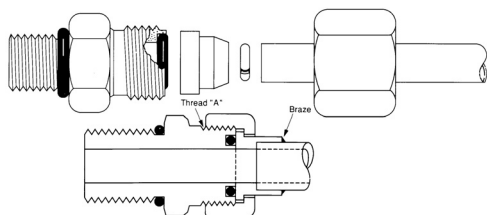


# FOR-SEAL®

## Introduction



|           |         |          |          |      |           |
|-----------|---------|----------|----------|------|-----------|
| Tube O.D. | 1/4     | 3/8      | 1/2      | 5/8  | 3/4       |
| Thread    | 9/16-18 | 11/16-16 | 13/16-16 | 1-14 | 1 3/16-12 |

|           |           |           |            |       |
|-----------|-----------|-----------|------------|-------|
| Tube O.D. | 7/8       | 1         | 1-1/4      | 1-1/2 |
| Thread    | 1 3/16-12 | 1 7/16-12 | 1 11/16-12 | 2-12  |

**Typical Application:** High pressure, hydraulic, pneumatic and chemical processing.

**Pressure\*:** Working pressure to 6000 PSI (1-1/4" and 1-1/2"; maximum 4000 PSI).

**Sealing Method:** O-ring.

**Vibration Rating:** Excellent resistance.

**Material:** 12L14 steel

**Plating:** All fittings are zinc-plated, except brazed parts which are oil dipped.

**Used With:** Steel tubing (tubing for brazing must be non-coated).

**Advantages:** Tubing is brazed for permanent leakproof connection.

**Conformance:** An exclusive item with Weatherhead®, meets SAE J1453.

**Ordering Information:** Use catalog number.

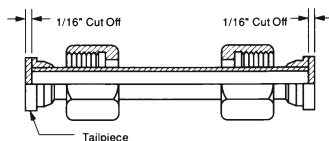
**Label Set:** FS-2400

**NOTE:** See page 377 for new hydraulic o-ring assortment.

## Tube Preparation And Cleaning

**Figure 1**

1. Establish the length of tubing required allowing 1/16" cut-off factor for each connection.
2. Cut the tubing to proper length keeping ends reasonably square. A fine tooth hack saw or cut-off saw works well for this job. The use of a tubing cutter is not recommended due to possible collapse of the tube end, retarding the capillary action required for proper braze flow.



**Note:** Subtract 1/16" from tube length for each connection.

3. Clean the end of the tube with an alkaline cleaner to remove all traces of oil or grease. Deburr the end of the tube with a file and polish the outside of the tube down to bare metal with clean emery paper. Oil and grease residue must be removed first to avoid working the oily residue into the tube surface.
4. After polishing, wipe off any metal particles using a clean solvent if necessary. Avoid touching the tube end after final cleaning as this may leave greasy spots which will braze poorly.

Clean the tailpiece with an alkaline cleaner.



\* Pressure ratings shown are the pressure ratings for the fitting and are not necessarily the pressure rating applicable in an assembly with hydraulic hose. The applicable pressure rating for an assembly with hydraulic hose is the lower value specified for the hose and the fitting.

Fluxing and Brazing Cleanup

Flux may be cleaned up using hot water and wire brush, using care not to scratch the tailpiece sealing surface.

- 1. Assemble proper size braze ring into counterbore of tailpiece. The correct size brazing will be slightly smaller than the inside diameter of the counterbore.
- 2. Clamp the tube securely in a vise, slide nut on tube, with threads pointing outward. Coat the tube end with flux and several inches of the tube outside diameter.
- 3. Coat the tailpiece liberally with flux including the counterbore and braze ring.

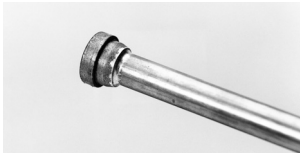


- 4. In a well ventilated area, apply heat uniformly to the tailpiece and the tube end. Watch the flux. The flux becomes completely clear when it is close to the proper brazing temperature. When ring melts, the tailpiece will settle down onto the end.

**NOTE:** General working knowledge of Acetylene torch brazing techniques is recommended.

- 5. Remove tube assembly from vise and check braze joint.
- 6. The braze alloy will flow down through the joint and should form a continuous fillet at the tube to tailpiece joint.

**NOTE:** Do not overheat. Excessive heat will only cause scaling and charred flux and make the parts more difficult to clean up.



Torque Requirements

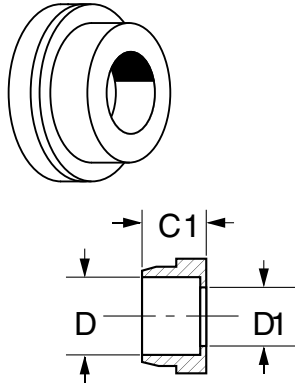
| Tube O.D.                                                            | 1/4   | 3/8   | 1/2   | 5/8   | 3/4        | 1          | 1-1/4      | 1-1/2      |
|----------------------------------------------------------------------|-------|-------|-------|-------|------------|------------|------------|------------|
| Torque Ft-Lb.<br>For-Seal SW. Nut                                    | 10-12 | 18-20 | 32-35 | 46-50 | 65-70      | 92<br>100  | 125<br>140 | 150<br>165 |
| Torque Ft-Lb O-Ring<br>Boss Straight Thread<br>O-Ring Locknut Torque | 14-16 | 24-26 | 50-60 | 72-80 | 125<br>135 | 200<br>220 | 210<br>280 | 270<br>360 |

Thread Chart

Rated pressures are for low surge, static type applications.

| Tube O.D.               | 1/4     | 3/8      | 1/2      | 5/8  | 3/4       | 1         | 1-1/4      | 1-1/2 |
|-------------------------|---------|----------|----------|------|-----------|-----------|------------|-------|
| For-Seal Thread         | 9/16-18 | 11/16-16 | 13/16-16 | 1-14 | 1-3/16-12 | 1-7/16-12 | 1-11/16-12 | 2-12  |
| Maximum PSI             | 6000    | 6000     | 6000     | 6000 | 6000      | 6000      | 4000       | 4000  |
| Adjustable Fittings PSI | 6000    | 6000     | 6000     | 6000 | 6000      | 5000      | 4000       | 3000  |

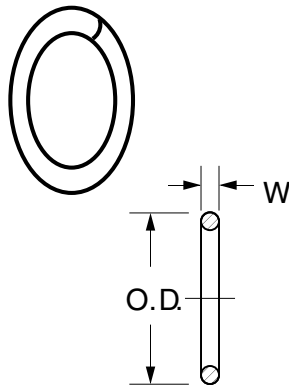
## Tailpiece Silver Braze (Ref. SAE No. 520115)



| TUBE<br>O.D. | CATALOG<br>NUMBER | D     | D1    | C1   |
|--------------|-------------------|-------|-------|------|
| 1/4          | 4165x4            | .256  | .172  | .374 |
| 3/8          | 4165x6            | .381  | .264  | .374 |
| 1/2          | 4165x8            | .506  | .378  | .374 |
| 5/8          | 4165x10           | .631  | .484  | .413 |
| 3/4          | 4165x12           | .757  | .609  | .551 |
| 1            | 4165x16           | 1.007 | .811  | .610 |
| 1-1/4        | 4165x20           | 1.257 | 1.024 | .610 |
| 1-1/2        | 4165x24           | 1.507 | 1.260 | .610 |

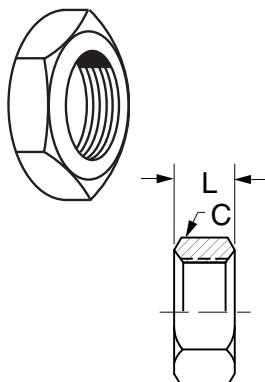
Oil Dipped

## FOR-SEAL® Cadmium Free Braze Ring



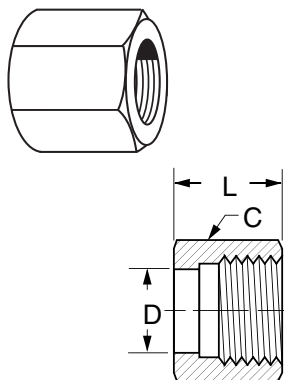
| TUBE<br>O.D. | CATALOG<br>NUMBER | WIRE<br>DIA. | O.D.  |
|--------------|-------------------|--------------|-------|
| 1/4          | 4640x4            | .046         | .250  |
| 3/8          | 4640x6            | .046         | .375  |
| 1/2          | 4640x8            | .046         | .500  |
| 5/8          | 4640x10           | .046         | .625  |
| 3/4          | 4640x12           | .062         | .750  |
| 1            | 4640x16           | .062         | 1.000 |
| 1-1/4        | 4640x20           | .062         | 1.250 |
| 1-1/2        | 4640x24           | .062         | 1.500 |

## Bulkhead Nut (Ref. SAE No. 520118)



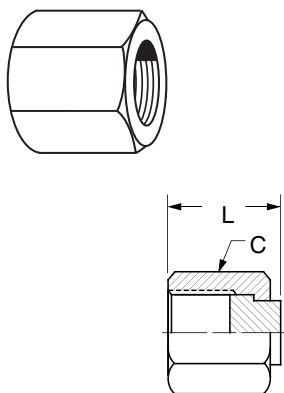
| TUBE<br>O.D. A | CATALOG<br>NUMBER | HEX<br>C | L   |
|----------------|-------------------|----------|-----|
| 1/4            | 4924x4            | 13/16    | .27 |
| 3/8            | 4924x6            | 1        | .31 |
| 1/2            | 4924x8            | 1-1/8    | .35 |
| 5/8            | 4924x10           | 1-5/16   | .41 |
| 3/4            | 4924x12           | 1-1/2    | .41 |
| 1              | 4924x16           | 1-3/4    | .41 |
| 1-1/4          | 4924x20           | 2        | .41 |
| 1-1/2          | 4924x24           | 2-3/8    | .41 |

Nut  
(Ref. SAE No. 520110)



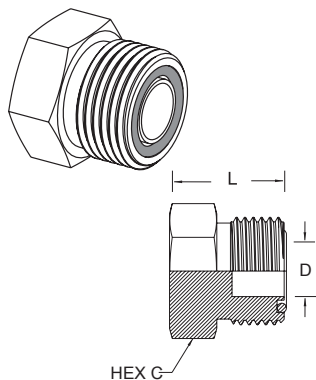
| TUBE<br>O.D. | CATALOG<br>NUMBER | HEX<br>C | D     | L    |
|--------------|-------------------|----------|-------|------|
| 1/4          | 4105x4            | 11/16    | .412  | .58  |
| 3/8          | 4105x6            | 13/16    | .531  | .67  |
| 1/2          | 4105x8            | 15/16    | .652  | .83  |
| 5/8          | 4105x10           | 1-1/8    | .829  | .93  |
| 3/4          | 4105x12           | 1-3/8    | .950  | 1.02 |
| 1            | 4105x16           | 1-5/8    | 1.144 | 1.10 |
| 1-1/4        | 4105x20           | 1-7/8    | 1.415 | 1.10 |
| 1-1/2        | 4105x24           | 2-1/4    | 1.727 | 1.10 |

Cap  
(Ref. SAE No. 520112)



| TUBE<br>O.D. | CATALOG<br>NUMBER | HEX<br>C | L    |
|--------------|-------------------|----------|------|
| 1/4          | 4129x4            | 11/16    | .67  |
| 3/8          | 4129x6            | 13/16    | .75  |
| 1/2          | 4129x8            | 15/16    | .90  |
| 5/8          | 4129x10           | 1-1/8    | 1.00 |
| 3/4          | 4129x12           | 1-3/8    | 1.10 |
| 1            | 4129x16           | 1-5/8    | 1.17 |
| 1-1/4        | 4129x20           | 1-7/8    | 1.17 |
| 1-1/2        | 4129x24           | 2-1/4    | 1.17 |

Plug  
(Ref. SAE No. 520109)

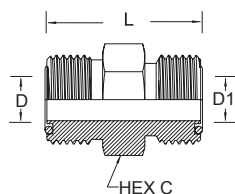
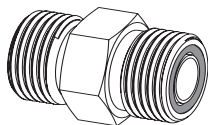


| TUBE<br>O.D. | CATALOG<br>NUMBER | HEX<br>C | D     | L     |
|--------------|-------------------|----------|-------|-------|
| 1/4          | 4229x4            | 5/8      | .172  | .659  |
| 3/8          | 4229x6            | 3/4      | .264  | .751  |
| 1/2          | 4229x8            | 7/8      | .378  | .854  |
| 5/8          | 4229x10           | 1-1/16   | .484  | 1.020 |
| 3/4          | 4229x12           | 1-1/4    | .609  | 1.080 |
| 1            | 4229x16           | 1-1/2    | .811  | 1.100 |
| 1-1/4        | 4229x20           | 1-3/4    | 1.024 | 1.100 |
| 1-1/2        | 4229x24           | 2-1/8    | 1.260 | 1.100 |

FOR-SEAL o-ring included.

## Union

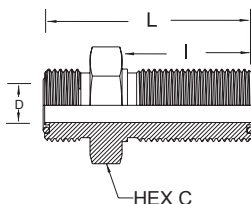
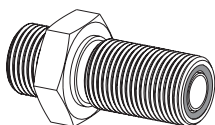
(Ref. SAE No. 520101)



| TUBE<br>O.D. | TUBE<br>O.D. | CATALOG<br>NUMBER | HEX<br>C | D     | D1    | L    |
|--------------|--------------|-------------------|----------|-------|-------|------|
| 1/4          | 1/4          | 4305x4            | 5/8      | .172  | .172  | 1.08 |
| 3/8          | 1/4          | 4305x6x4          | 3/4      | .264  | .172  | 1.17 |
| 3/8          | 3/8          | 4305x6            | 3/4      | .264  | .264  | 1.22 |
| 1/2          | 3/8          | 4305x8x6          | 7/8      | .378  | .264  | 1.33 |
| 1/2          | 1/2          | 4305x8            | 7/8      | .378  | .378  | 1.39 |
| 5/8          | 1/2          | 4305x10x8         | 1-1/16   | .484  | .378  | 1.57 |
| 5/8          | 5/8          | 4305x10           | 1-1/16   | .484  | .484  | 1.68 |
| 3/4          | 1/2          | 4305x12x8         | 1-1/4    | .609  | .378  | 1.69 |
| 3/4          | 5/8          | 4305x12x10        | 1-1/4    | .609  | .484  | 1.80 |
| 3/4          | 3/4          | 4305x12           | 1-1/4    | .609  | .609  | 1.86 |
| 1            | 3/4          | 4305x16x12        | 1-1/2    | .812  | .609  | 1.92 |
| 1            | 1            | 4305x16           | 1-1/2    | .811  | .811  | 1.94 |
| 1-1/4        | 1-1/4        | 4305x20           | 1-3/4    | 1.024 | 1.024 | 2.02 |
| 1-1/2        | 1-1/2        | 4305x24           | 2-1/8    | 1.260 | 1.260 | 2.09 |

## Bulkhead Union

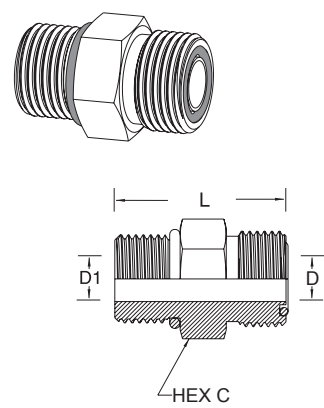
(Ref. SAE No. 520601)



| TUBE<br>O.D. | CATALOG<br>NUMBER | HEX<br>C | D     | I    | L    |
|--------------|-------------------|----------|-------|------|------|
| 3/8          | 4325x6            | 1        | .264  | 1.34 | 2.09 |
| 1/2          | 4325x8            | 1-1/8    | .378  | 1.44 | 2.30 |
| 3/4          | 4325x12           | 1-1/2    | .609  | 1.64 | 2.72 |
| 1            | 4325x16           | 1-3/4    | .812  | 1.66 | 2.76 |
| 1-1/4        | 4325x20           | 2        | 1.024 | 1.66 | 2.76 |
| 1-1/2        | 4325x24           | 2-3/8    | 1.260 | 1.66 | 2.76 |

For bulkhead nut, see page 257.

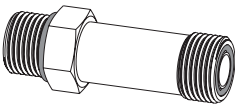
Straight Thread O-Ring Connector  
(Ref. SAE No. 520120)



| MALETUBE<br>O.D. | MALE PORT<br>SIZE | CATALOG<br>NUMBER | HEX<br>C | D     | D1    | L     |
|------------------|-------------------|-------------------|----------|-------|-------|-------|
| 1/4              | 1/4               | 4315x4            | 5/8      | .172  | .172  | 1.133 |
| 1/4              | 3/8               | 4315x4x6          | 11/16    | .172  | .172  | 1.202 |
| 3/8              | 1/4               | 4315x6x4          | 3/4      | .264  | .172  | 1.343 |
| 3/8              | 3/8               | 4315x6            | 3/4      | .264  | .264  | 1.252 |
| 3/8              | 1/2               | 4315x6x8          | 7/8      | .378  | .264  | 1.378 |
| 3/8              | 5/8               | 4315x6x10         | 1-1/16   | .264  | .484  | 1.530 |
| 1/2              | 3/8               | 4315x8x6          | 7/8      | .378  | .264  | 1.472 |
| 1/2              | 1/2               | 4315x8            | 7/8      | .378  | .378  | 1.441 |
| 1/2              | 5/8               | 4315x8x10         | 1        | .378  | .484  | 1.590 |
| 1/2              | 3/4               | 4315x8x12         | 1-1/4    | .378  | .609  | 1.748 |
| 5/8              | 5/8               | 4315x10           | 1-1/16   | .484  | .484  | 1.700 |
| 3/4              | 3/4               | 4315x12           | 1-1/4    | .609  | .609  | 1.918 |
| 3/4              | 1                 | 4315x12x16        | 1-1/2    | .609  | .609  | 1.960 |
| 1                | 3/4               | 4315x16x12        | 1-1/2    | .812  | .609  | 2.138 |
| 1                | 1                 | 4315x16           | 1-1/2    | .811  | .811  | 1.978 |
| 1                | 1-1/4             | 4315x16x20        | 1-7/8    | .812  | 1.709 | 2.058 |
| 1-1/4            | 1                 | 4315x20x16        | 1-3/4    | 1.024 | .843  | 2.278 |
| 1-1/4            | 1-1/4             | 4315x20           | 1-7/8    | 1.024 | 1.024 | 2.058 |
| 1-1/2            | 1-1/2             | 4315x24           | 2-1/8    | 1.260 | 1.260 | 2.125 |

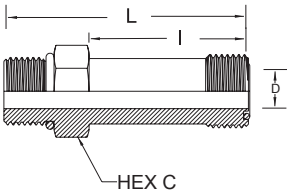
For replacement Straight Thread O-ring, see page 254.

Straight Thread O-Ring  
Extended  
(Ref. SAE No. 520122)

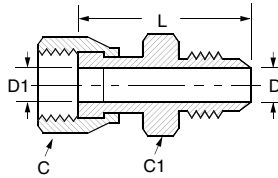
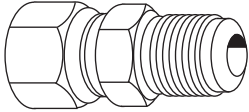


| MALETUBE<br>O.D. | MALE PORT<br>SIZE | CATALOG<br>NUMBER | HEX<br>C | D     | I    | L    |
|------------------|-------------------|-------------------|----------|-------|------|------|
| 3/8              | 3/8               | 4316x6            | 3/4      | .264  | 1.46 | 2.27 |
| 1/2              | 1/2               | 4316x8            | 7/8      | .378  | 1.75 | 2.67 |
| 3/4              | 3/4               | 4316x12           | 1-1/4    | .609  | 2.52 | 3.76 |
| 1                | 1                 | 4316x16           | 1-1/2    | .811  | 2.87 | 4.14 |
| 1-1/4            | 1-1/4             | 4316x20           | 1-7/8    | 1.024 | 3.41 | 4.76 |
| 1-1/2            | 1-1/2             | 4316x24           | 2-1/8    | 1.260 | 3.82 | 5.26 |

For replacement Straight Thread O-ring, see page 254.

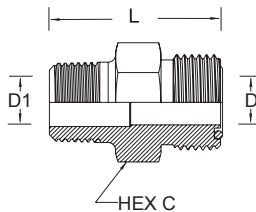
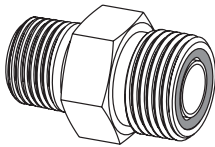


## Male 37° to Female FOR-SEAL®



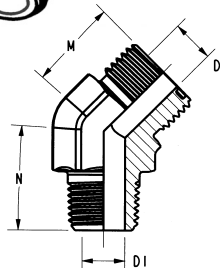
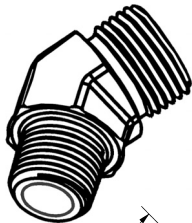
| FEMALE TUBE O.D. | MALE TUBE SIZE | CATALOG NUMBER | HEX C | HEX C1 | D    | L    |
|------------------|----------------|----------------|-------|--------|------|------|
| 1/4              | 1/4            | 4213x4         | 11/16 | 5/8    | .172 | 1.50 |
| 3/8              | 3/8            | 4213x6         | 13/16 | 3/4    | .297 | 1.62 |
| 1/2              | 1/2            | 4213x8         | 15/16 | 7/8    | .392 | 1.90 |
| 5/8              | 5/8            | 4213x10        | 1-1/8 | 1-1/16 | .484 | 2.25 |
| 3/4              | 3/4            | 4213x12        | 1-3/8 | 1-1/4  | .609 | 2.48 |
| 1                | 1              | 4213x16        | 1-5/8 | 1-1/2  | .811 | 2.84 |

## Male FOR-SEAL® Male Pipe Adapter



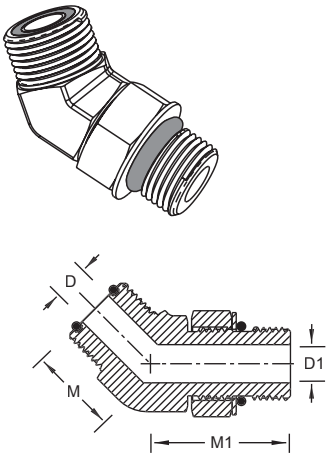
| TUBE O.D. | MALE PIPE SIZE | CATALOG NUMBER | HEX C  | D     | D1    | L    |
|-----------|----------------|----------------|--------|-------|-------|------|
| 3/8       | 3/8            | 4205x6x6       | 3/4    | .264  | .406  | 1.30 |
| 1/2       | 3/8            | 4205x8         | 7/8    | .378  | .406  | 1.45 |
| 1/2       | 1/2            | 4205x8x8       | 7/8    | .378  | .484  | 1.64 |
| 5/8       | 1/2            | 4205x10        | 1-1/16 | .484  | .531  | 1.82 |
| 3/4       | 1/2            | 4205x12x8      | 1-1/4  | .406  | .484  | 1.87 |
| 3/4       | 3/4            | 4205x12        | 1-1/4  | .609  | .719  | 1.94 |
| 3/4       | 1              | 4205x12x16     | 1-3/8  | .609  | .938  | 1.87 |
| 1         | 1              | 4205x16        | 1-1/2  | .811  | .938  | 2.19 |
| 1-1/4     | 1-1/4          | 4205x20        | 1-3/4  | 1.024 | 1.250 | 2.30 |

## 45° Male Elbow



| MALE TUBE O.D. | MALE PIPE THREAD | CATALOG NUMBER | D     | D1    | M    | N    | ACROSS FLATS |
|----------------|------------------|----------------|-------|-------|------|------|--------------|
| 1/4            | 1/8              | 4355x4         | .172  | .188  | .63  | .64  | 9/16         |
| 3/8            | 1/4              | 4355x6         | .264  | .281  | .74  | .86  | 3/4          |
| 1/2            | 3/8              | 4355x8         | .378  | .406  | .80  | .95  | 7/8          |
| 5/8            | 1/2              | 4355x10        | .484  | .531  | .92  | 1.17 | 1-1/16       |
| 3/4            | 3/4              | 4355x12        | .609  | .719  | 1.02 | 1.20 | 1-5/16       |
| 1              | 1                | 4355x16        | .812  | .939  | 1.18 | 1.48 | 1-5/8        |
| 1-1/4          | 1-1/4            | 4355x20        | 1.026 | 1.252 | 1.26 | 1.67 | 1-5/8        |
| 1-1/2          | 1-1/2            | 4355x24        | 1.262 | 1.502 | 1.45 | 1.77 | 1-7/8        |

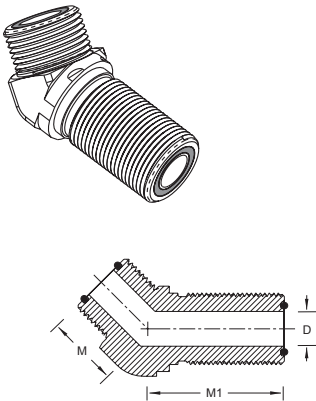
Straight Thread O-Ring  
Connector 45° Elbow  
(Ref. SAE No. 520320)



| MALETUBE<br>O.D. | MALE PORT<br>SIZE | CATALOG<br>NUMBER | D     | D1    | M    | M1   | ACROSS<br>FLATS |
|------------------|-------------------|-------------------|-------|-------|------|------|-----------------|
| 1/4              | 1/4               | 4365x4            | .172  | .172  | .63  | 1.18 | 9/16            |
| 1/4              | 3/8               | 4365x4x6          | .172  | .264  | .68  | 1.30 | 3/4             |
| 3/8              | 1/4               | 4365x6x4          | .264  | .172  | .74  | 1.22 | 3/4             |
| 3/8              | 3/8               | 4365x6            | .264  | .264  | .74  | 1.30 | 3/4             |
| 3/8              | 1/2               | 4365x6x8          | .264  | .390  | .74  | 1.43 | 3/4             |
| 1/2              | 3/8               | 4365x8x6          | .378  | .264  | .80  | 1.27 | 3/4             |
| 1/2              | 1/2               | 4365x8            | .378  | .390  | .80  | 1.43 | 3/4             |
| 1/2              | 5/8               | 4365x8x10         | .378  | .484  | .82  | 1.76 | 1-1/16          |
| 1/2              | 3/4               | 4365x8x12         | .378  | .609  | .87  | 1.97 | 1-3/16          |
| 5/8              | 1/2               | 4365x10x8         | .484  | .390  | .92  | 1.59 | 1-1/16          |
| 5/8              | 5/8               | 4365x10           | .484  | .484  | .92  | 1.76 | 1-1/16          |
| 5/8              | 3/4               | 4365x10x12        | .484  | .609  | .94  | 1.97 | 1-3/16          |
| 3/4              | 5/8               | 4365x12x10        | .609  | .484  | 1.02 | 1.81 | 1-3/16          |
| 3/4              | 3/4               | 4365x12           | .609  | .609  | 1.02 | 1.97 | 1-5/16          |
| 3/4              | 1                 | 4365x12x16        | .609  | .811  | 1.16 | 2.06 | 1-5/16          |
| 1                | 3/4               | 4365x16x12        | .811  | .609  | 1.12 | 2.03 | 1-7/16          |
| 1                | 1                 | 4365x16           | .812  | .811  | 1.18 | 2.06 | 1-1/2           |
| 1                | 1-1/4             | 4365x16x20        | .811  | 1.081 | 1.26 | 2.11 | 1-5/8           |
| 1-1/4            | 1-1/4             | 4365x20           | 1.024 | 1.081 | 1.26 | 2.11 | 1-5/8           |
| 1-1/2            | 1-1/2             | 4365x24           | 1.260 | 1.312 | 1.45 | 2.11 | 1-7/8           |

For replacement straight thread O-ring, see page 254.

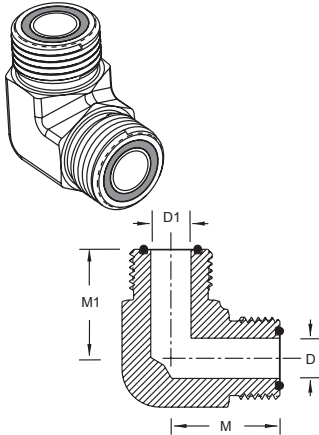
45° Bulkhead Elbow  
(Ref. SAE No. 520201)



| MALETUBE<br>O.D. | CATALOG<br>NUMBER | D     | M    | M1   | ACROSS<br>FLATS |
|------------------|-------------------|-------|------|------|-----------------|
| 1/4              | 4375x4            | .172  | .63  | 1.73 | 9/16            |
| 3/8              | 4375x6            | .264  | .74  | 1.91 | 3/4             |
| 1/2              | 4375x8            | .378  | .80  | 2.01 | 3/4             |
| 5/8              | 4375x10           | .484  | .92  | 2.23 | 1-1/16          |
| 3/4              | 4375x12           | .609  | 1.02 | 2.39 | 1-3/16          |
| 1                | 4375x16           | .811  | 1.18 | 2.57 | 1-7/16          |
| 1-1/4            | 4375x20           | 1.045 | 1.26 | 2.64 | 1-11/16         |
| 1-1/2            | 4375x24           | 1.312 | 1.45 | 2.64 | 1-7/8           |

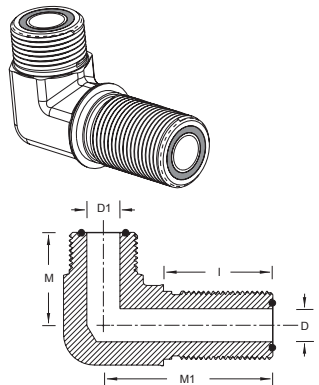
For Bulkhead Nut, see page 257.

## Union 90° Elbow (Ref. SAE No. 520201)



| MALE<br>TUBE O.D. | CATALOG<br>NUMBER | D     | M    | ACROSS<br>FLATS |
|-------------------|-------------------|-------|------|-----------------|
| 1/4               | 4505x4            | .172  | .85  | 9/16            |
| 3/8               | 4505x6            | .264  | .98  | 3/4             |
| 1/2               | 4505x8            | .378  | 1.10 | 3/4             |
| 5/8               | 4505x10           | .484  | 1.31 | 1-1/16          |
| 3/4               | 4505x12           | .609  | 1.47 | 1-3/16          |
| 1                 | 4505x16           | .811  | 1.64 | 1-7/16          |
| 1-1/4             | 4505x20           | 1.045 | 1.76 | 1-5/8           |
| 1-1/2             | 4505x24           | 1.312 | 1.92 | 1-7/8           |
| 2                 | 4505x32           | —     | —    | —               |

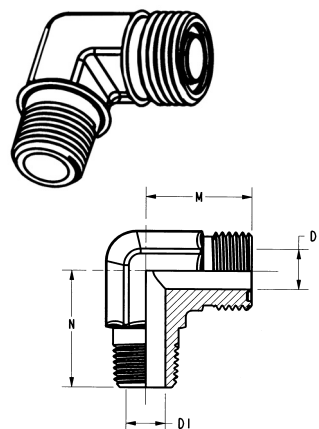
## Bulkhead Union 90° Elbow (Ref. SAE No. 520701)



| MALE<br>TUBE O.D. | PORT<br>SIZE | CATALOG<br>NUMBER | D     | D1    | M    | M1   | I    | ACROSS<br>FLATS |
|-------------------|--------------|-------------------|-------|-------|------|------|------|-----------------|
| 1/4               | 1/4          | 4525x4            | .172  | .172  | .89  | 1.85 | 1.24 | 9/16            |
| 3/8               | 3/8          | 4525x6            | .264  | .264  | 1.02 | 2.05 | 1.34 | 3/4             |
| 1/2               | 1/2          | 4525x8            | .378  | .378  | 1.14 | 2.18 | 1.44 | 7/8             |
| 5/8               | 5/8          | 4525x10           | .484  | .484  | 1.36 | 2.36 | 1.44 | 1-1/16          |
| 3/4               | 3/4          | 4525x12           | .609  | .609  | 1.52 | 2.64 | 1.60 | 1-5/16          |
| 1                 | 1            | 4525x16           | .811  | .811  | 1.67 | 2.80 | 1.64 | 1-5/8           |
| 1-1/4             | 1-1/4        | 4525x20           | 1.024 | 1.024 | 1.79 | 2.97 | 1.66 | 1-7/8           |
| 1-1/2             | 1-1/2        | 4525x24           | 1.260 | 1.260 | 1.95 | 3.13 | 1.66 | 1-7/8           |

For bulkhead nut, see page 257.

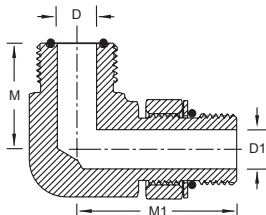
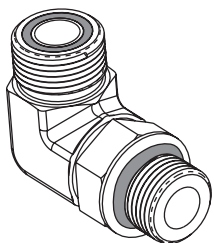
## 90° Male Elbow



| MALE<br>TUBE O.D. | PORT<br>SIZE | CATALOG<br>NUMBER | D     | D1    | M    | N    | ACROSS<br>FLATS |
|-------------------|--------------|-------------------|-------|-------|------|------|-----------------|
| 1/4               | 1/8          | 4405x4            | .172  | .188  | .85  | .78  | 9/16            |
| 3/8               | 1/4          | 4405x6            | .264  | .281  | .80  | 1.09 | 3/4             |
| 1/2               | 3/8          | 4405x8            | .378  | .406  | 1.10 | 1.22 | 3/4             |
| 5/8               | 1/2          | 4405x10           | .484  | .531  | 1.31 | 1.47 | 1-1/16          |
| 3/4               | 3/4          | 4405x12           | .609  | .719  | 1.47 | 1.59 | 1-5/16          |
| 1                 | 1            | 4405x16           | .812  | .939  | 1.64 | 1.97 | 1-5/8           |
| 1-1/4             | 1-1/4        | 4405x20           | 1.026 | 1.252 | 1.76 | 2.38 | 1-5/8           |
| 1-1/2             | 1-1/2        | 4405x24           | 1.262 | 1.502 | 1.92 | 2.64 | 1-7/8           |

## Straight Thread O-Ring 90° Elbow

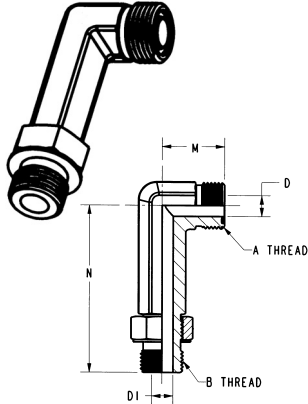
(Ref. SAE No. 520220)



| MALE<br>TUBE O.D. | PORT<br>SIZE | CATALOG<br>NUMBER | D     | D1    | M    | M1   | ACROSS<br>FLATS |
|-------------------|--------------|-------------------|-------|-------|------|------|-----------------|
| 1/4               | 1/4          | 4515x4            | .172  | .172  | .85  | 1.29 | 9/16            |
| 1/4               | 5/16         | 4515x4x5          | .172  | .234  | .85  | 1.29 | 9/16            |
| 1/4               | 3/8          | 4515x4x6          | .172  | .264  | .92  | 1.45 | 3/4             |
| 1/4               | 1/2          | 4515x4x8          | .172  | .390  | .97  | 1.60 | 3/4             |
| 3/8               | 1/4          | 4515x6x4          | .264  | .172  | .98  | 1.37 | 3/4             |
| 3/8               | 5/16         | 4515x6x5          | .264  | .234  | .98  | 1.37 | 3/4             |
| 3/8               | 3/8          | 4515x6            | .264  | .264  | .98  | 1.45 | 3/4             |
| 3/8               | 1/2          | 4515x6x8          | .264  | .390  | 1.04 | 1.60 | 3/4             |
| 3/8               | 5/8          | 4515x6x10         | .264  | .484  | 1.15 | 1.97 | 3/4             |
| 3/8               | 3/4          | 4515x6x12         | .264  | .609  | 1.25 | 2.17 | 1-3/16          |
| 1/2               | 5/8          | 4515x8x10         | .378  | .484  | 1.21 | 1.97 | 1-1/16          |
| 1/2               | 3/4          | 4515x8x12         | .378  | .484  | 1.32 | 2.17 | 1-1/16          |
| 1/2               | 3/8          | 4515x8x6          | .378  | .264  | 1.10 | 1.44 | 3/4             |
| 1/2               | 1/2          | 4515x8            | .378  | .390  | 1.10 | 1.60 | 3/4             |
| 5/8               | 5/8          | 4515x10           | .484  | .484  | 1.31 | 1.97 | 1-1/16          |
| 5/8               | 3/4          | 4515x10x12        | .484  | .609  | 1.41 | 2.17 | 1-3/16          |
| 5/8               | 1/2          | 4515x10x8         | .484  | .390  | 1.31 | 1.80 | 1-1/16          |
| 3/4               | 5/8          | 4515x12x10        | .609  | .484  | 1.47 | 2.01 | 1-5/16          |
| 3/4               | 3/4          | 4515x12           | .609  | .609  | 1.47 | 2.17 | 1-5/16          |
| 3/4               | 1            | 4515x12x16        | .609  | .811  | 1.62 | 2.35 | 1-5/16          |
| 3/4               | 1/2          | 4515x12x8         | .609  | .390  | 1.47 | 1.84 | 1-3/16          |
| 1                 | 3/4          | 4515x16x12        | .811  | .609  | 1.64 | 2.32 | 1-5/8           |
| 1                 | 7/8          | 4515x16x14        | .811  | .609  | 1.64 | 2.32 | 1-5/8           |
| 1                 | 1            | 4515x16           | .811  | .811  | 1.64 | 2.35 | 1-5/8           |
| 1                 | 1-1/4        | 4515x16x20        | .811  | 1.081 | 1.76 | 2.45 | 1-5/8           |
| 1-1/4             | 1            | 4515x20x16        | 1.024 | .811  | 1.76 | 2.42 | 1-5/8           |
| 1-1/4             | 1-1/4        | 4515x20           | 1.024 | 1.081 | 1.76 | 2.45 | 1-7/8           |
| 1-1/4             | 1-1/2        | 4515x20x24        | 1.024 | 1.312 | 1.92 | 2.59 | 1-7/8           |
| 1-1/2             | 1-1/4        | 4515x24x20        | 1.312 | 1.081 | 1.92 | 2.59 | 1-7/8           |
| 1-1/2             | 1-1/2        | 4515x24           | 1.312 | 1.312 | 1.92 | 2.59 | 1-7/8           |

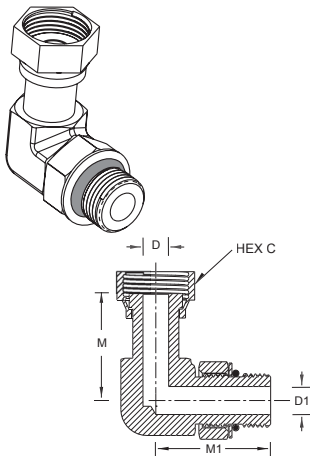
For replacement straight thread O-ring, see page 176.

## 90° Elbow Straight Thread Swivel - Long



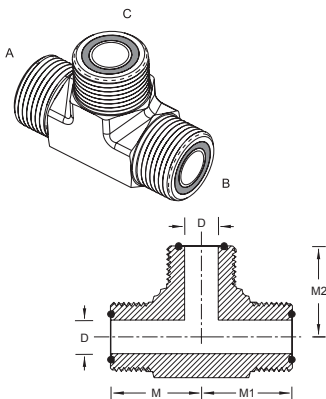
| MALE<br>TUBE O.D. | MALE PORT<br>SIZE | CATALOG<br>NUMBER | D     | D1    | M    | N    | ACROSS<br>FLATS |
|-------------------|-------------------|-------------------|-------|-------|------|------|-----------------|
| 1/4               | 1/4               | 4515x4L           | .172  | .180  | .85  | 2.23 | 9/16            |
| 3/8               | 3/8               | 4515x6L           | .264  | .300  | .98  | 2.61 | 3/4             |
| 1/2               | 1/2               | 4515x8L           | .378  | .398  | 1.10 | 2.95 | 3/4             |
| 5/8               | 5/8               | 4515x10L          | .484  | .498  | 1.31 | 3.51 | 1-1/16          |
| 3/4               | 3/4               | 4515x12L          | .609  | .616  | 1.47 | 3.97 | 1-3/16          |
| 1                 | 1                 | 4515x16L          | .812  | .852  | 1.64 | 4.51 | 1-7/16          |
| 1-1/4             | 1-1/4             | 4515x20L          | 1.026 | 1.090 | 1.76 | 4.98 | 1-5/8           |
| 1-1/2             | 1-1/2             | 4515x24L          | 1.262 | 1.326 | 1.92 | 5.48 | 1-7/8           |

## 90° Straight Thread Swivel (Ref. SAE No. 520281)



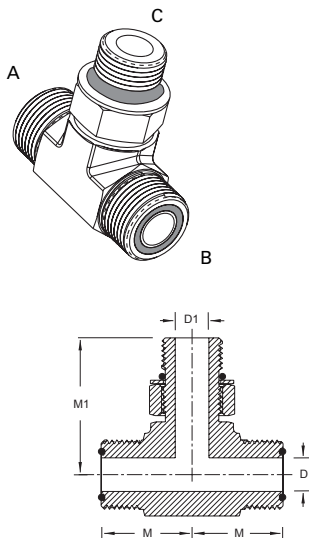
| FEMALE<br>TUBE O.D. | PORT<br>SIZE | CATALOG<br>NUMBER | D     | D1    | M    | M1   | HEX<br>C | ACROSS<br>FLATS |
|---------------------|--------------|-------------------|-------|-------|------|------|----------|-----------------|
| 1/4                 | 1/4          | 4535x4            | .165  | .180  | 1.04 | 1.29 | 11/16    | 9/16            |
| 3/8                 | 3/8          | 4535x6            | .264  | .300  | 1.15 | 1.45 | 13/16    | 3/4             |
| 1/2                 | 1/2          | 4535x8            | .258  | .398  | 1.49 | 1.60 | 15/16    | 7/8             |
| 5/8                 | 5/8          | 4535x10           | .453  | .498  | 1.62 | 1.97 | 1-1/8    | 1-1/16          |
| 3/4                 | 3/4          | 4535x12           | .547  | .616  | 1.82 | 2.17 | 1-3/8    | 1-3/8           |
| 1                   | 1            | 4535x16           | .783  | .852  | 2.10 | 2.35 | 1-5/8    | 1-5/8           |
| 1-1/4               | 1-1/4        | 4535x20           | 1.026 | 1.090 | 2.29 | 2.45 | 1-7/8    | 1-5/8           |
| 1-1/2               | 1-1/2        | 4535x24           | 1.262 | 1.326 | 2.41 | 2.59 | 2-1/4    | 1-7/8           |

## Union Tee (Ref. SAE No. 520401)



| MALE<br>TUBE<br>O.D. A | MALE<br>TUBE<br>O.D. B | MALE<br>TUBE<br>O.D. C | CATALOG<br>NUMBER | D     | D1    | M    | M1   | M2   | ACROSS<br>FLATS |
|------------------------|------------------------|------------------------|-------------------|-------|-------|------|------|------|-----------------|
| 1/4                    | 1/4                    | 1/4                    | 4705x4            | .172  | .172  | .85  | .85  | .85  | 9/16            |
| 3/8                    | 3/8                    | 3/8                    | 4705x6            | .264  | .264  | .98  | .98  | .98  | 3/4             |
| 3/8                    | 3/8                    | 1/2                    | 4705x6x6x8        | .264  | .378  | 1.04 | 1.04 | 1.10 | 3/4             |
| 1/2                    | 3/8                    | 1/2                    | 4705x8x6x8        | .264  | .378  | .98  | .98  | 1.10 | 3/4             |
| 1/2                    | 1/2                    | 1/2                    | 4705x8            | .378  | .378  | 1.10 | 1.10 | 1.10 | 3/4             |
| 5/8                    | 5/8                    | 5/8                    | 4705x10           | .484  | .484  | 1.31 | 1.31 | 1.31 | 1-1/16          |
| 3/4                    | 3/4                    | 3/4                    | 4705x12           | .609  | .609  | 1.47 | 1.47 | 1.47 | 1-3/16          |
| 1                      | 1                      | 1                      | 4705x16           | .811  | .811  | 1.64 | 1.64 | 1.64 | 1-5/8           |
| 1-1/4                  | 1-1/4                  | 1-1/4                  | 4705x20           | 1.024 | 1.024 | 1.76 | 1.76 | 1.76 | 1-5/8           |
| 1-1/2                  | 1-1/2                  | 1-1/2                  | 4705x24           | 1.260 | 1.260 | 1.92 | 1.92 | 1.92 | 1-7/8           |

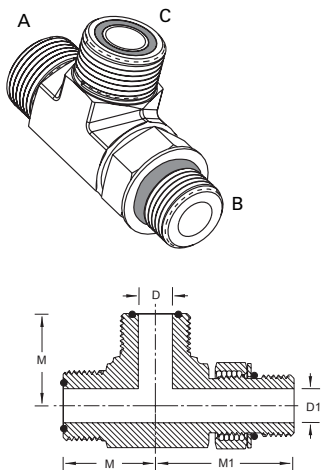
## Straight Thread Branch Tee (Ref. SAE No. 520429)



| TUBE O.D. | PORT SIZE | CATALOG NUMBER | D     | D1    | M    | M1   | ACROSS FLATS |
|-----------|-----------|----------------|-------|-------|------|------|--------------|
| 1/4       | 1/4       | 4715x4         | .172  | .172  | .85  | 1.29 | 9/16         |
| 3/8       | 3/8       | 4715x6         | .264  | .264  | .98  | 1.45 | 3/4          |
| 3/8       | 1/2       | 4715x6x8       | .264  | .391  | 1.04 | 1.60 | 7/8          |
| 1/2       | 3/8       | 4715x8x6       | .378  | .264  | 1.10 | 1.44 | 3/4          |
| 1/2       | 1/2       | 4715x8         | .378  | .390  | 1.10 | 1.60 | 3/4          |
| 5/8       | 5/8       | 4715x10        | .484  | .484  | 1.31 | 1.97 | 1-1/16       |
| 3/4       | 3/4       | 4715x12        | .609  | .609  | 1.47 | 2.17 | 1-3/16       |
| 3/4       | 1         | 4715x12x16     | .609  | .812  | 1.62 | 2.35 | 1-5/8        |
| 1         | 1         | 4715x16        | .811  | .845  | 1.64 | 2.35 | 1-5/8        |
| 1-1/4     | 1         | 4715x20x16     | 1.046 | .845  | 1.76 | 2.45 | 1-15/16      |
| 1-1/4     | 1-1/4     | 4715x20        | 1.046 | 1.081 | 1.76 | 2.45 | 1-7/8        |
| 1-1/2     | 1-1/2     | 4715x24        | 1.260 | 1.313 | 1.92 | 2.59 | 1-7/8        |

For replacement straight thread O-ring, see page 254.

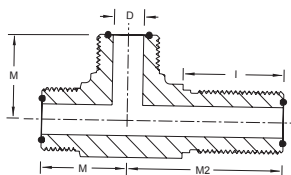
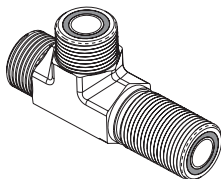
## Straight Thread Run Tee (Ref. SAE No. 520428)



| MALE TUBE O.D. A | MALE TUBE O.D. B | MALE TUBE O.D. C | CATALOG NUMBER | D     | D1    | M    | M1   | ACROSS FLATS |
|------------------|------------------|------------------|----------------|-------|-------|------|------|--------------|
| 1/4              | 1/4              | 1/4              | 4716x4         | .172  | .172  | .85  | 1.29 | 9/16         |
| 1/4              | 1/4              | 3/8              | 4716x4x6       | .172  | .264  | 1.39 | 1.45 | 3/4          |
| 3/8              | 3/8              | 3/8              | 4716x6         | .264  | .264  | .98  | 1.45 | 3/4          |
| 1/2              | 1/2              | 1/2              | 4716x8         | .378  | .391  | 1.10 | 1.60 | 7/8          |
| 5/8              | 5/8              | 5/8              | 4716x10        | .484  | .484  | 1.31 | 1.97 | 1-1/16       |
| 3/4              | 3/4              | 3/4              | 4716x12        | .609  | .609  | 1.47 | 2.17 | 1-3/16       |
| 3/4              | 3/4              | 1                | 4716x12x16     | .609  | .812  | 1.62 | 2.32 | 1-7/16       |
| 3/4              | 1                | 3/4              | 4716x12x16x12  | .609  | .812  | 1.62 | 2.35 | 1-7/16       |
| 1                | 1                | 3/4              | 4716x16x12     | .812  | .609  | 1.64 | 2.35 | 1-7/16       |
| 1                | 1                | 1                | 4716x16        | .812  | .845  | 1.64 | 2.35 | 1-7/16       |
| 1-1/4            | 1-1/4            | 1-1/4            | 4716x20        | 1.046 | 1.081 | 1.76 | 2.45 | 1-7/8        |
| 1-1/2            | 1-1/2            | 1-1/2            | 4716x24        | 1.313 | 1.313 | 1.92 | 2.59 | 1-7/8        |

For replacement straight thread O-ring, see page 254.

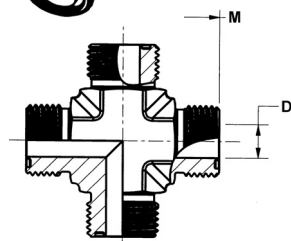
## Bulkhead Run Tee (Ref. SAE No. 520958)



| TUBE<br>O.D. | CATALOG<br>NUMBER | D     | I    | M    | M1   | M2   | ACROSS<br>FLATS |
|--------------|-------------------|-------|------|------|------|------|-----------------|
| 1/4          | 4726x4            | .172  | 1.24 | .89  | .89  | 1.85 | 9/16            |
| 3/8          | 4726x6            | .264  | 1.34 | 1.02 | 1.02 | 2.05 | 3/4             |
| 1/2          | 4726x8            | .378  | 1.44 | 1.14 | 1.14 | 2.18 | 3/4             |
| 5/8          | 4726x10           | .484  | 1.60 | 1.36 | 1.36 | 2.48 | 1-1/16          |
| 3/4          | 4726x12           | .609  | 1.64 | 1.52 | 1.52 | 2.65 | 1-3/16          |
| 1            | 4726x16           | .812  | 1.66 | 1.67 | 1.67 | 2.80 | 1-7/16          |
| 1-1/4        | 4726x20           | 1.024 | 1.66 | 1.79 | 1.79 | 2.97 | 1-5/8           |
| 1-1/2        | 4726x24           | 1.260 | 1.66 | 1.95 | 1.95 | 3.13 | 1-7/8           |

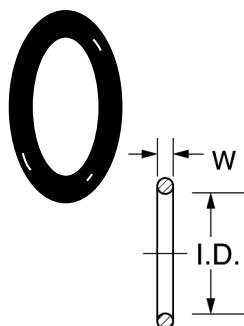
For Bulkhead Nut, see page 257.

## Male FOR-SEAL® Cross



| TUBE<br>O.D. | CATALOG<br>NUMBER | D     | M    | ACROSS<br>FLATS |
|--------------|-------------------|-------|------|-----------------|
| 1/4          | 4955x4            | .172  | .89  | 9/16            |
| 3/8          | 4955x6            | .264  | 1.02 | 3/4             |
| 1/2          | 4955x8            | .378  | 1.14 | 7/8             |
| 5/8          | 4955x10           | .484  | 1.36 | 1-1/16          |
| 3/4          | 4955x12           | .609  | 1.52 | 1-5/16          |
| 1            | 4955x16           | .812  | 1.67 | 1-5/8           |
| 1-1/4        | 4955x20           | 1.026 | 1.79 | 1-5/8           |
| 1-1/2        | 4955x24           | 1.262 | 1.95 | 1-7/8           |

## O-Ring, FOR-SEAL®



**Material:** Buna N, 90 Durometer  
**Temperature:** -40°F to +250°F (-40°C to +121°C)  
 Standard o-ring complies with SAE specification SAE J515 Type CH

| TUBE<br>O.D. | CATALOG<br>NUMBER | W           | I.D.         |
|--------------|-------------------|-------------|--------------|
| 1/4          | 4629x4            | .070 ± .005 | .301 ± .005  |
| 3/8          | 4629x6            | .070 ± .005 | .364 ± .005  |
| 1/2          | 4629x8            | .070 ± .005 | .489 ± .005  |
| 5/8          | 4629x10           | .070 ± .005 | .614 ± .005  |
| 3/4          | 4629x12           | .070 ± .005 | .739 ± .005  |
| 1            | 4629x16           | .070 ± .006 | .926 ± .006  |
| 1-1/4        | 4629x20           | .070 ± .006 | 1.176 ± .006 |
| 1-1/2        | 4629x24           | .070 ± .010 | 1.489 ± .010 |