       | 19                | 16 | 16.2 | 18.6 | 29.5 | 37.0 |
| CFC8M-6R   | 8                 | 3/8         | 6.4       | 22                | 16 | 16.2 | 18.6 | 30.2 | 37.7 |
| CFC8M-8R   | 8                 | 1/2         | 6.4       | 27                | 16 | 16.2 | 18.6 | 35.8 | 43.3 |
| CFC10M-2R  | 10                | 1/8         | 7.9       | 18                | 19 | 17.2 | 19.5 | 25.4 | 33.0 |
| CFC10M-4R  | 10                | 1/4         | 7.9       | 19                | 19 | 17.2 | 19.5 | 30.2 | 37.8 |
| CFC10M-6R  | 10                | 3/8         | 7.9       | 22                | 19 | 17.2 | 19.5 | 31.0 | 38.6 |
| CFC10M-8R  | 10                | 1/2         | 7.9       | 27                | 19 | 17.2 | 19.5 | 36.6 | 44.2 |
| CFC12M-2R  | 12                | 1/8         | 8.3       | 22                | 22 | 22.8 | 22.0 | 28.4 | 38.5 |
| CFC12M-4R  | 12                | 1/4         | 9.5       | 22                | 22 | 22.8 | 22.0 | 30.2 | 40.3 |
| CFC12M-6R  | 12                | 3/8         | 9.5       | 22                | 22 | 22.8 | 22.0 | 31.0 | 41.1 |
| CFC12M-8R  | 12                | 1/2         | 9.5       | 27                | 22 | 22.8 | 22.0 | 36.6 | 46.7 |
| CFC12M-12R | 12                | 3/4         | 9.5       | 35                | 22 | 22.8 | 22.0 | 38.9 | 49.0 |
| CFC15M-8R  | 15                | 1/2         | 11.9      | 27                | 25 | 24.4 | 22.0 | 36.6 | 46.7 |
| CFC16M-8R  | 16                | 1/2         | 12.7      | 27                | 25 | 24.4 | 22.0 | 36.8 | 46.9 |
| CFC20M-8R  | 20                | 1/2         | 15.9      | 30                | 32 | 26.0 | 22.0 | 37.8 | 47.9 |
| CFC20M-12R | 20                | 3/4         | 15.9      | 35                | 32 | 26.0 | 22.0 | 39.6 | 49.7 |
| CFC22M-12R | 22                | 3/4         | 18.3      | 35                | 32 | 26.0 | 22.0 | 39.6 | 49.7 |
| CFC22M-16R | 22                | 1           | 18.3      | 41                | 32 | 26.0 | 22.0 | 47.8 | 57.9 |
| CFC25M-12R | 25                | 3/4         | 21.8      | 35                | 38 | 31.3 | 26.5 | 41.1 | 53.4 |
| CFC25M-16R | 25                | 1           | 21.8      | 41                | 38 | 31.3 | 26.5 | 50.0 | 62.3 |

\*NPT Threads are available upon request.

## Tube Fittings

### Gauge Connector CGC



#### Fractional Tube To Iso Parallel Thread (Gauge)

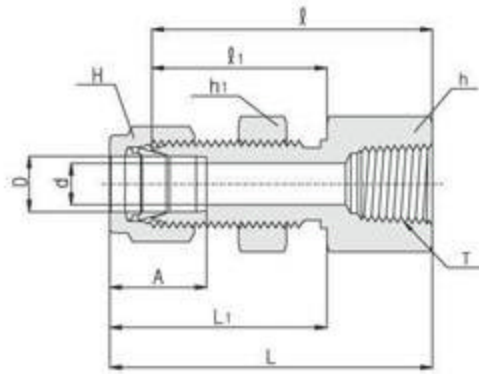
| Part No. | Tube O.D. |       | T<br>G(PF) | d<br>Min. | d <sub>1</sub> | Width across flat |       |       |       | A     | B     | ℓ     | ℓ <sub>1</sub> | ℓ <sub>2</sub> | L     |
|----------|-----------|-------|------------|-----------|----------------|-------------------|-------|-------|-------|-------|-------|-------|----------------|----------------|-------|
|          | D         |       |            |           |                | h                 |       | H     |       |       |       |       |                |                |       |
|          | in        | mm    |            |           |                | in                | mm    | in    | mm    |       |       |       |                |                |       |
| CGC4- 2G | 1/4       | 6.35  | 1/8        | 4.82      | -              | 9/16              | 14.28 | 9/16  | 14.28 | 15.24 | 17.78 | 26.3  | 12.00          | -              | 33.55 |
| CGC4- 4G | 1/4       | 6.35  | 1/4        | 4.82      | 5.58           | 3/4               | 19.05 | 9/16  | 14.28 | 15.24 | 17.78 | 30.22 | 13.00          | 17.00          | 37.59 |
| CGC4- 6G | 1/4       | 6.35  | 3/8        | 4.82      | 6.60           | 15/16             | 24.81 | 9/16  | 14.28 | 15.24 | 17.78 | 30.22 | 14.22          | 20.30          | 37.59 |
| CGC4- 8G | 1/4       | 6.35  | 1/2        | 4.82      | 6.60           | 11/16             | 26.98 | 9/16  | 14.28 | 15.24 | 17.78 | 30.07 | 18.80          | 24.90          | 43.43 |
| CGC5- 4G | 5/16      | 7.93  | 1/4        | 5.58      | -              | 3/4               | 19.05 | 5/8   | 15.87 | 16.25 | 18.54 | 30.98 | 13.00          | -              | 38.35 |
| CGC5- 8G | 5/16      | 7.93  | 1/2        | 7.11      | -              | 1-1/16            | 26.98 | 5/8   | 15.87 | 16.25 | 18.54 | 33.02 | 18.80          | -              | 40.38 |
| CGC6- 4G | 3/8       | 9.52  | 1/8        | 5.58      | -              | 3/4               | 19.05 | 11/16 | 17.46 | 16.76 | 19.30 | 31.75 | 12.95          | -              | 39.12 |
| CGC6- 6G | 3/8       | 9.52  | 3/8        | 6.60      | -              | 15/16             | 24.81 | 11/16 | 17.46 | 16.76 | 19.30 | 31.24 | 14.22          | -              | 38.61 |
| CGC6- 8G | 3/8       | 9.52  | 1/2        | 7.11      | -              | 1-1/16            | 26.98 | 11/16 | 17.46 | 16.76 | 19.30 | 34.54 | 18.80          | -              | 41.91 |
| CGC8- 4G | 1/2       | 12.70 | 1/4        | 5.5       | -              | 7/8               | 22.22 | 7/8   | 22.22 | 22.86 | 21.84 | 31.80 | 13.00          | -              | 41.95 |
| CGC8- 6G | 1/2       | 12.70 | 3/8        | 6.60      | -              | 15/16             | 23.81 | 7/8   | 22.22 | 22.86 | 21.84 | 34.29 | 14.24          | -              | 44.45 |
| CGC8- 8G | 1/2       | 12.70 | 1/2        | 7.11      | 7.11           | 1-1/16            | 26.98 | 7/8   | 22.22 | 22.86 | 21.84 | 38.10 | 18.80          | -              | 48.26 |

#### Metric Tube To Iso Parallel Thread (Gauge)

| Part No.    | Tube<br>O.D.<br>D | T<br>G (PF) | d<br>Min. | d <sub>1</sub> | Width across flat |    | A    | B    | l    | l <sub>1</sub> | l <sub>2</sub> | L    |
|-------------|-------------------|-------------|-----------|----------------|-------------------|----|------|------|------|----------------|----------------|------|
|             |                   |             |           |                | h                 | H  |      |      |      |                |                |      |
| CGC 3M - 4G | 3                 | 1/4         | 2.4       | 5.5            | 19                | 12 | 12.9 | 15.3 | 28.7 | 13             | 17             | 35.3 |
| CGC 6M - 4G | 6                 | 1/4         | 4.8       | 5.5            | 19                | 14 | 15.3 | 17.7 | 30.2 | 13             | 17             | 37.6 |
| CGC 6M - 6G | 6                 | 3/8         | 4.8       | 6.5            | 24                | 14 | 15.3 | 17.7 | 30.2 | 14             | 20             | 37.6 |
| CGC 6M - 8G | 6                 | 1/2         | 4.8       | 7.0            | 27                | 14 | 15.3 | 17.7 | 36.3 | 19             | 25             | 43.0 |
| CGC 8M - 4G | 8                 | 1/4         | 5.5       | -              | 19                | 16 | 16.2 | 18.6 | 31.0 | 13             | -              | 38.5 |
| CGC 8M - 6G | 8                 | 3/8         | 6.5       | -              | 24                | 16 | 16.2 | 18.6 | 28.7 | 14             | -              | 36.2 |
| CGC 8M - 8G | 8                 | 1/2         | 7.0       | -              | 27                | 16 | 16.2 | 18.6 | 33.0 | 19             | -              | 40.5 |
| CGC10M - 4G | 10                | 1/4         | 5.5       | -              | 19                | 19 | 17.2 | 19.5 | 31.8 | 13             | -              | 39.4 |
| CGC10M - 6G | 10                | 3/8         | 6.5       | -              | 24                | 19 | 17.2 | 19.5 | 31.2 | 14             | -              | 38.8 |
| CGC10M - 8G | 10                | 1/2         | 7.0       | -              | 27                | 19 | 17.2 | 19.5 | 34.5 | 19             | -              | 41.4 |
| CGC12M - 4G | 12                | 1/4         | 5.5       | -              | 22                | 22 | 22.8 | 22.0 | 31.8 | 13             | -              | 41.9 |
| CGC12M - 6G | 12                | 3/8         | 6.5       | -              | 24                | 22 | 22.8 | 22.0 | 34.3 | 14             | -              | 44.4 |
| CGC12M - 8G | 12                | 1/2         | 7.0       | -              | 27                | 22 | 22.8 | 22.0 | 38.1 | 19             | -              | 48.2 |
| CGC20M - 8G | 20                | 1/2         | 7.0       | -              | 30                | 32 | 26.0 | 22.0 | 44.2 | 19             | -              | 54.3 |
| CGC22M - 8G | 22                | 1/2         | 7.0       | -              | 30                | 32 | 26.0 | 22.0 | 44.2 | 19             | -              | 54.3 |

## Tube Fittings

### Bulkhead Female Connector CBFC



#### Fractional Tube To Male NPT Thread

| Part No.   | Tube O.D.<br>D |       | T*<br>(NPT) | d<br>Min. | Width across flat |       |                |       |       |       | A     | <i>Z</i> | <i>Z</i> <sub>1</sub> | L     | L <sub>2</sub> | Panel<br>Hole<br>Drill Size | Pannel<br>Max.<br>Thickness |
|------------|----------------|-------|-------------|-----------|-------------------|-------|----------------|-------|-------|-------|-------|----------|-----------------------|-------|----------------|-----------------------------|-----------------------------|
|            | in             | mm    |             |           | h                 |       | h <sub>1</sub> |       | H     |       |       |          |                       |       |                |                             |                             |
|            |                |       |             |           | in                | mm    | in             | mm    | in    | mm    |       |          |                       |       |                |                             |                             |
| CBFC2-2N   | 1/8            | 3.17  | 1/8         | 2.28      | 9/16              | 14.28 | 1/2            | 12.70 | 7/16  | 11.11 | 12.70 | 38.10    | 24.63                 | 44.70 | 31.24          | 8.33                        | 12.70                       |
| CBFC4-2N   | 1/4            | 6.35  | 1/8         | 4.82      | 5/8               | 15.87 | 5/8            | 15.87 | 9/16  | 14.28 | 15.24 | 39.62    | 26.16                 | 46.99 | 33.52          | 11.50                       | 10.16                       |
| CBFC4-4N   | 1/4            | 6.35  | 1/4         | 4.82      | 3/4               | 19.05 | 5/8            | 15.87 | 9/16  | 14.28 | 15.24 | 44.45    | 26.16                 | 51.81 | 33.52          | 11.50                       | 10.16                       |
| CBFC6-4N   | 3/8            | 9.52  | 1/4         | 7.11      | 3/4               | 19.05 | 3/4            | 19.05 | 11/16 | 17.46 | 16.76 | 47.75    | 29.46                 | 55.11 | 36.83          | 14.68                       | 11.17                       |
| CBFC8-6N   | 1/2            | 12.70 | 3/8         | 10.41     | 15/16             | 23.81 | 15/16          | 23.81 | 7/8   | 22.22 | 22.86 | 51.56    | 31.75                 | 61.72 | 41.91          | 19.44                       | 12.70                       |
| CBFC8-8N   | 1/2            | 12.70 | 1/2         | 40.41     | 1-1/16            | 26.98 | 15/16          | 23.81 | 7/8   | 22.22 | 22.86 | 56.38    | 31.75                 | 66.54 | 41.91          | 19.44                       | 12.70                       |
| CBFC12-12N | 3/4            | 19.05 | 3/4         | 15.74     | 1-1/4             | 31.75 | 1-3/16         | 30.16 | 1-1/8 | 28.57 | 24.38 | 63.60    | 38.30                 | 73.51 | 47.21          | 25.79                       | 16.76                       |

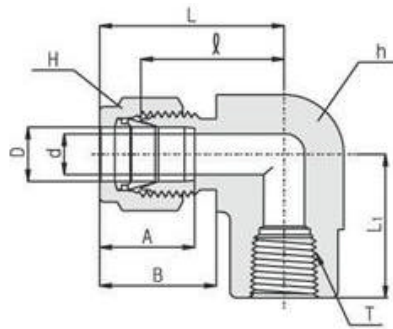
#### Metric Tube To Male NPT Thread

| Part No.   | Tube<br>O.D.<br>D | T*<br>(NPT) | d<br>Min. | Width across flat |                |    | A    | Z    | Z <sub>1</sub> | L     | L <sub>2</sub> | Panel<br>Hole<br>Drill Size | Pannel<br>Max.<br>Thickness |
|------------|-------------------|-------------|-----------|-------------------|----------------|----|------|------|----------------|-------|----------------|-----------------------------|-----------------------------|
|            |                   |             |           | h                 | h <sub>1</sub> | H  |      |      |                |       |                |                             |                             |
| CBFC6M-2N  | 6                 | 1/8         | 4.8       | 15.8              | 15.8           | 14 | 15.3 | 39.6 | 27.7           | 46.90 | 35             | 11.5                        | 10.2                        |
| CBFC6M-4N  | 6                 | 1/4         | 4.8       | 19.0              | 16.0           | 14 | 15.3 | 44.4 | 26.2           | 51.80 | 33.6           | 11.5                        | 10.2                        |
| CBFC8M-4N  | 8                 | 1/4         | 6.3       | 19.0              | 17.4           | 16 | 16.2 | 46.7 | 28.4           | 53.85 | 35.55          | 13.1                        | 11.2                        |
| CBFC12M-8N | 12                | 1/2         | 9.5       | 27.0              | 24.0           | 22 | 22.8 | 56.4 | 31.8           | 66.50 | 41.9           | 19.5                        | 12.7                        |

\*ISO Tapered Threads are available upon request.

# Tube Fittings

## Female Elbow CLF



### Fractional Tube To Male NPT Thread

| Part No.    | Tube O.D.<br>D |       | T*<br>(NPT) | d<br>Min. | Width across flat |       |       |       | A     | B     | Z     | L     | L <sub>1</sub> |
|-------------|----------------|-------|-------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|----------------|
|             | in             | mm    |             |           | h                 |       | H     |       |       |       |       |       |                |
|             |                |       |             |           | in                | mm    | in    | mm    |       |       |       |       |                |
| CLF 2 - 2N  | 1/8            | 3.17  | 1/8         | 2.28      | 1/2               | 12.70 | 7/16  | 11.11 | 12.70 | 15.24 | 18.03 | 24.63 | 19.05          |
| CLF 2 - 4N  | 1/8            | 3.17  | 1/4         | 2.28      | 11/16             | 17.46 | 7/16  | 11.11 | 12.70 | 15.24 | 20.82 | 27.43 | 22.35          |
| CLF 3 - 2N  | 3/16           | 4.76  | 1/8         | 3.04      | 1/2               | 12.70 | 1/2   | 12.70 | 13.71 | 16.00 | 18.79 | 25.40 | 19.05          |
| CLF 4 - 2N  | 1/4            | 6.35  | 1/8         | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 19.55 | 26.92 | 19.05          |
| CLF 4 - 4N  | 1/4            | 6.35  | 1/4         | 4.82      | 11/16             | 17.46 | 9/16  | 14.28 | 15.24 | 17.78 | 22.35 | 29.71 | 22.35          |
| CLF 4 - 6N  | 1/4            | 6.35  | 3/8         | 4.82      | 13/16             | 20.63 | 9/16  | 14.28 | 15.24 | 17.78 | 24.38 | 31.75 | 22.35          |
| CLF 4 - 8N  | 1/4            | 6.35  | 1/2         | 4.82      | 1                 | 25.40 | 9/16  | 14.28 | 15.24 | 17.78 | 27.17 | 34.54 | 28.44          |
| CLF 5 - 2N  | 5/16           | 7.93  | 1/8         | 6.35      | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 18.54 | 21.33 | 28.70 | 19.05          |
| CLF 5 - 4N  | 5/16           | 7.93  | 1/4         | 6.35      | 11/16             | 17.46 | 5/8   | 15.87 | 16.25 | 18.54 | 23.11 | 30.48 | 22.35          |
| CLF 6 - 2N  | 3/8            | 9.52  | 1/8         | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 23.11 | 30.48 | 19.05          |
| CLF 6 - 4N  | 3/8            | 9.52  | 1/4         | 7.11      | 11/16             | 17.46 | 11/16 | 17.46 | 16.76 | 19.30 | 23.87 | 31.24 | 22.35          |
| CLF 6 - 6N  | 3/8            | 9.52  | 3/8         | 7.11      | 13/16             | 20.63 | 11/16 | 17.46 | 16.76 | 19.30 | 25.90 | 33.27 | 22.35          |
| CLF 6 - 8N  | 3/8            | 9.52  | 1/2         | 7.11      | 1                 | 25.40 | 11/16 | 17.46 | 16.76 | 19.30 | 28.70 | 36.06 | 28.44          |
| CLF 8 - 4N  | 1/2            | 12.70 | 1/4         | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 36.06 | 22.35          |
| CLF 8 - 6N  | 1/2            | 12.70 | 3/8         | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 36.06 | 22.35          |
| CLF 8 - 8N  | 1/2            | 12.70 | 1/2         | 10.41     | 1                 | 25.40 | 7/8   | 22.22 | 22.86 | 21.84 | 28.70 | 38.86 | 28.44          |
| CLF10 - 6N  | 5/8            | 15.87 | 3/8         | 12.70     | 15/16             | 23.80 | 1     | 25.40 | 24.38 | 21.84 | 27.94 | 38.10 | 22.35          |
| CLF10 - 8N  | 5/8            | 15.87 | 1/2         | 12.70     | 1                 | 25.40 | 1     | 25.40 | 24.38 | 21.84 | 29.71 | 39.87 | 28.44          |
| CLF12 - 8N  | 3/4            | 19.05 | 1/2         | 15.74     | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 29.71 | 39.87 | 28.44          |
| CLF12 - 12N | 3/4            | 19.05 | 3/4         | 15.74     | 1-3/8             | 34.92 | 1-1/8 | 28.57 | 24.37 | 21.84 | 34.54 | 44.70 | 31.75          |
| CLF14 - 12N | 7/8            | 22.22 | 3/4         | 18.28     | 1-3/8             | 34.92 | 1-1/4 | 31.75 | 25.90 | 21.84 | 34.54 | 44.70 | 31.75          |
| CLF16 - 12N | 1              | 25.40 | 3/4         | 22.35     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 36.83 | 49.02 | 31.75          |
| CLF16 - 16N | 1              | 25.40 | 1           | 22.35     | 1-11/16           | 42.86 | 1-1/2 | 38.10 | 31.24 | 26.41 | 38.10 | 50.29 | 38.10          |

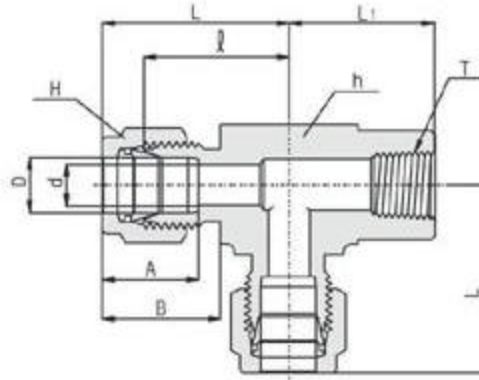
### Metric Tube To Male NPT Thread

| Part No.    | Tube<br>O.D.<br>D | T*<br>(NPT) | d<br>Min. | Width across flat |    | A    | B    | Z     | L    | L <sub>1</sub> |
|-------------|-------------------|-------------|-----------|-------------------|----|------|------|-------|------|----------------|
|             |                   |             |           | h                 | H  |      |      |       |      |                |
| CLF 6M - 2N | 6                 | 1/8         | 4.8       | 12.70             | 14 | 15.3 | 17.7 | 19.6  | 27.0 | 19.0           |
| CLF 6M - 4N | 6                 | 1/4         | 4.8       | 17.46             | 14 | 15.3 | 17.7 | 22.4  | 29.8 | 22.40          |
| CLF 6M - 6N | 6                 | 3/8         | 4.8       | 20.63             | 14 | 15.3 | 17.7 | 24.4  | 31.7 | 22.40          |
| CLF 6M - 8N | 6                 | 1/2         | 4.8       | 25.40             | 14 | 15.3 | 17.7 | 27.2  | 34.6 | 28.40          |
| CLF 8M - 4N | 8                 | 1/4         | 6.4       | 17.46             | 16 | 16.2 | 18.6 | 23.1  | 30.6 | 22.40          |
| CLF 8M - 8N | 8                 | 1/2         | 6.4       | 20.63             | 16 | 16.2 | 18.6 | 28.0  | 35.2 | 28.40          |
| CLF10M - 2N | 10                | 1/8         | 7.9       | 17.46             | 19 | 17.2 | 19.5 | 23.9  | 31.5 | 19.0           |
| CLF10M - 4N | 10                | 1/4         | 7.9       | 17.46             | 19 | 17.2 | 19.5 | 25.9  | 33.5 | 22.35          |
| CLF10M - 6N | 10                | 3/8         | 7.9       | 20.63             | 19 | 17.2 | 19.5 | 25.9  | 33.5 | 22.40          |
| CLF10M - 8N | 10                | 1/2         | 7.9       | 25.40             | 19 | 17.2 | 19.5 | 28.37 | 36.1 | 28.40          |
| CLF12M - 4N | 12                | 1/4         | 9.5       | 20.63             | 22 | 22.8 | 22.0 | 25.9  | 36.0 | 22.4           |
| CLF12M - 6N | 12                | 3/8         | 9.5       | 20.63             | 22 | 22.8 | 22.0 | 25.9  | 36.2 | 22.35          |
| CLF12M - 8N | 12                | 1/2         | 9.5       | 25.40             | 22 | 22.8 | 22.0 | 28.7  | 38.8 | 28.40          |
| CLF16M - 8N | 16                | 1/2         | 12.7      | 26.98             | 25 | 24.4 | 22.0 | 29.7  | 39.5 | 28.4           |

\*ISO Tapered Threads are available upon request.

## Tube Fittings

### Female Run Tee CRTF



### Fractional Tube To Male NPT Thread

| Part No.      | Tube O.D.<br>D |       | T*<br>(NPT) | d<br>Min. | Width across flat |       |       |       | A     | B     |       | L     | L <sub>1</sub> |
|---------------|----------------|-------|-------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|----------------|
|               | in             | mm    |             |           | h                 |       | H     |       |       |       |       |       |                |
|               |                |       |             |           | in                | mm    | in    | mm    |       |       |       |       |                |
| CRTF 2 - 2N   | 1/8            | 3.17  | 1/8         | 2.28      | 1/2               | 12.70 | 7/16  | 11.11 | 12.70 | 15.24 | 18.03 | 24.63 | 19.05          |
| CRTF 4 - 2N   | 1/4            | 6.35  | 1/8         | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 19.55 | 26.92 | 19.05          |
| CRTF 4 - 4N   | 1/4            | 6.35  | 1/4         | 4.82      | 11/16             | 17.46 | 9/16  | 14.28 | 15.24 | 17.78 | 22.86 | 29.71 | 22.35          |
| CRTF 6 - 4N   | 3/8            | 9.52  | 1/4         | 7.11      | 11/16             | 17.46 | 11/16 | 17.46 | 16.76 | 19.30 | 23.87 | 31.24 | 22.35          |
| CRTF 8 - 6N   | 1/2            | 12.70 | 3/8         | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 36.06 | 22.35          |
| CRTF 8 - 8N   | 1/2            | 12.70 | 1/2         | 10.41     | 1                 | 25.40 | 7/8   | 22.22 | 22.86 | 21.84 | 29.71 | 39.87 | 28.44          |
| CRTF 12 - 12N | 3/4            | 19.05 | 3/4         | 15.74     | 1-3/8             | 34.92 | 1-1/8 | 28.57 | 24.38 | 21.84 | 34.54 | 44.70 | 31.75          |
| CRTF 16 - 12N | 1              | 25.40 | 3/4         | 22.35     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 36.83 | 49.02 | 31.75          |
| CRTF 16 - 16N | 1              | 25.40 | 1           | 22.35     | 1-11/16           | 42.86 | 1-1/2 | 38.10 | 31.24 | 26.41 | 41.40 | 53.59 | 38.10          |

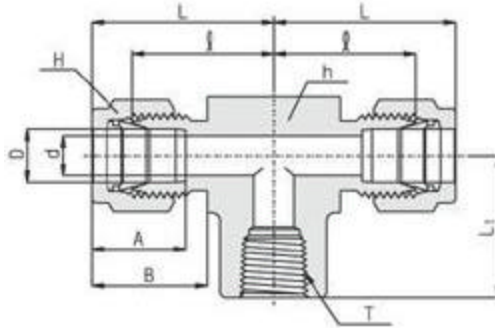
### Metric Tube To Male NPT Thread

| Part No.      | Tube O.D.<br>D | T*<br>(NPT) | d<br>Min. | Width across flat |    | A    | B    |      | L    | L <sub>1</sub> |
|---------------|----------------|-------------|-----------|-------------------|----|------|------|------|------|----------------|
|               |                |             |           | h                 | H  |      |      |      |      |                |
| CRTF 6M - 2R  | 6              | 1/8         | 4.8       | 12.70             | 14 | 15.3 | 17.7 | 19.6 | 46.0 | 19.0           |
| CRTF 6M - 4R  | 6              | 1/4         | 4.8       | 17.46             | 14 | 15.3 | 17.7 | 22.4 | 52.1 | 22.4           |
| CRTF 6M - 8R  | 6              | 1/2         | 4.8       | 25.40             | 14 | 15.3 | 17.7 | 27.2 | 34.5 | 28.4           |
| CRTF 8M - 2R  | 8              | 1/8         | 6.4       | 15.87             | 16 | 16.2 | 18.6 | 22.4 | 48.9 | 19.0           |
| CRTF 8M - 4R  | 8              | 1/4         | 6.4       | 17.46             | 16 | 16.2 | 18.6 | 23.1 | 53.0 | 22.4           |
| CRTF 8M - 6R  | 8              | 3/8         | 6.4       | 20.63             | 16 | 16.2 | 18.6 | 25.2 | 32.4 | 22.4           |
| CRTF 8M - 8R  | 8              | 1/2         | 6.4       | 25.40             | 16 | 16.2 | 18.6 | 28.0 | 35.2 | 28.4           |
| CRTF 10M - 4R | 10             | 1/4         | 7.9       | 20.63             | 19 | 17.2 | 19.5 | 25.9 | 33.5 | 22.4           |
| CRTF 12M - 4R | 12             | 1/4         | 9.5       | 20.63             | 22 | 22.8 | 22.0 | 25.9 | 58.4 | 22.4           |
| CRTF 12M - 6R | 12             | 3/8         | 9.5       | 20.63             | 22 | 22.8 | 22.0 | 25.9 | 58.4 | 22.4           |
| CRTF 12M - 8R | 12             | 1/2         | 9.5       | 26.98             | 22 | 22.8 | 22.0 | 29.7 | 40.0 | 28.4           |
| CRTF 16M - 8R | 16             | 1/2         | 12.7      | 25.40             | 25 | 24.4 | 22.0 | 29.7 | 39.9 | 28.4           |

\*ISO Tapered Threads are available upon request.

## Tube Fittings

### Female Branch Tee CBTF



#### Fractional Tube To Male NPT Thread

| Part No.      | Tube O.D.<br>D |       | T*<br>(NPT) | d<br>Min. | Width across flat |       |       |       | A     | B     |       | L     | L <sub>1</sub> |
|---------------|----------------|-------|-------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|----------------|
|               |                |       |             |           | h                 |       | H     |       |       |       |       |       |                |
|               | in             | mm    |             |           | in                | mm    | in    | mm    |       |       |       |       |                |
| CBTF 2 - 2N   | 1/8            | 3.17  | 1/8         | 2.28      | 1/2               | 12.70 | 7/16  | 11.11 | 12.70 | 15.24 | 18.03 | 24.38 | 19.05          |
| CBTF 4 - 2N   | 1/4            | 6.35  | 1/8         | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 19.55 | 26.92 | 19.05          |
| CBTF 4 - 4N   | 1/4            | 6.35  | 1/4         | 4.82      | 11/16             | 17.46 | 9/16  | 14.28 | 15.24 | 17.78 | 22.35 | 29.71 | 22.35          |
| CBTF 6 - 4N   | 3/8            | 9.52  | 1/4         | 7.11      | 11/16             | 17.46 | 11/16 | 17.46 | 16.76 | 19.30 | 23.87 | 31.24 | 22.35          |
| CBTF 8 - 6N   | 1/2            | 12.70 | 1/4         | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 36.06 | 22.35          |
| CBTF 8 - 8N   | 1/2            | 12.70 | 3/8         | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 36.06 | 22.35          |
| CBTF 8 - 12N  | 1/2            | 12.70 | 1/2         | 10.41     | 1                 | 25.40 | 7/8   | 22.22 | 22.86 | 21.84 | 28.70 | 38.86 | 28.44          |
| CBTF 10 - 12N | 5/8            | 15.87 | 1/2         | 12.70     | 1                 | 25.40 | 1     | 25.40 | 24.38 | 21.84 | 28.70 | 38.86 | 28.44          |
| CBTF 12 - 12N | 3/4            | 19.05 | 3/4         | 15.74     | 1-3/8             | 34.92 | 1-1/8 | 28.57 | 24.38 | 21.84 | 34.54 | 44.70 | 31.75          |
| CBTF 12 - 12N | 1              | 25.40 | 3/4         | 22.35     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 36.83 | 49.02 | 31.75          |
| CBTF 16 - 16N | 1              | 25.40 | 1           | 22.35     | 1-11/16           | 42.86 | 1-1/2 | 38.10 | 31.24 | 26.41 | 44.20 | 53.59 | 38.10          |

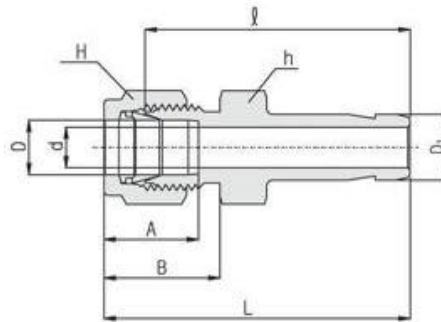
#### Metric Tube To Male NPT Thread

| Part No.      | Tube O.D.<br>D | T*<br>(NPT) | d<br>Min. | Width across flat |    | A    | B    |      | L    | L <sub>1</sub> |
|---------------|----------------|-------------|-----------|-------------------|----|------|------|------|------|----------------|
|               |                |             |           | h                 | H  |      |      |      |      |                |
| CBTF 6M - 2R  | 6              | 1/8         | 4.8       | 12.70             | 14 | 15.3 | 17.7 | 19.6 | 27.0 | 19.0           |
| CBTF 6M - 4R  | 6              | 1/4         | 4.8       | 17.46             | 14 | 15.3 | 17.7 | 22.4 | 29.8 | 22.4           |
| CBTF 6M - 6R  | 6              | 3/8         | 4.8       | 20.63             | 14 | 15.3 | 17.7 | 24.4 | 31.7 | 22.4           |
| CBTF 6M - 8R  | 6              | 1/2         | 4.8       | 25.40             | 14 | 15.3 | 17.7 | 27.2 | 34.5 | 28.4           |
| CBTF 8M - 2R  | 8              | 1/8         | 6.4       | 15.87             | 16 | 16.2 | 18.6 | 23.1 | 29.9 | 19.0           |
| CBTF 8M - 4R  | 8              | 1/4         | 6.4       | 17.46             | 16 | 16.2 | 18.6 | 23.1 | 30.6 | 22.4           |
| CBTF 8M - 6R  | 8              | 3/8         | 6.4       | 20.63             | 16 | 16.2 | 18.6 | 25.2 | 32.4 | 22.4           |
| CBTF 8M - 8R  | 8              | 1/2         | 6.4       | 25.40             | 16 | 16.2 | 18.6 | 28.0 | 35.2 | 28.4           |
| CBTF 10M - 4R | 10             | 1/4         | 7.9       | 20.63             | 19 | 17.2 | 19.5 | 25.9 | 33.5 | 22.4           |
| CBTF 10M - 6R | 10             | 3/8         | 7.9       | 20.63             | 19 | 17.2 | 19.5 | 25.9 | 33.3 | 22.4           |
| CBTF 10M - 8R | 10             | 1/2         | 9.5       | 25.40             | 19 | 17.2 | 19.5 | 26.2 | 33.6 | 22.4           |
| CBTF 12M - 4R | 12             | 1/4         | 9.5       | 20.63             | 22 | 22.8 | 22.0 | 25.9 | 36.0 | 22.4           |
| CBTF 12M - 6R | 12             | 3/8         | 9.5       | 20.63             | 22 | 22.8 | 22.0 | 25.9 | 36.0 | 22.4           |
| CBTF 12M - 8R | 12             | 1/2         | 9.5       | 25.40             | 22 | 22.8 | 22.0 | 29.7 | 40.0 | 28.4           |
| CBTF 16M - 8R | 16             | 1/2         | 12.7      | 25.40             | 25 | 24.4 | 22.0 | 28.7 | 38.8 | 28.7           |

\*ISO Tapered Threads are available upon request.

## Tube Fittings

### Reducer CR



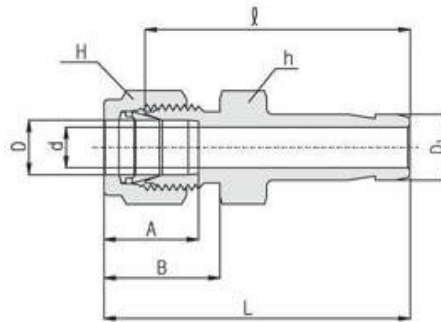
#### \* Fractional Tube To Fractional Hy-Lok Port

| Part No.  | Tube O.D. |       |       |       | d<br>Min. | Width across flat |       |       |       | A     | B     |        | L      |
|-----------|-----------|-------|-------|-------|-----------|-------------------|-------|-------|-------|-------|-------|--------|--------|
|           | D         |       | D1    |       |           | h                 |       | H     |       |       |       |        |        |
|           | in        | mm    | in    | mm    |           | in                | mm    | in    | mm    |       |       |        |        |
| CR 1 - 2  | 1/16      | 1.58  | 1/8   | 3.17  | 1.27      | 5/16              | 7.93  | 5/16  | 7.93  | 8.63  | 10.92 | 25.40  | 29.21  |
| CR 1 - 4  | 1/16      | 1.58  | 1/4   | 6.35  | 1.27      | 5/16              | 7.93  | 5/16  | 7.93  | 8.63  | 10.92 | 27.68  | 31.49  |
| CR 2 - 1  | 1/8       | 3.17  | 1/16  | 1.58  | 0.76      | 7/16              | 11.11 | 7/16  | 11.11 | 12.70 | 15.24 | 22.35  | 28.95  |
| CR 2 - 2  | 1/8       | 3.17  | 1/8   | 3.17  | 2.03      | 7/16              | 11.11 | 7/16  | 11.11 | 12.70 | 15.24 | 26.92  | 33.52  |
| CR 2 - 3  | 1/8       | 3.17  | 3/16  | 4.76  | 2.28      | 7/16              | 11.11 | 7/16  | 11.11 | 12.70 | 15.24 | 27.68  | 34.29  |
| CR 2 - 4  | 1/8       | 3.17  | 1/4   | 6.35  | 2.28      | 7/16              | 11.11 | 7/16  | 11.11 | 12.70 | 15.24 | 29.46  | 36.06  |
| CR 2 - 6  | 1/8       | 3.17  | 3/8   | 9.52  | 2.28      | 7/16              | 11.11 | 7/16  | 11.11 | 12.70 | 15.24 | 30.98  | 37.59  |
| CR 2 - 8  | 1/8       | 3.17  | 1/2   | 12.70 | 2.28      | 9/16              | 14.28 | 7/16  | 11.11 | 12.70 | 15.24 | 37.59  | 44.19  |
| CR 3 - 2  | 3/16      | 4.76  | 1/8   | 3.17  | 2.03      | 7/16              | 11.11 | 1/2   | 12.70 | 13.71 | 16.00 | 28.19  | 34.79  |
| CR 3 - 4  | 3/16      | 4.76  | 1/4   | 6.35  | 3.04      | 7/16              | 11.11 | 1/2   | 12.70 | 13.71 | 16.00 | 30.48  | 37.08  |
| CR 4 - 2  | 1/4       | 6.35  | 1/8   | 3.17  | 2.03      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 29.46  | 36.83  |
| CR 4 - 3  | 1/4       | 6.35  | 3/16  | 4.76  | 3.04      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 30.22  | 37.59  |
| CR 4 - 4  | 1/4       | 6.35  | 1/4   | 6.35  | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 31.75  | 39.11  |
| CR 4 - 5  | 1/4       | 6.35  | 5/16  | 7.93  | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 32.51  | 39.87  |
| CR 4 - 6  | 1/4       | 6.35  | 3/8   | 9.52  | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 33.27  | 40.64  |
| CR 4 - 8  | 1/4       | 6.65  | 1/2   | 12.70 | 4.82      | 9/16              | 14.28 | 9/16  | 14.28 | 15.24 | 17.78 | 38.86  | 46.22  |
| CR 4 - 10 | 1/4       | 6.35  | 5/8   | 15.87 | 4.82      | 11/16             | 17.46 | 9/16  | 14.28 | 15.24 | 17.78 | 40.64  | 48.00  |
| CR 4 - 12 | 1/4       | 6.35  | 3/4   | 19.05 | 4.82      | 13/16             | 20.63 | 9/16  | 14.28 | 15.24 | 17.78 | 40.38  | 47.75  |
| CR 5 - 6  | 5/16      | 7.93  | 3/8   | 9.52  | 6.35      | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 18.54 | 34.54  | 41.91  |
| CR 5 - 8  | 5/16      | 7.93  | 1/2   | 12.70 | 6.35      | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 18.54 | 40.13  | 47.49  |
| CR 6 - 4  | 3/8       | 9.52  | 1/4   | 6.35  | 4.82      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 34.03  | 41.40  |
| CR 6 - 6  | 3/8       | 9.52  | 3/8   | 9.52  | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 35.81  | 43.18  |
| CR 6 - 8  | 3/8       | 9.52  | 1/2   | 12.70 | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 41.14  | 48.51  |
| CR 6 - 10 | 3/8       | 9.52  | 5/8   | 15.87 | 7.11      | 11/16             | 17.46 | 11/16 | 17.46 | 16.76 | 19.30 | 42.92  | 50.29  |
| CR 6 - 12 | 3/8       | 9.52  | 3/4   | 19.05 | 7.11      | 13/16             | 20.63 | 11/16 | 17.46 | 16.76 | 19.30 | 42.92  | 50.29  |
| CR 8 - 4  | 1/2       | 12.70 | 1/4   | 6.35  | 4.82      | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 34.79  | 44.95  |
| CR 8 - 6  | 1/2       | 12.70 | 3/8   | 9.52  | 7.11      | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 36.57  | 46.73  |
| CR 8 - 8  | 1/2       | 12.70 | 1/2   | 12.70 | 9.90      | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 42.16  | 52.32  |
| CR 8 - 10 | 1/2       | 12.70 | 5/8   | 15.87 | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 43.68  | 53.84  |
| CR 8 - 12 | 1/2       | 12.70 | 3/4   | 19.05 | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 43.68  | 53.84  |
| CR 8 - 16 | 1/2       | 12.70 | 1     | 25.40 | 10.41     | 1-1/16            | 26.98 | 7/8   | 22.22 | 22.86 | 21.84 | 50.03  | 60.19  |
| CR10 - 12 | 5/8       | 15.87 | 3/4   | 19.05 | 12.70     | 15/16             | 23.81 | 1     | 25.40 | 24.38 | 21.84 | 44.45  | 54.61  |
| CR10 - 14 | 5/8       | 15.87 | 7/8   | 22.22 | 12.70     | 15/16             | 23.81 | 1     | 25.40 | 24.38 | 21.84 | 45.97  | 56.13  |
| CR10 - 16 | 5/8       | 15.87 | 1     | 25.40 | 12.70     | 1-1/16            | 26.98 | 1     | 25.40 | 24.38 | 21.84 | 50.80  | 60.96  |
| CR12 - 8  | 3/4       | 19.05 | 1/2   | 12.70 | 9.90      | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 44.45  | 54.61  |
| CR12 - 16 | 3/4       | 19.05 | 1     | 25.40 | 15.74     | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 52.32  | 62.48  |
| CR16 - 20 | 1         | 25.40 | 1-1/4 | 31.75 | 22.35     | -31/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 68.32  | 80.51  |
| CR16 - 24 | 1         | 25.40 | 1-1/2 | 38.10 | 22.35     | 1-5/8             | 41.27 | 1-1/2 | 38.10 | 31.24 | 26.41 | 76.96  | 89.15  |
| CR16 - 32 | 1         | 25.40 | 2     | 50.80 | 22.35     | 2-1/8             | 53.97 | 1-1/2 | 38.10 | 31.24 | 26.41 | 100.33 | 112.52 |
| CR20 - 24 | 1-1/4     | 31.75 | 1-1/2 | 38.10 | 27.68     | 1-7/8             | 47.62 | 2-1/4 | 57.15 | 41.14 | 38.86 | 82.04  | 104.14 |
| CR20 - 32 | 1-1/4     | 31.75 | 2     | 50.80 | 27.68     | 1-7/8             | 47.62 | 3     | 76.20 | 41.14 | 38.86 | 103.12 | 125.22 |
| CR24 - 32 | 1-1/2     | 38.10 | 2     | 50.80 | 34.03     | 2-1/4             | 57.15 | 3     | 76.20 | 50.03 | 45.21 | 104.14 | 131.31 |

\*Fractional Tube to Metric Hy-Lok ports are available upon request.

## Tube Fittings

### Reducer CR

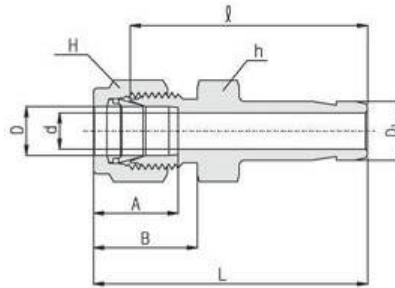


### Metric Tube To Metric HY-Lok Port

| Part No.     | Tube O.D. |    | d<br>Min. | Width across flat |    | A    | B    |      | L    |
|--------------|-----------|----|-----------|-------------------|----|------|------|------|------|
|              | D         | D1 |           | h                 | H  |      |      |      |      |
| CR 2M - 3M   | 2         | 3  | 1.7       | 12                | 12 | 12.9 | 15.3 | 26.9 | 33.5 |
| CR 3M - 4M   | 3         | 4  | 2.4       | 12                | 12 | 12.9 | 15.3 | 28.4 | 35.0 |
| CR 3M - 6M   | 3         | 6  | 2.4       | 12                | 12 | 12.9 | 15.3 | 29.5 | 36.1 |
| CR 3M - 10M  | 3         | 10 | 2.4       | 12                | 12 | 12.9 | 15.3 | 31.8 | 38.4 |
| CR 4M - 6M   | 4         | 6  | 2.4       | 12                | 12 | 13.7 | 16.1 | 30.5 | 37.1 |
| CR 6M - 3M   | 6         | 3  | 1.8       | 14                | 14 | 15.3 | 17.7 | 29.5 | 36.9 |
| CR 6M - 8M   | 6         | 8  | 4.8       | 14                | 14 | 15.3 | 17.7 | 32.5 | 39.9 |
| CR 6M - 10M  | 6         | 10 | 4.8       | 14                | 14 | 15.3 | 17.7 | 33.3 | 40.7 |
| CR 6M - 12M  | 6         | 12 | 4.8       | 14                | 14 | 15.3 | 17.7 | 38.9 | 46.3 |
| CR 8M - 6M   | 8         | 6  | 4.6       | 15                | 16 | 16.2 | 18.6 | 32.8 | 40.3 |
| CR 8M - 10M  | 8         | 10 | 6.4       | 15                | 16 | 16.2 | 18.6 | 34.5 | 42.0 |
| CR 8M - 12M  | 8         | 12 | 6.4       | 15                | 16 | 16.2 | 18.6 | 40.1 | 47.6 |
| CR 10M - 6M  | 10        | 6  | 4.6       | 18                | 19 | 17.2 | 19.5 | 34.8 | 42.4 |
| CR 10M - 12M | 10        | 12 | 7.9       | 18                | 19 | 17.2 | 19.5 | 42.2 | 49.8 |
| CR 10M - 15M | 10        | 15 | 7.9       | 18                | 19 | 17.2 | 19.5 | 43.7 | 51.3 |
| CR 10M - 18M | 10        | 18 | 7.9       | 19                | 19 | 17.2 | 19.5 | 43.7 | 51.3 |
| CR 12M - 6M  | 12        | 6  | 4.6       | 22                | 22 | 22.8 | 22.0 | 34.8 | 44.9 |
| CR 12M - 10M | 12        | 10 | 7.7       | 2                 | 22 | 22.8 | 22.0 | 36.6 | 46.7 |
| CR 12M - 16M | 12        | 16 | 9.5       | 22                | 22 | 22.8 | 22.0 | 43.7 | 53.8 |
| CR 12M - 18M | 12        | 18 | 9.5       | 22                | 22 | 22.8 | 22.0 | 43.7 | 53.8 |
| CR 12M - 20M | 12        | 20 | 9.5       | 22                | 22 | 22.8 | 22.0 | 46.0 | 56.1 |
| CR 12M - 22M | 12        | 22 | 9.5       | 24                | 22 | 22.8 | 22.0 | 46.0 | 56.1 |
| CR 12M - 25M | 12        | 25 | 9.5       | 27                | 22 | 22.8 | 22.0 | 52.3 | 62.4 |
| CR 16M - 12M | 16        | 12 | 9.1       | 24                | 25 | 24.4 | 22.0 | 42.9 | 53.0 |
| CR 18M - 12M | 18        | 12 | 9.1       | 27                | 30 | 24.4 | 22.0 | 44.5 | 54.6 |
| CR 18M - 16M | 18        | 16 | 12.7      | 27                | 30 | 24.4 | 22.0 | 46.0 | 56.1 |
| CR 18M - 20M | 18        | 20 | 15.1      | 27                | 30 | 24.4 | 22.0 | 47.5 | 57.6 |
| CR 18M - 22M | 18        | 22 | 15.1      | 27                | 30 | 24.4 | 22.0 | 47.5 | 57.6 |
| CR 18M - 25M | 18        | 25 | 15.1      | 27                | 30 | 24.4 | 22.0 | 52.3 | 62.4 |
| CR 20M - 16M | 20        | 16 | 12.7      | 30                | 32 | 26.0 | 22.0 | 47.8 | 57.9 |
| CR 20M - 18M | 20        | 18 | 13.9      | 30                | 32 | 26.0 | 22.0 | 47.8 | 57.9 |
| CR 20M - 22M | 20        | 22 | 15.8      | 30                | 32 | 26.0 | 22.  | 49.3 | 59.4 |
| CR 20M - 25M | 20        | 25 | 15.8      | 30                | 32 | 26.0 | 22.0 | 54.1 | 64.2 |
| CR 22M - 18M | 22        | 18 | 13.9      | 30                | 32 | 26.0 | 22.0 | 47.8 | 57.9 |
| CR 22M - 20M | 22        | 20 | 15.1      | 30                | 32 | 26.0 | 22.0 | 49.3 | 59.4 |
| CR 22M - 25M | 22        | 25 | 18.3      | 30                | 32 | 26.0 | 22.0 | 54.1 | 64.2 |
| CR 25M - 18M | 25        | 18 | 13.9      | 35                | 38 | 31.3 | 26.5 | 50.8 | 63.1 |
| CR 25M - 20M | 25        | 20 | 15.1      | 35                | 38 | 31.3 | 26.5 | 52.3 | 64.6 |

## Tube Fittings

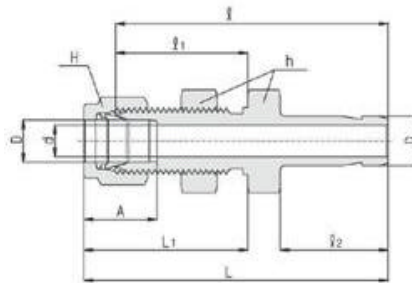
### Reducer CR



#### Metric Tube To Metric HY-Lok Port

| Part No.    | Tube O.D. |      |       | d<br>Min. | Width across flat |    | A     | B    |      | L    |
|-------------|-----------|------|-------|-----------|-------------------|----|-------|------|------|------|
|             | D         | D1   |       |           | h                 | H  |       |      |      |      |
|             |           | in   | mm    |           |                   |    |       |      |      |      |
| CR 2M - 2   | 2         | 1/8  | 3.17  | 1.7       | 12                | 12 | 12.9  | 15.3 | 26.9 | 33.5 |
| CR 3M - 2   | 3         | 1/8  | 3.17  | 2.0       | 12                | 12 | 12.69 | 15.3 | 26.9 | 33.5 |
| CR 3M - 4   | 3         | 1/4  | 6.35  | 2.4       | 12                | 12 | 12.9  | 15.3 | 29.5 | 36.1 |
| CR 4M - 4   | 4         | 1/4  | 6.35  | 2.4       | 12                | 12 | 13.7  | 16.1 | 30.5 | 37.1 |
| CR 6M - 2   | 6         | 1/8  | 3.17  | 2.0       | 14                | 14 | 15.3  | 17.7 | 29.5 | 36.9 |
| CR 6M - 4   | 6         | 1/4  | 6.35  | 4.8       | 14                | 14 | 15.3  | 17.7 | 31.8 | 39.2 |
| CR 6M - 5   | 6         | 5/16 | 7.93  | 4.8       | 14                | 14 | 15.3  | 17.7 | 32.5 | 39.9 |
| CR 6M - 6   | 6         | 3/8  | 9.52  | 4.8       | 14                | 14 | 15.3  | 17.7 | 33.3 | 40.7 |
| CR 6M - 8   | 6         | 1/2  | 12.70 | 4.8       | 14                | 14 | 15.3  | 17.7 | 38.9 | 46.3 |
| CR 8M - 6   | 8         | 3/8  | 9.52  | 6.4       | 15                | 16 | 16.2  | 18.6 | 34.5 | 42.0 |
| CR 8M - 8   | 8         | 1/2  | 12.70 | 6.4       | 15                | 16 | 16.2  | 18.6 | 40.1 | 47.6 |
| CR 10M - 6  | 10        | 3/8  | 9.52  | 7.1       | 18                | 19 | 17.2  | 19.5 | 36.6 | 44.2 |
| CR 10M - 8  | 10        | 1/2  | 12.70 | 7.9       | 18                | 19 | 17.2  | 19.5 | 42.2 | 49.8 |
| CR 12M - 8  | 12        | 1/2  | 12.70 | 9.5       | 22                | 22 | 22.8  | 22.0 | 42.2 | 52.3 |
| CR 12M - 12 | 12        | 3/4  | 19.05 | 9.5       | 22                | 22 | 22.8  | 22.0 | 43.7 | 53.8 |
| CR 18M - 12 | 18        | 3/4  | 19.05 | 15.1      | 27                | 30 | 24.4  | 22.0 | 46.0 | 56.1 |
| CR 18M - 16 | 18        | 1    | 25.40 | 15.1      | 27                | 30 | 24.4  | 22.0 | 52.3 | 62.4 |
| CR 25M - 16 | 25        | 1    | 25.40 | 20.2      | 35                | 38 | 31.3  | 26.5 | 57.2 | 69.5 |

### Bulkhead Reducer CBR



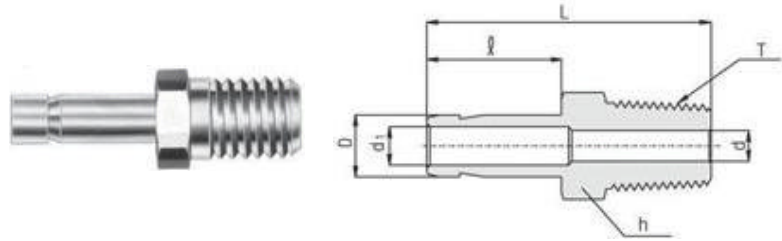
#### Metric Tube To Metric HY-Lok Port

| Part No.    | Tube O.D.<br>D |       | d<br>Min. | Width across flat |       |       |       | A     |       | 1     | 2     | L      | L <sub>1</sub> | Panel<br>Hole<br>Drill Size | Panel<br>Max.<br>Thickness |
|-------------|----------------|-------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|--------|----------------|-----------------------------|----------------------------|
|             |                |       |           | h                 |       | H     |       |       |       |       |       |        |                |                             |                            |
|             | in             | mm    |           | in                | mm    | in    | mm    |       |       |       |       |        |                |                             |                            |
| CBR 2 - 2   | 1/8            | 3.17  | 2.03      | 1/2               | 12.70 | 7/16  | 11.11 | 12.70 | 42.92 | 24.63 | 13.46 | 49.53  | 31.24          | 8.33                        | 12.70                      |
| CBR 4 - 4   | 1/4            | 6.35  | 4.82      | 5/8               | 15.87 | 9/16  | 14.28 | 15.24 | 48.51 | 26.16 | 15.74 | 55.88  | 33.52          | 11.50                       | 10.16                      |
| CBR 6 - 6   | 3/8            | 9.52  | 7.11      | 3/4               | 19.05 | 11/16 | 17.46 | 16.76 | 53.84 | 29.46 | 17.52 | 61.21  | 36.83          | 14.68                       | 11.17                      |
| CBR 8 - 8   | 1/2            | 12.70 | 10.41     | 15/16             | 23.81 | 7/8   | 22.22 | 22.86 | 62.73 | 31.75 | 23.11 | 72.89  | 41.91          | 19.44                       | 12.70                      |
| CBR 10 - 10 | 5/8            | 15.87 | 12.70     | 1-1/16            | 26.98 | 1     | 25.40 | 24.38 | 65.02 | 32.51 | 24.70 | 75.18  | 42.67          | 22.62                       | 12.70                      |
| CBR 16 - 16 | 1              | 25.40 | 20.32     | 1-5/8             | 41.27 | 1-1/2 | 38.10 | 31.24 | 88.13 | 45.21 | 31.70 | 100.33 | 57.40          | 33.73                       | 19.05                      |

# Tube Fittings

## Male Adapter CAM

**Hy-Lok Adapter** eliminates difficult alignment problems.



1. It is required to install tubing to a female port in a certain direction as shown.



2. With pipe connection tight, the male elbow is directed to wrong direction.



3. To avoid this, simply tighten the pipe thread of male adapter into female port.



4. Connect union elbow to male adapter by tightening the Hy-Lok nut while keeping the elbow in the desired direction. Then install the tubing into the other end of elbow

### Fractional Hy-lok Port To Female NPT Thread

| Part No.     | Tube O.D.<br>D |       | T*<br>(NPT) | d<br>Min. | d <sub>1</sub> | Width across flat<br>h |       |       | L      |
|--------------|----------------|-------|-------------|-----------|----------------|------------------------|-------|-------|--------|
|              | in             | mm    |             |           |                | in                     | mm    |       |        |
| CAM 2 - 2N   | 1/8            | 3.17  | 1/8         | 4.57      | 1.77           | 7/16                   | 11.11 | 13.45 | 29.50  |
| CAM 2 - 4N   | 1/8            | 3.17  | 1/4         | 7.11      | 1.77           | 9/16                   | 14.28 | 13.45 | 34.80  |
| CAM 3 - 2N   | 3/16           | 4.76  | 1/8         | 4.57      | 3.04           | 7/16                   | 11.11 | 14.20 | 30.22  |
| CAM 3 - 4N   | 3/16           | 4.76  | 1/4         | 7.11      | 3.04           | 9/16                   | 14.28 | 14.20 | 35.56  |
| CAM 4 - 2N   | 1/4            | 6.35  | 1/8         | 4.57      | 4.57           | 7/16                   | 11.11 | 15.76 | 31.80  |
| CAM 4 - 4N   | 1/4            | 6.35  | 1/4         | 7.11      | 4.57           | 9/16                   | 14.28 | 15.75 | 37.08  |
| CAM 4 - 6N   | 1/4            | 6.35  | 3/8         | 10.41     | 4.57           | 11/16                  | 17.46 | 15.75 | 37.84  |
| CAM 4 - 8N   | 1/4            | 6.35  | 1/2         | 12.70     | 4.57           | 7/8                    | 22.22 | 15.76 | 43.43  |
| CAM 5 - 2N   | 5/16           | 7.93  | 1/8         | 4.57      | 6.35           | 7/16                   | 11.11 | 16.80 | 32.76  |
| CAM 5 - 4N   | 5/16           | 7.93  | 1/4         | 7.11      | 6.35           | 9/16                   | 14.28 | 16.80 | 38.10  |
| CAM 6 - 2N   | 3/8            | 9.52  | 1/8         | 4.57      | 7.11           | 7/16                   | 11.11 | 17.50 | 33.50  |
| CAM 6 - 4N   | 3/8            | 9.52  | 1/4         | 7.11      | 7.11           | 9/16                   | 14.28 | 17.50 | 38.90  |
| CAM 6 - 6N   | 3/8            | 9.52  | 3/8         | 10.41     | 7.11           | 11/16                  | 17.46 | 17.50 | 39.60  |
| CAM 6 - 8N   | 3/8            | 9.52  | 1/2         | 12.70     | 7.11           | 7/8                    | 22.22 | 17.50 | 45.20  |
| CAM 8 - 4N   | 1/2            | 12.70 | 1/4         | 7.11      | 9.90           | 9/16                   | 14.28 | 23.20 | 44.50  |
| CAM 8 - 6N   | 1/2            | 12.70 | 3/8         | 10.41     | 9.90           | 11/16                  | 17.46 | 23.20 | 45.20  |
| CAM 8 - 8N   | 1/2            | 12.70 | 1/2         | 12.70     | 9.90           | 7/8                    | 22.22 | 23.20 | 50.50  |
| CAM 10 - 6N  | 5/8            | 15.87 | 3/8         | 10.41     | 12.70          | 11/16                  | 17.46 | 24.70 | 47.40  |
| CAM 10 - 8N  | 5/8            | 15.87 | 1/2         | 12.70     | 12.70          | 7/8                    | 22.22 | 24.70 | 52.30  |
| CAM 10 - 12N | 5/8            | 15.87 | 3/4         | 18.28     | 12.70          | 1-1/16                 | 26.98 | 24.70 | 52.30  |
| CAM 12 - 8N  | 3/4            | 19.05 | 1/2         | 12.70     | 14.98          | 7/8                    | 22.22 | 24.70 | 52.30  |
| CAM 12 - 12N | 3/4            | 19.05 | 3/4         | 18.28     | 14.98          | 1-1/16                 | 26.92 | 24.70 | 52.30  |
| CAM 12 - 16N | 3/4            | 19.05 | 1           | 22.35     | 14.98          | 1-3/8                  | 34.92 | 24.70 | 57.91  |
| CAM 14 - 12N | 7/8            | 22.22 | 3/4         | 18.28     | 17.27          | 1-1/16                 | 26.98 | 26.70 | 54.30  |
| CAM 16 - 12N | 1              | 25.40 | 3/4         | 18.28     | 20.06          | 1-1/16                 | 26.98 | 31.70 | 58.70  |
| CAM 16 - 16N | 1              | 25.40 | 1           | 22.35     | 20.06          | 1-3/8                  | 34.92 | 31.70 | 66.00  |
| CAM 20 - 20N | 1-1/4          | 31.75 | 1-1/4       | 27.68     | -              | 1-3/4                  | 44.45 | 40.00 | 80.26  |
| CAM 24 - 24N | 1-1/2          | 38.10 | 1-1/2       | 33.27     | -              | 2-1/8                  | 53.97 | 51.50 | 94.48  |
| CAM 32 - 32N | 2              | 50.80 | 2           | 44.45     | -              | 2-3/4                  | 69.85 | 68.40 | 119.38 |

\*ISO Tapered Threads are available upon request.

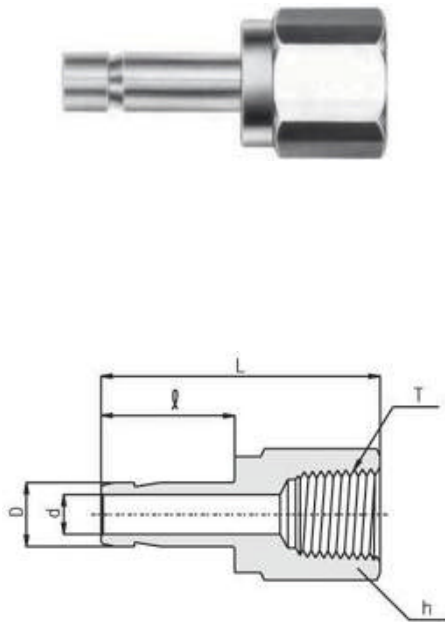
### Metric Hy-Lok Port To Female ISO Taperad Thread

| Part No.      | Tube O.D.<br>D |  | T*<br>(NPT) | d<br>Min. | d <sub>1</sub> | Width across<br>flat<br>h |       | L    |
|---------------|----------------|--|-------------|-----------|----------------|---------------------------|-------|------|
|               |                |  |             |           |                |                           |       |      |
| CAM 3M - 2R   | 3              |  | 1/8         | 4.0       | 1.8            | 12                        | 13.15 | 29.4 |
| CAM 6M - 2R   | 6              |  | 1/8         | 4.6       | 4.6            | 12                        | 15.75 | 32.8 |
| CAM 6M - 4R   | 6              |  | 1/4         | 4.6       | 4.6            | 14                        | 15.75 | 38.1 |
| CAM 8M - 4R   | 8              |  | 1/4         | 6.3       | 6.3            | 14                        | 16.50 | 39.1 |
| CAM 10M - 4R  | 10             |  | 1/4         | 7.7       | 7.7            | 14                        | 17.50 | 39.9 |
| CAM 10M - 4R  | 10             |  | 3/8         | 7.7       | 7.7            | 17                        | 17.50 | 40.6 |
| CAM 10M - 6R  | 10             |  | 1/2         | 11.9      | 7.7            | 22                        | 17.50 | 45.2 |
| CAM 12M - 8R  | 12             |  | 1/4         | 7.1       | 9.1            | 14                        | 23.50 | 46.5 |
| CAM 12M - 4R  | 12             |  | 3/8         | 9.1       | 9.1            | 17                        | 23.50 | 46.2 |
| CAM 12M - 6R  | 12             |  | 1/2         | 11.9      | 9.1            | 22                        | 23.50 | 51.8 |
| CAM 18M - 8R  | 18             |  | 1/2         | 11.9      | 13.9           | 22                        | 24.90 | 53.2 |
| CAM 18M - 12R | 18             |  | 3/4         | 15.9      | 13.9           | 27                        | 24.90 | 53.2 |
| CAM 28M - 16R | 28             |  | 1           | 22.2      | -              | 35                        | 31.70 | 74.7 |
| CAM 28M - 20R | 28             |  | 1-1/4       | 23.8      | -              | 6                         | 31.70 | 76.2 |
| CAM 32M - 20R | 32             |  | 1-1/4       | 27.4      | -              | 46                        | 40.00 | 81.0 |
| CAM 38M - 24R | 38             |  | 1-1/2       | 33.3      | -              | 55                        | 51.50 | 92.2 |

\*NPT Threads are available upon request.

## Tube Fittings

### Female Adapter CAF



### Fractional Hy-Lok Port To Male NPT Thread

| Part No.      | Tube O.D.<br>D |       | T*<br>(NPT) | d<br>Min. | Width across flat<br>h |       | ℓ     | L      |
|---------------|----------------|-------|-------------|-----------|------------------------|-------|-------|--------|
|               | in             | mm    |             |           | in                     | mm    |       |        |
| CAF 2 - 2 N   | 1/8            | 3.17  | 1/8         | 1.77      | 9/16                   | 14.28 | 13.45 | 31.50  |
| CAF 2 - 4 N   | 1/8            | 3.17  | 1/4         | 1.77      | 3/4                    | 19.05 | 13.45 | 35.30  |
| CAF 3 - 2 N   | 3/16           | 4.76  | 1/8         | 3.04      | 9/16                   | 14.28 | 14.20 | 32.00  |
| CAF 3 - 4 N   | 3/16           | 4.76  | 1/4         | 3.04      | 3/4                    | 19.05 | 14.20 | 35.81  |
| CAF 4 - 2 N   | 1/4            | 6.35  | 1/8         | 4.57      | 9/16                   | 14.28 | 16.00 | 33.02  |
| CAF 4 - 4 N   | 1/4            | 6.35  | 1/4         | 4.57      | 3/4                    | 19.05 | 16.00 | 37.10  |
| CAF 4 - 6 N   | 1/4            | 6.35  | 3/8         | 4.57      | 7/8                    | 22.22 | 16.00 | 39.37  |
| CAF 4 - 8 N   | 1/4            | 6.35  | 1/2         | 4.57      | 1-1/16                 | 26.98 | 16.00 | 45.50  |
| CAF 5 - 2 N   | 5/16           | 7.93  | 1/8         | 6.35      | 9/16                   | 14.28 | 16.80 | 34.29  |
| CAF 5 - 4 N   | 5/16           | 7.93  | 1/4         | 6.35      | 3/4                    | 19.05 | 16.80 | 37.59  |
| CAF 6 - 2 N   | 3/8            | 9.52  | 1/8         | 7.11      | 9/16                   | 14.28 | 17.50 | 34.29  |
| CAF 6 - 4 N   | 3/8            | 9.52  | 1/4         | 7.11      | 3/4                    | 19.05 | 17.50 | 38.10  |
| CAF 6 - 6 N   | 3/8            | 9.52  | 3/8         | 7.11      | 7/8                    | 22.22 | 17.50 | 40.38  |
| CAF 6 - 8 N   | 3/8            | 9.52  | 1/2         | 7.11      | 1-1/16                 | 26.98 | 17.50 | 46.73  |
| CAF 8 - 4 N   | 1/2            | 12.70 | 1/4         | 9.90      | 3/4                    | 19.05 | 24.00 | 43.43  |
| CAF 8 - 6 N   | 1/2            | 12.70 | 3/8         | 9.90      | 7/8                    | 22.22 | 24.00 | 45.46  |
| CAF 8 - 8 N   | 1/2            | 12.70 | 1/2         | 9.90      | 1-1/16                 | 26.98 | 24.00 | 51.80  |
| CAF 10 - 6 N  | 5/8            | 15.87 | 3/8         | 12.70     | 7/8                    | 22.22 | 24.70 | 48.26  |
| CAF 10 - 8 N  | 5/8            | 15.87 | 1/2         | 12.70     | 1-1/16                 | 26.98 | 24.70 | 53.84  |
| CAF 10 - 12 N | 5/8            | 15.87 | 3/4         | 12.70     | 1-5/16                 | 33.33 | 24.70 | 55.37  |
| CAF 12 - 8 N  | 3/4            | 19.05 | 1/2         | 14.98     | 1-1/16                 | 26.98 | 24.70 | 52.83  |
| CAF 12 - 12 N | 3/4            | 19.05 | 3/4         | 14.98     | 1-5/16                 | 33.33 | 24.70 | 54.86  |
| CAF 12 - 16 N | 3/4            | 19.05 | 1           | 14.98     | 1-5/8                  | 41.27 | 24.70 | 58.42  |
| CAF 14 - 12 N | 7/8            | 22.22 | 3/4         | 17.27     | 1-5/16                 | 33.33 | 26.70 | 57.15  |
| CAF 16 - 12 N | 1              | 25.40 | 3/4         | 20.06     | 1-5/16                 | 33.33 | 31.70 | 60.70  |
| CAF 16 - 16 N | 1              | 25.40 | 1           | 20.06     | 1-5/8                  | 41.27 | 31.70 | 64.26  |
| CAF 20 - 20 N | 1-1/4          | 31.75 | 1-1/4       | 27.68     | 2-1/8                  | 53.98 | 40.00 | 77.72  |
| CAF 24 - 24 N | 1-1/2          | 38.10 | 1-1/2       | 33.27     | 2-3/8                  | 60.32 | 51.50 | 88.90  |
| CAF 32 - 32 N | 2              | 50.80 | 2           | 44.45     | 2-7/8                  | 70.02 | 68.40 | 107.44 |

\*ISO Tapered Threads are available upon request.

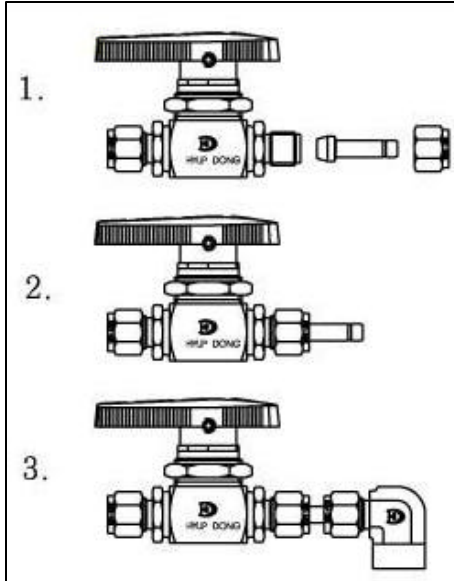
### Metric Hy-Lok Port To Female ISO Taperad Thread

| Part No.      | Tube O.D.<br>D | T*<br>(NPT) | d<br>Min. | Width across<br>flat<br>h | ℓ     | L     |
|---------------|----------------|-------------|-----------|---------------------------|-------|-------|
| CAF 3M - 2R   | 3              | 1/8         | 1.8       | 14                        | 13.15 | 31.15 |
| CAF 6M - 2R   | 6              | 1/8         | 4.6       | 14                        | 15.75 | 32.5  |
| CAF 6M - 4R   | 6              | 1/4         | 4.6       | 19                        | 15.75 | 37.1  |
| CAF 8M - 4R   | 8              | 1/4         | 6.3       | 19                        | 16.50 | 37.6  |
| CAF 10M - 4R  | 10             | 1/4         | 7.7       | 19                        | 17.50 | 38.1  |
| CAF 10M - 6R  | 10             | 3/8         | 7.7       | 22                        | 17.50 | 40.1  |
| CAF 10M - 8R  | 10             | 1/2         | 7.7       | 27                        | 17.50 | 46.5  |
| CAF 12M - 4R  | 12             | 1/4         | 9.1       | 19                        | 23.50 | 43.7  |
| CAF 12M - 6R  | 12             | 3/8         | 9.1       | 22                        | 23.50 | 46.0  |
| CAF 12M - 8R  | 12             | 1/2         | 9.1       | 27                        | 23.50 | 52.3  |
| CAF 18M - 12R | 18             | 3/4         | 13.9      | 35                        | 24.90 | 54.8  |

\*NPT Threads are available upon request.

## Tube Fittings

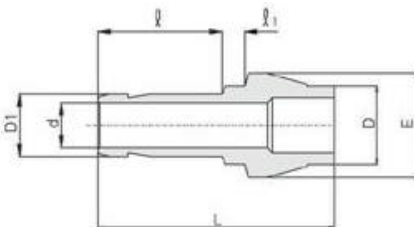
**Hy-Lok port Connector** provides close coupling between two ports.



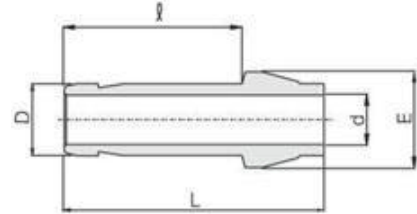
### Example of Installation onto Ball Valve

1. Remove nut and ferrules from Hy-Lok end of valve. Place nut only (no ferrules) over the machined ferrule of port connector.
2. Insert the machined ferrule into ball valve and finger tighten nut. Further tighten nut with a wrench 1/4 turn only, (for 3/16", 4mm and under, 1/8 turn only, for over 1" and 25mm, 1/2 turn only) as there are on ferrules to set.
3. Insert the other end into Hy-Lok end of fitting and tighten nut according to normal Hy-Lok fitting installation instructions.

## Reducing port Connector CPR



## Port Connector CPC



### To Fractional Hy-Lok Ports

| Part No. | Tube O.D.<br>D |       | d<br>Min. | E     |       | L     |
|----------|----------------|-------|-----------|-------|-------|-------|
|          | in             | mm    |           |       |       |       |
| CPC - 1  | 1/16           | 1.58  | 1.00      | 3.30  | 10.66 | -     |
| CPC - 2  | 1/8            | 3.17  | 1.77      | 6.10  | 15.75 | 24.77 |
| CPC - 4  | 1/4            | 6.35  | 4.57      | 9.39  | 18.79 | 28.07 |
| CPC - 5  | 5/16           | 7.93  | 6.35      | 10.92 | 20.06 | 29.58 |
| CPC - 6  | 3/8            | 9.52  | 7.11      | 12.70 | 20.32 | 29.76 |
| CPC - 8  | 1/2            | 12.70 | 9.90      | 15.74 | 25.90 | 42.29 |
| CPC - 12 | 3/4            | 19.05 | 14.98     | 22.09 | 27.81 | 45.55 |
| CPC - 16 | 1              | 25.40 | 20.06     | 28.44 | 34.54 | 58.49 |

### To Metric Hy-Lok Ports

| Part No.  | Tube O.D.<br>D | d<br>Min. | E     |       | L     |
|-----------|----------------|-----------|-------|-------|-------|
| CPC - 3M  | 3              | 1.8       | 6.0   | 15.70 | 24.51 |
| CPC - 4M  | 4              | 2.2       | 7.0   | 16.67 | 25.81 |
| CPC - 6M  | 6              | 4.4       | 9.0   | 18.70 | 27.99 |
| CPC - 8M  | 8              | 6.2       | 11.0  | 20.00 | 29.88 |
| CPC - 10M | 10             | 8.2       | 13.1  | 20.20 | 30.64 |
| CPC - 12M | 12             | 9.1       | 15.0  | 26.08 | 42.58 |
| CPC - 15M | 15             | 12.7      | 19.0  | 27.78 | 45.30 |
| CPC - 16M | 16             | 12.7      | 19.0  | 27.78 | 45.30 |
| CPC - 18M | 18             | 13.9      | 21.0  | 27.91 | 45.75 |
| CPC - 20M | 20             | 15.1      | 23.0  | 29.20 | 47.35 |
| CPC - 22M | 22             | 17.9      | 24.97 | 29.30 | 47.67 |
| CPC - 25M | 25             | 19.8      | 28.0  | 34.50 | 57.90 |
| CPC - 28M | 28             | 23.8      | 34.3  | 48.30 | 74.40 |
| CPC - 32M | 32             | 27.4      | 39.5  | 52.40 | 80.70 |
| CPC - 38M | 38             | 33.3      | 47.1  | 61.40 | 95.90 |

### To Fractional Hy-Lok Ports

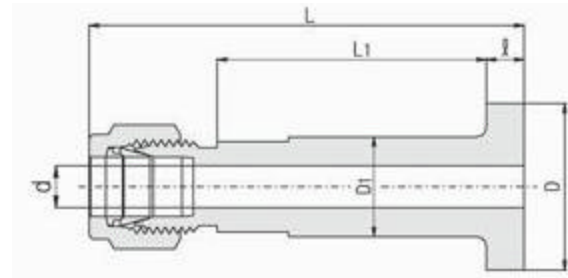
| Part No.    | Tube O.D.<br>D |       | Reduced O.D.<br>D <sub>1</sub> |       | d<br>Min. | E     |       | 1    | L     |
|-------------|----------------|-------|--------------------------------|-------|-----------|-------|-------|------|-------|
|             | in             | mm    | in                             | mm    |           |       |       |      |       |
| CPR 2 - 1   | 1/8            | 3.17  | 1/16                           | 1.58  | 1.00      | 6.10  | 8.64  | 2.03 | 19.69 |
| CPR 4 - 1   | 1/4            | 6.35  | 1/16                           | 1.58  | 1.00      | 9.39  | 8.64  | 3.55 | 21.47 |
| CPR 4 - 2   | 1/4            | 6.35  | 1/8                            | 3.17  | 2.28      | 9.39  | 13.45 | 3.30 | 26.03 |
| CPR 6 - 2   | 3/8            | 9.52  | 1/8                            | 3.17  | 2.28      | 12.70 | 13.45 | 3.81 | 26.70 |
| CPR 6 - 4   | 3/8            | 9.52  | 1/4                            | 6.35  | 4.82      | 12.70 | 15.75 | 3.30 | 28.49 |
| CPR 8 - 4   | 1/2            | 12.70 | 1/4                            | 6.35  | 4.82      | 15.74 | 15.75 | 3.81 | 35.95 |
| CPR 8 - 6   | 1/2            | 12.70 | 3/8                            | 9.52  | 7.11      | 15.74 | 17.50 | 3.30 | 37.19 |
| CPR 12 - 8  | 3/4            | 19.05 | 1/2                            | 12.70 | 9.90      | 22.09 | 24.47 | 3.81 | 46.06 |
| CPR 16 - 8  | 1              | 25.40 | 1/2                            | 12.70 | 9.90      | 28.44 | 24.47 | 4.28 | 53.24 |
| CPR 16 - 12 | 1              | 25.40 | 3/4                            | 19.05 | 14.98     | 28.44 | 25.90 | 4.06 | 53.91 |

### To Metric Hy-Lok Ports

| Part No.      | Tube O.D.<br>D | Reduced O.D.<br>D <sub>1</sub> | d<br>Min. | E    |       | 1    | L     |
|---------------|----------------|--------------------------------|-----------|------|-------|------|-------|
| CPR 6M - 3M   | 6              | 3                              | 1.8       | 9.0  | 13.5  | 3.2  | 25.99 |
| CPR 8M - 6M   | 8              | 6                              | 4.6       | 11.0 | 15.75 | 3.1  | 28.73 |
| CPR 10M - 6M  | 10             | 6                              | 4.6       | 13.1 | 15.75 | 3.4  | 29.59 |
| CPR 10M - 8M  | 10             | 8                              | 6.4       | 13.1 | 16.80 | 3.1  | 30.34 |
| CPR 12M - 6M  | 12             | 6                              | 4.6       | 15.0 | 15.75 | 3.6  | 36.08 |
| CPR 12M - 8M  | 12             | 8                              | 6.4       | 15.0 | 16.80 | 3.4  | 36.93 |
| CPR 12M - 10M | 12             | 10                             | 7.7       | 15.0 | 17.58 | 3.1  | 37.41 |
| CPR 16M - 6M  | 16             | 6                              | 4.6       | 19.0 | 15.75 | 3.6  | 36.87 |
| CPR 16M - 12M | 16             | 12                             | 9.1       | 19.0 | 23.10 | 3.4  | 44.02 |
| CPR 28M - 25M | 28             | 25                             | 19.8      | 34.3 | 33.0  | 8.2  | 66.30 |
| CPR 32M - 25M | 32             | 25                             | 19.8      | 39.5 | 33.0  | 9.9  | 71.20 |
| CPR 38M - 25M | 38             | 25                             | 19.8      | 47.1 | 33.0  | 12.3 | 79.80 |

## Tube Fittings

### Lapped Flange Connector CFTC



Hy-Lok Lapped flange connector provides safe and easy connections between process lines and instruments. It provides Hy-Lok tube connection ends by a lap joint pipe flange to ANSI B 16.5 or BS 1560. Both "smooth" and "serrated" surface finishes are available. For identification of serrated surface finish, groove is provided.

| Part No.    | Tube size | Flange Seal | Dimensions |                |     |    |                |      | Flange Surface Finish (Ra) |
|-------------|-----------|-------------|------------|----------------|-----|----|----------------|------|----------------------------|
|             |           |             | L          | L <sub>1</sub> | I   | D  | D <sub>1</sub> | H    |                            |
| CFTC 4 - SM | 1/4"      | SM          | 80.8       | 56.5           | 6.5 | 35 | 22.2           | 4.8  | 3.2-6.3 Micrometer         |
| CFTC 4 - SE | 1/4"      | SE          | 80.8       | 56.5           | 6.5 | 35 | 22.2           | 4.8  | 6.3-12.5 Micrometer        |
| CFTC 6 - SM | 3/8"      | SM          | 82.3       | 56.5           | 6.5 | 35 | 22.2           | 7.1  | 3.2-6.3 Micrometer         |
| CFTC 6 - SE | 3/8"      | SE          | 82.3       | 56.5           | 6.5 | 35 | 22.2           | 7.1  | 6.3-12.5 Micrometer        |
| CFTC 8 - SM | 1/2"      | SM          | 84.8       | 56.5           | 6.5 | 35 | 22.2           | 10.4 | 3.2-6.3 Micrometer         |
| CFTC 8 - SE | 1/2"      | SE          | 84.8       | 56.5           | 6.5 | 35 | 22.2           | 10.4 | 6.3-12.5 Micrometer        |

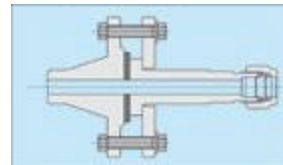
Surface Finish



Smooth (SM)



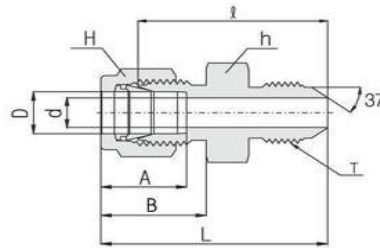
Serrated (SE)



Lapped flange connector installed with gasket between seal faces

## Tube Fittings

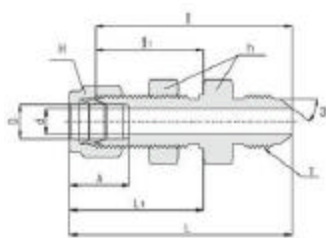
### AN Union CFU



#### Fraction Tube To AN Flared Tube

| Part No.   | Tube O.D.<br>D |       | AN Tube<br>Flare size |       | Straight<br>Thread<br>T(U) | d<br>Min. | Width across flat |       |       |       | A     | B     | I     | L     |
|------------|----------------|-------|-----------------------|-------|----------------------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|
|            |                |       |                       |       |                            |           | h                 |       | H     |       |       |       |       |       |
|            | in             | mm    | in                    | mm    |                            |           | in                | mm    | in    | mm    |       |       |       |       |
| CFU 1 - 2  | 1/16           | 1.58  | 1/8                   | 3.17  | 5/16-24                    | 1.27      | 7/16              | 11.11 | 5/16  | 7.93  | 8.63  | 10.92 | 23.36 | 27.17 |
| CFU 2 - 2  | 1/8            | 3.17  | 1/8                   | 3.17  | 5/16-24                    | 1.52      | 7/16              | 11.11 | 7/16  | 11.11 | 12.70 | 15.24 | 24.89 | 31.49 |
| CFU 2 - 4  | 1/8            | 3.17  | 1/4                   | 6.35  | 7/16-20                    | 2.28      | 1/2               | 12.70 | 7/16  | 11.11 | 12.70 | 15.24 | 28.44 | 35.05 |
| CFU 4 - 4  | 1/4            | 6.35  | 1/4                   | 6.35  | 7/16-20                    | 4.31      | 1.2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 30.22 | 37.59 |
| CFU 5 - 5  | 5/16           | 7.93  | 5/16                  | 7.93  | 1/2-20                     | 5.84      | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 18.54 | 30.98 | 38.35 |
| CFU 6 - 4  | 3/8            | 9.52  | 1/4                   | 6.35  | 7/16-20                    | 4.31      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 32.25 | 39.62 |
| CFU 6 - 6  | 3/8            | 9.52  | 3/8                   | 9.52  | 9/16-18                    | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 32.25 | 39.62 |
| CFU 8 - 8  | 1/2            | 12.70 | 1/2                   | 12.70 | 3/4-16                     | 9.90      | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 35.81 | 45.97 |
| CFU12 - 12 | 3/4            | 19.05 | 3/4                   | 19.05 | 1-1/16-12                  | 15.49     | 1-1/8             | 28.57 | 1-1/8 | 28.57 | 24.38 | 21.84 | 43.18 | 53.34 |
| CFU16 - 16 | 1              | 25.40 | 1                     | 25.40 | 1-5/16-12                  | 21.33     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 49.27 | 61.46 |

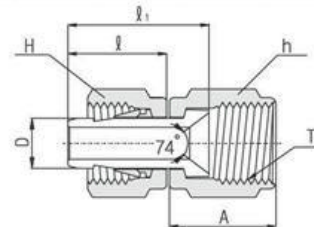
### AN Bulkhead Union CBFU



#### Fractional Tube To AN Flared Tube

| Part No.    | Tube O.D.<br>D |       | AN Tube<br>Flare size |       | Straight<br>Thread<br>T(U) | d<br>Min. | Width across flat |       |       |       | A     | I     | I1    | L     | L1    | Panel<br>Home<br>Drill Size | Panel<br>Max.<br>Thickness |
|-------------|----------------|-------|-----------------------|-------|----------------------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------------------|----------------------------|
|             |                |       |                       |       |                            |           | h                 |       | H     |       |       |       |       |       |       |                             |                            |
|             | in             | mm    | in                    | mm    |                            |           | in                | mm    | in    | mm    |       |       |       |       |       |                             |                            |
| CBFU 4 - 4  | 1/4            | 6.35  | 1/4                   | 6.35  | 7/16-20                    | 4.31      | 5/8               | 15.87 | 9/16  | 14.28 | 15.24 | 46.48 | 26.16 | 53.84 | 33.52 | 11.50                       | 10.16                      |
| CBFU 6 - 6  | 3/8            | 9.52  | 3/8                   | 9.52  | 9/16-18                    | 7.11      | 3/4               | 19.05 | 11/16 | 17/46 | 16.76 | 49.78 | 29.46 | 57.15 | 36.83 | 14.68                       | 11.17                      |
| CBFU 8 - 8  | 1/2            | 12.70 | 1/2                   | 12.70 | 3/4-16                     | 9.90      | 15/16             | 23/81 | 7/8   | 22.22 | 22.86 | 55.62 | 31.75 | 65.78 | 41.91 | 19.44                       | 12.7                       |
| CBFU12 - 12 | 3/4            | 19.05 | 3/4                   | 19.05 | 1-1/16-12                  | 15.49     | 1-3/16            | 30.16 | 1-1/8 | 28.57 | 24.38 | 68.83 | 37.33 | 78.99 | 47.49 | 25.79                       | 16.76                      |
| CBFU16 - 16 | 1              | 25.40 | 1                     | 25.40 | 1-5/16-12                  | 21.33     | 1-5/8             | 41.27 | 1-1/2 | 38.10 | 31.24 | 80.26 | 45.21 | 92.45 | 57.40 | 33.73                       | 19.05                      |

### AN Adapter CFA



#### Fractional Hy-Lok Port To Male AN

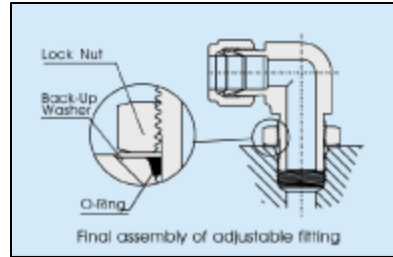
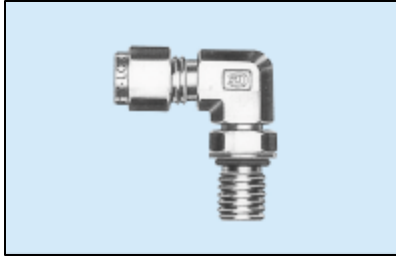
| Part No.  | Tube O.D.<br>D |       | AN Tube<br>Flare size |       | Straight<br>Thread<br>T(U) | Width across flat |       |       |       | A     | I     | I1    |
|-----------|----------------|-------|-----------------------|-------|----------------------------|-------------------|-------|-------|-------|-------|-------|-------|
|           |                |       |                       |       |                            | h                 |       | H     |       |       |       |       |
|           | in             | mm    | in                    | mm    |                            | in                | mm    | in    | mm    |       |       |       |
| CFU 2 - 2 | 1/8            | 3.17  | 1/8                   | 3.17  | 5/16-24                    | 3/8               | 9.52  | 7/16  | 11.11 | 13.71 | 13.46 | 18.54 |
| CFU 2 - 4 | 1/8            | 3.17  | 1/4                   | 6.35  | 7/16-20                    | 9/16              | 14.28 | 7/16  | 11.11 | 15.74 | 13.46 | 19.05 |
| CFU 4 - 4 | 1/4            | 6.35  | 1/4                   | 6.35  | 7/16-20                    | 9/16              | 14.28 | 9/16  | 14.28 | 15.74 | 15.74 | 21.33 |
| CFU 6 - 6 | 3/8            | 9.52  | 3/8                   | 9.52  | 9/16-18                    | 11/16             | 17.46 | 11/16 | 17.46 | 18.28 | 17.52 | 24.89 |
| CFU 8 - 8 | 1/2            | 12.70 | 1/2                   | 12.70 | 3/4-16                     | 7/8               | 22.22 | 7/8   | 22.22 | 21.59 | 23.11 | 31.75 |

\* From Air Force and Navy Standard for 37 degree flared fittings (SAE J514)

## Tube Fittings

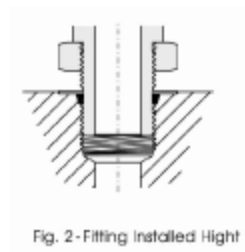
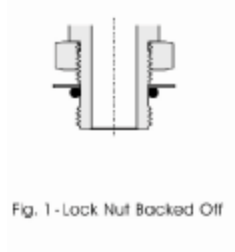
### Adjustable SE/MS Straight Thread Fittings

These adjustable or positionable fittings are useful in that the direction of Hy-Lok tube end can be oriented into desired direction with ease. they can be installed in tanks or vessels without welding or brazing. Buna-N O-ring is standard, and other materials are available upon request.

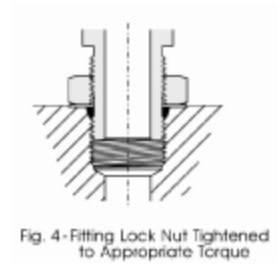
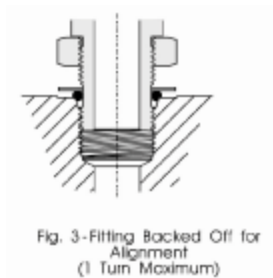


### Installation Instructions

1. Lubricate O-ring with lubricant compatible with system and O-ring material and place it over the groove close to metal back-up washer.
3. Position the fitting by backing it out no more than one turn.

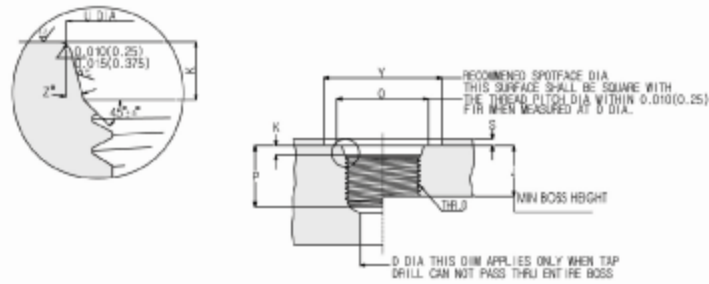


2. Screw fitting into the SAE straight thread boss until the washer contacts the face of the boss.
4. Hold the fitting in position and tighten the lock nut until the washer contacts the face of the boss.



## Tube Fittings

### SAE/MS Internal Straight Thread Boss



### Data for SAE/MS Straight thread Boss

(reprinted from "Hydraulic tube Fittings - SAE J1926 / 1 Port Dimensions of SAE Standard.")

| Nom Tube O.D | Thread Size | D Min. | J Min. | K   | O Min. | P Min. | U    | Y  | S Max | Z   |
|--------------|-------------|--------|--------|-----|--------|--------|------|----|-------|-----|
| 1/8          | 5/16-24     | 1.6    | 10.0   | 1.9 | 11     | 12.0   | 9.   | 19 | 1.6   | 12° |
| 3/16         | 3/8-24      | 3.2    | 10.0   | 1.9 | 13     | 12.0   | 10.7 | 19 | 1.6   | 12° |
| 1/4          | 7/16-20     | 4.4    | 11.5   | 2.4 | 15     | 14.0   | 12.4 | 21 | 1.6   | 12° |
| 5/16         | 1/2-20      | 6.0    | 11.5   | 2.4 | 16     | 14.0   | 14.0 | 23 | 1.6   | 12° |
| 3/8          | 9/16-18     | 7.5    | 12.7   | 2.5 | 18     | 15.5   | 15.6 | 25 | 1.6   | 12° |
| 1/2          | 3/4-16      | 10.0   | 14.3   | 2.5 | 22     | 17.5   | 20.6 | 30 | 2.4   | 15° |
| 5/8          | 7/8-14      | 12.5   | 16.7   | 2.5 | 26     | 20.0   | 23.9 | 34 | 2.4   | 15° |
| 3/4          | 1-1/16-12   | 16.0   | 19.0   | 3.3 | 32     | 20.0   | 29.2 | 41 | 2.4   | 15° |
| 7/8          | 1-3/16-12   | 18.0   | 19.0   | 3.3 | 35     | 23.0   | 32.3 | 45 | 2.4   | 15° |
| 1            | 1-5/16-12   | 21.0   | 19.0   | 3.3 | 38     | 23.0   | 35.5 | 49 | 3.2   | 15° |
| 1 1/4        | 1-5/ 8-12   | 27.0   | 19.0   | 3.3 | 48     | 23.0   | 43.5 | 58 | 3.2   | 15° |
| 1 1/2        | 1-7/ 8-12   | 33.0   | 19.0   | 3.3 | 54     | 23.0   | 49.8 | 65 | 3.2   | 15° |
| 2            | 2-1 2-12    | 70.0   | 19.0   | 3.3 | 70     | 23.0   | 65.7 | 88 | 3.2   | 15° |

- Diameter U shall be concentric with thread pitch diameter within 0.13 full indicator reading(FIR). and shall be free from longitudinal and spiral tool marks. Angular tool marks up to 2.5 Micro meter max shall be permissible.
- Maximum recommended spotface depth to permit sufficient wrench grip for proper tightening of fitting or locknut.
- If face of boss is on a machined surface, dimensions Y and S need not apply as long as R 0.25/0.375 is maintained to avoid damage to the O-ring during installation.
- Tap drill depths given require use of a bottoming taps to produce the specified full thread lengths. Where standard taps are used, the tap drill depths must be increased accordingly.
- Figures are for reference only, as any boss can be used for a tubing size depending upon other design criteria.

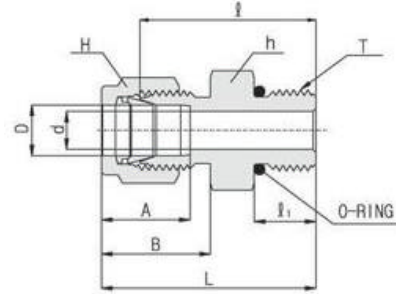
### O - Ring Dimensions for SAE/MS Bosses

Standard O-Ring is Buna-N other materials are available upon request.

| Part Size | Nominal Tube O.D. | Uniform Size Number | Dimension |                  | Part Size | Nominal Tube O.D. | Uniform Size Number | Width across flat |                  |
|-----------|-------------------|---------------------|-----------|------------------|-----------|-------------------|---------------------|-------------------|------------------|
|           |                   |                     | I.D. in   | Cross Section in |           |                   |                     | I.D. in           | Cross Section in |
| 2         | 1/8               | 902                 | .239      | .064             | 12        | 3/4               | 912                 | .924              | .116             |
| 3         | 3/16              | 903                 | .301      | .064             | 14        | 7/8               | 914                 | 1.048             | .116             |
| 4         | 1/4               | 904                 | .351      | .072             | 16        | 1                 | 916                 | 1.171             | .116             |
| 5         | 5/16              | 905                 | .414      | .072             | 20        | 1-1/4             | 920                 | 1.475             | .118             |
| 6         | 3/8               | 906                 | .468      | .078             | 24        | 1-1/2             | 924                 | 1.720             | .118             |
| 8         | 1/2               | 908                 | .644      | .087             | 32        | 2                 | 932                 | 2.337             | .118             |
| 10        | 5/8               | 910                 | .755      | .097             |           |                   |                     |                   |                  |

## Tube Fittings

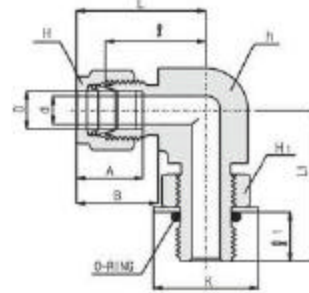
### SAE/MS Male Connector CSC



#### Fractional Tube To SAE / MS Straight Thread

| Part No.     | Tube O.D.<br>D |       | Straght<br>Thread<br>T(U) | d<br>Min. | Width across flat |       |       |       | A     | B     | I     | I1    | L      | O-Ring<br>Uniform<br>Size Number |
|--------------|----------------|-------|---------------------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|--------|----------------------------------|
|              | in             | mm    |                           |           | h                 |       | H     |       |       |       |       |       |        |                                  |
|              |                |       |                           |           | in                | mm    | in    | mm    |       |       |       |       |        |                                  |
| CSC 2 - 2U   | 1/8            | 3.17  | 5/16-24                   | 2.28      | 7/16              | 11.11 | 7/16  | 11.11 | 12.70 | 15.24 | 23.26 | 7.62  | 29.97  | -902                             |
| CSC 2 - 4U   | 1/8            | 3.17  | 7/16-20                   | 2.28      | 9/16              | 14.28 | 7/16  | 11.11 | 12.70 | 15.24 | 24.89 | 9.14  | 31.49  | -904                             |
| CSC 4 - 4U   | 1/4            | 6.35  | 7/16-20                   | 4.82      | 9/16              | 14.28 | 9/16  | 14.28 | 15.24 | 17.78 | 26.67 | 9.14  | 34.03  | -904                             |
| CSC 4 - 6U   | 1/4            | 6.35  | 9/16-18                   | 4.82      | 11/16             | 17.46 | 9/16  | 14.28 | 15.24 | 17.78 | 28.19 | 9.90  | 35.56  | -906                             |
| CSC 4 - 8U   | 1/4            | 6.35  | 3/4-16                    | 4.82      | 7/8               | 22.22 | 9/16  | 14.28 | 15.24 | 17.78 | 30.22 | 11.17 | 37.59  | -908                             |
| CSC 4 - 10U  | 1/4            | 6.35  | 7/8-14                    | 4.82      | 1                 | 25.40 | 9/16  | 14.28 | 15.24 | 17.78 | 33.27 | 12.70 | 40.64  | -910                             |
| CSC 5 - 5U   | 5/16           | 7.93  | 1/2-20                    | 5.84      | 5/8               | 15.87 | 5/8   | 15.87 | 16.25 | 18.54 | 27.43 | 9.14  | 34.79  | -905                             |
| CSC 6 - 4U   | 3/8            | 9.52  | 7/16-20                   | 5.08      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 28.19 | 9.14  | 35.56  | -904                             |
| CSC 6 - 6U   | 3/8            | 9.52  | 9/16-18                   | 7.11      | 11/16             | 17.46 | 11/16 | 17.46 | 16.76 | 19.30 | 29.71 | 9.90  | 37.08  | -906                             |
| CSC 6 - 8U   | 3/8            | 9.52  | 3/4-16                    | 7.11      | 7/8               | 22.22 | 11/16 | 17.46 | 16.76 | 19.30 | 31.75 | 11.17 | 39.11  | -908                             |
| CSC 6 - 10U  | 3/8            | 9.52  | 7/8-14                    | 7.11      | 1                 | 25.40 | 11/16 | 17.46 | 16.76 | 19.30 | 34.79 | 12.70 | 42.16  | -910                             |
| CSC 8 - 6U   | 1/2            | 12.70 | 9/16-18                   | 7.11      | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 28.95 | 9.90  | 39.11  | -906                             |
| CSC 8 - 8U   | 1/2            | 12.70 | 3/4-16                    | 10.41     | 7/8               | 22.22 | 7/8   | 22.22 | 22.86 | 21.84 | 31.75 | 11.17 | 41.91  | -908                             |
| CSC 8 - 10U  | 1/2            | 12.70 | 7/8-14                    | 10.41     | 1                 | 25.40 | 7/8   | 22.22 | 22.86 | 21.84 | 34.79 | 12.70 | 44.95  | -910                             |
| CSC 8 - 12U  | 1/2            | 12.70 | 1-1/16-12                 | 10.41     | 1-1/4             | 31.75 | 7/8   | 22.22 | 22.86 | 21.84 | 38.86 | 14.98 | 49.02  | -912                             |
| CSC 10 - 8U  | 5/8            | 15.87 | 3/4-16                    | 10.66     | 15/16             | 23.81 | 1     | 25.40 | 24.38 | 21.84 | 31.75 | 11.17 | 41.91  | -908                             |
| CSC 10 - 10U | 5/8            | 15.87 | 7/8-14                    | 12.70     | 1                 | 25.40 | 1     | 25.40 | 24.38 | 21.84 | 35.05 | 12.70 | 45.21  | -910                             |
| CSC 12 - 8U  | 3/4            | 19.05 | 3/4-16                    | 10.66     | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 35.81 | 11.17 | 45.97  | -908                             |
| CSC 12 - 12U | 3/4            | 19.05 | 1-1/16-12                 | 15.74     | 1-1/4             | 31.80 | 1-1/8 | 28.57 | 24.38 | 21.84 | 38.86 | 14.98 | 49.02  | -912                             |
| CSC 14 - 14U | 7/8            | 22.22 | 1-3/16-12                 | 18.28     | 1-3/8             | 34.92 | 1-1/4 | 31.75 | 25.90 | 21.84 | 38.86 | 14.98 | 49.02  | -914                             |
| CSC 16 - 12U | 1              | 25.40 | 1-1/16-12                 | 16.76     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 41.14 | 14.98 | 53.34  | -912                             |
| CSC 16 - 16U | 1              | 25.40 | 1-5/16-12                 | 22.35     | 1-1/2             | 38.10 | 1-1/2 | 38.10 | 31.24 | 26.41 | 42.16 | 14.98 | 54.32  | -916                             |
| CSC 20 - 20U | 1-1/4          | 31.75 | 1-5/ 8-12                 | 27.68     | 1-7/8             | 47.62 | 1-7/8 | 47.62 | 41.14 | 38.86 | 46.22 | 14.98 | 68.32  | -920                             |
| CSC 24 - 24U | 1-1/2          | 38.10 | 1-7/ 8-12                 | 34.03     | 2-1/8             | 53.97 | 2-1/4 | 57.15 | 50.03 | 45.21 | 50.54 | 14.98 | 77.72  | -924                             |
| CSC 32 - 32U | 2              | 50.80 | 2-1/ 2-12                 | 45.97     | 2-3/4             | 69.85 | 3     | 76.20 | 67.56 | 62.73 | 64.26 | 14.98 | 101.60 | -932                             |

### SAE / MS Male Elbow (Adjustable) CSLA

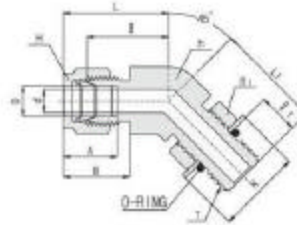


#### Fractional Tube To SAE / MS Straght Thread Boss

| Part No.     | Tube O.D.<br>D |       | Straght<br>Thread<br>T(U) | d<br>Min. | Width across flat |       |       |       |       |       | A     | B     |       | 1     | L      | L <sub>1</sub> | K     | O-Ring<br>Uniform<br>Size<br>Number |
|--------------|----------------|-------|---------------------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|----------------|-------|-------------------------------------|
|              | in             | mm    |                           |           | h                 |       | H     |       | H     |       |       |       |       |       |        |                |       |                                     |
|              |                |       |                           |           | in                | mm    | in    | mm    | in    | mm    |       |       |       |       |        |                |       |                                     |
| CSLA 4 - 4U  | 1/4            | 6.35  | 7/16-20                   | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 9/16  | 14.28 | 15.24 | 17.78 | 21.08 | 9.90  | 28.44  | 28.44          | 16.51 | -904                                |
| CSLA 4 - 6U  | 1/4            | 6.35  | 9/16-18                   | 4.82      | 5/8               | 15.87 | 9/16  | 14.28 | 11/16 | 17.46 | 15.24 | 17.78 | 23.11 | 11.17 | 30.48  | 32.25          | 20.06 | -906                                |
| CSLA 5 - 5U  | 5/16           | 7.93  | 1/2-20                    | 5.84      | 9/16              | 14.28 | 5/8   | 15.87 | 5/8   | 15.87 | 16.25 | 18.54 | 22.86 | 9.90  | 30.22  | 29.46          | 18.28 | -905                                |
| CSLA 6 - 6U  | 3/8            | 9.52  | 9/16-18                   | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 11/16 | 17.46 | 16.76 | 19.30 | 24.63 | 11.17 | 32.00  | 32.25          | 20.06 | -906                                |
| CSLA 6 - 8U  | 3/8            | 9.52  | 3/4-16                    | 7.11      | 13/16             | 20.63 | 11/16 | 17.46 | 7/8   | 22.22 | 22.86 | 19.30 | 27.43 | 12.70 | 34.79  | 37.84          | 25.65 | -908                                |
| CSLA 8 - 8U  | 1/2            | 12.70 | 3/4-16                    | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 7/8   | 22.22 | 24.38 | 21.84 | 27.43 | 12.70 | 37.59  | 37.84          | 25.65 | -908                                |
| CSLA 10 -10U | 5/8            | 15.87 | 7/8-14                    | 12.70     | 1                 | 25.40 | 1     | 25.40 | 1     | 25.40 | 24.38 | 21.84 | 29.46 | 14.22 | 39.62  | 43.43          | 29.46 | -910                                |
| CSLA 12 -12U | 3/4            | 19.05 | 1-1/16-12                 | 15.74     | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 1-1/4 | 31.75 | 24.38 | 21.84 | 31.24 | 16.76 | 41.40  | 48.76          | 36.57 | -912                                |
| CSLA 14 -14U | 7/8            | 22.22 | 1-3/16-12                 | 18.28     | 1-1/4             | 31.75 | 1-1/4 | 31.75 | 1-3/8 | 34.92 | 25.90 | 21.84 | 33.02 | 16.76 | 43.18  | 50.54          | 40.38 | -914                                |
| CSLA 16 -16U | 1              | 25.40 | 1-5/16-12                 | 22.35     | 1-3/8             | 38.10 | 1-1/2 | 38.10 | 1-1/2 | 38.10 | 31.24 | 26.41 | 38.35 | 16.76 | 50.54  | 53.59          | 43.94 | -916                                |
| CSLA 20 -20U | 1-1/4          | 31.75 | 1-5/ 8-12                 | 27.68     | 1-11/16           | 47.62 | 1-7/8 | 47.62 | 1-7/8 | 47.62 | 41.14 | 38.86 | 45.72 | 16.76 | 67.81  | 58.16          | 54.86 | -920                                |
| CSLA 24 -24U | 1-1/2          | 38.10 | 1-7/ 8-12                 | 34.03     | 2                 | 57.15 | 2-1/4 | 57.15 | 2-1/8 | 53.97 | 50.03 | 45.21 | 50.80 | 16.76 | 77.97  | 60.45          | 62.23 | -924                                |
| CSLA 32 -32U | 2              | 50.80 | 2-1/ 2-12                 | 45.97     | 2-3/4             | 76.20 | 3     | 76.20 | 2-3/4 | 69.85 | 67.56 | 62.73 | 69.85 | 16.76 | 107.18 | 71.62          | 80.26 | -932                                |

## Tube Fittings

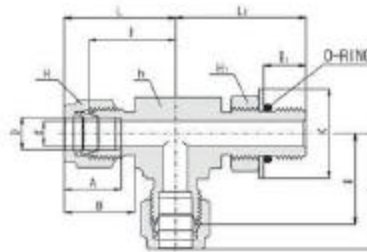
### SAE / MS 45° Male Elbow (Adjustable) CSLB



#### Fractional Tube To SAE / MS Straight Thread Boss

| Part No.     | Tube O.D.<br>D |       | Straght<br>Thread<br>T(U) | d<br>Min. | Width across flat |       |       |       |       |       | A     | B     | ℓ     | ℓ <sub>1</sub> | L     | L1    | K     | O-Ring<br>Uniform<br>Size<br>Number |
|--------------|----------------|-------|---------------------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------|-------|-------|-------------------------------------|
|              |                |       |                           |           | h                 |       | H     |       | H     |       |       |       |       |                |       |       |       |                                     |
|              | in             | mm    |                           |           | in                | mm    | in    | mm    | in    | mm    |       |       |       |                |       |       |       |                                     |
| CSLB 4 - 4U  | 1/4            | 6.35  | 7/16-20                   | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 9/16  | 14.28 | 15.24 | 17.78 | 18.28 | 9.90           | 25.65 | 25.65 | 16.51 | -904                                |
| CSLB 6 - 6U  | 3/8            | 9.52  | 9/16-18                   | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 11/16 | 17.46 | 16.76 | 19.30 | 20.07 | 11.17          | 27.94 | 28.19 | 20.06 | -906                                |
| CSLB 8 - 8U  | 1/2            | 12.70 | 3/4-16                    | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 7/8   | 22.22 | 22.86 | 21.84 | 21.84 | 12.70          | 32.00 | 32.25 | 25.65 | -908                                |
| CSLB 12 -12U | 3/4            | 19.50 | 1-1/16-12                 | 15.74     | 1-1/8             | 28.57 | 1-1/8 | 28.57 | 1-1/4 | 31.75 | 24.38 | 21.84 | 29.71 | 16.76          | 39.87 | 47.24 | 36.57 | -912                                |
| CSLB 16 -16U | 1              | 25.40 | 1-5/16-12                 | 22.35     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 1-1/2 | 38.10 | 31.24 | 26.41 | 35.30 | 16.76          | 47.49 | 50.54 | 43.94 | -916                                |

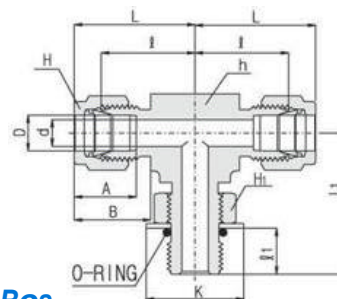
### SAE / MS Male Run Tee (Adjustable) CSRT



#### Fractional Tube To SAE / Ms Straight Thread Boss

| Part No.     | Tube O.D.<br>D |       | Straght<br>Thread<br>T(U) | d<br>Min. | Width across flat |       |       |       |       |       | A     | B     | 1     | L     | L1     | K     | O-Ring<br>Uniform<br>Size<br>Number |      |
|--------------|----------------|-------|---------------------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------------------------------------|------|
|              |                |       |                           |           | h                 |       | H     |       | H     |       |       |       |       |       |        |       |                                     |      |
|              | in             | mm    |                           |           | in                | mm    | in    | mm    | in    | mm    |       |       |       |       |        |       |                                     |      |
| CSRT 4 - 4U  | 1/4            | 6.35  | 7/16-20                   | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 9/16  | 14.28 | 15.24 | 17.78 | 18.28 | 9.90  | 25.65  | 25.65 | 16.51                               | -904 |
| CSRT 6 - 6U  | 3/8            | 9.52  | 9/16-18                   | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 11/16 | 17.46 | 16.76 | 19.30 | 20.07 | 11.17 | 27.94  | 28.19 | 20.06                               | -906 |
| CSRT 8 - 8U  | 1/2            | 12.70 | 3/4-16                    | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 7/8   | 22.22 | 22.86 | 21.84 | 21.84 | 12.70 | 32.00  | 32.25 | 25.65                               | -908 |
| CSRT 12 -12U | 3/4            | 19.50 | 1-1/16-12                 | 15.74     | 1-1/8             | 28.57 | 1-1/8 | 28.57 | 1-1/4 | 31.75 | 24.38 | 21.84 | 29.71 | 16.76 | 39.87  | 47.24 | 36.57                               | -912 |
| CSRT 16 -16U | 1              | 25.40 | 1-5/16-12                 | 22.35     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 1-1/2 | 38.10 | 31.24 | 26.42 | 35.30 | 16.76 | 47.49  | 50.54 | 43.94                               | -916 |
| CSRT 20 -20U | 1-1/4          | 31.75 | 1-5/ 8-12                 | 27.68     | 1-11/16           | 42.86 | 1-7/8 | 47.62 | 1-7/8 | 47.62 | 41.14 | 38.86 | 45.72 | 16.76 | 67.81  | 58.16 | 54.86                               | -920 |
| CSRT 24 -24U | 1-1/2          | 38.10 | 1-7/ 8-12                 | 34.03     | 2                 | 50.80 | 2-1/4 | 57.15 | 2-1/8 | 53.97 | 50.03 | 45.21 | 50.80 | 16.76 | 77.97  | 60.45 | 62.23                               | -924 |
| CSRT 32 -32U | 2              | 50.80 | 2-1/ 2-12                 | 45.97     | 2-3/4             | 69.85 | 3     | 76.20 | 2-3/4 | 69.85 | 67.56 | 62.73 | 69.85 | 16.76 | 107.18 | 71.62 | 80.26                               | -932 |

### SAE / MS Male Branch Tee (Adjustable) CSBT



#### Fractional Tube To SAE / Ms Straight Thread Bos

| Part No.     | Tube O.D.<br>D |       | Straght<br>Thread<br>T(U) | d<br>Min. | Width across flat |       |       |       |       |       | A     | B     | 1     | L     | L1     | K     | O-Ring<br>Uniform<br>Size<br>Number |      |
|--------------|----------------|-------|---------------------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------------------------------------|------|
|              |                |       |                           |           | h                 |       | H     |       | H     |       |       |       |       |       |        |       |                                     |      |
|              | in             | mm    |                           |           | in                | mm    | in    | mm    | in    | mm    |       |       |       |       |        |       |                                     |      |
| CSBT 4 - 4U  | 1/4            | 6.35  | 7/16-20                   | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 9/16  | 14.28 | 15.24 | 17.78 | 18.28 | 9.90  | 25.65  | 25.65 | 16.51                               | -904 |
| CSBT 6 - 6U  | 3/8            | 9.52  | 9/16-18                   | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 11/16 | 17.46 | 16.76 | 19.30 | 20.07 | 11.17 | 27.94  | 28.19 | 20.06                               | -906 |
| CSBT 8 - 8U  | 1/2            | 12.70 | 3/4-16                    | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 7/8   | 22.22 | 22.86 | 21.84 | 21.84 | 12.70 | 32.00  | 32.25 | 25.65                               | -908 |
| CSBT 12 -12U | 3/4            | 19.50 | 1-1/16-12                 | 15.74     | 1-1/8             | 28.57 | 1-1/8 | 28.57 | 1-1/4 | 31.75 | 24.38 | 21.84 | 29.71 | 16.76 | 39.87  | 47.24 | 36.57                               | -912 |
| CSBT 16 -16U | 1              | 25.40 | 1-5/16-12                 | 22.35     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 1-1/2 | 38.10 | 31.24 | 26.42 | 35.30 | 16.76 | 47.49  | 50.54 | 43.94                               | -916 |
| CSBT 20 -20U | 1-1/4          | 31.75 | 1-5/ 8-12                 | 27.68     | 1-11/16           | 42.86 | 1-7/8 | 47.62 | 1-7/8 | 47.62 | 41.14 | 38.86 | 45.72 | 16.76 | 67.81  | 58.16 | 54.86                               | -920 |
| CSBT 24 -24U | 1-1/2          | 38.10 | 1-7/ 8-12                 | 34.03     | 2                 | 50.80 | 2-1/4 | 57.15 | 2-1/8 | 53.97 | 50.03 | 45.21 | 50.80 | 16.76 | 77.97  | 60.45 | 62.23                               | -924 |
| CSBT 32 -32U | 2              | 50.80 | 2-1/ 2-12                 | 45.97     | 2-3/4             | 69.85 | 3     | 76.20 | 2-3/4 | 69.85 | 67.56 | 62.73 | 69.85 | 16.76 | 107.18 | 71.62 | 80.26                               | -932 |

# Tube Fittings

## O-Seal Connectors

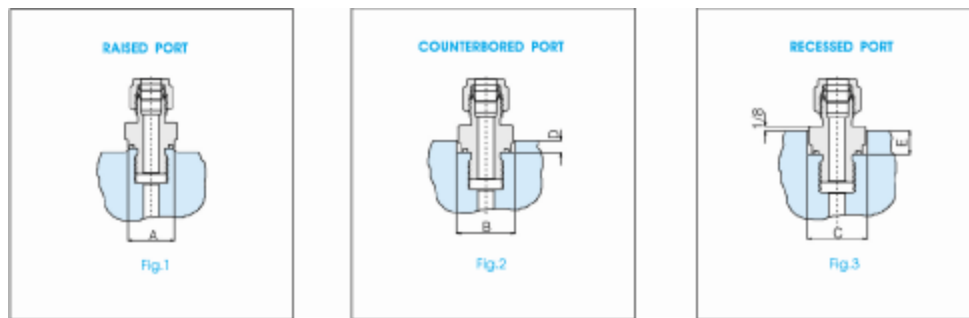
Hy-Lok O-Seal fittings can be directly installed into existing pipe thread or straight thread port. Due to short thread length, thread interference which is common on tapered thread does not occur and the leak tight seal is made by O-ring. The standard Buna-N O-ring is fully contained in a precision groove, The groove provides anti-extrusion of O-ring at high pressure and controlled squeeze for vacuum tight sealing. To provide a leak tight installation, smooth flat surface perpendicular to the axis of the threads is required.

## Installation Instructions

1. Hand tighten the O-Seal fittings in the port until O-ring compresses on the port.
2. Further snug the fitting lightly with a wrench.

Note : When installing or disconnecting tubing to or from Hy-Lok tube end, make sure that the fitting body is always held by back-up wrench. By doing this, the fitting does not turn and the proper seal is maintained.

The illustrations and table below show required mounting dimensions for O-seal connectors.

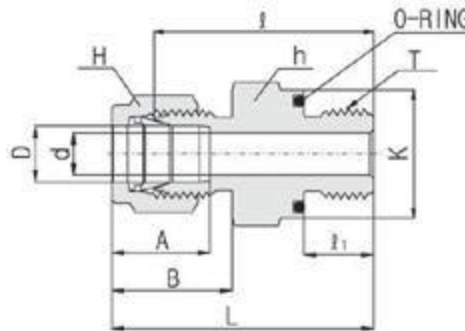
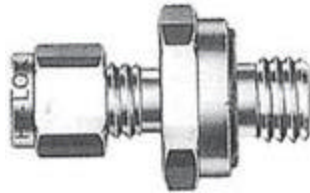


## Mounting Dimensions

| Part No.   | Straight Thread | Pipe Thread | A Min. | B Min. | C Min. | D Min. | E Min. |
|------------|-----------------|-------------|--------|--------|--------|--------|--------|
| COS 2 - 2  | 5/16-24         | -           | 12.7   | 15.0   | 16.8   | 2.3    | 5.6    |
| COP 2 - 2  | -               | 1/8 NPT     | 17.5   | 19.8   | 22.4   | 4.1    | 7.1    |
| COS 3 - 3  | 3/8-24          | -           | 14.2   | 16.8   | 19.1   | 2.3    | 5.6    |
| COS 4 - 4  | 7/16-20         | -           | 17.5   | 19.8   | 22.4   | 4.1    | 7.1    |
| COP 4 - 2  | -               | 1/8 NPT     | 17.5   | 19.8   | 22.4   | 4.1    | 7.1    |
| COP 4 - 4  | -               | 1/4NPT      | 22.1   | 24.6   | 27.7   | 4.1    | 7.9    |
| COS 5 - 5  | 1/2-20          | -           | 19.1   | 23.1   | 26.2   | 4.1    | 7.9    |
| COS 6 - 6  | 9/16-18         | -           | 20.6   | 24.6   | 27.7   | 4.1    | 7.9    |
| COP 6 - 6  | -               | 1/8 NPT     | 25.4   | 29.5   | 33.3   | 4.1    | 8.6    |
| COP 6 - 8  | -               | 1/2 NPT     | 31.0   | 34.0   | 38.9   | 5.6    | 11.2   |
| COS 8 - 8  | 3/4-16          | -           | 25.4   | 29.5   | 33.3   | 4.1    | 8.6    |
| COP8 - 8   | -               | 1/2 NPT     | 31.0   | 34.0   | 38.9   | 5.6    | 11.2   |
| COS12 - 12 | 1-1/16-12       | -           | 35.8   | 38.9   | 44.5   | 5.6    | 12.7   |
| COS16 - 16 | 1-5/16-12       | -           | 42.9   | 45.2   | 51.6   | 5.6    | 14.2   |

## Tube Fittings

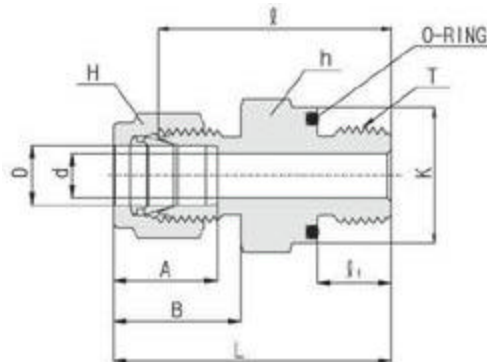
### O-Seal Straight Thread Connector COS



#### Fractional Tube To Female Straight Thread.

| Part No.     | Tube O.D.<br>D |       | Straight<br>Thread<br>T(U) | d<br>Min. | Width across flat |       |       |       | A     | B     |       | 1     | L     | O-Ring<br>Uniform<br>Size Number |
|--------------|----------------|-------|----------------------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|----------------------------------|
|              | in             | mm    |                            |           | h                 |       | H     |       |       |       |       |       |       |                                  |
|              |                |       |                            |           | in                | mm    | in    | mm    |       |       |       |       |       |                                  |
| COS 2 - 2U   | 1/8            | 3.17  | 5/16-24                    | 2.28      | 9/16              | 14.28 | 7/16  | 11.11 | 12.70 | 15.24 | 26.16 | 8.63  | 32.76 | -011                             |
| COS 3 - 3U   | 3/16           | 4.76  | 3/8-24                     | 3.04      | 5/8               | 15.87 | 1/2   | 12.70 | 13.71 | 16.00 | 27.68 | 9.65  | 34.29 | -012                             |
| COS 4 - 4U   | 1/5            | 6.35  | 7/16-20                    | 4.82      | 3/4               | 19.05 | 9/16  | 14.28 | 15.24 | 17.78 | 30.98 | 10.41 | 38.35 | -111                             |
| COS 5 - 5U   | 5/16           | 7.93  | 1/2-20                     | 6.35      | 7/8               | 22.22 | 5/8   | 15.87 | 16.25 | 18.54 | 33.27 | 11.17 | 40.64 | -112                             |
| COS 6 - 6U   | 3/8            | 9.52  | 9/16-18                    | 7.11      | 15/16             | 23.81 | 11/16 | 17.46 | 16.76 | 19.30 | 35.05 | 11.93 | 42.41 | -113                             |
| COS 8 - 8U   | 1/2            | 12.70 | 3/4-16                     | 10.41     | 1-1/8             | 28.57 | 7/8   | 22.22 | 22.86 | 21.84 | 35.81 | 11.93 | 45.97 | -116                             |
| COS 12 - 12U | 3/4            | 19.05 | 1-1/16-12                  | 15.74     | 1-1/2             | 38.10 | 1-1/8 | 28.57 | 24.38 | 21.84 | 42.16 | 14.22 | 52.32 | -215                             |
| COS 16 - 16U | 1              | 25.40 | 1-5/16-12                  | 22.35     | 1-3/4             | 44.45 | 1-1/2 | 38.10 | 31.24 | 26.41 | 45.97 | 14.22 | 58.16 | -219                             |

### O-Seal Pipe Thread Connector COP



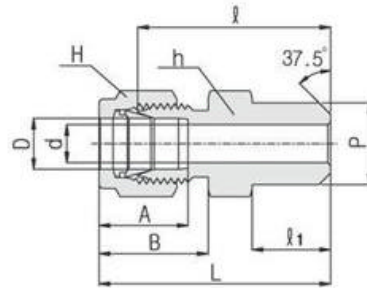
#### Fractional Tube To Female NPT Thread.

| Part No.  | Tube O.D.<br>D |       | Straight<br>Thread<br>T*(NPT) | d<br>Min. | Width across flat |       |       |       | A     | B     |       | 1     | L     | O-Ring<br>Uniform<br>Size Number |
|-----------|----------------|-------|-------------------------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|----------------------------------|
|           | in             | mm    |                               |           | h                 |       | H     |       |       |       |       |       |       |                                  |
|           |                |       |                               |           | in                | mm    | in    | mm    |       |       |       |       |       |                                  |
| COP 2 - 2 | 1/8            | 3.17  | 1/8                           | 2.28      | 3/4               | 19.05 | 7/16  | 11.11 | 12.70 | 15.24 | 26.16 | 7.11  | 32.76 | -111                             |
| COP 4 - 2 | 1/4            | 6.35  | 1/8                           | 4.82      | 3/4               | 19.05 | 9/16  | 14.28 | 15.24 | 17.78 | 27.68 | 7.11  | 35.05 | -111                             |
| COP 4 - 4 | 1/4            | 6.35  | 1/4                           | 4.82      | 15/16             | 23.81 | 9/16  | 14.28 | 15.24 | 17.78 | 30.98 | 9.65  | 38.35 | -113                             |
| COP 6 - 4 | 3/8            | 9.52  | 1/4                           | 7.11      | 15/16             | 23.81 | 11/16 | 17.46 | 16.76 | 19.30 | 32.51 | 9.65  | 39.87 | -113                             |
| COP 6 - 6 | 3/8            | 9.52  | 3/8                           | 7.11      | 1-1/8             | 28.57 | 11/16 | 17.46 | 16.76 | 19.30 | 34.03 | 10.41 | 41.40 | -116                             |
| COP 6 - 8 | 3/8            | 9.52  | 1/2                           | 7.11      | 1-5/16            | 33.33 | 11/16 | 17.46 | 16.76 | 19.30 | 39.62 | 13.46 | 46.99 | -212                             |
| COP 8 - 8 | 1/2            | 12.70 | 1/2                           | 10.41     | 1-5/16            | 33.33 | 7/8   | 22.22 | 22.86 | 21.84 | 39.62 | 13.46 | 49.78 | -212                             |

\*ISO Parallel Threads are available upon request.

## Tube Fittings

### Male Pipe Weld Connector CWC



#### Fractional Tube To Pipe

| Part No.     | Tube O.D.<br>D |       | Male Pipe Size<br>P |       | d<br>Min. | Width across flat |       |       |       | A     | B     |       | 1     | L      |
|--------------|----------------|-------|---------------------|-------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|--------|
|              | in             | mm    | Nom.                | O.D.  |           | h                 |       | H     |       |       |       |       |       |        |
|              |                |       |                     |       |           | in                | mm    | in    | mm    |       |       |       |       |        |
| CWC 2 - 2P   | 1/8            | 3.17  | 1/8                 | 10.30 | 2.28      | 7/16              | 11.11 | 7-16  | 11.11 | 12.70 | 15.24 | 23.87 | 9.65  | 31.24  |
| CWC 3 - 2P   | 3/16           | 4.6   | 1/8                 | 10.30 | 3.04      | 7/16              | 11.11 | 1/2   | 12.70 | 13.71 | 16.00 | 24.63 | 9.65  | 31.24  |
| CWC 4 - 2P   | 1/4            | 6.35  | 1/8                 | 10.30 | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 25.40 | 9.65  | 32.76  |
| CWC 4 - 4P   | 1/4            | 6.35  | 1/4                 | 13.70 | 4.82      | 9/16              | 14.28 | 9/16  | 14.28 | 15.24 | 17.78 | 30.48 | 14.22 | 37.84  |
| CWC 5 - 2P   | 5/16           | 7.93  | 1/8                 | 10.30 | 5.08      | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 18.54 | 26.67 | 9.65  | 34.03  |
| CWC 5 - 4P   | 5/16           | 7.93  | 1/4                 | 13.70 | 6.35      | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 18.54 | 31.24 | 14.22 | 38.60  |
| CWC 6 - 4P   | 3/8            | 9.52  | 1/4                 | 13.70 | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 16.67 | 19.30 | 32.51 | 14.22 | 39.87  |
| CWC 6 - 6P   | 3/8            | 9.52  | 3/8                 | 17.10 | 7.11      | 11/16             | 17.46 | 11/16 | 17.46 | 16.67 | 19.30 | 32.51 | 14.22 | 39.87  |
| CWC 6 - 8P   | 3/8            | 9.52  | 1/2                 | 21.30 | 7.11      | 7/8               | 22.22 | 11/16 | 17.46 | 16.67 | 19.30 | 38.86 | 19.05 | 43.23  |
| CWC 6 - 12P  | 3/8            | 9.52  | 3/4                 | 26.67 | 7.11      | 1-1/16            | 26.98 | 11/16 | 17.46 | 16.67 | 19.30 | 40.38 | 19.05 | 47.75  |
| CWC 8 - 6P   | 1/2            | 12.70 | 3/8                 | 17.10 | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 33.27 | 14.22 | 43.23  |
| CWC 8 - 8P   | 1/2            | 12.70 | 1/2                 | 21.30 | 10.41     | 7/8               | 22.22 | 7/8   | 22.22 | 22.86 | 21.84 | 38.86 | 19.05 | 49.02  |
| CWC 8 - 12P  | 1/2            | 12.70 | 3/4                 | 26.67 | 10.41     | 1-1/16            | 26.98 | 7/8   | 22.22 | 22.86 | 21.84 | 40.38 | 19.05 | 50.54  |
| CWC 10 - 8P  | 5/8            | 15.87 | 1/2                 | 21.30 | 12.70     | 15/16             | 23.81 | 1     | 25.40 | 24.38 | 21.84 | 38.86 | 19.05 | 49.02  |
| CWC 12 - 12P | 3/4            | 19.05 | 3/4                 | 26.67 | 15.74     | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 40.38 | 19.05 | 50.54  |
| CWC 16 - 16P | 1              | 25.40 | 1                   | 33.40 | 22.35     | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 50.03 | 23.87 | 62.23  |
| CWC 20 - 20P | 1-1/4          | 31.75 | 1-1/4               | 42.16 | 27.68     | 1-3/4             | 44.45 | 2     | 50.80 | 41.14 | 38.86 | 55.11 | 23.87 | 77.21  |
| CWC 24 - 24P | 1-1/2          | 38.10 | 1-1/2               | 48.26 | 34.03     | 2-1/8             | 53.97 | 2-1/4 | 57.15 | 50.03 | 45.21 | 61.72 | 26.16 | 88.90  |
| CWC 32 - 32P | 2              | 50.80 | 2                   | 60.32 | 47.75     | 2-3/4             | 69.85 | 3     | 76.20 | 67.56 | 62.73 | 76.20 | 26.92 | 113.53 |

#### Metric Tube To Pipe

| Part No.      | Tube O.D.<br>D | Male Pipe Size<br>P |      | d<br>Min. | Width across flat |    | A    | B    |      | 1    | L    |
|---------------|----------------|---------------------|------|-----------|-------------------|----|------|------|------|------|------|
|               |                | Nom.                | O.D. |           | h                 | H  |      |      |      |      |      |
| CWC 3M - 2P   | 3              | 1/8                 | 10.3 | 2.4       | 12                | 12 | 12.9 | 15.3 | 23.1 | 9.7  | 29.7 |
| CWC 4M - 2P   | 4              | 1/8                 | 10.3 | 2.4       | 12                | 12 | 13.7 | 16.1 | 24.1 | 9.7  | 30.7 |
| CWC 6M - 2P   | 6              | 1/8                 | 10.3 | 4.8       | 14                | 14 | 15.3 | 17.7 | 25.4 | 9.7  | 32.8 |
| CWC 6M - 4P   | 6              | 1/4                 | 13.7 | 4.8       | 14                | 14 | 15.3 | 17.7 | 30.2 | 14.2 | 37.6 |
| CWC 8M - 2P   | 8              | 1/8                 | 10.3 | 5.1       | 15                | 16 | 16.2 | 18.6 | 26.7 | 9.7  | 34.2 |
| CWC 8M - 4P   | 8              | 1/4                 | 13.7 | 6.4       | 15                | 16 | 16.2 | 18.6 | 31.2 | 14.2 | 38.7 |
| CWC 8M - 8P   | 8              | 1/2                 | 21.3 | 6.4       | 22                | 16 | 16.2 | 18.6 | 37.3 | 19.0 | 44.8 |
| CWC 10M - 4P  | 10             | 1/4                 | 13.7 | 7.1       | 18                | 19 | 17.2 | 19.5 | 33.3 | 14.2 | 40.9 |
| CWC 10M - 6P  | 10             | 3/8                 | 17.1 | 7.9       | 18                | 19 | 17.2 | 19.5 | 32.5 | 14.2 | 40.1 |
| CWC 10M - 8P  | 10             | 1/2                 | 21.3 | 7.9       | 22                | 19 | 17.2 | 19.5 | 38.1 | 19.0 | 45.7 |
| CWC 12M - 4P  | 12             | 1/4                 | 13.7 | 7.1       | 22                | 22 | 22.8 | 22.0 | 33.3 | 14.2 | 43.4 |
| CWC 12M - 6P  | 12             | 3/8                 | 17.1 | 9.5       | 22                | 22 | 22.8 | 22.0 | 33.3 | 14.2 | 43.4 |
| CWC 12M - 8P  | 12             | 1/2                 | 21.3 | 9.5       | 22                | 22 | 22.8 | 22.0 | 38.1 | 19.0 | 48.2 |
| CWC 14M - 6P  | 14             | 1/2                 | 17.1 | 10.3      | 24                | 25 | 24.4 | 22.0 | 34.0 | 14.2 | 44.1 |
| CWC 15M - 8P  | 15             | 3/8                 | 21.3 | 11.9      | 24                | 25 | 24.4 | 22.0 | 38.9 | 19.0 | 49.0 |
| CWC 16M - 8P  | 16             | 1/2                 | 21.3 | 12.7      | 24                | 25 | 24.4 | 22.0 | 38.9 | 19.0 | 49.0 |
| CWC 18M - 8P  | 18             | 1/2                 | 21.3 | 13.5      | 27                | 30 | 24.4 | 22.0 | 40.4 | 19.0 | 50.5 |
| CWC 32M - 20P | 32             | 1-1/4               | 42.2 | 28.6      | 46                | 50 | 42.0 | 41.6 | 56.6 | 23.9 | 79.6 |
| CWC 38M - 24P | 38             | 1-1/2               | 48.3 | 33.7      | 55                | 60 | 49.4 | 47.9 | 64.0 | 26.2 | 91.6 |

Note : All Hy - Lok pipe weld ends have schedule 80 wall thickness or greater.

#### Welding Precautions

If you weld the fully assembled fittings, the assembly can be distorted and the Lubricant on the nut can be removed, which is not desirable.

To avoid this, remove nut and ferrules from the body and cover thread and seat area with another nut or a plug in

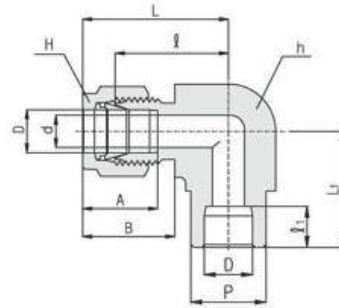
order to protect them from weld splatter. (Just finger tighten for easy removal)

Provide a proper heat sink for heat dissipation.

After weld, put the nut and ferrule in place.

## Tube Fittings

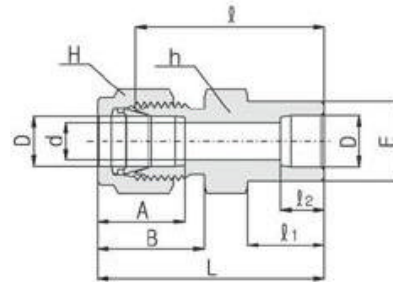
### Male Pipe Weld Elbow CLW



#### Fractional Tube Pipe

| Part No.     | Tube O.D.<br>D |       | Pipe Weld Size<br>P |       | d<br>Min. | Width across flat |       |       |       | A     | B     | ℓ     | ℓ <sub>1</sub> | L     | L1    |
|--------------|----------------|-------|---------------------|-------|-----------|-------------------|-------|-------|-------|-------|-------|-------|----------------|-------|-------|
|              | in             | mm    | Nom.                | O.D.  |           | h                 |       | H     |       |       |       |       |                |       |       |
|              |                |       |                     |       |           | in                | mm    | in    | mm    |       |       |       |                |       |       |
| CLW 2 - 2P   | 1/8            | 3.17  | 1/8                 | 10.30 | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 19.55 | 9.65           | 26.92 | 18.79 |
| CLW 4 - 4P   | 1/4            | 6.35  | 1/4                 | 13.70 | 4.82      | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 19.55 | 14.22          | 26.92 | 23.36 |
| CLW 6 - 4P   | 3/8            | 9.52  | 1/4                 | 13.70 | 7.11      | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 23.11 | 14.22          | 30.48 | 25.40 |
| CLW 8 - 8P   | 1/2            | 12.70 | 1/2                 | 21.30 | 10.41     | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 19.05          | 36.06 | 33.02 |
| CLW 12 - 12P | 3/4            | 19.05 | 3/4                 | 26.67 | 15.74     | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 29.71 | 19.05          | 39.87 | 36.83 |

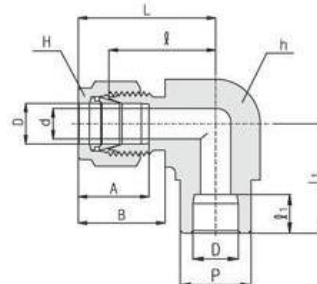
### Tube Socket Weld Connector CSWC



#### Fractional Tubes

| Part No.   | Tube O.D.<br>D |       | d<br>Min. | E     | Width across flat |       |       |       | A     | B     | ℓ     | ℓ <sub>1</sub> | ℓ <sub>2</sub> | L     |
|------------|----------------|-------|-----------|-------|-------------------|-------|-------|-------|-------|-------|-------|----------------|----------------|-------|
|            | in             | mm    |           |       | h                 |       | H     |       |       |       |       |                |                |       |
|            |                |       |           |       | in                | mm    | in    | mm    |       |       |       |                |                |       |
| CSWC 2-2   | 1/8            | 3.17  | 2.28      | 7.87  | 7/16              | 11.11 | 7/16  | 11.11 | 12.70 | 15.24 | 22.35 | 8.63           | 6.35           | 28.95 |
| CSWC 4-4   | 1/4            | 6.35  | 4.82      | 11.17 | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 26.16 | 10.41          | 7.87           | 33.52 |
| CSWC 6-6   | 3/8            | 9.52  | 7.11      | 15.74 | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 30.22 | 11.93          | 9.65           | 37.59 |
| CSWC 8-8   | 1/2            | 12.70 | 10.41     | 19.05 | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 30.98 | 11.93          | 12.70          | 41.14 |
| CSWC 12-12 | 3/4            | 19.05 | 15.74     | 26.67 | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 33.27 | 11.93          | 14.22          | 43.43 |
| CSWC 16-16 | 1              | 25.40 | 22.35     | 33.27 | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 40.38 | 14.22          | 19.05          | 52.57 |

### Tube Socket Weld Elbow CLSW

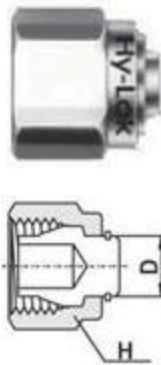


#### Fractional Tubes

| Part No.   | Tube O.D.<br>D |       | d<br>Min. | E     | Width across flat |       |       |       | A     | B     | ℓ     | ℓ <sub>1</sub> | L     | L1    |
|------------|----------------|-------|-----------|-------|-------------------|-------|-------|-------|-------|-------|-------|----------------|-------|-------|
|            | in             | mm    |           |       | h                 |       | H     |       |       |       |       |                |       |       |
|            |                |       |           |       | in                | mm    | in    | mm    |       |       |       |                |       |       |
| CLSW 4-4   | 1/4            | 6.35  | 4.82      | 12.70 | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 19.55 | 7.87           | 26.92 | 19.55 |
| CLSW 6-6   | 3/8            | 9.52  | 7.11      | 15.74 | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 23.11 | 9.65           | 30.48 | 23.11 |
| CLSW 8-8   | 1/2            | 12.70 | 10.41     | 20.57 | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 25.90 | 12.70          | 36.06 | 25.90 |
| CLSW 12-12 | 3/4            | 19.05 | 15.74     | 26.92 | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 29.71 | 14.22          | 39.87 | 29.71 |
| CLSW 16-16 | 1              | 25.40 | 22.35     | 35.05 | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 36.83 | 19.05          | 49.02 | 36.83 |

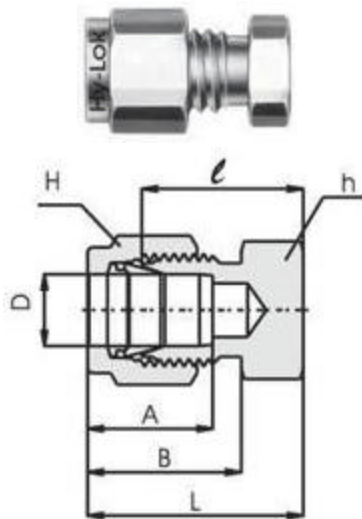
## Tube Fittings

### Plug for Fitting Port CPA



**Installation Instruction**  
With wrench, 1/4 turn fro finger-tight position.  
(1/8 turn for 1/8" 3/16" and 2mm, 3mm, 4mm  
size plug, 1/2 turn for over 1" and 25mm)

### Cap for Tube End CCA



**Installation Instruction**  
Just follow Hy-Lok installation instruction on  
page. 51

### Fractional Tubes

| Part No. | Tube O.D.<br>D |       | Width across flat<br>H |       |
|----------|----------------|-------|------------------------|-------|
|          | in             | mm    | in                     | mm    |
| CPA-1    | 1/16           | 1.58  | 5/16                   | 7.94  |
| CPA-2    | 1/8            | 3.17  | 7/16                   | 11.11 |
| CPA-3    | 3/16           | 4.76  | 1/2                    | 12.70 |
| CPA-4    | 1/4            | 6.35  | 9/16                   | 14.28 |
| CPA-5    | 5/16           | 7.93  | 5/8                    | 15.87 |
| CPA-6    | 3/8            | 9.52  | 11/16                  | 17.46 |
| CPA-8    | 1/2            | 12.70 | 7/8                    | 22.22 |
| CPA-10   | 5/8            | 15.87 | 1                      | 25.40 |
| CPA-12   | 3/4            | 19.05 | 1-1/8                  | 28.57 |
| CPA-14   | 7/8            | 22.22 | 1-1/4                  | 31.75 |
| CPA-16   | 1              | 25.40 | 1-1/2                  | 38.10 |
| CPA-20   | 1-1/4          | 31.75 | 1-7/8                  | 47.62 |
| CPA-24   | 1-1/2          | 38.10 | 2-1/4                  | 57.15 |
| CPA-32   | 2              | 50.80 | 3                      | 76.20 |

Plugs unused prot of metric Hy-Lok fittings.

### Metric Tubes

| Part No. | Tube O.D.<br>D | Width across<br>flat<br>H | Part No. | Tube O.D.<br>D | Width across<br>flat<br>H |
|----------|----------------|---------------------------|----------|----------------|---------------------------|
|          |                |                           |          |                |                           |
| CPA-2M   | 2              | 12                        | CPA-16M  | 16             | 25                        |
| CPA-3M   | 3              | 12                        | CPA-18M  | 18             | 30                        |
| CPA-4M   | 4              | 12                        | CPA-20M  | 20             | 32                        |
| CPA-6M   | 6              | 14                        | CPA-22M  | 22             | 32                        |
| CPA-8M   | 8              | 16                        | CPA-25M  | 25             | 38                        |
| CPA-10M  | 10             | 19                        | CPA-28M  | 28             | 46                        |
| CPA-12M  | 12             | 22                        | CPA-32M  | 32             | 50                        |
| CPA-15M  | 15             | 25                        | CPA-38M  | 38             | 60                        |

Plugs unused prot of metric Hy-Lok fittings.

### Fractional Tubes

| Part No. | Tube O.D.<br>D |       | Width across flat |       |       |       | A     | B     |       | L     |
|----------|----------------|-------|-------------------|-------|-------|-------|-------|-------|-------|-------|
|          | in             | mm    | h                 |       | H     |       |       |       |       |       |
|          |                |       | in                | mm    | in    | mm    |       |       |       |       |
| CCA-1    | 1/16           | 1.58  | 5/16              | 7.94  | 5/16  | 7.94  | 8.63  | 10.92 | 11.20 | 14.18 |
| CCA-2    | 1/8            | 3.17  | 7/16              | 11.11 | 7/16  | 11.11 | 12.70 | 15.24 | 13.46 | 20.06 |
| CCA-3    | 3/16           | 4.76  | 7/16              | 11.11 | 1/2   | 12.70 | 13.71 | 16.00 | 14.73 | 21.33 |
| CCA-4    | 1/4            | 6.35  | 1/2               | 12.70 | 9/16  | 14.28 | 15.24 | 17.78 | 16.00 | 23.26 |
| CCA-5    | 5/16           | 7.93  | 9/16              | 14.28 | 5/8   | 15.87 | 16.25 | 18.54 | 17.01 | 24.38 |
| CCA-6    | 3/8            | 9.52  | 5/8               | 15.87 | 11/16 | 17.46 | 16.76 | 19.30 | 18.28 | 25.65 |
| CCA-8    | 1/2            | 12.70 | 13/16             | 20.63 | 7/8   | 22.22 | 22.86 | 21.84 | 19.05 | 29.21 |
| CCA-10   | 5/8            | 15.87 | 15/16             | 23.81 | 1     | 25.40 | 24.38 | 21.84 | 19.81 | 29.97 |
| CCA-12   | 3/4            | 19.05 | 1-1/16            | 26.98 | 1-1/8 | 28.57 | 24.38 | 21.84 | 21.33 | 31.49 |
| CCA-14   | 7/8            | 22.22 | 1-3/16            | 30.16 | 1-1/4 | 31.75 | 25.90 | 21.84 | 23.87 | 34.03 |
| CCA-16   | 1              | 25.40 | 1-3/8             | 34.92 | 1-1/2 | 38.10 | 31.24 | 26.41 | 26.16 | 38.35 |
| CCA-20   | 1-1/4          | 31.75 | 1-3/4             | 44.45 | 1-7/8 | 47.62 | 41.14 | 38.86 | 32.24 | 53.34 |
| CCA-24   | 1-1/2          | 38.10 | 2-1/8             | 53.97 | 2-1/4 | 57.15 | 50.03 | 45.21 | 37.33 | 64.51 |
| CCA-32   | 2              | 50.80 | 2-3/4             | 69.85 | 3     | 76.20 | 67.56 | 62.73 | 49.27 | 86.61 |

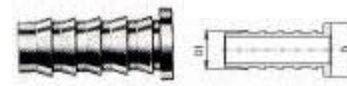
### Metric Tubes

| Part No. | Tube O.D.<br>D | Width across flat |    | A    | B    |      | L    |
|----------|----------------|-------------------|----|------|------|------|------|
|          |                | h                 | H  |      |      |      |      |
| CCA-2M   | 2              | 12                | 12 | 12.9 | 15.3 | 13.5 | 20.1 |
| CCA-3M   | 3              | 12                | 12 | 12.9 | 15.3 | 13.5 | 20.1 |
| CCA-4M   | 4              | 12                | 12 | 13.7 | 16.1 | 14.7 | 21.3 |
| CCA-6M   | 6              | 14                | 14 | 15.3 | 17.7 | 15.7 | 23.1 |
| CCA-8M   | 8              | 15                | 16 | 16.2 | 18.6 | 17.0 | 24.5 |
| CCA-10M  | 10             | 18                | 19 | 17.2 | 19.5 | 19.0 | 26.6 |
| CCA-12M  | 12             | 22                | 22 | 22.8 | 22.0 | 19.0 | 29.1 |
| CCA-15M  | 15             | 24                | 25 | 24.4 | 22.0 | 19.8 | 29.9 |
| CCA-16M  | 16             | 24                | 25 | 24.4 | 22.0 | 19.8 | 29.9 |
| CCA-18M  | 18             | 27                | 30 | 24.4 | 22.0 | 21.3 | 31.4 |
| CCA-20M  | 20             | 30                | 32 | 26.0 | 22.0 | 23.9 | 34.0 |
| CCA-22M  | 22             | 30                | 32 | 26.0 | 22.0 | 23.9 | 34.0 |
| CCA-25M  | 25             | 35                | 38 | 31.3 | 26.5 | 26.2 | 38.5 |
| CCA-28M  | 28             | 41                | 46 | 36.6 | 36.6 | 27.7 | 48.5 |
| CCA-32M  | 32             | 46                | 50 | 42.0 | 41.6 | 32.8 | 55.8 |
| CCA-38M  | 38             | 55                | 60 | 49.4 | 47.9 | 37.8 | 65.4 |

## Tube Fittings

### Tube Insert for Nylon or Soft Plastic Tubing CI

**Hy-Lok Tube Inserts** are used to secure the nylon or other soft plastic tubing to Hy-Lok Tube fittings. For, right choice of Hy-Lok tube insert, check if OD and ID of the tubing are the same as dimension D and D<sub>1</sub> of tube insert, respectively.



#### Fractional Tubes

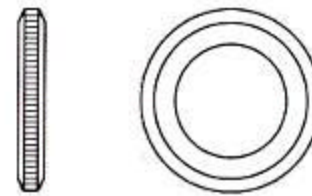
| Part No. | Tube O.D. |       |                |       |
|----------|-----------|-------|----------------|-------|
|          | D         |       | D <sub>1</sub> |       |
|          | in        | mm    | in             | mm    |
| CI3-2    | 3/16      | 4.76  | 1/8            | 3.17  |
| CI4-2    | 1/4       | 6.35  | 1/8            | 3.17  |
| CI4-3    | 1/4       | 6.35  | 3/16           | 4.76  |
| CI5-2    | 5/16      | 7.93  | 1/8            | 3.17  |
| CI5-3    | 5/16      | 7.93  | 3/16           | 4.76  |
| CI5-4    | 5/16      | 7.93  | 1/4            | 6.35  |
| CI6-3    | 3/8       | 9.52  | 3/16           | 4.76  |
| CI6-4    | 3/8       | 9.52  | 1/4            | 6.35  |
| CI8-4    | 1/2       | 12.7  | 1/4            | 6.35  |
| CI8-6    | 1/2       | 12.7  | 3/8            | 9.52  |
| CI10-6   | 5/8       | 15.87 | 3/8            | 9.52  |
| CI10-8   | 5/8       | 15.87 | 1/2            | 12.7  |
| CI12-8   | 3/4       | 19.05 | 1/2            | 12.7  |
| CI12-10  | 3/4       | 19.05 | 5/8            | 15.87 |
| CI16-12  | 1         | 25.4  | 3/4            | 19.05 |

#### Metric Tubes

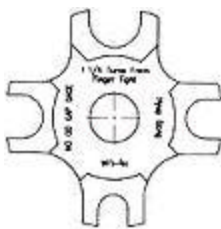
| Part No. | Tube O.D. |                |
|----------|-----------|----------------|
|          | D         | D <sub>1</sub> |
| CI       | 6         | 4              |
| CI       | 8         | 6              |
| CI       | 10        | 8              |
| CI       | 12        | 8              |
| CI       | 12        | 10             |

### Sure Ring Against Overtight CCL

**Hy-Lok Sure Ring** is especially useful when you install Hy-Lok fittings in small space such as in a cabinet where it is practically impossible to apply to apply the standard installation procedures. (i.e., 1 1/4 turns or 3/4 turns from finger tight) It ensures sufficient tightening and protects over-tightening. For installation, insert Sure Ring between the nut and the body before assembly, and then tighten the nut until being blocked by the sure ring.



### Gap Gauge for Gap Inspection CIG



#### Multiple Sizes

| Part No.   | Tube O.D.<br>in/mm |     |           |      |
|------------|--------------------|-----|-----------|------|
| CIG 46810M | 1/4(mm)            | 3/8 | 1/2(12mm) | 10mm |

#### Fractional Tubes

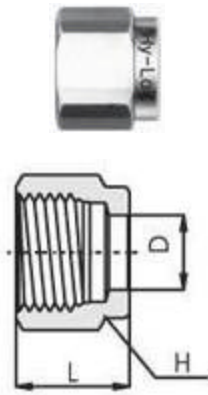
| Part No. | Tube O.D. |       |
|----------|-----------|-------|
|          | in        | mm    |
| CCL - 2  | 1/8       | 3.17  |
| CCL - 4  | 1/4       | 6.35  |
| CCL - 6  | 3/8       | 9.52  |
| CCL - 8  | 1/2       | 12.70 |
| CCL - 12 | 3/4       | 19.05 |
| CCL - 16 | 1         | 25.40 |

#### Metric Tubes

| Part No   | Tube O.D. |
|-----------|-----------|
| CCL - 3M  | 3         |
| CCL - 6M  | 6         |
| CCL - 10M | 10        |
| CCL - 12M | 12        |
| CCL - 18M | 18        |
| CCL - 20M | 20        |
| CCL - 25M | 25        |

# Tube Fittings

## Nut CN



### Fractional Tubes

| Part No. | Tube O.D.<br>D |       | Width across<br>flat<br>H |       | L     |
|----------|----------------|-------|---------------------------|-------|-------|
|          | in             | mm    | in                        | mm    |       |
| CN - 1   | 1/16           | 1.58  | 5/16                      | 7.94  | 7.90  |
| CN - 2   | 1/8            | 3.17  | 7/16                      | 11.11 | 11.93 |
| CN - 3   | 3/16           | 4.76  | 1/2                       | 12.70 | 11.93 |
| CN - 4   | 1/4            | 6.35  | 9/16                      | 14.28 | 12.70 |
| CN - 5   | 5/16           | 7.93  | 5/8                       | 15.87 | 13.46 |
| CN - 6   | 3/8            | 9.52  | 11/16                     | 17.46 | 14.22 |
| CN - 8   | 1/2            | 12.70 | 7/8                       | 22.22 | 17.52 |
| CN - 10  | 5/8            | 15.87 | 1                         | 25.40 | 17.52 |
| CN - 12  | 3/4            | 19.05 | 1-1/8                     | 28.57 | 17.52 |
| CN - 14  | 7/8            | 22.22 | 1-1/4                     | 31.75 | 17.52 |
| CN - 16  | 1              | 25.40 | 1-1/2                     | 38.10 | 20.57 |
| CN - 20  | 1-1/4          | 31.75 | 1-7/8                     | 47.62 | 31.75 |
| CN - 24  | 1-1/2          | 38.10 | 2-1/4                     | 57.15 | 38.10 |
| CN - 32  | 2              | 50.80 | 3                         | 76.20 | 52.32 |

### Metric Tubes

| Part No. | Tube<br>O.D.<br>D | Width<br>across<br>flat<br>H | L    |
|----------|-------------------|------------------------------|------|
| CN - 2M  | 3                 | 12                           | 11.9 |
| CN - 3M  | 3                 | 12                           | 11.9 |
| CN - 4M  | 4                 | 12                           | 11.9 |
| CN - 6M  | 6                 | 14                           | 12.7 |
| CN - 8M  | 8                 | 16                           | 13.5 |
| CN - 10M | 10                | 19                           | 15.1 |
| CN - 12M | 12                | 22                           | 17.4 |
| CN - 15M | 15                | 25                           | 17.4 |
| CN - 16M | 16                | 25                           | 17.4 |
| CN - 18M | 18                | 30                           | 17.4 |
| CN - 20M | 20                | 32                           | 17.4 |
| CN - 22M | 22                | 32                           | 17.4 |
| CN - 25M | 25                | 38                           | 20.6 |
| CN - 28M | 28                | 46                           | 30.6 |
| CN - 32M | 32                | 50                           | 34.4 |
| CN - 38M | 38                | 60                           | 40.6 |

## Front Ferrule CFF



### Fractional Tubes

| Part No. | Tube O.D.<br>D |       |
|----------|----------------|-------|
|          | in             | mm    |
| CFF - 1  | 1/16           | 1.58  |
| CFF - 2  | 1/8            | 3.17  |
| CFF - 3  | 3/16           | 4.76  |
| CFF - 4  | 1/4            | 6.35  |
| CFF - 5  | 5/16           | 7.93  |
| CFF - 6  | 3/8            | 9.52  |
| CFF - 8  | 1/2            | 12.70 |
| CFF - 10 | 5/8            | 15.87 |
| CFF - 12 | 3/4            | 19.05 |
| CFF - 14 | 7/8            | 22.22 |
| CFF - 16 | 1              | 25.40 |
| CFF - 20 | 1-1/4          | 31.75 |
| CFF - 24 | 1-1/2          | 38.10 |
| CFF - 32 | 2              | 50.80 |

### Metric Tubes

| Part No.  | Tube<br>O.D.<br>D |
|-----------|-------------------|
| CFF - 2M  | 2                 |
| CFF - 3M  | 3                 |
| CFF - 4M  | 4                 |
| CFF - 6M  | 6                 |
| CFF - 8M  | 8                 |
| CFF - 10M | 10                |
| CFF - 12M | 12                |
| CFF - 15M | 15                |
| CFF - 16M | 16                |
| CFF - 18M | 18                |
| CFF - 20M | 20                |
| CFF - 22M | 22                |
| CFF - 25M | 25                |
| CFF - 28M | 28                |
| CFF - 32M | 32                |
| CFF - 38M | 38                |

## Back Ferrule CFB



### Fractional Tubes

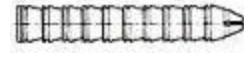
| Part No. | Tube O.D.<br>D |       |
|----------|----------------|-------|
|          | in             | mm    |
| CFB - 1  | 1/16           | 1.58  |
| CFB - 2  | 1/8            | 3.17  |
| CFB - 3  | 3/16           | 4.76  |
| CFB - 4  | 1/4            | 6.35  |
| CFB - 5  | 5/16           | 7.93  |
| CFB - 6  | 3/8            | 9.52  |
| CFB - 8  | 1/2            | 12.70 |
| CFB - 10 | 5/8            | 15.87 |
| CFB - 12 | 3/4            | 19.05 |
| CFB - 14 | 7/8            | 22.22 |
| CFB - 16 | 1              | 25.40 |
| CFB - 20 | 1-1/4          | 31.75 |
| CFB - 24 | 1-1/2          | 38.10 |
| CFB - 32 | 2              | 50.80 |

### Metric Tubes

| Part No.  | Tube<br>O.D.<br>D |
|-----------|-------------------|
| CFB - 2M  | 2                 |
| CFB - 3M  | 3                 |
| CFB - 4M  | 4                 |
| CFB - 6M  | 6                 |
| CFB - 8M  | 8                 |
| CFB - 10M | 10                |
| CFB - 12M | 12                |
| CFB - 15M | 15                |
| CFB - 16M | 16                |
| CFB - 18M | 18                |
| CFB - 20M | 20                |
| CFB - 22M | 22                |
| CFB - 25M | 25                |
| CFB - 28M | 28                |
| CFB - 32M | 32                |
| CFB - 38M | 38                |

## Tube Fittings

### Ferrule Set CFS



#### Fractional Tubes

| Part No. | Tube O.D.<br>D |       |
|----------|----------------|-------|
|          | in             | mm    |
| CFS - 1  | 1/16           | 1.58  |
| CFS - 2  | 1/8            | 3.17  |
| CFS - 3  | 3/16           | 4.76  |
| CFS - 4  | 1/4            | 6.35  |
| CFS - 5  | 5/16           | 7.93  |
| CFS - 6  | 3/8            | 9.52  |
| CFS - 8  | 1/2            | 12.70 |
| CFS - 10 | 5/8            | 15.87 |
| CFS - 12 | 3/4            | 19.05 |
| CFS - 14 | 7/8            | 22.22 |
| CFS - 16 | 1              | 25.40 |

#### Metric Tubes

| Part No.  | Tube<br>O.D.<br>D |
|-----------|-------------------|
| CFS - 2M  | 2                 |
| CFS - 3M  | 3                 |
| CFS - 4M  | 4                 |
| CFS - 6M  | 6                 |
| CFS - 8M  | 8                 |
| CFS - 10M | 10                |
| CFS - 12M | 12                |
| CFS - 15M | 15                |
| CFS - 16M | 16                |
| CFS - 18M | 18                |
| CFS - 20M | 20                |
| CFS - 22M | 22                |
| CFS - 25M | 25                |

## Installations Instructions

### Tube Preparations

1. Check if tubing O.D., wall thickness, circularity, hardness and their tolerances are within specs for your application. Also check if surface is free from scratches and dirt.
2. Make a square cut, (Always use proper tube cutter. Improper tube cutter can cause excessive tube deformation at the tube end.)
3. Remove burs from inner and outer edges of tubing.

### Installation Instructions form Hy-Lok Fitting of 1 inch or 25mm and Under

Hy-Lok fittings are wupplied fully assembled / finger tight and are readily usable. A leak tight and mechanically safe installation is easily made by just turning the nut 1 a/4 turns (or 3/4 turn for small sizes.)



1. Insert prepared tubing into Hy-Lok fitting until tubing end is firmly seated on the body shoulder and make sure the nut is hand tight.(Do not force the tubing into ferrule if it does not go in easily. it may be burred or oval, or there may be foreign materials inside the fitting.)



2. Mark the nut at 9 o'clock position for identification of starting point.
3. Tighten the nut 1 1/4 turns\* with a wrench keeping the fitting body steady with a back-up wrench. When the nut is tightened 1 1/4 turns, the mark at 9 o'clock position before tightening will be at 12 o'clock position.

**Note\*** : Only 3/4 turn from finger tight is required for 1/16", 1/8", 3/16", 2mm, 3mm, and 4mm sizes.

### High Pressure Applications

Even though Hy-Lok fittings are designed to accept the tube variations specified in ASTM or equivalent specifications, it is more desirable to have common starting point, or snug position, for high pressure applications. It is obtained by slightly tightening the nut until the tubing is not able to be rotated by hand.

Make sure that the tubing end is fully seated, 1 1/4 turns (or 3/4 turn for small size fittings) from snug position will ensure reliable leak tight installation.

### Reassembling Instructions

Hy-Lok fittings can be disassembled and reassembled many times and leak tight performance can be obtained each time.

1. Insert tubing which is preswaged withe ferrules into fitting body.
2. Hand tighten the nut and further tighten the nut with a wrench to the original position keeping the body steady with a back-up wrench, A sharp rise in resistance will be felt at the original position, Then snug-up slightly with a wrench.

### installation of Hy-Lok Fitting bigger than 1" : or 25mm

**EZY-MAT TOOL**, Hy-Lok Corporation's Hydraulic Preswaging Machine, designed for use all Hy-Lok tube fittings ranging 1/2" ~2"(12mm ~38mm). This tool can make you save money and reduce the storage space and carrying efforts.

### Hy-Lok Hydraulic Preswaging Unit for Multi-Size Tubes - EZY-MAT TOOL

**EZY-MAT TOOL** is easy to learn and operate, Reading and following instructions is all you do. In manual model, the hand pumping requires very little power and swage indicator arm lets you know when to stop pumping. In auto model, pre-swaging is simply made by only pressing the start button according to the instructions.

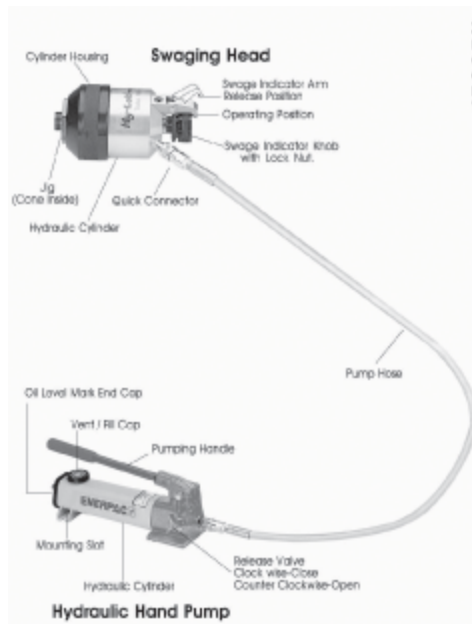
**EZY-MAT TOOL** can be used for various tube sizes by only replacing jig and cone. Two manual models (or just one auto model) are required for all sizes ranging from 1/2 inch to 2 inch(or 12mm to 38mm).

**EZY-MAT TOOL** reduces make-up torque and assembly time in the field and prevents the fitting from deformation and damage.

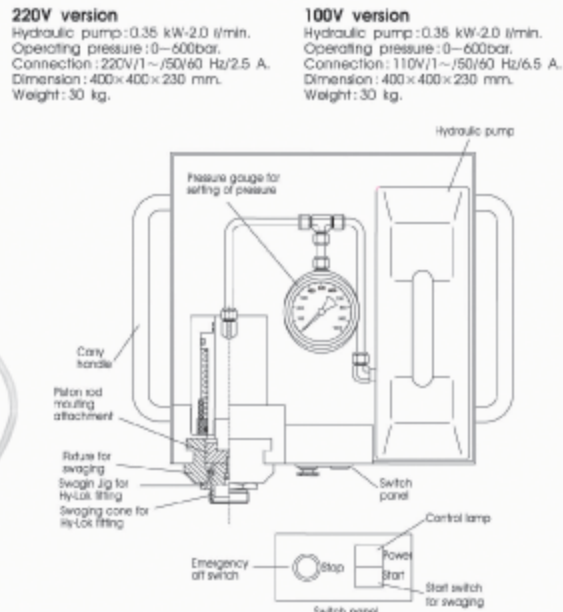
## Operating Procedures

1. Assemble front ferrule, back ferrule and nut onto jig.
2. Insert the prepared tube into pre-assembled nut and ferrules and hand-tighten the nut. Pumping until arm release (manual), or just press "start" switch(auto).
3. Unthread nut from swaging jig. Remove pre-swaged tube and insert it into fitting body. Make sure the ferrule seats in the fitting. (The detailed instructions are provided for each of EZY - MAT TOOL.)

### EZY - MAT 1 (manual)



### EZY - MAT 2 (Auto)



## How to Order

### EZY - MAT TOOL

| Part No.    | Applicable Fitting Size   | Operation |
|-------------|---------------------------|-----------|
| EZY - MAT 1 | 1/2" to 2" (12mm to 38mm) | Manual    |
| EZY - MAT 2 | 1/2" to 2" (12mm to 38mm) | Auto      |

### JIG and DIE

| Basic Part No. | Size Designator | Remart  |
|----------------|-----------------|---------|
| PS - CSJ - *   | See below *     | for Jig |
| PS - CSD - *   | See below *     | for Die |

Note \* : To complete part number, basic part No. must be followed by size designator. For fractional size, designate size in sixteenth and then add T, e.g. 20T for 1 1/4 inches. For metric size, designate size in millimeters and then add M, e.g. 28M for 28mm.