



ROTAREX
VALVES - FITTINGS - REGULATORS



COMPRESSION TUBE FITTINGS

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All Rotarex compression tube fittings are produced in Europe in accordance with international standards (ISO; CGA..) and are guaranteed to provide safe and reliable performance in operation. All locations are ISO 9001.



STRAIGHT UNIONS



US P. 014
Straight union



USMOD P. 014
Conversion union



URS P. 015
Reducing union



UCS P. 015
Bulkhead union



UMS NPT / BSPT / BSPP G / BSPP K / METRIC / THERMOCOUPLE CONNECTOR P. 016
Male union



UCMS NPT / BSPT P. 020
Male bulkhead union



UCOMS NPT / BSPT P. 020
Male bulkhead union with O-ring



UMS AN P. 021
Straight union «AN»



UCMS AN P. 021
Bulkhead union «AN»



UMOMS P. 022
Male O-ring connector



UMOMSS P. 022
Male O-ring connector «UN»



UFS NPT / BSPT / BSPP P. 023
Female union



UCFS NPT / BSPT / BSPP P. 026
Female bulkhead union



UMSWS P. 027
Tube socket weld union



UMBWS P. 027
Male pipe weld connector

ELBOW UNIONS



EQS P. 028
Elbow



EQM45S P. 028
45° male elbow



EQMS NPT / BSPT / BSPP P. 029
Male elbow



EQFS NPT / BSPT / BSPP P. 031
Female elbow



EQSWS P. 034
Socket weld elbow



EQBWS P. 034
Male pipe weld elbow

TEE & CROSS UNIONS



TS P. 035
Union tee



TRS P. 036
Reducing tee



TRS P. 036
Reducing run tee



TMS NPT / BSPT P. 037
Male branch tee



TMRS NPT / BSPT P. 038
Male run tee



TFS NPT / BSPT / BSPP P. 039
Female branch tee




TFRS NPT / BSPT / BSPP P. 040
Female run tee










CS P. 041
Cross

ADAPTORS

| | | | | | |
|---|---|---|---|---|---|
|  |  |  |  |  | |
| APS Port connector P. 042 | APRS Reducing port connector P. 042 | ADRS Reducer P. 043 | ADTS Heat exchanger reducer P. 043 | UCAS Bulkhead reducer P. 044 | |
|  |  |  |  |  |  |
| AMOD Converting reducer P. 044 | ADS NPT / BSPT / BSPP G / BSPP K Male adaptor P. 045 | | | ADS AN Male adaptor «AN» P. 048 | AOMSS Male O-ring adaptor «UN» P. 048 |
|  |  |  |  |  | |
| AOMS Male O-ring adaptor «NPSM» P. 049 | AFS NPT / BSPT / BSPP Female adaptor P. 050 | | | AFS AN Female adaptor P. 052 | |

CHROMATOGRAPH FITTINGS

| | | | |
|---|---|--|--|
|  |  |  |  |
| USFVM Straight union - low dead volume P. 053 | TSFVM Union tee - low dead volume P. 053 | UMSFVM Male connector - low dead volume P. 053 | URSFVM Column end reducing union - low dead volume P. 054 |
|  |  |  | |
| URSZVM Column end reducing union - zero dead volume P. 054 | UFSFVM Column end female connector - low dead volume P. 054 | EDS Male nut P. 054 | |

COMPONENTS & ACCESSORIES

| | | | | | |
|---|---|---|---|---|---|
|  |  |  |  |  | |
| BPS Cap P. 055 | OBS Plug P. 055 | FF Front ferrule P. 056 | BF Back ferrule P. 056 | SET Ferrule set (10 of each) P. 056 | |
|  |  |  |  |  | |
| ES Nut P. 057 | EMS Knurled nut P. 057 | ECS Bulkhead locknut P. 057 | INS Insert for plastic tube P. 058 | CCS Gauge P. 058 | |
|  |  |  |  |  |  |
| PRE-ASSEMBLY TOOL P. 058 | GASKETS P. 059 | TUBE BENDER P. 060 | DEBURRING TOOL P. 060 | TUBE CUTTER P. 060 | PTFE TAPE P. 060 |

TECHNOLOGY OVERVIEW

ROTAREX COMPRESSION TUBE FITTINGS TECHNOLOGY

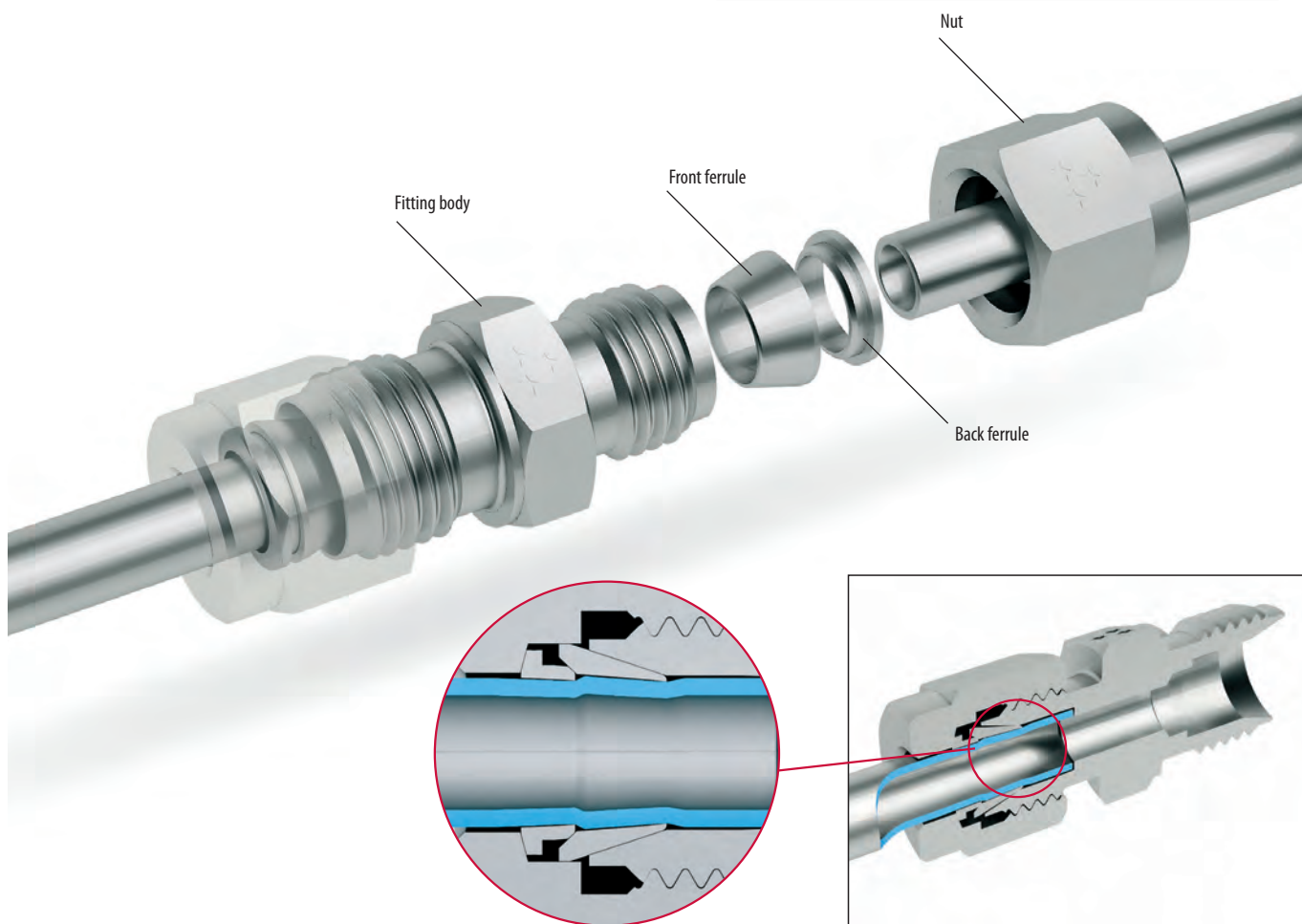
Rotarex double-ring compression tube fitting technology combines leak-free confidence and strength with maximum ease and flexibility... and is the recommended technology for all instrumentation applications maximizing safety, control and productivity.

Rotarex offers one of the largest selections of fittings in the industry – and specializes in non-standard dimensions with over 100 unique configurations not available from other supplies, and a choice of over 12 material types representing the cutting edge alloy technologies.



BEST PRACTICE:

For best results minimize the use of threaded connections in your installation. Compression fittings have a higher pressure rating, are quicker and easier to install and are much more resistant to vibration.



Tightening the nut exerts radial compression around the tube in two places creating an exceptional grip – able to withstand very high working pressure – and vibration.

Easy to install: just insert the tube and tighten

Rotarex ferrules utilize an advanced design geometry where the ferrule force-displacement vectors are optimized to deliver an exceptionally efficient double-grip compression into the tube's outer surface when tightened.

Exceptionally precise machining tolerances ensures a leak-tight grip around the entire tube circumference.

All Rotarex stainless steel alloy back ferrules are hardened by a low temperature carburization process that significantly increases surface hardness,

increases compression strength and improves resistance to wear and galling. This back ferrule differential hardness is essential to tightly grip into the tube and provide a robust leak-tight compression seal.

Reusable: The Rotarex compression tube fitting is re-usable several times, making possible configuration changes and quicker servicing of the system.

TECHNOLOGY OVERVIEW (CONTINUED)

DESIGNED FOR BETTER OPERATING RESULTS

SAFETY:

- Leak-tight confidence
- Exceptional tube grip
- Gaugeable to ensure proper tightness
- Stays tight even with vibration
- High temperature resistant

CONTROL:

- A vast range of sizes and shapes enables your optimal installation configuration

PRODUCTIVITY:

- Fast & Easy to install
- Long lasting and reusable
- Quicker maintenance

INTERCHANGEABILITY

Rotarex compression tube fittings are designed and certified interchangeable with double-ferrule components from other leading manufacturers. That means superior choice, flexibility and productivity for your operations.



Certified by TÜV Rheinland – a leading independent 3rd party testing & certification facility based in Germany.



BEST PRACTICE:

Although you can intermix components, it is strongly recommended to use exclusively Rotarex components throughout your entire gas installation. Rotarex fittings are designed and manufactured to the same demanding specifications as our leading valves and regulators for maximum warranted performance.

GAUGEABILITY

Rotarex compression tube fittings allow installers to verify the proper tightness using a gap inspection gauge – for greater safety and leak-free confidence.

When properly tightened, the gauge should not be able to fit between the body and shoulder of the nut.

The inspection gauge is only to be used on the first assembly.



Properly tightened, the gauge will not fit



Not tight enough if the gauge fits

TRACEABILITY

Each stainless steel component is compliant with high and ultra-high purity traceability requirements, and most stringent applications such as automotive. For greater quality assurance, a material-specific identification

code is visible on every component in addition to the Rotarex 3-star quality assurance symbol.



3-star quality assurance symbol on forged bodies



3-star quality assurance symbol on hex flats and nuts



New material coding system (from September 2011)



Former material coding system (before September 2011)

SELECTING THE RIGHT FITTING

STANDARD MATERIALS

All Rotarex compression fittings are standardly available in stainless steel 316L and raw brass, covering most major application needs. In addition, ten other speciality alloy materials are available upon request for specific applications. Which material is best for your installation?

Stainless steel 316L: The recommended option for corrosive gases and high purity applications due to its superior resistance, non-reactivity, exceptional durability and high-surface finish properties. It is compatible with most gas types and low-velocity oxygen applications.

Rotarex uses stainless steel type 316L, an austenitic chromium nickel stainless steel containing Molybdenum. It offers:

- Exceptional corrosion resistance - particularly against sulfuric, hydrochloric, acetic, formic and tartaric acids, acid sulfates and alkaline chlorides;
- resistance to pitting from chloride-ion solutions; and
- outstanding strength even at elevated temperatures

Raw brass: The most commonly used material for industrial and high velocity oxygen applications due to its cost effectiveness versus stainless steel, good strength, resistance and low-friction flow properties.

All raw brass fittings can be chrome plated on request (see page 11).



Gas Compatibility: make sure the body material is compatible with the gas type you will be using. Consult the gas compatibility reference chart on page 64.

O-RINGS

Rotarex O-ring fittings with elastomer sealing technology are delivered with the O-ring specification as per the below chart. Special cleaning of the parts in the manufacturing process might modify the performances. Other materials are available upon request.

| TYPE | DESIGNATION | TEMPERATURE RATING | HARDNESS |
|---------------------------|-------------|------------------------------|----------|
| Nitrile rubber | NBR | -30 to 100°C -22 to 212°F | 79 (± 5) |
| Fluorocarbon rubber* | FPM | -28 to 204°C -18 to 400°F | 78 (± 5) |
| Ethylene propylene rubber | EPDM | -50 to 140°C -58 to 284°F | 83 (± 5) |

*Fluorocarbon rubber designation: - FPM is the international abbreviation according to DIN/ISO
- FKM is the short form for the fluoroelastomer category to ASTM.

Materials compliant with enforceable norms

| Status | Fitting Material | Rotarex code | Bar stock | Forging |
|--------------|-----------------------------------|--------------|---|--|
| Standard | Brass | L | ASTM B16, ASTM B453 | ASTM B124 |
| Standard | Stainless steel 316L | I | ASTM A276, ASME SA 479, EN 1.4404 | ASTM A182, ASME SA182, EN 1.4404 |
| Upon request | Stainless steel 904L | W | ASTM A182, EN 1.4539 | ASTM A182 |
| Upon request | Super duplex stainless steel 2507 | SD | ASTM A479 | ASTM A182 |
| Upon request | Alloy 400 | M | ASTM B164 | ASTM B564 |
| Upon request | Alloy 600 | O | ASTM B166 | ASTM B564 |
| Upon request | Alloy 625 | Q | ASTM B446 | ASTM B564 |
| Upon request | Alloy 825 | Y | ASTM B425 | ASTM B564 |
| Upon request | Alloy C-276 | H | ASTM B574 | ASTM B564 |
| Upon request | Steel | C | ASTM A108 | - |
| Upon request | Alloy 20 | R | ASTM B473 | ASTM B462, ASTM B472 |
| Upon request | Titanium | T | ASTM B348 | ASTM B381 |

Need more information? One of our material engineers would be happy to discuss the pros and cons of each option to help you choose the best solution.

Rotarex Fittings in Stainless Steel 316L with O-rings, for connections up to 25 mm and 1 inch, are to be used up to 206 bars or 3000 psi.










UNIFORM DASH NUMBERING, ACCORDING TO AEROSPACE STANDARD AS568B

| Straight thread type (inch) | NBR | FPM |
|-----------------------------|------|------|
| 5/16"-24 | -011 | -902 |
| 3/8"-24 | -012 | -903 |
| 7/16"-20 | -013 | -904 |
| 1/2"-20 | -112 | -905 |
| 9/16"-18 | -113 | -906 |
| 3/4"-16 | -116 | -908 |
| 1 1/16"-12 | -121 | -912 |

SELECTING THE RIGHT FITTING (CONTINUED)

THREADS AND END CONNECTIONS

Rotarex offers a complete range of thread options compliant with world-wide norms & standards. Please ask us if you do not see what you require.

| Family | thread configuration | Rotarex thread identification code | Description | International standards for threads and end connections |
|---------------------------------|---|------------------------------------|--|--|
| NPT-BSPT Tapered Pipe Thread |  | N | National Pipe Tapered thread (NPT) - Seal is made on the thread. - Thread angle 60° - Thread sealant is required. | ASME B1.20.1(part1) ASME B1.20.1(part2) |
| |  | T | British Standard Pipe Tapered thread (BSPT) (Whitworth Conical) - Seal is made on the thread. - Thread angle 55° - Thread sealant is required. | ISO 7/1 EN 10226-1/2 DIN 3852-2, Form C |
| BSPP Parallel Pipe Thread |  | K | British Standard Pipe Parallel thread (BSPP) (Whitworth Cylindrical) - Must be used with the sealing gasket according to DIN 3852-2, form A. Used with a GBS gasket (sealing gasket sold separately). | ISO 228/1 DIN 3852-2 Form A JIS B0202 |
| |  | G | British Standard Pipe Parallel thread (BSPP) (Whitworth Cylindrical) - Seals with a sealing gasket according to DIN 3852-2, form B. Used with a GCU gasket (sealing gasket sold separately). | ISO 228/1 BS 2779 JIS B0202 DIN 3852-2 Form B |
| |  | G | British Standard Pipe Parallel thread (BSPP) (Whitworth Cylindrical) - Seals with a sealing gasket according to DIN 3852-2, form B. Used with a GKF or GTE gasket (sealing gasket sold separately). - Compatible with all BSPP male threads. - Flat bottom for manometer connection | ISO 228/1 BS 2779 JIS B0202 EN 837-1 & EN 837-3 |
| Unified Screw thread |  | UN | Unified Screw Thread (UN) - Straight thread with a groove for an O-ring (included) | ASME B1.1 |
| |  | AN37 | Army and Navy application (AN) - Seals on the tapered face - Tube must be flared to 37°, according to SAE standard | ASME B1.1 SAE J514 |
| |  | NPSM | National Pipe Straight Mechanical (NPSM) - American Standard for straight pipe threads - Straight thread with a groove for an O-ring (included) | ASME B1.20.1 |
| Metric Thread |  | MB | Metric Parallel Thread - Seals using a sealing gasket to DIN 3852-1, form B. - Used with a GCU gasket (sealing gasket sold separately). | DIN13 ISO 261 DIN 3852-1 Form B |

Sealants

- When assembling tapered pipe thread, it is mandatory to use pipe thread sealant. This will ensure a leak free seal, as well as prevent thread galling.
- Rotarex recommends using PTFE tape due to its ease of application (see page 60 for PTFE tape).



To apply, wrap the tape clockwise starting from under the first thread to avoid potential contact between the PTFE and the gas.


SELECTING THE RIGHT FITTING (CONTINUED)

FOR NPT AND BSPT(ISO 7/1) TAPERED PIPE THREADS:

Pressure ratings change according to thread size, thread type (male or female thread) and material type. Be certain to use the right threads for your application.

The chart on the right represents the pressures rates for male and female threads in Brass and SS 316L.

Pressure ratings are based on the ASME code for pressure piping B31.3, process piping at ambient temperature



Female thread pressure ratings are lower than those for male threads of the same diameter. Take the lower female thread ratings into account when choosing thread dimensions.

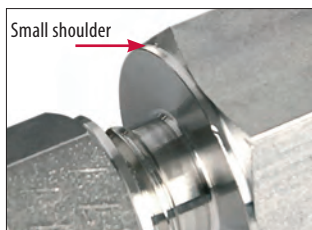
Allowable stress values are based on the standard ASME B31.3 (ambient temperature)

FOR SAE STRAIGHT THREADS :

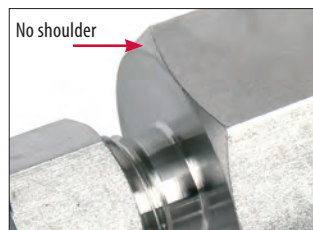
Pressure ratings are based on connector SAE J1926. Depending on the reference, Rotarex fittings with SAE threads might have lower pressure rates.

FOR NPT AND BSPT(ISO 7/1) TAPERED PIPE THREADS:

Visual Differences of Metric vs. Fractional Fittings:
 Components for metric tube dimensions have visible shoulders. Fractional dimension fittings do not.



Metric compression tube fittings (mm)



Fractional compression tube fittings (inch)

MAXIMUM ALLOWABLE STRESS (PRESSURE)

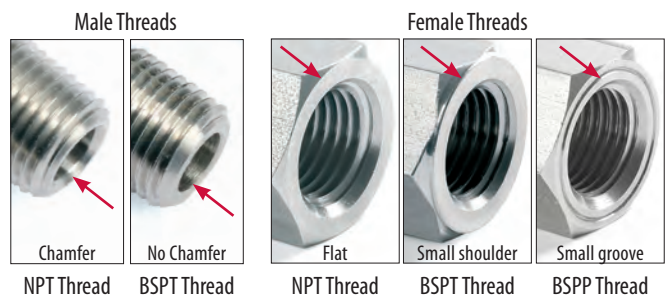
| Thread Size | | BRASS | | STAINLESS STEEL 316L | |
|-------------|-----|-------|--------|----------------------|--------|
| | | Male | Female | Male | Female |
| 1/16" | bar | 379 | 227 | 717 | 434 |
| | psi | 5500 | 3300 | 10400 | 6300 |
| 1/8" | bar | 345 | 221 | 648 | 420 |
| | psi | 5000 | 3200 | 9400 | 6100 |
| 1/4" | bar | 276 | 200 | 517 | 427 |
| | psi | 4000 | 3000 | 7500 | 6200 |
| 3/8" | bar | 269 | 179 | 503 | 345 |
| | psi | 3900 | 2600 | 7300 | 5000 |
| 1/2" | bar | 262 | 165 | 496 | 317 |
| | psi | 3800 | 2400 | 7200 | 4600 |
| 3/4" | bar | 248 | 159 | 469 | 296 |
| | psi | 3600 | 2300 | 6800 | 4300 |
| 1" | bar | 179 | 152 | 345 | 283 |
| | psi | 2600 | 2200 | 5000 | 4100 |

to determine the pressure in Mpa, multiply bar value by 0.10

| Material | bar | psi |
|----------------------|------|-------|
| Stainless Steel 316L | 1378 | 20000 |
| Brass | 689 | 10000 |

| | bar | psi |
|-----------|-----|------|
| 5/16-24 | 315 | 4568 |
| 7/16-20 | 315 | 4568 |
| 1/2-20 | 315 | 4568 |
| 9/16-18 | 315 | 4568 |
| 3/4-16 | 315 | 4568 |
| 7/8-14 | 250 | 3626 |
| 1 1/16-12 | 250 | 3626 |
| 1 3/16-12 | 200 | 2900 |
| 1 5/16-12 | 200 | 2900 |

Visual Differences between NPT and BSPT threads:
 Male NPT end connections have a chamfer at the inside diameter. Female BSPT end connections have a small shoulder on the outside face and BSPP G connections have a groove on the outside face.



SELECTING THE RIGHT FITTING (CONTINUED)

ORDERING CODES & OPTIONS

Rotarex makes it easy to choose the exact material, diameter, thread size and thread type to meet your specific needs. Each product page has a configuration table where you can quickly find the available dimensions, thread types and the corresponding reference number. Where you see an asterisk (*), you will need to specify the material. See page 8 for available materials and codes.

Example: Product number: UCMS I 6 ¼ N

Don't see what you want? We can custom-manufacture any product to your exact specifications. Just ask one of our engineers.

Need help choosing the optimal solution? One of our engineers will be happy to discuss your project in more detail and help you choose the best solution.

www.rotarex.com

| 14 STRAIGHT UNIONS | | | | | | | | | | | | | | STRAIGHT UNIONS 15 | | | | | | | | | | | | | | | |
|--|------|-----------|------|------|----|------|--------------------------------------|--------|------------|------|------|----|-----|--|------|-----------|------|------|------|----|--------------------------------------|--------|-----------|------------|------|------|------|----|-----|
| STRAIGHT UNION US | | | | | | | | | | | | | | REDUCING UNION URS | | | | | | | | | | | | | | | |
| APPLICATION Connects tubes of the same dimension in a straight configuration. <small>Special requirements on request.</small> | | | | | | | | | | | | | | APPLICATION Connects tubes of different dimensions. <small>Special requirements on request.</small> | | | | | | | | | | | | | | | |
| TUBE SIZE - METRIC (mm) | | | | | | | TUBE SIZE - FRACTIONAL (inch) | | | | | | | TUBE SIZE - METRIC (mm) | | | | | | | TUBE SIZE - FRACTIONAL (inch) | | | | | | | | |
| D | # | Reference | A | E | H | P | D | # | Reference | A | E | H | P | D | # | Reference | A | E | H | P | D | # | Reference | A | E | H | P | | |
| 3 | 1/8" | US1-3 | 13.0 | 12.0 | 12 | 2.4 | 3/8" | 1/4" | URS1-3/8 | 9.99 | 9.94 | 8 | 16* | 4 | 1/4" | URS1-4 | 16.6 | 15.7 | 12.0 | 12 | 2.4 | 1/2" | 3/8" | URS1-1/2 | 12.2 | 8.0 | 8.0 | 12 | 16* |
| 4 | 1/4" | US1-4 | 15.0 | 13.7 | 15 | 3.2 | 1/2" | 3/8" | URS1-1/2 | 13.9 | 13.0 | 12 | 16* | 6 | 1/4" | URS1-6 | 18.6 | 17.5 | 13.0 | 14 | 16* | 3/4" | 1/2" | URS1-3/4 | 14.6 | 10.4 | 10.4 | 12 | 16* |
| 4 | 1/4" | US1-4 | 15.0 | 13.3 | 14 | 4.8 | 3/4" | 1/2" | URS1-3/4 | 14.7 | 14.0 | 12 | 16* | 8 | 1/4" | URS1-8 | 20.4 | 19.2 | 14.0 | 14 | 16* | 1" | 3/4" | URS1-1 | 15.6 | 11.4 | 11.4 | 14 | 16* |
| 6 | 1/4" | US1-6 | 18.2 | 16.2 | 16 | 4.8 | 1" | 3/4" | URS1-1 | 14.8 | 14.0 | 14 | 16* | 10 | 1/4" | URS1-10 | 24.1 | 22.8 | 17.0 | 14 | 16* | 1 1/4" | 1" | URS1-1 1/4 | 19.6 | 15.4 | 15.4 | 14 | 16* |
| 10 | 1/2" | US1-10 | 21.2 | 17.2 | 17 | 3.2 | 1 1/4" | 1" | URS1-1 1/4 | 17.0 | 16.0 | 14 | 16* | 12 | 1/2" | URS1-12 | 27.0 | 25.8 | 19.0 | 14 | 16* | 1 1/2" | 1 1/4" | URS1-1 1/2 | 20.4 | 16.2 | 16.2 | 14 | 16* |
| 12 | 1/2" | US1-12 | 21.2 | 20.0 | 20 | 3.2 | 1 1/2" | 1 1/4" | URS1-1 1/2 | 17.0 | 16.0 | 14 | 16* | 16 | 1/2" | URS1-16 | 31.8 | 30.6 | 23.0 | 14 | 16* | 2" | 1 1/2" | URS1-2 | 21.2 | 17.0 | 17.0 | 14 | 16* |
| 14 | 1/2" | US1-14 | 23.2 | 21.4 | 24 | 11.1 | 2" | 1 1/2" | URS1-2 | 20.2 | 19.0 | 18 | 16* | 20 | 1/2" | URS1-20 | 36.7 | 35.4 | 27.0 | 14 | 16* | 2 1/2" | 2" | URS1-2 1/2 | 24.6 | 20.4 | 20.4 | 14 | 16* |
| 16 | 1/2" | US1-16 | 23.2 | 21.4 | 24 | 15.2 | 2 1/2" | 2" | URS1-2 1/2 | 20.2 | 19.0 | 18 | 16* | 24 | 1/2" | URS1-24 | 42.5 | 41.2 | 33.0 | 14 | 16* | 3" | 2 1/2" | URS1-3 | 24.6 | 20.4 | 20.4 | 14 | 16* |
| 18 | 1/2" | US1-18 | 23.2 | 21.4 | 27 | 15.1 | 3" | 2 1/2" | URS1-3 | 21.1 | 19.6 | 17 | 16* | 28 | 1/2" | URS1-28 | 48.3 | 47.0 | 39.0 | 14 | 16* | 3 1/2" | 3" | URS1-3 1/2 | 24.6 | 20.4 | 20.4 | 14 | 16* |
| 20 | 1/2" | US1-20 | 25.0 | 23.0 | 26 | 15.0 | 3 1/2" | 3" | URS1-3 1/2 | 21.1 | 19.6 | 17 | 16* | 32 | 1/2" | URS1-32 | 54.1 | 52.8 | 45.0 | 14 | 16* | 4" | 3 1/2" | URS1-4 | 24.6 | 20.4 | 20.4 | 14 | 16* |
| 22 | 1/2" | US1-22 | 25.0 | 23.0 | 30 | 18.2 | 4" | 3" | URS1-4 | 23.6 | 22.1 | 18 | 16* | 40 | 1/2" | URS1-40 | 60.0 | 58.7 | 51.0 | 14 | 16* | 5" | 4" | URS1-5 | 24.6 | 20.4 | 20.4 | 14 | 16* |
| 24 | 1/2" | US1-24 | 26.0 | 24.0 | 30 | 22.2 | 5" | 4" | URS1-5 | 23.6 | 22.1 | 18 | 16* | 48 | 1/2" | URS1-48 | 65.8 | 64.5 | 57.0 | 14 | 16* | 6" | 5" | URS1-6 | 24.6 | 20.4 | 20.4 | 14 | 16* |

CLEANING AND PACKAGING

To maintain the proper purity of the fluid system, every Rotarex fitting is thoroughly cleaned of oil and metal particles from the machining process.

For special applications where higher purity is warranted, Rotarex offers the following additional cleaning and packaging options:

- **individual packaging:** fittings can be delivered individually packaged to maintain extra purity during transport and storage.

For ordering, please add **PKG** at the end of the reference (example : US1 6 PKG)

- **For oxygen systems,** Rotarex offers a specific cleaning to meet the stringent international safety standards for oxygen applications. For more information, please refer to Rotarex Special Cleaning and Packaging STQ/02

For ordering, please add **D0** at the end of the reference (example : US1 6 D0)

CHROME PLATING

All Rotarex raw brass fittings are available in chrome plated brass as an option: For ordering, please add **CHR** at the end of the reference (example : US1 6 CHR)

- **For Absolute Cleaning** (all parts are lubricant free), please refer to Rotarex Special Cleaning and Packaging STQ/02

For ordering, please add **DA** at the end of the reference (example : US1 6 DA)

Example: To order a fitting oxygen clean in an individual packaging, mention as following: US1 6 D0 PKG



For further information, please refer to Rotarex Cleaning Standard STQ/01 on our web site: www.rotarex.com

SELECTING THE RIGHT FITTING (CONTINUED)

TUBE SELECTION GUIDE - Stainless Steel tubing

Different tube diameters, wall thicknesses and material types have different pressure ratings. Please confirm that you are using the correct materials for your intended operating pressure.

The below pressure rates are to be considered for annealed stainless steel tubing (304, 316, etc.) in compliance with:

- **ASTM 269** - for Seamless and welded Austenitic Stainless Steel Tubing (General service).
- **ASTM 213** - for Seamless Ferric and Austenitic Alloy Steel Boiler, Superheated and Heat Exchanger Tubes (General Service) or equivalent specifications.
- **EN ISO 1127** - Stainless Steel tubes: Dimensions, tolerances and conventional mass per unit length
 For diameters ≤ 14 mm: Tolerance D4 = outside diameter
 T4 = thickness.
 For diameters > 14 mm: Tolerance D4 = outside diameter
 T3 = thickness.

Following ASME B31.3, the temperature range to be considered is -28°C to 37°C (-20°F to 100°F). Recommended tube hardness 80 HRB(50HV). Maximum acceptable hardness 90 HRB (200HV).

PRESSURE ADJUSTMENT FOR HIGHER TEMPERATURES (FACTOR K)

At operating temperatures above 93° C / 200° F, multiply the pressure ratings by the appropriate Factor K.

| F° | C° | Factor K |
|------------|-----------|----------|
| -4 - 200 | -20 - 93 | 1,00 |
| 200 - 250 | 93 - 121 | 0,99 |
| 250 - 300 | 121 - 149 | 0,98 |
| 300 - 350 | 149 - 177 | 0,97 |
| 350 - 400 | 177 - 204 | 0,96 |
| 400 - 450 | 204 - 232 | 0,95 |
| 450 - 500 | 232 - 260 | 0,94 |
| 550 - 600 | 288 - 316 | 0,93 |
| 600 - 650 | 316 - 343 | 0,91 |
| 650 - 700 | 343 - 371 | 0,90 |
| 700 - 750 | 371 - 399 | 0,89 |
| 750 - 800 | 399 - 427 | 0,88 |
| 800 - 850 | 427 - 454 | 0,87 |
| 850 - 900 | 454 - 482 | 0,86 |
| 900 - 950 | 482 - 510 | 0,85 |
| 950 - 1000 | 510 - 538 | 0,84 |



Welded joints do not have the same pressure resiliency as the tube. Reduce the pressure by the following factors:

- 0,80 for single welded tubing
- 0,85 for double welded tubing

STAINLESS STEEL - METRIC

| Ø (mm) | Unit | Wall thickness (mm) | | | | | | | | | |
|--------|------|---------------------|------|------|-------|------|------|------|------|------|-----|
| | | 0,8 | 1,0 | 1,2 | 1,5 | 1,8 | 2,0 | 2,2 | 2,5 | 3,0 | 3,5 |
| 3 | bar | 670 | | | | | | | | | |
| | psi | 9715 | | | | | | | | | |
| 6 | bar | 310 | 420 | 540 | 710 | | | | | | |
| | psi | 4495 | 6090 | 7830 | 10295 | | | | | | |
| 8 | bar | 310 | 390 | 520 | | | | | | | |
| | psi | 4495 | 5655 | 7540 | | | | | | | |
| 10 | bar | 240 | 300 | 440 | 510 | 580 | | | | | |
| | psi | 3480 | 4350 | 6380 | 7395 | 8410 | | | | | |
| 12 | bar | 200 | 250 | 330 | 410 | 470 | | | | | |
| | psi | 2900 | 3625 | 4785 | 5945 | 6815 | | | | | |
| 14 | bar | 160 | 200 | 270 | 340 | 380 | 430 | | | | |
| | psi | 2320 | 2900 | 3915 | 4930 | 5510 | 6235 | | | | |
| 15 | bar | 150 | 190 | 250 | 310 | 360 | 400 | | | | |
| | psi | 2175 | 2755 | 3625 | 4495 | 5220 | 5800 | | | | |
| 16 | bar | | 170 | 230 | 290 | 330 | 370 | 400 | | | |
| | psi | | 2465 | 3335 | 4205 | 4785 | 5365 | 5800 | | | |
| 18 | bar | | 150 | 200 | 260 | 290 | 320 | 370 | | | |
| | psi | | 2175 | 2900 | 3770 | 4205 | 4640 | 5365 | | | |
| 20 | bar | | 140 | 180 | 230 | 260 | 290 | 330 | 380 | | |
| | psi | | 2030 | 2610 | 3335 | 3770 | 4205 | 4785 | 5510 | | |
| 22 | bar | | 180 | 200 | 200 | 230 | 260 | 300 | 340 | | |
| | psi | | 2610 | 2900 | 2900 | 3335 | 3770 | 4350 | 4930 | | |
| 25 | bar | | | | 180 | 200 | 230 | 260 | 290 | 320 | |
| | psi | | | | 2610 | 2900 | 3335 | 3770 | 4205 | 4640 | |

OK for all fluid services - standard assembly

STAINLESS STEEL - FRACTIONAL

| Ø (inch) | Unit | Wall thickness (inches) | | | | | | | | | | | | | | | |
|----------|------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|
| | | 0.010 | 0.012 | 0.014 | 0.016 | 0.020 | 0.028 | 0.035 | 0.049 | 0.065 | 0.083 | 0.095 | 0.109 | 0.120 | | | |
| 1/16" | psi | 5600 | 6800 | 8100 | 9400 | 12000 | | | | | | | | | | | |
| | bar | 386 | 469 | 559 | 648 | 828 | | | | | | | | | | | |
| 1/8" | psi | | | | | 8500 | 9000 | | | | | | | | | | |
| | bar | | | | | 586 | 621 | | | | | | | | | | |
| 3/16" | psi | | | | | 5400 | 7000 | 10200 | | | | | | | | | |
| | bar | | | | | 372 | 483 | | | | | | | | | | |
| 1/4" | psi | | | | | 4000 | 5100 | 7500 | 10200 | | | | | | | | |
| | bar | | | | | 276 | 352 | 517 | 703 | | | | | | | | |
| 5/16" | psi | | | | | | 4000 | 5800 | 8000 | | | | | | | | |
| | bar | | | | | | 276 | 400 | 552 | | | | | | | | |
| 3/8" | psi | | | | | | | 3300 | 4800 | 6500 | 7500 | | | | | | |
| | bar | | | | | | | 228 | 331 | 448 | | | | | | | |
| 1/2" | psi | | | | | | | | 2600 | 3700 | 5100 | 6700 | | | | | |
| | bar | | | | | | | | 179 | 255 | 352 | 462 | | | | | |
| 5/8" | psi | | | | | | | | | 2900 | 4000 | 5200 | 6000 | | | | |
| | bar | | | | | | | | | 200 | 276 | 359 | 414 | | | | |
| 3/4" | psi | | | | | | | | | | 2400 | 3300 | 4200 | 4900 | 5800 | | |
| | bar | | | | | | | | | | 166 | 228 | 290 | 338 | 400 | | |
| 7/8" | psi | | | | | | | | | | | 2000 | 2800 | 3600 | 4200 | 4800 | |
| | bar | | | | | | | | | | | 138 | 193 | 248 | 290 | 331 | |
| 1" | psi | | | | | | | | | | | | 2400 | 3100 | 3600 | 4100 | 4900 |
| | bar | | | | | | | | | | | | 166 | 214 | 248 | 283 | 338 |

OK for all fluid services using pre-assembly too

Not recommended for gas service

SELECTING THE RIGHT FITTING (CONTINUED)

TUBE SELECTION GUIDE - Copper – annealed seamless tubing (ASTM B-75 or equivalent)

The below pressure rates are to be considered for copper tubing in compliance with:

- **ASTM B75** - for seamless round copper tube suitable for general engineering applications.
- **ASTM B88** - Standard specification for seamless copper water tube
- **EN ISO 1057**- seamless round bar copper and copper alloy tubes for water and heating applications.
- other equivalent specifications

Following ASME B31.3 and B31.1, the standard temperature range is -28°C to 37°C (-20°F to 100°F)

PRESSURE ADJUSTMENT FOR HIGHER TEMPERATURES (FACTOR K)

At operating temperatures above 38° C / 100° F, multiply the above pressure ratings by the appropriate Factor K.

| F° | C° | Factor K |
|-----------|-----------|----------|
| -20 - 100 | -28 - 37 | 1,00 |
| 100 - 150 | 38 - 66 | 0,85 |
| 150 - 200 | 66 - 93 | 0,80 |
| 200 - 250 | 93 - 121 | 0,80 |
| 250 - 300 | 121 - 149 | 0,78 |
| 300 - 350 | 149 - 177 | 0,67 |
| 350 - 400 | 177 - 204 | 0,50 |
| 400 + | 204 + | |



Apply Factor K when operating at higher temperatures (see chart above)

COPPER - METRIC

| Ø (mm) | Unit | Wall thickness (mm) | | | | | | | | | | |
|--------|------|---------------------|------|------|------|------|------|------|------|------|------|--|
| | | 0,8 | 1,0 | 1,2 | 1,5 | 1,8 | 2,0 | 2,2 | 2,5 | 2,8 | 3,0 | |
| 6 | bar | 110 | 140 | 170 | 220 | | | | | | | |
| | psi | 1595 | 2030 | 2465 | 3190 | | | | | | | |
| 8 | bar | | 100 | 120 | 160 | | | | | | | |
| | psi | | 1450 | 1740 | 2320 | | | | | | | |
| 10 | bar | | 80 | 100 | 130 | | | | | | | |
| | psi | | 1160 | 1450 | 1885 | | | | | | | |
| 12 | bar | | 60 | 80 | 100 | 130 | 140 | | | | | |
| | psi | | 870 | 1160 | 1450 | 1885 | 2030 | | | | | |
| 14 | bar | | 50 | 60 | 90 | 110 | 120 | | | | | |
| | psi | | 725 | 870 | 1305 | 1595 | 1740 | | | | | |
| 15 | bar | | | 60 | 80 | 100 | 110 | 120 | | | | |
| | psi | | | 870 | 1160 | 1450 | 1595 | 1740 | | | | |
| 16 | bar | | | | 70 | 90 | 100 | 110 | 120 | | | |
| | psi | | | | 1015 | 1305 | 1450 | 1595 | 1740 | | | |
| 18 | bar | | | | 60 | 80 | 90 | 100 | 110 | | | |
| | psi | | | | 870 | 1160 | 1305 | 1450 | 1595 | | | |
| 20 | bar | | | | 60 | 70 | 80 | 90 | 100 | 110 | | |
| | psi | | | | 870 | 1015 | 1160 | 1305 | 1450 | 1595 | | |
| 22 | bar | | | | 50 | 60 | 70 | 80 | 90 | 100 | | |
| | psi | | | | 725 | 870 | 1015 | 1160 | 1305 | 1450 | | |
| 25 | bar | | | | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
| | psi | | | | 580 | 725 | 870 | 1015 | 1160 | 1305 | 1450 | |

OK for all fluid services - standard assembly

OK for all fluid services using pre-assembly too

Not recommended for gas service

COPPER - FRACTIONAL

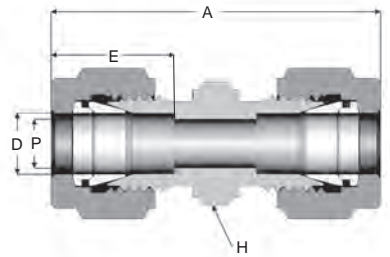
| Ø (inch) | Unit | Wall thickness (inches) | | | | | | | |
|----------|------|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| | | 0.028 | 0.035 | 0.049 | 0.065 | 0.083 | 0.095 | 0.109 | 0.120 |
| 1/8" | psi | 2700 | 3600 | | | | | | |
| | bar | 186 | 248 | | | | | | |
| 3/16" | psi | 1800 | 2300 | 3400 | 3750 | | | | |
| | bar | 124 | 159 | 234 | 259 | | | | |
| 1/4" | psi | 1300 | 1600 | 2500 | 3500 | | | | |
| | bar | 90 | 110 | 172 | 241 | | | | |
| 5/16" | psi | | 1300 | 1900 | 2700 | | | | |
| | bar | | 90 | 131 | 186 | | | | |
| 3/8" | psi | | 1000 | 1600 | 2200 | | | | |
| | bar | | 69 | 110 | 152 | | | | |
| 1/2" | psi | | 800 | 1100 | 1600 | 2100 | | | |
| | bar | | 55 | 76 | 110 | 145 | | | |
| 5/8" | psi | | | 900 | 1200 | 1600 | 1900 | | |
| | bar | | | 62 | 83 | 110 | 131 | | |
| 3/4" | psi | | | 700 | 1000 | 1300 | 1500 | 1800 | |
| | bar | | | 48 | 69 | 90 | 103 | 124 | |
| 7/8" | psi | | | 600 | 800 | 1100 | 1300 | 1500 | |
| | bar | | | 41 | 55 | 76 | 90 | 103 | |
| 1" | psi | | | 500 | 700 | 900 | 1100 | 1300 | 1400 |
| | bar | | | 34 | 48 | 62 | 76 | 90 | 97 |

STRAIGHT UNION | US

APPLICATION

Connects tubes of the same dimension in a straight configuration.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference | A | E | H | P |
|----|-----------|------|------|----|------|
| 3 | US*3 | 35,3 | 12,9 | 12 | 2,4 |
| 4 | US*4 | 37,3 | 13,7 | 12 | 3,2 |
| 6 | US*6 | 41,0 | 15,3 | 14 | 4,8 |
| 8 | US*8 | 43,2 | 16,2 | 14 | 6,4 |
| 10 | US*10 | 46,2 | 17,2 | 17 | 7,9 |
| 12 | US*12 | 51,2 | 22,8 | 22 | 9,5 |
| 14 | US*14 | 52,0 | 24,4 | 24 | 11,1 |
| 16 | US*16 | 52,0 | 24,4 | 24 | 12,7 |
| 18 | US*18 | 53,5 | 24,4 | 27 | 15,1 |
| 20 | US*20 | 55,0 | 26,0 | 30 | 15,9 |
| 22 | US*22 | 55,0 | 26,0 | 30 | 18,3 |
| 25 | US*25 | 65,0 | 31,3 | 36 | 22,2 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | A | E | H (mm) | P |
|-------|-----------|------|------|--------|--------|
| 1/16" | US*1/16 | 0.99 | 0.34 | 8 | 3/64" |
| 1/8" | US* 1/8 | 1.39 | 0.54 | 12 | 3/32" |
| 3/16" | US* 3/16 | 1.47 | 0.60 | 12 | 1/8" |
| 1/4" | US* 1/4 | 1.61 | 0.64 | 14 | 3/16" |
| 5/16" | US* 5/16 | 1.70 | 0.68 | 14 | 1/4" |
| 3/8" | US* 3/8 | 1.77 | 0.90 | 17 | 9/32" |
| 1/2" | US* 1/2 | 2.02 | 0.96 | 22 | 13/32" |
| 5/8" | US* 5/8 | 2.05 | 0.96 | 24 | 1/2" |
| 3/4" | US* 3/4 | 2.11 | 0.96 | 37 | 5/8" |
| 7/8" | US* 7/8 | 2.17 | 1.02 | 30 | 3/4" |
| 1" | US* 1" | 2.56 | 1.23 | 36 | 7/8" |

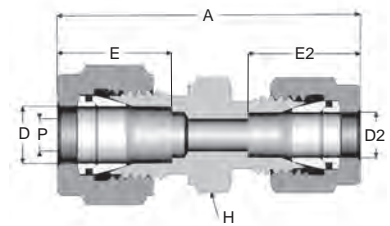
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

CONVERSION UNION | USMOD

APPLICATION

Join a metric tube to a fractional tube.

Special requirements on request



TUBE SIZE-METRIC TO FRACTIONAL (mm to inch)

| D | D2 | Reference | A | E | E2 | H | P |
|---|-------|---------------|------|------|------|----|-----|
| 3 | 1/8" | USMOD* 3 1/8 | 35.2 | 12.9 | 12.8 | 12 | 2.4 |
| 4 | 1/8" | USMOD* 4 1/8 | 36.5 | 13.7 | 12.8 | 12 | 2.4 |
| 4 | 3/16" | USMOD* 4 3/16 | 38.6 | 13.7 | 13.7 | 12 | 2.4 |
| 4 | 1/4" | USMOD* 4 1/4 | 39.4 | 13.7 | 15.3 | 14 | 2.4 |
| 6 | 1/8" | USMOD* 6 1/8 | 38.5 | 15.3 | 12.8 | 14 | 2.4 |
| 6 | 3/16" | USMOD* 6 3/16 | 39.8 | 15.3 | 13.7 | 14 | 3.2 |
| 6 | 1/4" | USMOD* 6 1/4 | 41.0 | 15.3 | 15.3 | 14 | 4.8 |
| 6 | 5/16" | USMOD* 6 5/16 | 42.3 | 15.3 | 16.2 | 14 | 4.8 |
| 6 | 3/8" | USMOD* 6 3/8 | 43.7 | 15.3 | 17.2 | 17 | 4.8 |
| 8 | 1/4" | USMOD* 8 1/4 | 42.3 | 16.2 | 15.3 | 14 | 6.4 |
| 8 | 5/16" | USMOD* 8 5/16 | 43.2 | 16.2 | 16.2 | 14 | 6.4 |
| 8 | 3/8" | USMOD* 8 3/8 | 44.3 | 16.2 | 16.9 | 17 | 6.4 |

*Specify material when ordering. See page 8 for materials and codes.

| D | D2 | Reference | A | E | E2 | H | P |
|----|-------|---------------|------|------|------|----|------|
| 10 | 1/8" | USMOD*10 1/8 | 41.8 | 17.2 | 12.8 | 17 | 2.4 |
| 10 | 1/4" | USMOD*10 1/4 | 44.5 | 17.2 | 15.3 | 17 | 4.8 |
| 10 | 5/16" | USMOD*10 5/16 | 45.1 | 17.2 | 16.2 | 17 | 6.4 |
| 10 | 3/8" | USMOD* 10 3/8 | 45.9 | 17.2 | 17.2 | 17 | 7.1 |
| 12 | 1/4" | USMOD* 12 1/4 | 47.3 | 22.8 | 15.3 | 22 | 4.8 |
| 12 | 3/8" | USMOD* 12 3/8 | 48.4 | 22.8 | 16.9 | 22 | 7.1 |
| 12 | 1/2" | USMOD* 12 1/2 | 51.2 | 22.8 | 22.8 | 22 | 9.5 |
| 16 | 5/8" | USMOD* 16 5/8 | 52 | 24.4 | 24.4 | 24 | 12.7 |
| 18 | 3/4" | USMOD* 18 3/4 | 53.5 | 24.4 | 24.4 | 27 | 15.1 |
| 20 | 1/2" | USMOD* 20 1/2 | 55 | 26 | 22.8 | 30 | 10.3 |
| 25 | 1" | USMOD* 25 1 | 65 | 31.3 | 31.3 | 36 | 21.8 |

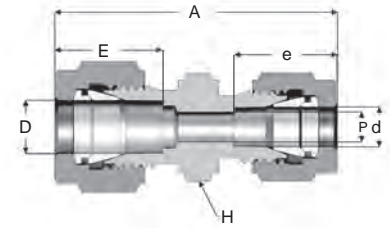
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

REDUCING UNION | URS

APPLICATION

Connects tubes of different dimensions.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | d | Reference | A | E | e | H | P |
|----|----|------------|------|------|------|----|------|
| 4 | 3 | URS* 4 3 | 36,6 | 13,7 | 12,9 | 12 | 2,4 |
| 6 | 3 | URS* 6 3 | 38,6 | 15,7 | 12,9 | 14 | 2,4 |
| 6 | 4 | URS* 6 4 | 39,4 | 15,7 | 13,7 | 14 | 3,2 |
| 8 | 6 | URS* 8 6 | 42,3 | 16,2 | 15,3 | 14 | 4,8 |
| 10 | 6 | URS* 10 6 | 44,5 | 17,2 | 15,3 | 17 | 4,8 |
| 10 | 8 | URS* 10 8 | 45,1 | 17,2 | 16,2 | 17 | 6,4 |
| 12 | 6 | URS* 12 6 | 47,0 | 22,8 | 15,3 | 22 | 4,8 |
| 12 | 8 | URS* 12 8 | 47,8 | 22,8 | 16,2 | 22 | 6,4 |
| 12 | 10 | URS* 12 10 | 48,7 | 22,8 | 17,2 | 22 | 7,9 |
| 16 | 10 | URS* 16 10 | 49,5 | 24,4 | 17,2 | 24 | 7,9 |
| 16 | 12 | URS* 16 12 | 52,0 | 24,4 | 22,8 | 24 | 9,5 |
| 18 | 12 | URS* 18 12 | 53,5 | 24,4 | 22,8 | 27 | 9,5 |
| 20 | 12 | URS* 20 12 | 54,0 | 26,0 | 22,8 | 30 | 9,5 |
| 22 | 20 | URS* 22 20 | 55,6 | 26,0 | 26,0 | 30 | 15,9 |
| 25 | 20 | URS* 25 20 | 62,3 | 31,3 | 26,0 | 36 | 15,9 |
| 25 | 22 | URS* 25 22 | 62,3 | 31,3 | 26,0 | 36 | 19,1 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | d | Reference | A | E | e | H (mm) | P |
|-------|-------|---------------|------|------|------|--------|--------|
| 1/8" | 1/16" | URS* 1/8 1/16 | 1.22 | 0.50 | 0.34 | 12 | 3/64" |
| 3/16" | 1/8" | URS* 3/16 1/8 | 1.44 | 0.54 | 0.51 | 12 | 3/32" |
| 1/4" | 1/16" | URS* 1/4 1/16 | 1.35 | 0.60 | 0.34 | 14 | 3/64" |
| 1/4" | 1/8" | URS* 1/4 1/8 | 1.52 | 0.62 | 0.51 | 14 | 3/32" |
| 1/4" | 3/16" | URS* 1/4 3/16 | 1.55 | 0.62 | 0.54 | 14 | 1/8" |
| 5/16" | 1/4" | URS* 5/16 1/4 | 1.67 | 0.64 | 0.60 | 14 | 3/16" |
| 3/8" | 1/4" | URS* 3/8 1/4 | 1.75 | 0.68 | 0.60 | 17 | 3/16" |
| 3/8" | 5/16" | URS* 3/8 5/16 | 1.78 | 0.68 | 0.64 | 17 | 1/4" |
| 1/2" | 1/4" | URS* 1/2 1/4 | 1.85 | 0.90 | 0.60 | 17 | 3/16" |
| 1/2" | 3/8" | URS* 1/2 3/8 | 1.92 | 0.90 | 0.68 | 17 | 9/32" |
| 5/8" | 3/8" | URS* 5/8 3/8 | 1.95 | 0.96 | 0.68 | 24 | 9/32" |
| 5/8" | 1/2" | URS* 5/8 1/2 | 2.05 | 0.96 | 0.90 | 24 | 13/32" |
| 3/4" | 1/2" | URS* 3/4 1/2 | 2.13 | 1.02 | 0.90 | 30 | 3/8" |
| 3/4" | 5/8" | URS* 3/4 5/8 | 2.13 | 1.02 | 0.96 | 30 | 1/2" |
| 1" | 1/2" | URS* 1" 1/2 | 2.38 | 1.23 | 0.9 | 36 | 3/8" |
| 1" | 3/4" | URS* 1" 3/4 | 2.45 | 1.23 | 0.96 | 36 | 5/8" |

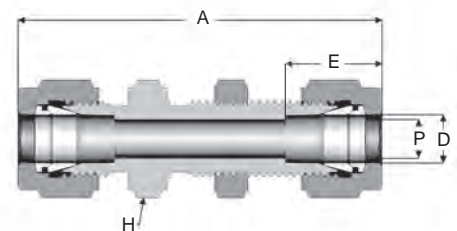
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

BULKHEAD UNION | UCS

APPLICATION

Join tubes of the same dimension through a wall panel.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference | A | E | H | P | B'Head Hole Drill Size | Max. B'Head Thickness |
|----|-----------|------|------|----|------|------------------------|-----------------------|
| 3 | UCS* 3 | 51,3 | 12,9 | 12 | 2,4 | 8,3 | 12,7 |
| 4 | UCS* 4 | 53,6 | 13,7 | 14 | 3,2 | 9,8 | 12,7 |
| 6 | UCS* 6 | 57,7 | 15,3 | 17 | 4,8 | 11,5 | 10,3 |
| 8 | UCS* 8 | 61,0 | 16,2 | 17 | 6,4 | 13,1 | 11,1 |
| 10 | UCS* 10 | 63,7 | 17,2 | 19 | 7,9 | 16,3 | 11,1 |
| 12 | UCS* 12 | 71,0 | 22,8 | 24 | 9,5 | 19,5 | 12,7 |
| 14 | UCS* 14 | 72,5 | 24,4 | 27 | 11,1 | 21,0 | 12,7 |
| 16 | UCS* 16 | 72,5 | 24,4 | 27 | 12,7 | 22,5 | 12,7 |
| 18 | UCS* 18 | 78,9 | 24,4 | 30 | 15,1 | 26,0 | 16,7 |
| 20 | UCS* 20 | 84,5 | 26,0 | 36 | 15,9 | 29,0 | 19,1 |
| 22 | UCS* 22 | 84,9 | 26,0 | 36 | 19,1 | 29,0 | 20,6 |
| 25 | UCS* 25 | 95,8 | 31,3 | 41 | 22,2 | 33,8 | 23,8 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | A | E | H (mm) | P | B'Head Hole Drill Size | Max. B'Head Thickness |
|-------|-----------|------|------|--------|--------|------------------------|-----------------------|
| 1/8" | UCS* 1/8 | 2.02 | 0.51 | 12 | 3/32" | 21/64" | 1/2" |
| 3/16" | UCS* 3/16 | 2.11 | 0.54 | 14 | 1/8" | 25/64" | 1/2" |
| 1/4" | UCS* 1/4 | 2.27 | 0.60 | 17 | 3/16" | 29/64" | 17/32" |
| 5/16" | UCS* 5/16 | 2.40 | 0.64 | 17 | 1/4" | 33/64" | 9/16" |
| 3/8" | UCS* 3/8 | 2.45 | 0.68 | 19 | 9/32" | 37/64" | 9/16" |
| 1/2" | UCS* 1/2 | 2.80 | 0.90 | 24 | 13/32" | 49/64" | 19/32" |
| 5/8" | UCS* 5/8 | 2.85 | 0.96 | 27 | 1/2" | 57/64" | 19/32" |
| 3/4" | UCS* 3/4 | 3.11 | 0.96 | 27 | 5/8" | 1 1/64" | 25/32" |
| 1" | UCS* 1" | 3.77 | 1.23 | 41 | 7/8" | 1 21/64" | 15/16" |

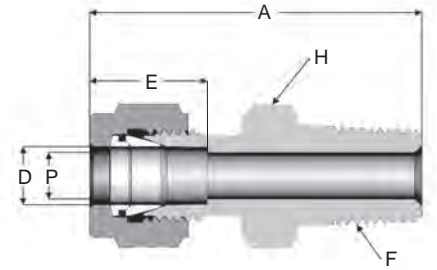
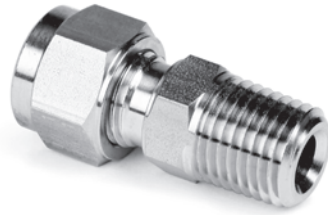
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

MALE UNION | UMS

APPLICATION

Connects a tube to a pipe or a female taper-threaded apparatus.

Special requirements on request



NPT (N)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P |
|----|-------|---------------|------|------|----|------|
| 3 | 1/16" | UMS* 3 1/16 N | 30,5 | 12,9 | 12 | 2,4 |
| 3 | 1/8" | UMS* 3 1/8 N | 30,5 | 12,9 | 12 | 2,4 |
| 3 | 1/4" | UMS* 3 1/4 N | 35,6 | 12,9 | 14 | 2,4 |
| 4 | 1/8" | UMS* 4 1/8 N | 31,2 | 13,7 | 12 | 3,2 |
| 4 | 1/4" | UMS* 4 1/4 N | 36,3 | 13,7 | 14 | 3,2 |
| 6 | 1/8" | UMS* 6 1/8 N | 32,8 | 15,3 | 14 | 4,8 |
| 6 | 1/4" | UMS* 6 1/4 N | 37,9 | 15,3 | 14 | 4,8 |
| 6 | 3/8" | UMS* 6 3/8 N | 38,4 | 15,3 | 19 | 4,8 |
| 6 | 1/2" | UMS* 6 1/2 N | 44,7 | 15,3 | 22 | 4,8 |
| 8 | 1/8" | UMS* 8 1/8 N | 34,2 | 16,2 | 14 | 4,8 |
| 8 | 1/4" | UMS* 8 1/4 N | 38,7 | 16,2 | 14 | 6,4 |
| 8 | 3/8" | UMS* 8 3/8 N | 39,3 | 16,2 | 19 | 6,4 |
| 8 | 1/2" | UMS* 8 1/2 N | 45,6 | 16,2 | 22 | 6,4 |
| 10 | 1/8" | UMS* 10 1/8 N | 36,3 | 17,2 | 17 | 4,8 |
| 10 | 1/4" | UMS* 10 1/4 N | 40,9 | 17,2 | 17 | 7,9 |
| 10 | 3/8" | UMS* 10 3/8 N | 40,9 | 17,2 | 19 | 7,9 |
| 10 | 1/2" | UMS* 10 1/2 N | 46,5 | 17,2 | 22 | 7,9 |
| 10 | 3/4" | UMS* 10 3/4 N | 48,0 | 17,2 | 27 | 7,9 |
| 12 | 1/8" | UMS* 12 1/8 N | 38,8 | 22,8 | 22 | 4,8 |
| 12 | 1/4" | UMS* 12 1/4 N | 43,4 | 22,8 | 22 | 7,1 |
| 12 | 3/8" | UMS* 12 3/8 N | 43,4 | 22,8 | 22 | 9,5 |
| 12 | 1/2" | UMS* 12 1/2 N | 49,0 | 22,8 | 22 | 9,5 |
| 12 | 3/4" | UMS* 12 3/4 N | 50,5 | 22,8 | 27 | 9,5 |
| 14 | 1/4" | UMS* 14 1/4 N | 44,1 | 24,4 | 24 | 7,1 |
| 14 | 3/8" | UMS* 14 3/8 N | 44,1 | 24,4 | 24 | 9,5 |
| 14 | 1/2" | UMS* 14 1/2 N | 44,1 | 24,4 | 24 | 11,1 |
| 14 | 3/4" | UMS* 14 3/4 N | 49,0 | 24,4 | 27 | 11,1 |
| 15 | 3/8" | UMS* 15 3/8 N | 45,6 | 24,3 | 24 | 9,5 |
| 15 | 1/2" | UMS* 15 1/2 N | 50,5 | 24,3 | 24 | 11,1 |
| 16 | 3/8" | UMS* 16 3/8 N | 44,1 | 24,4 | 24 | 7,1 |
| 16 | 1/2" | UMS* 16 1/2 N | 49,0 | 24,4 | 24 | 11,1 |
| 16 | 3/4" | UMS* 16 3/4 N | 50,5 | 24,4 | 27 | 12,7 |
| 18 | 1/2" | UMS* 18 1/2 N | 50,5 | 24,4 | 27 | 11,1 |
| 18 | 3/4" | UMS* 18 3/4 N | 50,5 | 24,4 | 27 | 15,9 |
| 18 | 1" | UMS* 18 1" N | 57,2 | 24,4 | 36 | 15,9 |
| 20 | 1/2" | UMS* 20 1/2 N | 52,3 | 26,0 | 30 | 11,1 |
| 20 | 3/4" | UMS* 20 3/4 N | 52,3 | 26,0 | 30 | 15,9 |
| 20 | 1" | UMS* 20 1" N | 56,4 | 26,0 | 36 | 15,9 |
| 22 | 1/2" | UMS* 22 1/2 N | 52,1 | 26 | 30 | 11,1 |
| 22 | 3/4" | UMS* 22 3/4 N | 52,3 | 26,0 | 30 | 15,9 |
| 22 | 1" | UMS* 22 1" N | 57,1 | 26,0 | 36 | 19,1 |
| 25 | 1/2" | UMS* 25 1/2 N | 56,9 | 31,3 | 36 | 11,1 |
| 25 | 3/4" | UMS* 25 3/4 N | 57,5 | 31,3 | 36 | 15,9 |
| 25 | 1" | UMS* 25 1" N | 62,3 | 31,3 | 36 | 22,2 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P |
|-------|-------|------------------|------|------|--------|--------|
| 1/16" | 1/16" | UMS* 1/16 1/16 N | 0.94 | 0.34 | 8 | 3/16" |
| 1/16" | 1/8" | UMS* 1/16 1/8 N | 1.03 | 0.34 | 12 | 3/16" |
| 1/8" | 1/16" | UMS* 1/8 1/16 N | 1.20 | 0.50 | 12 | 3/32" |
| 1/8" | 1/8" | UMS* 1/8 1/8 N | 1.20 | 0.50 | 12 | 3/32" |
| 1/8" | 1/4" | UMS* 1/8 1/4 N | 1.40 | 0.50 | 14 | 3/32" |
| 3/16" | 1/8" | UMS* 3/16 1/8 N | 1.23 | 0.54 | 12 | 1/8" |
| 3/16" | 1/4" | UMS* 3/16 1/4 N | 1.43 | 0.54 | 14 | 1/8" |
| 1/4" | 1/8" | UMS* 1/4 1/8 N | 1.29 | 0.60 | 14 | 3/16" |
| 1/4" | 1/4" | UMS* 1/4 1/4 N | 1.49 | 0.60 | 14 | 3/16" |
| 1/4" | 3/8" | UMS* 1/4 3/8 N | 1.51 | 0.60 | 19 | 3/16" |
| 1/4" | 1/2" | UMS* 1/4 1/2 N | 1.76 | 0.60 | 22 | 3/16" |
| 5/16" | 1/8" | UMS* 5/16 1/8 N | 1.35 | 0.64 | 14 | 3/16" |
| 5/16" | 1/4" | UMS* 5/16 1/4 N | 1.52 | 0.64 | 14 | 1/4" |
| 3/8" | 1/8" | UMS* 3/8 1/8 N | 1.43 | 0.66 | 17 | 3/16" |
| 3/8" | 1/4" | UMS* 3/8 1/4 N | 1.61 | 0.66 | 17 | 9/32" |
| 3/8" | 3/8" | UMS* 3/8 3/8 N | 1.61 | 0.66 | 19 | 9/32" |
| 3/8" | 1/2" | UMS* 3/8 1/2 N | 1.83 | 0.66 | 22 | 9/32" |
| 3/8" | 3/4" | UMS* 3/8 3/4 N | 1.89 | 0.66 | 27 | 9/32" |
| 1/2" | 1/4" | UMS* 1/2 1/4 N | 1.71 | 0.90 | 22 | 9/32" |
| 1/2" | 3/8" | UMS* 1/2 3/8 N | 1.71 | 0.90 | 22 | 3/8" |
| 1/2" | 1/2" | UMS* 1/2 1/2 N | 1.93 | 0.90 | 22 | 3/8" |
| 1/2" | 3/4" | UMS* 1/2 3/4 N | 1.99 | 0.90 | 27 | 3/8" |
| 5/8" | 3/8" | UMS* 5/8 3/8 N | 1.74 | 0.96 | 24 | 3/8" |
| 5/8" | 1/2" | UMS* 5/8 1/2 N | 1.93 | 0.96 | 24 | 3/8" |
| 5/8" | 3/4" | UMS* 5/8 3/4 N | 1.99 | 0.96 | 27 | 1/2" |
| 3/4" | 1/2" | UMS* 3/4 1/2 N | 1.99 | 0.96 | 27 | 15/32" |
| 3/4" | 3/4" | UMS* 3/4 3/4 N | 1.99 | 0.96 | 27 | 5/8" |
| 3/4" | 1" | UMS* 3/4 1" N | 2.25 | 0.96 | 36 | 5/8" |
| 7/8" | 3/4" | UMS* 7/8 3/4 N | 2.06 | 1.02 | 30 | 5/8" |
| 7/8" | 1" | UMS* 7/8 1" N | 2.25 | 1.02 | 36 | 3/4" |
| 1" | 3/4" | UMS* 1" 3/4 N | 2.26 | 1.23 | 36 | 5/8" |
| 1" | 1" | UMS* 1" 1" N | 2.45 | 1.23 | 36 | 7/8" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

BSPT - ISO BSP Tapered Thread (T)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P |
|----|------|---------------|------|------|----|------|
| 3 | 1/8" | UMS* 3 1/8 T | 30,5 | 12,9 | 12 | 2,4 |
| 3 | 1/4" | UMS* 3 1/4 T | 35,6 | 12,9 | 14 | 2,4 |
| 4 | 1/8" | UMS* 4 1/8 T | 31,2 | 13,7 | 12 | 3,2 |
| 4 | 1/4" | UMS* 4 1/4 T | 36,3 | 13,7 | 14 | 3,2 |
| 6 | 1/8" | UMS* 6 1/8 T | 32,8 | 15,3 | 14 | 4,8 |
| 6 | 1/4" | UMS* 6 1/4 T | 37,9 | 15,3 | 14 | 4,8 |
| 6 | 3/8" | UMS* 6 3/8 T | 38,4 | 15,3 | 19 | 4,8 |
| 6 | 1/2" | UMS* 6 1/2 T | 44,7 | 15,3 | 22 | 4,8 |
| 8 | 1/8" | UMS* 8 1/8 T | 34,2 | 16,2 | 14 | 4,8 |
| 8 | 1/4" | UMS* 8 1/4 T | 38,7 | 16,2 | 14 | 6,4 |
| 8 | 3/8" | UMS* 8 3/8 T | 39,3 | 16,2 | 19 | 6,4 |
| 8 | 1/2" | UMS* 8 1/2 T | 45,6 | 16,2 | 22 | 6,4 |
| 10 | 1/8" | UMS* 10 1/8 T | 36,3 | 17,2 | 17 | 4,8 |
| 10 | 1/4" | UMS* 10 1/4 T | 40,9 | 17,2 | 17 | 7,9 |
| 10 | 3/8" | UMS* 10 3/8 T | 40,9 | 17,2 | 19 | 7,9 |
| 10 | 1/2" | UMS* 10 1/2 T | 46,5 | 17,2 | 22 | 7,9 |
| 10 | 3/4" | UMS* 10 3/4 T | 48,0 | 17,2 | 27 | 7,9 |
| 12 | 1/4" | UMS* 12 1/4 T | 43,4 | 22,8 | 22 | 7,1 |
| 12 | 3/8" | UMS* 12 3/8 T | 43,4 | 22,8 | 22 | 9,5 |
| 12 | 1/2" | UMS* 12 1/2 T | 49,0 | 22,8 | 22 | 9,5 |
| 12 | 3/4" | UMS* 12 3/4 T | 50,5 | 22,8 | 27 | 9,5 |
| 14 | 1/4" | UMS* 14 1/4 T | 44,1 | 24,4 | 24 | 7,1 |
| 14 | 3/8" | UMS* 14 3/8 T | 44,1 | 24,4 | 24 | 9,5 |
| 14 | 1/2" | UMS* 14 1/2 T | 44,1 | 24,4 | 24 | 11,1 |
| 14 | 3/4" | UMS* 14 3/4 T | 49,0 | 24,4 | 27 | 11,1 |
| 15 | 1/2" | UMS* 15 1/2 T | 50,5 | 24,3 | 24 | 11,1 |
| 16 | 3/8" | UMS* 16 3/8 T | 44,1 | 24,4 | 24 | 7,1 |
| 16 | 1/2" | UMS* 16 1/2 T | 49,0 | 24,4 | 24 | 11,1 |
| 16 | 3/4" | UMS* 16 3/4 T | 50,5 | 24,4 | 27 | 12,7 |
| 18 | 1/2" | UMS* 18 1/2 T | 50,5 | 24,4 | 27 | 11,1 |
| 18 | 3/4" | UMS* 18 3/4 T | 50,5 | 24,4 | 27 | 15,9 |
| 20 | 1/2" | UMS* 20 1/2 T | 52,3 | 26,0 | 30 | 11,1 |
| 20 | 3/4" | UMS* 20 3/4 T | 52,3 | 26,0 | 30 | 15,9 |
| 22 | 3/4" | UMS* 22 3/4 T | 52,3 | 26,0 | 30 | 15,9 |
| 22 | 1" | UMS* 22 1" T | 57,1 | 26,0 | 36 | 19,1 |
| 25 | 3/4" | UMS* 25 3/4 T | 57,5 | 31,3 | 36 | 15,9 |
| 25 | 1" | UMS* 25 1" T | 62,3 | 31,3 | 36 | 22,2 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P |
|-------|-------|------------------|------|------|--------|-------|
| 1/16" | 1/16" | UMS* 1/16 1/16 T | 0.94 | 0.34 | 8 | 3/16" |
| 1/16" | 1/8" | UMS* 1/16 1/8 T | 1.03 | 0.34 | 12 | 3/16" |
| 1/8" | 1/8" | UMS* 1/8 1/8 T | 1.20 | 0.50 | 12 | 3/32" |
| 1/8" | 1/4" | UMS* 1/8 1/4 T | 1.40 | 0.50 | 14 | 3/32" |
| 1/8" | 3/8" | UMS* 1/8 3/8 T | 1.42 | 0.5 | 19 | 3/32" |
| 3/16" | 1/4" | UMS* 3/16 1/4 T | 1.43 | 0.54 | 14 | 1/8" |
| 1/4" | 1/8" | UMS* 1/4 1/8 T | 1.29 | 0.60 | 14 | 3/16" |
| 1/4" | 1/4" | UMS* 1/4 1/4 T | 1.49 | 0.60 | 14 | 3/16" |
| 1/4" | 3/8" | UMS* 1/4 3/8 T | 1.51 | 0.60 | 19 | 3/16" |
| 1/4" | 1/2" | UMS* 1/4 1/2 T | 1.76 | 0.60 | 22 | 3/16" |
| 5/16" | 1/8" | UMS* 5/16 1/8 T | 1.35 | 0.64 | 14 | 3/16" |
| 5/16" | 1/4" | UMS* 5/16 1/4 T | 1.52 | 0.64 | 14 | 1/4" |
| 3/8" | 1/8" | UMS* 3/8 1/8 T | 1.43 | 0.66 | 17 | 3/16" |
| 3/8" | 1/4" | UMS* 3/8 1/4 T | 1.61 | 0.66 | 17 | 9/32" |
| 3/8" | 3/8" | UMS* 3/8 3/8 T | 1.61 | 0.66 | 19 | 9/32" |
| 3/8" | 1/2" | UMS* 3/8 1/2 T | 1.83 | 0.66 | 22 | 9/32" |
| 3/8" | 3/4" | UMS* 3/8 3/4 T | 1.89 | 0.66 | 27 | 9/32" |
| 1/2" | 1/4" | UMS* 1/2 1/4 T | 1.71 | 0.90 | 22 | 9/32" |
| 1/2" | 3/8" | UMS* 1/2 3/8 T | 1.71 | 0.90 | 22 | 3/8" |
| 1/2" | 1/2" | UMS* 1/2 1/2 T | 1.93 | 0.90 | 22 | 3/8" |
| 1/2" | 3/4" | UMS* 1/2 3/4 T | 1.99 | 0.90 | 27 | 3/8" |
| 5/8" | 3/8" | UMS* 5/8 3/8 T | 1.74 | 0.96 | 24 | 3/8" |
| 5/8" | 1/2" | UMS* 5/8 1/2 T | 1.93 | 0.96 | 24 | 3/8" |
| 3/4" | 3/4" | UMS* 3/4 3/4 T | 1.99 | 0.96 | 27 | 5/8" |
| 3/4" | 1" | UMS* 3/4 1" T | 2.25 | 0.96 | 36 | 5/8" |
| 1" | 3/4" | UMS* 1" 3/4 T | 2.26 | 1.23 | 36 | 5/8" |
| 1" | 1" | UMS* 1" 1" T | 2.45 | 1.23 | 36 | 7/8" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

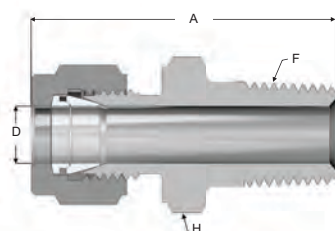
THERMOCOUPLE CONNECTOR | UMTS

For ordering use UMTS instead of UMS

APPLICATION

Straight-through bore to join apparatus such as dip tubes and thermocouple sensors.

Special requirements on request



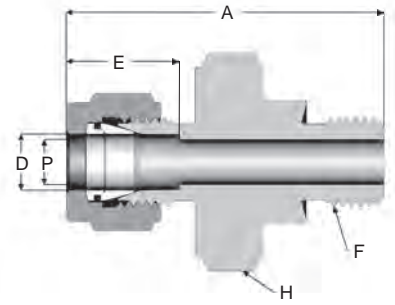
Depending on the UMTS reference, the operating pressure might be lower due to the lower wall thickness.

MALE UNION | UMS

APPLICATION

Connects a tube to a pipe or a female parallel-threaded apparatus.

Special requirements on request



BSPP - ISO BSP Parallel Thread (G)

TUBE SIZE - METRIC

| D | F | Reference | A | E | H | P |
|----|------|---------------|------|------|----|------|
| 3 | 1/8" | UMS* 3 1/8 G | 30,0 | 12,9 | 14 | 2,4 |
| 3 | 1/4" | UMS* 3 1/4 G | 35,3 | 12,9 | 19 | 2,4 |
| 4 | 1/8" | UMS* 4 1/8 G | 30,7 | 13,7 | 14 | 3,2 |
| 4 | 1/4" | UMS* 4 1/4 G | 35,9 | 13,7 | 19 | 3,2 |
| 6 | 1/8" | UMS* 6 1/8 G | 32,3 | 15,3 | 14 | 4,0 |
| 6 | 1/4" | UMS* 6 1/4 G | 37,6 | 15,3 | 19 | 4,8 |
| 6 | 3/8" | UMS* 6 3/8 G | 38,9 | 15,3 | 22 | 4,8 |
| 6 | 1/2" | UMS* 6 1/2 G | 44,7 | 15,3 | 27 | 4,8 |
| 8 | 1/8" | UMS* 8 1/8 G | 33,2 | 16,2 | 14 | 4,8 |
| 8 | 1/4" | UMS* 8 1/4 G | 38,5 | 16,2 | 19 | 5,9 |
| 8 | 3/8" | UMS* 8 3/8 G | 39,8 | 16,2 | 22 | 6,4 |
| 8 | 1/2" | UMS* 8 1/2 G | 45,6 | 16,2 | 27 | 6,4 |
| 8 | 3/4" | UMS* 8 3/4 G | 50,8 | 16,2 | 36 | 6,4 |
| 10 | 1/8" | UMS* 10 1/8 G | 36,5 | 17,2 | 17 | 4,0 |
| 10 | 1/4" | UMS* 10 1/4 G | 39,4 | 17,2 | 19 | 5,9 |
| 10 | 3/8" | UMS* 10 3/8 G | 40,6 | 17,2 | 22 | 7,9 |
| 10 | 1/2" | UMS* 10 1/2 G | 46,5 | 17,2 | 27 | 7,9 |
| 10 | 3/4" | UMS* 10 3/4 G | 50,7 | 17,2 | 36 | 7,9 |
| 12 | 1/4" | UMS* 12 1/4 G | 42,6 | 22,8 | 22 | 5,9 |
| 12 | 3/8" | UMS* 12 3/8 G | 43,1 | 22,8 | 22 | 7,9 |
| 12 | 1/2" | UMS* 12 1/2 G | 49,0 | 22,8 | 27 | 9,5 |
| 12 | 3/4" | UMS* 12 3/4 G | 52,8 | 22,8 | 36 | 9,5 |
| 14 | 1/4" | UMS* 14 1/4 G | 43,4 | 24,4 | 24 | 5,9 |
| 14 | 3/8" | UMS* 14 3/8 G | 43,3 | 24,4 | 24 | 7,9 |
| 14 | 1/2" | UMS* 14 1/2 G | 49,2 | 24,4 | 27 | 9,5 |
| 16 | 3/8" | UMS* 16 3/8 G | 43,9 | 24,4 | 24 | 7,9 |
| 16 | 1/2" | UMS* 16 1/2 G | 49,0 | 24,4 | 27 | 11,9 |
| 16 | 3/4" | UMS* 16 3/4 G | 53,0 | 24,4 | 36 | 12,7 |
| 18 | 1/2" | UMS* 18 1/2 G | 49,0 | 24,4 | 27 | 11,9 |
| 18 | 3/4" | UMS* 18 3/4 G | 52,8 | 24,4 | 36 | 15,1 |
| 20 | 1/2" | UMS* 20 1/2 G | 50,5 | 26,0 | 30 | 11,9 |
| 20 | 3/4" | UMS* 20 3/4 G | 52,8 | 26,0 | 36 | 15,9 |
| 22 | 1/2" | UMS* 22 1/2 G | 50,5 | 26 | 30 | 11,9 |
| 22 | 3/4" | UMS* 22 3/4 G | 52,8 | 26,0 | 36 | 15,9 |
| 22 | 1" | UMS* 22 1 G | 55,3 | 26,0 | 41 | 18,3 |
| 25 | 3/4" | UMS* 25 3/4 G | 57,5 | 31,3 | 36 | 15,9 |
| 25 | 1" | UMS* 25 1 G | 60,1 | 31,3 | 41 | 19,8 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P |
|-------|------|-----------------|------|------|--------|--------|
| 1/16" | 1/8" | UMS* 1/16 1/8 G | 0.98 | 0.35 | 14 | 3/64 |
| 1/8" | 1/8" | UMS* 1/8 1/8 G | 1.18 | 0.50 | 14 | 3/32" |
| 1/8" | 1/4" | UMS* 1/8 1/4 G | 1.39 | 0.50 | 19 | 3/32" |
| 1/8" | 3/8" | UMS* 1/8 3/8 G | 1.44 | 0.5 | 22 | 3/32" |
| 3/16" | 1/4" | UMS* 3/16 1/4 G | 1.21 | 0.54 | 19 | 3/32" |
| 1/4" | 1/8" | UMS* 1/4 1/8 G | 1.27 | 0.60 | 14 | 5/32" |
| 1/4" | 1/4" | UMS* 1/4 1/4 G | 1.48 | 0.60 | 19 | 3/16" |
| 1/4" | 3/8" | UMS* 1/4 3/8 G | 1.53 | 0.60 | 22 | 3/16" |
| 1/4" | 1/2" | UMS* 1/4 1/2 G | 1.76 | 0.60 | 27 | 3/16" |
| 3/8" | 1/8" | UMS* 3/8 1/8 G | 1.44 | 0.66 | 17 | 5/32" |
| 3/8" | 1/4" | UMS* 3/8 1/4 G | 1.55 | 0.66 | 19 | 7/32" |
| 3/8" | 3/8" | UMS* 3/8 3/8 G | 1.60 | 0.66 | 22 | 9/32" |
| 1/2" | 1/4" | UMS* 1/2 1/4 G | 1.68 | 0.90 | 22 | 7/32" |
| 1/2" | 3/8" | UMS* 1/2 3/8 G | 1.70 | 0.90 | 22 | 3/8" |
| 1/2" | 1/2" | UMS* 1/2 1/2 G | 1.93 | 0.90 | 27 | 3/8" |
| 5/8" | 3/8" | UMS* 5/8 3/8 G | 1.73 | 0.96 | 24 | 3/8" |
| 5/8" | 1/2" | UMS* 5/8 1/2 G | 1.93 | 0.96 | 27 | 15/32" |
| 5/8" | 3/4" | UMS* 5/8 3/4 G | 2.09 | 0.96 | 36 | 1/2" |
| 3/4" | 1/2" | UMS* 3/4 1/2 G | 1.93 | 0.96 | 27 | 15/32" |
| 3/4" | 3/4" | UMS* 3/4 3/4 G | 2.08 | 0.96 | 36 | 5/8" |
| 1" | 1" | UMS* 1" 1" G | 2.37 | 1.23 | 41 | 7/8" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

BSPP G end connections should be used with sealing gaskets. See page 9 for further information. See page 59 for gaskets.

Metric Parallel Thread (MB)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P |
|----|--------|-------------------|------|------|----|-----|
| 6 | 10 x 1 | UMSI 6 10 x 1 MB | 25,7 | 15,3 | 14 | 4 |
| 6 | 12 x 1 | UMSI 6 12 x 1 MB | 30,2 | 15,3 | 17 | 4,8 |
| 8 | 12 x 1 | UMSI 8 12 x 1 MB | 30,9 | 16,2 | 17 | 4,8 |
| 10 | 10 x 1 | UMSI 10 10 x 1 MB | 27,8 | 17,2 | 19 | 4 |
| 10 | 12 x 1 | UMSI 10 12 x 1 MB | 31,8 | 17,2 | 19 | 4,8 |

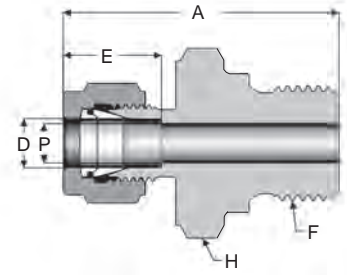
*Specify material when ordering. See page 8 for materials and codes.

MALE UNION | UMS

APPLICATION

Connects a tube to a pipe or a female parallel-threaded apparatus.

Special requirements on request



BSPP - ISO BSP Parallel Thread (K)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P |
|----|------|---------------|------|------|----|------|
| 3 | 1/8" | UMS* 3 1/8 K | 30,0 | 12,9 | 14 | 2,4 |
| 3 | 1/4" | UMS* 3 1/4 K | 35,3 | 12,9 | 19 | 2,4 |
| 4 | 1/8" | UMS* 4 1/8 K | 30,7 | 13,7 | 14 | 3,2 |
| 6 | 1/8" | UMS* 6 1/8 K | 32,3 | 15,3 | 14 | 4 |
| 6 | 1/4" | UMS* 6 1/4 K | 37,6 | 15,3 | 19 | 4,8 |
| 6 | 3/8" | UMS* 6 3/8 K | 38,9 | 15,3 | 22 | 4,8 |
| 6 | 1/2" | UMS* 6 1/2 K | 44,7 | 15,3 | 27 | 4,8 |
| 8 | 1/8" | UMS* 8 1/8 K | 33,2 | 16,2 | 14 | 4,8 |
| 8 | 1/4" | UMS* 8 1/4 K | 38,5 | 16,2 | 19 | 5,9 |
| 8 | 3/8" | UMS* 8 3/8 K | 39,8 | 16,2 | 22 | 6,4 |
| 8 | 1/2" | UMS* 8 1/2 K | 45,6 | 16,2 | 27 | 6,4 |
| 10 | 1/4" | UMS* 10 1/4 K | 39,4 | 17,2 | 19 | 5,9 |
| 10 | 3/8" | UMS* 10 3/8 K | 40,6 | 17,2 | 22 | 7,9 |
| 10 | 1/2" | UMS* 10 1/2 K | 46,5 | 17,2 | 27 | 7,9 |
| 12 | 1/4" | UMS* 12 1/4 K | 42,6 | 22,8 | 22 | 5,9 |
| 12 | 3/8" | UMS* 12 3/8 K | 43,1 | 22,8 | 22 | 7,9 |
| 12 | 1/2" | UMS* 12 1/2 K | 49,0 | 22,8 | 27 | 9,5 |
| 12 | 3/4" | UMS* 12 3/4 K | 52,8 | 22,8 | 36 | 9,5 |
| 14 | 3/8" | UMS* 14 3/8 K | 43,3 | 24,4 | 24 | 7,9 |
| 14 | 1/2" | UMS* 14 1/2 K | 49,2 | 24,4 | 27 | 9,5 |
| 16 | 3/8" | UMS* 16 3/8 K | 43,9 | 24,4 | 24 | 7,9 |
| 16 | 1/2" | UMS* 16 1/2 K | 49,0 | 24,4 | 27 | 11,9 |
| 16 | 3/4" | UMS* 16 3/4 K | 53,0 | 24,4 | 36 | 12,7 |
| 18 | 1/2" | UMS* 18 1/2 K | 49,0 | 24,4 | 27 | 11,9 |
| 18 | 3/4" | UMS* 18 3/4 K | 52,8 | 24,4 | 36 | 15,1 |
| 20 | 1/2" | UMS* 20 1/2 K | 50,5 | 26,0 | 30 | 11,9 |
| 20 | 3/4" | UMS* 20 3/4 K | 52,8 | 26,0 | 36 | 15,9 |
| 22 | 3/4" | UMS* 22 3/4 K | 52,8 | 26,0 | 36 | 15,9 |
| 22 | 1" | UMS* 22 1 K | 55,3 | 26,0 | 41 | 18,3 |
| 25 | 3/4" | UMS* 25 3/4 K | 57,5 | 31,3 | 36 | 15,9 |
| 25 | 1" | UMS* 25 1 K | 60,1 | 31,3 | 41 | 19,8 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P |
|-------|------|-----------------|------|------|--------|--------|
| 1/8" | 1/8" | UMS* 1/8 1/8 K | 1.18 | 0.50 | 14 | 3/32" |
| 1/8" | 1/4" | UMS* 1/8 1/4 K | 1.39 | 0.50 | 19 | 3/32" |
| 3/16" | 1/8" | UMS* 3/16 1/8 K | 1.21 | 0.54 | 14 | 3/32" |
| 1/4" | 1/8" | UMS* 1/4 1/8 K | 1.27 | 0.60 | 14 | 5/32" |
| 1/4" | 1/4" | UMS* 1/4 1/4 K | 1.48 | 0.60 | 19 | 3/16" |
| 1/4" | 3/8" | UMS* 1/4 3/8 K | 1.53 | 0.60 | 22 | 3/16" |
| 1/4" | 1/2" | UMS* 1/4 1/2 K | 1.76 | 0.60 | 27 | 3/16" |
| 5/16" | 1/4" | UMS* 5/16 1/4 K | 1.52 | 0.64 | 19 | 7/32" |
| 3/8" | 1/8" | UMS* 3/8 1/8 K | 1.44 | 0.66 | 17 | 5/32" |
| 3/8" | 1/4" | UMS* 3/8 1/4 K | 1.55 | 0.66 | 19 | 7/32" |
| 3/8" | 3/8" | UMS* 3/8 3/8 K | 1.60 | 0.66 | 22 | 9/32" |
| 3/8" | 1/2" | UMS* 3/8 1/2 K | 1.83 | 0.66 | 27 | 9/32" |
| 1/2" | 1/4" | UMS* 1/2 1/4 K | 1.68 | 0.90 | 22 | 7/32" |
| 1/2" | 3/8" | UMS* 1/2 3/8 K | 1.70 | 0.90 | 22 | 3/8" |
| 1/2" | 1/2" | UMS* 1/2 1/2 K | 1.93 | 0.90 | 27 | 3/8" |
| 1/2" | 3/4" | UMS* 1/2 3/4 K | 2.08 | 0.90 | 36 | 3/8" |
| 3/4" | 1/2" | UMS* 3/4 1/2 K | 1.93 | 0.96 | 27 | 15/32" |
| 3/4" | 3/4" | UMS* 3/4 3/4 K | 2.08 | 0.96 | 36 | 5/8" |
| 1" | 3/4" | UMS* 1" 3/4 K | 2.26 | 1.23 | 36 | 5/8" |
| 1" | 1" | UMS* 1" 1" K | 2.37 | 1.23 | 41 | 7/8" |

BSPP K end connections must be used with sealing gaskets. See page 9 for further information. See page 59 for gaskets.

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

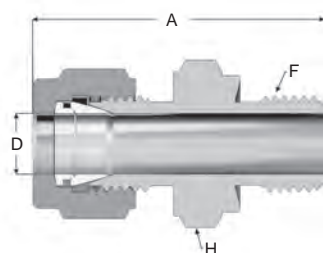
THERMOCOUPLE CONNECTOR | UMTS

For ordering use UMTS instead of UMS

APPLICATION

Straight-through bore to join apparatus such as dip tubes and thermocouple sensors.

Special requirements on request



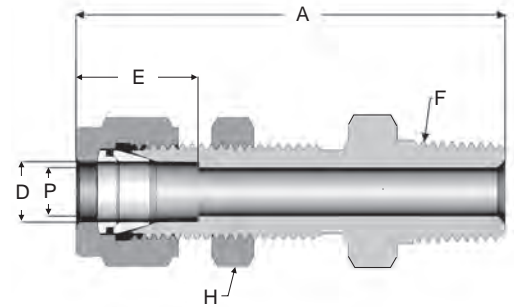
Depending on the UMTS reference, the operating pressure might be lower due to the lower wall thickness.

MALE BULKHEAD UNION | UCMS

APPLICATION (NPT)

Connects a tube to a female taper-threaded apparatus or pipe through a wall or panel.

Special requirements on request



NPT (N)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P | B'Head Hole Drill Size | Max. B'Head Thick. |
|----|------|----------------|------|------|----|-----|------------------------|--------------------|
| 3 | 1/8" | UCMS* 3 1/8 N | 46,5 | 12,9 | 12 | 2,4 | 8,3 | 12,7 |
| 4 | 1/8" | UCMS* 4 1/8 N | 47,2 | 13,7 | 12 | 3,2 | 9,8 | 12,7 |
| 6 | 1/8" | UCMS* 6 1/8 N | 49,5 | 15,3 | 17 | 4,8 | 11,5 | 10,3 |
| 6 | 1/4" | UCMS* 6 1/4 N | 49,5 | 15,3 | 17 | 4,8 | 11,5 | 10,3 |
| 6 | 3/8" | UCMS* 6 3/8 N | 53,3 | 15,3 | 17 | 4,8 | 11,5 | 10,3 |
| 8 | 1/8" | UCMS* 8 1/8 N | 51,9 | 16,2 | 17 | 4,8 | 13,1 | 11,1 |
| 8 | 1/4" | UCMS* 8 1/4 N | 56,6 | 16,2 | 17 | 6,4 | 13,1 | 11,1 |
| 10 | 1/4" | UCMS* 10 1/4 N | 57,4 | 17,2 | 19 | 7,9 | 16,3 | 11,1 |
| 12 | 3/8" | UCMS* 12 3/8 N | 63,2 | 22,8 | 24 | 9,5 | 19,5 | 12,7 |
| 12 | 1/2" | UCMS* 12 1/2 N | 68,8 | 22,8 | 24 | 9,5 | 19,5 | 12,7 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P | B'Head Hole Drill Size | Max. B'Head Thick. |
|-------|------|------------------|------|------|--------|-------|------------------------|--------------------|
| 1/8" | 1/8" | UCMS* 1/8 1/8 N | 1.83 | 0.51 | 12 | 3/32" | 21/64" | 1/2" |
| 3/16" | 1/8" | UCMS* 3/16 1/8 N | 1.86 | 0.54 | 12 | 1/8" | 25/64" | 1/2" |
| 1/4" | 1/8" | UCMS* 1/4 1/8 N | 1.95 | 0.60 | 17 | 3/16" | 29/64" | 17/32" |
| 1/4" | 1/4" | UCMS* 1/4 1/4 N | 2.10 | 0.60 | 17 | 3/16" | 29/64" | 17/32" |
| 3/8" | 1/4" | UCMS* 3/8 1/4 N | 2.26 | 0.68 | 19 | 9/32" | 37/64" | 9/16" |
| 3/8" | 3/8" | UCMS* 3/8 3/8 N | 2.26 | 0.68 | 19 | 9/32" | 37/64" | 9/16" |
| 3/8" | 1/2" | UCMS* 3/8 1/2 N | 2.51 | 0.68 | 22 | 9/32" | 37/64" | 9/16" |
| 1/2" | 3/8" | UCMS* 1/2 3/8 N | 2.49 | 0.90 | 24 | 3/8" | 49/64" | 19/32" |
| 1/2" | 1/2" | UCMS* 1/2 1/2 N | 2.71 | 0.90 | 24 | 3/8" | 49/64" | 19/32" |
| 3/4" | 3/4" | UCMS* 3/4 3/4 N | 3 | 0.96 | 30 | 5/8" | 1 1/64" | 25/32" |
| 1" | 1" | UCMS* 1" 1" N | 3.67 | 1.23 | 41 | 7/8" | 1 21/64" | 15/16" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

BSPT - ISO BSP Tapered Thread (T)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P | B'Head Hole Drill Size | Max. B'Head Thick. |
|---|------|---------------|------|------|----|-----|------------------------|--------------------|
| 3 | 1/8" | UCMS* 3 1/8 T | 46,5 | 12,9 | 12 | 2,4 | 8,3 | 12,7 |
| 4 | 1/8" | UCMS* 4 1/8 T | 47,2 | 13,7 | 12 | 3,2 | 9,8 | 12,7 |
| 6 | 1/8" | UCMS* 6 1/8 T | 49,5 | 15,3 | 17 | 4,8 | 11,5 | 10,3 |
| 6 | 1/4" | UCMS* 6 1/4 T | 49,5 | 15,3 | 17 | 4,8 | 11,5 | 10,3 |
| 8 | 3/8" | UCMS* 8 3/8 T | 56,6 | 16,2 | 19 | 6,4 | 13,1 | 11,1 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P | B'Head Hole Drill Size | Max. B'Head Thick. |
|------|------|-----------------|------|------|--------|-------|------------------------|--------------------|
| 1/8" | 1/8" | UCMS* 1/8 1/8 T | 1.83 | 0.51 | 12 | 3/32" | 21/64" | 1/2" |
| 1/4" | 1/4" | UCMS* 1/4 1/4 T | 2.10 | 0.60 | 17 | 3/16" | 29/64" | 17/32" |
| 3/8" | 1/4" | UCMS* 3/8 1/4 T | 2.26 | 0.68 | 19 | 9/32" | 37/64" | 9/16" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

MALE BULKHEAD UNION WITH O-RING | UCOMS

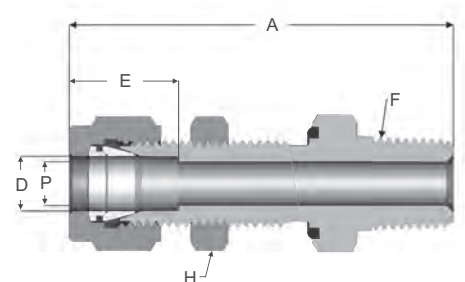
For ordering use UCOMS instead of UCMS

APPLICATION

Connects a tube to a female taper-threaded apparatus or pipe through a wall or panel.

The O-ring ensures a perfect tightness for isolators.

Special requirements on request

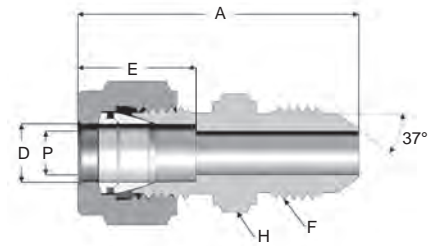


STRAIGHT UNION «AN» | UMS AN

APPLICATION

Connects a tube to a female AN-threaded apparatus.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | AN tube flare size | Reference | A | E | P | H | F |
|----|--------------------|----------------|------|------|-----|----|--------------|
| 4 | 3/16" | UMS*4 3/16 AN | 34,1 | 13,7 | 3,2 | 12 | 3/16" - 24 |
| 10 | 1/4" | UMS* 10 1/4 AN | 40,1 | 17,2 | 7,1 | 17 | 7/16" - 20 |
| 10 | 3/8" | UMS* 10 3/8 AN | 40,5 | 17,2 | 7,1 | 17 | 9/16" - 18 |
| 12 | 1/2" | UMS* 12 1/2 AN | 46,0 | 22,8 | 9,5 | 22 | 3/4" - 16 |
| 18 | 3/4" | UMS* 18 3/4 AN | 54,0 | 24,4 | 9,5 | 27 | 1 1/16" - 12 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | AN tube flare size | Reference | A | E | P | H (mm) | F |
|-------|--------------------|-------------------|------|------|------|--------|--------------|
| 1/8" | 1/8" | UMS* 1/8 1/8 AN | 1.25 | 0.51 | 3/32 | 12 | 5/16" - 24 |
| 1/8" | 1/4" | UMS* 1/8 1/4 AN | 1.41 | 0.51 | 3/32 | 14 | 7/16" - 20 |
| 3/16" | 3/16" | UMS* 3/16 3/16 AN | 1.34 | 0.54 | 1/8 | 12 | 3/16" - 24 |
| 1/4" | 1/4" | UMS* 1/4 1/4 AN | 1.50 | 0.60 | 3/16 | 14 | 7/16" - 20 |
| 5/16" | 5/16" | UMS* 5/16 5/16 AN | 1.53 | 0.64 | 5/32 | 14 | 1/2" - 20 |
| 3/8" | 1/4" | UMS* 3/8 1/4 AN | 1.58 | 0.68 | 9/32 | 17 | 7/16" - 20 |
| 3/8" | 3/8" | UMS* 3/8 3/8 AN | 1.59 | 0.68 | 9/32 | 17 | 9/16" - 18 |
| 1/2" | 1/2" | UMS* 1/2 1/2 AN | 1.81 | 0.90 | 3/8 | 22 | 3/4" - 16 |
| 3/4" | 3/4" | UMS* 3/4 3/4 AN | 2.13 | 0.96 | 3/8 | 27 | 1 1/16" - 12 |
| 1" | 1" | UMS* 1" 1" AN | 2.43 | 1.23 | 7/8 | 36 | 1 5/16" - 12 |

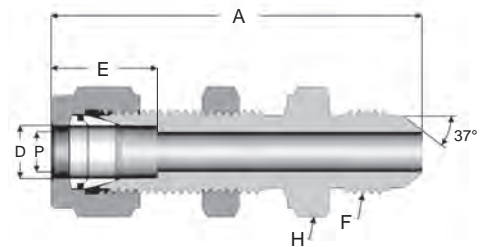
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

BULKHEAD UNION «AN» | UCMS AN

APPLICATION

Connects tubes to a female AN-threaded apparatus through a wall or panel.

Special requirements on request



TUBE SIZE - FRACTIONAL (inch)

| D | AN tube flare size | Reference | A | E | H (mm) | P | B'Head Hole Drill Size | Max. B'Head Thick. | F |
|------|--------------------|------------------|------|------|--------|--------|------------------------|--------------------|--------------|
| 1/4" | 1/4" | UCMS* 1/4 1/4 AN | 2.14 | 0.60 | 17 | 11/64" | 29/64" | 17/32" | 7/16" - 20 |
| 3/8" | 3/8" | UCMS* 3/8 3/8 AN | 2.28 | 0.68 | 19 | 19/64" | 37/64" | 9/16" | 9/16" - 18 |
| 1/2" | 1/2" | UCMS* 1/2 1/2 AN | 2.59 | 0.90 | 24 | 25/64" | 49/64" | 19/32" | 3/4" - 16 |
| 3/4" | 3/4" | UCMS* 3/4 3/4 AN | 3.08 | 0.96 | 36 | 39/64" | 1 1/64" | 25/32" | 1 1/16" - 12 |
| 1 | 1" | UCMS* 1" 1" AN | 3.63 | 1.23 | 41 | 27/32" | 1 21/64" | 15/16" | 1 5/16" - 12 |

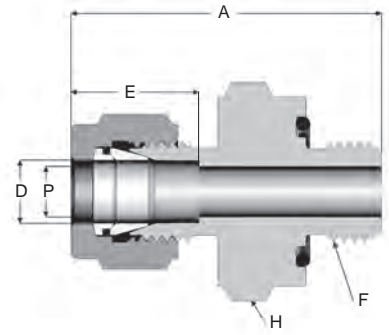
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

MALE O-RING CONNECTOR (NPSM) | UMOMS

APPLICATION

Connects a tube to a female threaded apparatus with an O-ring face seal connection.

Special requirements on request



NPSM (NM)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P |
|----|------|---------------|------|------|----|-----|
| 3 | 1/8" | UMOMS* 3 1/8 | 32,8 | 12,9 | 19 | 2,4 |
| 6 | 1/8" | UMOMS* 6 1/8 | 35,2 | 15,3 | 19 | 4,8 |
| 6 | 3/8" | UMOMS* 6 3/8 | 39,9 | 15,3 | 30 | 4,8 |
| 8 | 1/4" | UMOMS* 8 1/4 | 39,3 | 16,2 | 24 | 6,4 |
| 10 | 1/4" | UMOMS* 10 1/4 | 40,1 | 17,2 | 24 | 7,1 |
| 10 | 1/2" | UMOMS* 10 1/2 | 47,3 | 17,2 | 36 | 7,1 |
| 12 | 1/2" | UMOMS* 12 1/2 | 49,8 | 22,8 | 36 | 9,5 |
| 16 | 1/2" | UMOMS* 16 1/2 | 49,8 | 24,4 | 36 | 13 |

NPSM fittings are supplied with sealing O-rings in Nitrile (NBR). Fluorocarbon (FPM) O-rings are available upon request. See page 8 for additional information.

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P |
|-------|------|-----------------|------|------|--------|-------|
| 1/16" | 1/8" | UMOMS* 1/16 1/8 | 1.13 | 0.34 | 19 | 3/64" |
| 1/8" | 1/8" | UMOMS* 1/8 1/8 | 1.29 | 0.5 | 19 | 3/32" |
| 1/8" | 1/4" | UMOMS* 1/8 1/4 | 1.44 | 0.5 | 24 | 3/32" |
| 3/16" | 1/8" | UMOMS* 3/16 1/8 | 1.34 | 0.54 | 19 | 1/8" |
| 1/4" | 1/8" | UMOMS* 1/4 1/8 | 1.41 | 0.60 | 19 | 3/16" |
| 1/4" | 1/4" | UMOMS* 1/4 1/4 | 1.51 | 0.60 | 24 | 3/16" |
| 1/4" | 1/2" | UMOMS* 1/4 1/2 | 1.81 | 0.6 | 36 | 3/16" |
| 1/4" | 3/8" | UMOMS* 1/4 3/8 | 1.59 | 0.60 | 30 | 3/16" |
| 3/8" | 1/8" | UMOMS* 3/8 1/8 | 1.47 | 0.68 | 19 | 3/16" |
| 3/8" | 1/4" | UMOMS* 3/8 1/4 | 1.59 | 0.68 | 24 | 9/32" |
| 3/8" | 3/8" | UMOMS* 3/8 3/8 | 1.66 | 0.68 | 30 | 9/32" |
| 3/8" | 1/2" | UMOMS* 3/8 1/2 | 1.87 | 0.68 | 36 | 9/32" |
| 1/2" | 1/4" | UMOMS* 1/2 1/4 | 1.69 | 0.90 | 24 | 9/32" |
| 1/2" | 3/8" | UMOMS* 1/2 3/8 | 1.75 | 0.90 | 30 | 3/8" |
| 1/2" | 1/2" | UMOMS* 1/2 1/2 | 1.96 | 0.90 | 36 | 3/8" |
| 5/8" | 1/2" | UMOMS* 5/8 1/2 | 1.97 | 0.96 | 36 | 1/2" |
| 5/8" | 3/4" | UMOMS* 5/8 3/4 | 2.06 | 0.96 | 41 | 1/2" |
| 3/4" | 1/2" | UMOMS* 3/4 1/2 | 1.97 | 1.02 | 36 | 1/2" |
| 3/4" | 3/4" | UMOMS* 3/4 3/4 | 2.06 | 1.02 | 41 | 5/8" |
| 1" | 3/4" | UMOMS* 1" 3/4 | 2.22 | 1.23 | 41 | 5/8" |
| 1" | 1" | UMOMS* 1" 1" | 2.37 | 1.23 | 46 | 7/8" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

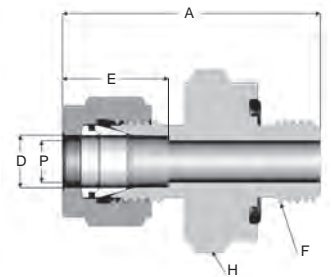


Do not mistake NPSM thread with BSPP threads

MALE O-RING CONNECTOR «UN» | UMOMSS

APPLICATION

Connects a tube to a female threaded apparatus with an O-ring face seal connection.



UN (UN)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P |
|----|------------|-------------------|------|------|----|-----|
| 3 | 5/16" - 24 | UMOMSS* 3 5/16 | 32,8 | 12,9 | 14 | 2,4 |
| 4 | 3/8" - 24 | UMOMSS* 4 3/8 | 34,4 | 13,7 | 17 | 3,2 |
| 6 | 7/16" - 20 | UMOMSS* 6 7/16 | 38,4 | 15,3 | 19 | 4,8 |
| 8 | 1/2" - 20 | UMOMSS* 8 1/2 | 40,9 | 16,2 | 22 | 6,4 |
| 10 | 9/16" - 18 | UMOMSS* 10 9/16 | 42,4 | 17,2 | 24 | 8 |
| 12 | 5/8" - 18 | UMOMSS* 12 5/8 | 45,7 | 22,8 | 24 | 9,5 |
| 12 | 3/4" - 16 | UMOMSS* 12 3/4 | 45,8 | 22,8 | 30 | 9,5 |
| 18 | 1 1/16"-12 | UMOMSS* 18 1 1/16 | 50,6 | 24,4 | 38 | 15 |
| 20 | 1 1/16"-12 | UMOMSS* 20 1 1/16 | 52,2 | 26,0 | 38 | 16 |

UN fittings are supplied with sealing O-rings in Nitrile (NBR). Fluorocarbon (FPM) O-rings are available upon request. See page 8 for additional information.

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P |
|-------|------------|--------------------|------|------|--------|--------|
| 1/16" | 5/16" - 24 | UMOMSS* 1/16 5/16 | 1.29 | 0.34 | 14 | 3/64" |
| 1/8" | 3/8" - 24 | UMOMSS* 1/8 3/8 | 1.29 | 0.51 | 14 | 3/32" |
| 1/8" | 5/16" - 18 | UMOMSS* 1/8 5/16 | 1.59 | 0.51 | 24 | 3/32" |
| 3/16" | 3/8" - 24 | UMOMSS* 3/16 3/8 | 1.35 | 0.54 | 17 | 1/8" |
| 1/4" | 7/16" - 20 | UMOMSS* 1/4 7/16 | 1.51 | 0.60 | 19 | 3/16" |
| 5/16" | 1/2" - 20 | UMOMSS* 5/16 1/2 | 1.61 | 0.64 | 22 | 1/4" |
| 3/8" | 9/16" - 18 | UMOMSS* 3/8 9/16 | 1.67 | 0.66 | 24 | 5/8" |
| 1/2" | 3/4" - 16 | UMOMSS* 1/2 3/4 | 1.80 | 0.90 | 30 | 3/8" |
| 3/4" | 1 1/16"-12 | UMOMSS* 3/4 1 1/16 | 1.98 | 0.96 | 38 | 19/32" |

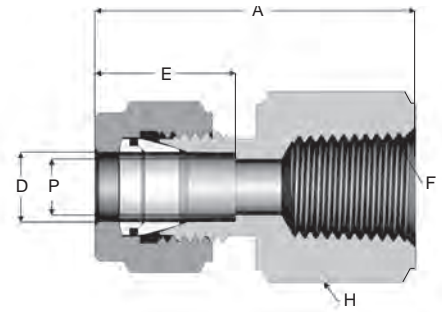
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

FEMALE UNION | UFS

APPLICATION

Connects a tube to a male NPT-tapered apparatus or pipe.

Special requirements on request



NPT (N)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P |
|----|------|---------------|------|------|----|------|
| 3 | 1/8" | UFS* 3 1/8 N | 28,7 | 12,9 | 14 | 2,4 |
| 3 | 1/4" | UFS* 3 1/4 N | 33,5 | 12,9 | 19 | 2,4 |
| 4 | 1/8" | UFS* 4 1/8 N | 29,7 | 13,7 | 14 | 2,4 |
| 6 | 1/8" | UFS* 6 1/8 N | 31,3 | 15,3 | 14 | 4,8 |
| 6 | 1/4" | UFS* 6 1/4 N | 35,8 | 15,3 | 19 | 4,8 |
| 6 | 3/8" | UFS* 6 3/8 N | 37,6 | 15,3 | 22 | 4,8 |
| 6 | 1/2" | UFS* 6 1/2 N | 42,5 | 15,3 | 27 | 4,8 |
| 8 | 1/8" | UFS* 8 1/8 N | 32,1 | 16,2 | 14 | 6,4 |
| 8 | 1/4" | UFS* 8 1/4 N | 37,0 | 16,2 | 19 | 6,4 |
| 8 | 3/8" | UFS* 8 3/8 N | 38,5 | 16,2 | 22 | 6,4 |
| 8 | 1/2" | UFS* 8 1/2 N | 43,3 | 16,2 | 27 | 6,4 |
| 10 | 1/8" | UFS* 10 1/8 N | 33,3 | 17,2 | 17 | 7,9 |
| 10 | 1/4" | UFS* 10 1/4 N | 37,8 | 17,2 | 19 | 7,9 |
| 10 | 3/8" | UFS* 10 3/8 N | 39,4 | 17,2 | 22 | 7,9 |
| 10 | 1/2" | UFS* 10 1/2 N | 44,2 | 17,2 | 27 | 7,9 |
| 12 | 1/4" | UFS* 12 1/4 N | 40,3 | 22,8 | 22 | 9,5 |
| 12 | 3/8" | UFS* 12 3/8 N | 41,9 | 22,8 | 22 | 9,5 |
| 12 | 1/2" | UFS* 12 1/2 N | 46,7 | 22,8 | 27 | 9,5 |
| 12 | 3/4" | UFS* 12 3/4 N | 48,9 | 22,8 | 32 | 9,5 |
| 14 | 3/8" | UFS* 14 3/8 N | 42,1 | 24,4 | 24 | 11,1 |
| 14 | 1/2" | UFS* 14 1/2 N | 46,9 | 24,4 | 27 | 11,1 |
| 16 | 1/4" | UFS* 16 1/4 N | 41,7 | 24,4 | 24 | 9,5 |
| 16 | 3/8" | UFS* 16 3/8 N | 46,9 | 24,4 | 24 | 12,7 |
| 16 | 1/2" | UFS* 16 1/2 N | 46,9 | 24,4 | 27 | 12,7 |
| 16 | 3/4" | UFS* 16 3/4 N | 48,9 | 24,4 | 32 | 12,7 |
| 18 | 1/2" | UFS* 18 1/2 N | 46,9 | 24,4 | 27 | 12,7 |
| 18 | 3/4" | UFS* 18 3/4 N | 48,4 | 24,4 | 30 | 12,7 |
| 20 | 1/2" | UFS* 20 1/2 N | 47,9 | 26,0 | 30 | 15,9 |
| 20 | 3/4" | UFS* 20 3/4 N | 49,7 | 26,0 | 36 | 15,9 |
| 22 | 3/4" | UFS* 22 3/4 N | 49,7 | 26,0 | 36 | 18,5 |
| 22 | 1" | UFS* 22 1" N | 57,9 | 26,0 | 41 | 18,5 |
| 25 | 3/4" | UFS* 25 3/4 N | 53,4 | 31,3 | 36 | 22,2 |
| 25 | 1" | UFS* 25 1" N | 62,3 | 31,3 | 41 | 22,2 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P |
|-------|-------|------------------|------|------|--------|--------|
| 1/16" | 1/16" | UFS* 1/16 1/16 N | 0.93 | 0.34 | 12 | 3/64" |
| 1/16" | 1/8" | UFS* 1/16 1/8 N | 0.96 | 0.34 | 12 | 3/64" |
| 1/16" | 1/4" | UFS* 1/16 1/4 N | 1.15 | 0.34 | 19 | 3/64" |
| 1/8" | 1/8" | UFS* 1/8 1/8 N | 1.13 | 0.51 | 14 | 3/32" |
| 1/8" | 1/4" | UFS* 1/8 1/4 N | 1.32 | 0.51 | 19 | 3/32" |
| 3/16" | 1/8" | UFS* 3/16 1/8 N | 1.17 | 0.54 | 14 | 1/8" |
| 1/4" | 1/16" | UFS* 1/4 1/16 N | 1.23 | 0.6 | 14 | 3/16" |
| 1/4" | 1/8" | UFS* 1/4 1/8 N | 1.23 | 0.60 | 14 | 3/16" |
| 1/4" | 1/4" | UFS* 1/4 1/4 N | 1.41 | 0.60 | 19 | 3/16" |
| 1/4" | 3/8" | UFS* 1/4 3/8 N | 1.48 | 0.60 | 22 | 3/16" |
| 1/4" | 1/2" | UFS* 1/4 1/2 N | 1.67 | 0.60 | 27 | 3/16" |
| 5/16" | 1/8" | UFS* 5/16 1/8 N | 1.26 | 0.64 | 14 | 1/4" |
| 5/16" | 1/4" | UFS* 5/16 1/4 N | 1.46 | 0.64 | 19 | 1/4" |
| 3/8" | 1/8" | UFS* 3/8 1/8 N | 1.31 | 0.68 | 17 | 9/32" |
| 3/8" | 1/4" | UFS* 3/8 1/4 N | 1.49 | 0.68 | 19 | 9/32" |
| 3/8" | 3/8" | UFS* 3/8 3/8 N | 1.55 | 0.68 | 22 | 9/32" |
| 3/8" | 1/2" | UFS* 3/8 1/2 N | 1.74 | 0.68 | 27 | 9/32" |
| 3/8" | 3/4" | UFS* 3/8 3/4 N | 1.88 | 0.68 | 30 | 9/32" |
| 1/2" | 1/8" | UFS* 1/2 1/8 N | 1.4 | 0.9 | 22 | 9/32" |
| 1/2" | 1/4" | UFS* 1/2 1/4 N | 1.59 | 0.90 | 22 | 13/32" |
| 1/2" | 3/8" | UFS* 1/2 3/8 N | 1.65 | 0.90 | 22 | 13/32" |
| 1/2" | 1/2" | UFS* 1/2 1/2 N | 1.84 | 0.90 | 27 | 13/32" |
| 1/2" | 3/4" | UFS* 1/2 3/4 N | 1.9 | 0.90 | 30 | 13/32" |
| 5/8" | 3/8" | UFS* 5/8 3/8 N | 1.64 | 0.96 | 24 | 1/2" |
| 5/8" | 1/2" | UFS* 5/8 1/2 N | 1.85 | 0.96 | 27 | 1/2" |
| 5/8" | 3/4" | UFS* 5/8 3/4 N | 1.9 | 0.96 | 30 | 1/2" |
| 3/4" | 1/2" | UFS* 3/4 1/2 N | 1.85 | 0.96 | 27 | 5/8" |
| 3/4" | 3/4" | UFS* 3/4 3/4 N | 1.91 | 0.96 | 30 | 5/8" |
| 7/8" | 3/4" | UFS* 7/8 3/4 N | 1.96 | 1.02 | 30 | 3/4" |
| 1" | 3/4" | UFS* 1" 3/4 N | 2.10 | 1.23 | 36 | 7/8" |
| 1" | 1" | UFS* 1" 1" N | 2.45 | 1.23 | 41 | 7/8" |

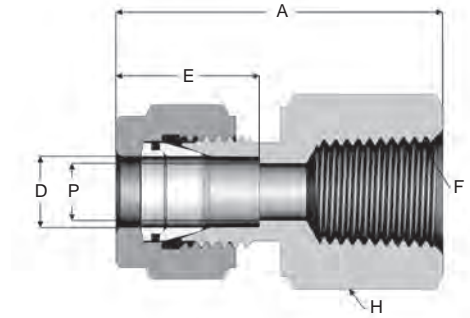
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

FEMALE UNION

APPLICATION

Connects a tube to a male BSPT-tapered apparatus or pipe.

Special requirements on request



BSPT - ISO BSP Tapered Thread (T)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P |
|----|------|---------------|------|------|----|------|
| 3 | 1/8" | UFS* 3 1/8 T | 28,7 | 12,9 | 14 | 2,4 |
| 4 | 1/8" | UFS* 4 1/8 T | 29,7 | 13,7 | 14 | 2,4 |
| 6 | 1/8" | UFS* 6 1/8 T | 31,3 | 15,3 | 14 | 4,8 |
| 6 | 1/4" | UFS* 6 1/4 T | 35,8 | 15,3 | 19 | 4,8 |
| 6 | 3/8" | UFS* 6 3/8 T | 37,6 | 15,3 | 22 | 4,8 |
| 6 | 1/2" | UFS* 6 1/2 T | 42,5 | 15,3 | 27 | 4,8 |
| 8 | 1/8" | UFS* 8 1/8 T | 32,1 | 16,2 | 14 | 6,4 |
| 8 | 1/4" | UFS* 8 1/4 T | 37,0 | 16,2 | 19 | 6,4 |
| 8 | 3/8" | UFS* 8 3/8 T | 38,5 | 16,2 | 22 | 6,4 |
| 8 | 1/2" | UFS* 8 1/2 T | 43,3 | 16,2 | 27 | 6,4 |
| 10 | 1/8" | UFS* 10 1/8 T | 33,3 | 17,2 | 17 | 7,9 |
| 10 | 1/4" | UFS* 10 1/4 T | 37,8 | 17,2 | 19 | 7,9 |
| 10 | 3/8" | UFS* 10 3/8 T | 39,4 | 17,2 | 22 | 7,9 |
| 10 | 1/2" | UFS* 10 1/2 T | 44,2 | 17,2 | 27 | 7,9 |
| 12 | 1/4" | UFS* 12 1/4 T | 40,3 | 22,8 | 22 | 9,5 |
| 12 | 3/8" | UFS* 12 3/8 T | 41,9 | 22,8 | 22 | 9,5 |
| 12 | 1/2" | UFS* 12 1/2 T | 46,7 | 22,8 | 27 | 9,5 |
| 14 | 3/8" | UFS* 14 3/8 T | 42,1 | 24,4 | 24 | 11,1 |
| 14 | 1/2" | UFS* 14 1/2 T | 46,9 | 24,4 | 27 | 11,1 |
| 16 | 3/8" | UFS* 16 3/8 T | 46,9 | 24,4 | 24 | 12,7 |
| 16 | 1/2" | UFS* 16 1/2 T | 46,9 | 24,4 | 27 | 12,7 |
| 16 | 3/4" | UFS* 16 3/4 T | 48,9 | 24,4 | 32 | 12,7 |
| 18 | 1/2" | UFS* 18 1/2 T | 46,9 | 24,4 | 27 | 12,7 |
| 20 | 1/2" | UFS* 20 1/2 T | 47,9 | 26,0 | 30 | 15,9 |
| 20 | 3/4" | UFS* 20 3/4 T | 49,7 | 26,0 | 36 | 15,9 |
| 22 | 3/4" | UFS* 22 3/4 T | 49,7 | 26,0 | 36 | 18,5 |
| 22 | 1" | UFS* 22 1" T | 57,9 | 26,0 | 41 | 18,5 |
| 25 | 3/4" | UFS* 25 3/4 T | 53,4 | 31,3 | 36 | 22,2 |
| 25 | 1" | UFS* 25 1" T | 62,3 | 31,3 | 41 | 22,2 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P |
|-------|------|-----------------|------|------|--------|--------|
| 1/16" | 1/8" | UFS* 1/16 1/8 T | 0.96 | 0.34 | 12 | 3/64" |
| 1/8" | 1/8" | UFS* 1/8 1/8 T | 1.13 | 0.51 | 14 | 3/32" |
| 1/8" | 1/4" | UFS* 1/8 1/4 T | 1.32 | 0.51 | 19 | 3/32" |
| 1/4" | 1/8" | UFS* 1/4 1/8 T | 1.23 | 0.60 | 14 | 3/16" |
| 1/4" | 1/4" | UFS* 1/4 1/4 T | 1.41 | 0.60 | 19 | 3/16" |
| 1/4" | 3/8" | UFS* 1/4 3/8 T | 1.48 | 0.60 | 22 | 3/16" |
| 1/4" | 1/2" | UFS* 1/4 1/2 T | 1.67 | 0.60 | 27 | 3/16" |
| 3/8" | 1/8" | UFS* 3/8 1/8 T | 1.31 | 0.68 | 17 | 9/32" |
| 3/8" | 1/4" | UFS* 3/8 1/4 T | 1.49 | 0.68 | 19 | 9/32" |
| 3/8" | 3/8" | UFS* 3/8 3/8 T | 1.55 | 0.68 | 22 | 9/32" |
| 3/8" | 1/2" | UFS* 3/8 1/2 T | 1.74 | 0.68 | 27 | 9/32" |
| 1/2" | 1/4" | UFS* 1/2 1/4 T | 1.59 | 0.90 | 22 | 13/32" |
| 1/2" | 3/8" | UFS* 1/2 3/8 T | 1.65 | 0.90 | 22 | 13/32" |
| 1/2" | 1/2" | UFS* 1/2 1/2 T | 1.84 | 0.90 | 27 | 13/32" |
| 1/2" | 3/4" | UFS* 1/2 3/4 T | 1.9 | 0.90 | 30 | 13/32" |
| 3/4" | 3/4" | UFS* 3/4 3/4 T | 1.91 | 0.96 | 30 | 5/8" |

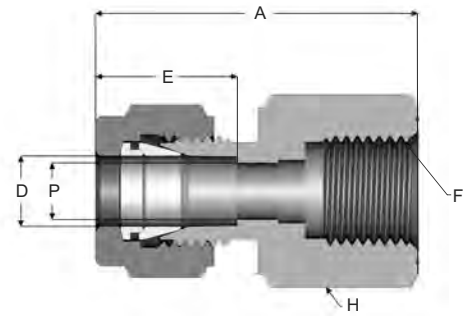
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

FEMALE UNION | UFS

APPLICATION

Connects a tube to a male BSPP parallel-threaded apparatus or pipe.

Special requirements on request



BSPP - ISO BSPP Parallel Thread (G)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H (mm) | P |
|----|------|---------------|------|------|--------|-----|
| 3 | 1/4" | UFS* 3 1/4 G | 35,3 | 12,9 | 19 | 2,4 |
| 4 | 1/8" | UFS* 4 1/8 G | 29,6 | 13,7 | 14 | 2,4 |
| 4 | 1/4" | UFS* 4 1/4 G | 35,9 | 13,7 | 19 | 2,4 |
| 4 | 3/8" | UFS* 4 3/8 G | 39,2 | 13,7 | 22 | 2,4 |
| 4 | 1/2" | UFS* 4 1/2 G | 40,6 | 13,7 | 27 | 2,4 |
| 6 | 1/8" | UFS* 6 1/8 G | 31,3 | 15,3 | 14 | 4,8 |
| 6 | 1/4" | UFS* 6 1/4 G | 37,6 | 15,3 | 19 | 4,8 |
| 6 | 3/8" | UFS* 6 3/8 G | 37,6 | 15,3 | 22 | 4,8 |
| 6 | 1/2" | UFS* 6 1/2 G | 43,5 | 15,3 | 27 | 4,8 |
| 8 | 1/8" | UFS* 8 1/8 G | 32,0 | 16,2 | 14 | 4,5 |
| 8 | 1/4" | UFS* 8 1/4 G | 38,5 | 16,2 | 19 | 5,5 |
| 8 | 3/8" | UFS* 8 3/8 G | 36,2 | 16,2 | 22 | 6,4 |
| 8 | 1/2" | UFS* 8 1/2 G | 41,0 | 16,2 | 27 | 6,4 |
| 10 | 1/8" | UFS* 10 1/8 G | 33,1 | 17,2 | 17 | 4,5 |
| 10 | 1/4" | UFS* 10 1/4 G | 39,4 | 17,2 | 19 | 5,5 |
| 10 | 3/8" | UFS* 10 3/8 G | 38,8 | 17,2 | 22 | 6,4 |
| 10 | 1/2" | UFS* 10 1/2 G | 42,1 | 17,2 | 27 | 7,0 |
| 12 | 1/4" | UFS* 12 1/4 G | 41,9 | 22,8 | 22 | 5,5 |
| 12 | 3/8" | UFS* 12 3/8 G | 44,4 | 22,8 | 22 | 6,4 |
| 12 | 1/2" | UFS* 12 1/2 G | 48,2 | 22,8 | 27 | 7,0 |
| 12 | 3/4" | UFS* 12 3/4 G | 48,9 | 22,8 | 32 | 9,5 |
| 14 | 3/8" | UFS* 14 3/8 G | 41,7 | 24,4 | 24 | 6,5 |
| 14 | 1/2" | UFS* 14 1/2 G | 46,5 | 24,4 | 27 | 7,1 |
| 16 | 1/2" | UFS* 16 1/2 G | 46,5 | 24,4 | 27 | 7,1 |
| 18 | 1/2" | UFS* 18 1/2 G | 46,5 | 24,4 | 27 | 7,1 |
| 18 | 3/4" | UFS* 18 3/4 G | 48,9 | 24,4 | 32 | 15 |
| 20 | 1/2" | UFS* 20 1/2 G | 54,3 | 26,0 | 30 | 7,0 |
| 22 | 1/2" | UFS* 22 1/2 G | 54,3 | 26,0 | 30 | 7,0 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P |
|-------|------|-----------------|------|------|--------|--------|
| 1/8" | 1/4" | UFS* 1/8 1/4 G | 1.39 | 0.51 | 19 | 3/32" |
| 1/4" | 1/8" | UFS* 1/4 1/8 G | 1.25 | 0.6 | 14 | 3/16" |
| 1/4" | 1/4" | UFS* 1/4 1/4 G | 1.48 | 0.60 | 19 | 3/16" |
| 1/4" | 3/8" | UFS* 1/4 3/8 G | 1.48 | 0.60 | 22 | 3/16" |
| 1/4" | 1/2" | UFS* 1/4 1/2 G | 1.61 | 0.60 | 27 | 3/16" |
| 5/16" | 1/4" | UFS* 5/16 1/4 G | 1.52 | 0.64 | 19 | 7/32" |
| 5/16" | 1/2" | UFS* 5/16 1/2 G | 1.61 | 0.64 | 27 | 9/32" |
| 3/8" | 1/4" | UFS* 3/8 1/4 G | 1.55 | 0.66 | 19 | 7/32" |
| 3/8" | 3/8" | UFS* 3/8 3/8 G | 1.53 | 0.66 | 22 | 17/64" |
| 3/8" | 1/2" | UFS* 3/8 1/2 G | 1.66 | 0.66 | 27 | 9/32" |
| 1/2" | 3/8" | UFS* 1/2 3/8 G | 1.75 | 0.9 | 22 | 17/64" |
| 1/2" | 1/2" | UFS* 1/2 1/2 G | 1.90 | 0.9 | 27 | 9/32" |
| 1/2" | 3/4" | UFS* 1/2 3/4 G | 1.94 | 0.9 | 32 | 3/8" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

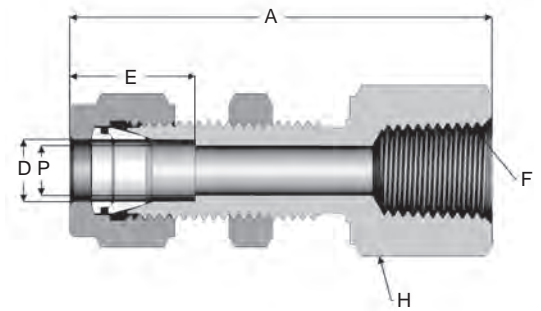
BSPP G end connections should be used with sealing gaskets.
See page 9 for further information. See page 59 for gaskets.

FEMALE BULKHEAD UNION | UCFS

APPLICATION

Connects a tube to a male threaded apparatus or pipe through a wall or panel.

Special requirements on request



NPT (N)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P | B'head Hole drill size | Max. B'head Thickness |
|----|------|----------------|------|------|----|------|------------------------|-----------------------|
| 4 | 1/4" | UCFS* 4 1/4 N | 50,3 | 13,7 | 19 | 2,4 | 9,8 | 12,7 |
| 6 | 1/8" | UCFS* 6 1/8 N | 47,1 | 15,3 | 17 | 4,8 | 11,5 | 10,3 |
| 6 | 1/4" | UCFS* 6 1/4 N | 51,9 | 15,3 | 19 | 4,8 | 11,5 | 10,3 |
| 10 | 1/4" | UCFS* 10 1/4 N | 54,3 | 17,2 | 19 | 7,9 | 16,3 | 11,1 |
| 12 | 1/4" | UCFS* 12 1/4 N | 60,0 | 22,8 | 22 | 9,5 | 19,5 | 12,7 |
| 12 | 3/8" | UCFS* 12 3/8 N | 61,7 | 22,8 | 22 | 9,5 | 19,5 | 12,7 |
| 12 | 1/2" | UCFS* 12 1/2 N | 66,5 | 22,8 | 27 | 9,5 | 19,5 | 12,7 |
| 16 | 1/2" | UCFS* 16 1/2 N | 67,1 | 24,4 | 27 | 12,7 | 22,5 | 12,7 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P | B'head Hole drill size | Max. B'head Thickness |
|------|------|-----------------|------|------|--------|-------|------------------------|-----------------------|
| 1/8" | 1/8" | UCFS* 1/8 1/8 N | 1.76 | 0.51 | 14 | 3/32" | 21/64" | 1/2" |
| 1/4" | 1/8" | UCFS* 1/4 1/8 N | 1.85 | 0.60 | 17 | 3/16" | 29/64" | 17/32" |
| 1/4" | 1/4" | UCFS* 1/4 1/4 N | 2.04 | 0.60 | 19 | 3/16" | 29/64" | 17/32" |
| 3/8" | 1/4" | UCFS* 3/8 1/4 N | 2.14 | 0.68 | 19 | 9/32" | 37/64" | 9/16" |
| 3/8" | 1/2" | UCFS* 3/8 1/2 N | 2.43 | 0.68 | 27 | 9/32" | 37/64" | 9/16" |
| 1/2" | 3/8" | UCFS* 1/2 3/8 N | 2.43 | 0.90 | 24 | 3/8" | 49/64" | 19/32" |
| 1/2" | 1/2" | UCFS* 1/2 1/2 N | 2.62 | 0.90 | 27 | 3/8" | 49/64" | 19/32" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

BSPT - ISO BSP Tapered Thread (T)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P | B'head Hole drill size | Max. B'head Thickness |
|----|------|----------------|------|------|----|-----|------------------------|-----------------------|
| 3 | 1/8" | UCFS* 3 1/8 T | 44,6 | 12,9 | 14 | 2,4 | 8,3 | 12,7 |
| 6 | 1/4" | UCFS* 6 1/4 T | 51,9 | 15,3 | 19 | 4,8 | 11,5 | 10,3 |
| 10 | 1/4" | UCFS* 10 1/4 T | 54,3 | 17,2 | 19 | 7,9 | 16,3 | 11,1 |
| 12 | 1/2" | UCFS* 12 1/2 T | 66,5 | 22,8 | 27 | 9,5 | 19,5 | 12,7 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P | B'head Hole drill size | Max. B'head Thickness |
|------|------|-----------------|------|------|--------|-------|------------------------|-----------------------|
| 1/4" | 1/4" | UCFS* 1/4 1/4 T | 2.04 | 0.60 | 19 | 3/16" | 29/64" | 17/32" |
| 3/8" | 1/4" | UCFS* 3/8 1/4 T | 2.14 | 0.68 | 19 | 9/32" | 37/64" | 9/16" |

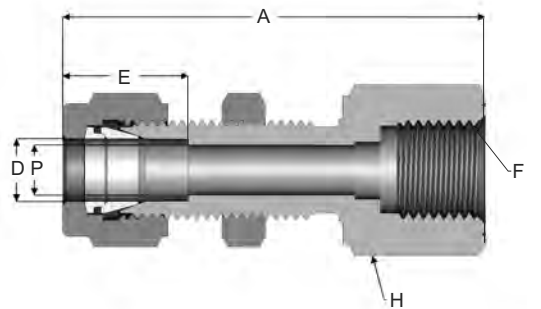
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

BSPP - ISO BSP Parallel Thread (G)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P | B'head Hole drill size | Max. B'head Thickness |
|----|------|----------------|------|------|----|-----|------------------------|-----------------------|
| 6 | 1/8" | UCFS* 6 1/8 G | 47,1 | 15,3 | 17 | 4,8 | 11,5 | 10,3 |
| 8 | 1/4" | UCFS* 8 1/4 G | 54,2 | 16,2 | 19 | 5,5 | 13,1 | 11,1 |
| 10 | 3/8" | UCFS* 10 3/8 G | 56,6 | 17,2 | 22 | 6,4 | 16,3 | 11,1 |
| 12 | 3/8" | UCFS* 12 3/8 G | 61,7 | 22,8 | 22 | 9,5 | 19,5 | 12,7 |
| 12 | 1/2" | UCFS* 12 1/2 G | 66,5 | 22,8 | 27 | 9,5 | 19,5 | 12,7 |

BSPP G end connections should be used with sealing gaskets.
See page 9 for further information. See page 59 for gaskets.
*Specify material when ordering. See page 8 for materials and codes.

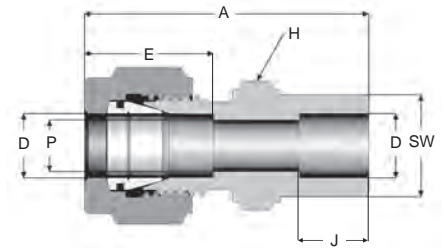


TUBE SOCKET WELD UNION | UMSWS

APPLICATION

Connects a tube to another tube via a socket weld.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference | A | E | H | J | P | SW |
|----|-----------|------|------|----|------|-----|------|
| 3 | UMSWS* 3 | 29,0 | 12,9 | 12 | 6,4 | 2,4 | 7,9 |
| 4 | UMSWS* 4 | 31,4 | 13,7 | 12 | 7,1 | 3,2 | 9,5 |
| 6 | UMSWS* 6 | 33,5 | 15,3 | 14 | 7,9 | 4,8 | 11,1 |
| 8 | UMSWS* 8 | 35,5 | 16,2 | 14 | 8,7 | 6,4 | 12,7 |
| 10 | UMSWS* 10 | 37,6 | 17,2 | 17 | 9,5 | 7,9 | 15,9 |
| 12 | UMSWS* 12 | 41,1 | 22,8 | 22 | 12,7 | 9,5 | 19,1 |
| 14 | UMSWS* 14 | 42,1 | 24,4 | 24 | 14,3 | 11 | 22,2 |
| 16 | UMSWS* 16 | 42,1 | 24,4 | 24 | 14,3 | 13 | 22,2 |
| 20 | UMSWS* 20 | 45,2 | 26,0 | 30 | 15,9 | 16 | 27,0 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | A | E | H (mm) | J | P | SW |
|------|------------|------|------|--------|------|--------|------|
| 1/8" | UMSWS* 1/8 | 1.14 | 0.5 | 12 | 0.25 | 3/32" | 0.31 |
| 1/4" | UMSWS* 1/4 | 1.32 | 0.60 | 14 | 0.31 | 3/16" | 0.44 |
| 3/8" | UMSWS* 3/8 | 1.48 | 0.66 | 17 | 0.38 | 9/32" | 0.63 |
| 1/2" | UMSWS* 1/2 | 1.62 | 0.90 | 22 | 0.50 | 13/32" | 0.75 |
| 5/8" | UMSWS* 5/8 | 1.66 | 0.96 | 24 | 0.56 | 1/2" | 0.88 |
| 3/4" | UMSWS* 3/4 | 1.71 | 0.96 | 27 | 0.56 | 5/8" | 1.06 |
| 1" | UMSWS* 1" | 2.07 | 1.23 | 36 | 0.75 | 7/8" | 1.31 |

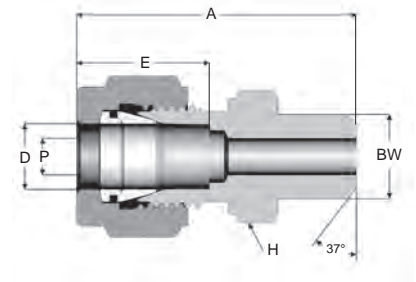
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

MALE PIPE WELD CONNECTOR | UMBWS

APPLICATION

Connects a tube to a pipe via a butt weld.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Nominal Pipe size | Reference | A | E | H | BW |
|----|-------------------|---------------|------|------|----|-------|
| 3 | 1/8" | UMBWS* 3 1/8 | 30,5 | 12,9 | 12 | 10,28 |
| 4 | 1/8" | UMBWS* 4 1/8 | 31,2 | 13,7 | 12 | 10,28 |
| 6 | 1/8" | UMBWS* 6 1/8 | 32,8 | 15,3 | 14 | 10,28 |
| 6 | 1/4" | UMBWS* 6 1/4 | 37,9 | 15,3 | 14 | 13,72 |
| 6 | 1/2" | UMBWS* 6 1/2 | 44,8 | 15,3 | 22 | 21,34 |
| 8 | 1/8" | UMBWS* 8 1/8 | 34,2 | 16,2 | 14 | 10,28 |
| 8 | 1/4" | UMBWS* 8 1/4 | 38,7 | 16,2 | 14 | 13,72 |
| 8 | 3/8" | UMBWS* 8 3/8 | 39,1 | 16,2 | 19 | 17,15 |
| 8 | 1/2" | UMBWS* 8 1/2 | 45,6 | 16,2 | 22 | 21,34 |
| 10 | 1/4" | UMBWS* 10 1/4 | 40,9 | 17,2 | 17 | 13,72 |
| 10 | 3/8" | UMBWS* 10 3/8 | 40,9 | 17,2 | 19 | 17,15 |
| 10 | 1/2" | UMBWS* 10 1/2 | 46,5 | 17,2 | 22 | 21,34 |
| 12 | 3/8" | UMBWS* 12 3/8 | 43,4 | 22,8 | 22 | 17,15 |
| 12 | 1/2" | UMBWS* 12 1/2 | 49,0 | 22,8 | 22 | 21,34 |
| 12 | 3/4" | UMBWS* 12 3/4 | 50,5 | 22,8 | 27 | 26,67 |
| 14 | 1/4" | UMBWS* 14 1/4 | 44,1 | 24,4 | 24 | 13,72 |
| 14 | 1/2" | UMBWS* 14 1/2 | 44,1 | 24,4 | 24 | 21,34 |
| 14 | 3/8" | UMBWS* 14 3/8 | 44,1 | 24,4 | 24 | 17,15 |
| 16 | 1/2" | UMBWS* 16 1/2 | 49,0 | 24,4 | 24 | 21,34 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Nominal Pipe size | Reference | A | E | H (mm) | BW |
|-------|-------------------|-----------------|------|------|--------|-------|
| 1/8" | 1/8" | UMBWS* 1/8 1/8 | 1.20 | 0.50 | 12 | 0.405 |
| 3/16" | 1/8" | UMBWS* 3/16 1/8 | 1.23 | 0.54 | 12 | 0.405 |
| 1/4" | 1/8" | UMBWS* 1/4 1/8 | 1.29 | 0.60 | 14 | 0.405 |
| 1/4" | 1/4" | UMBWS* 1/4 1/4 | 1.49 | 0.60 | 14 | 0.540 |
| 5/16" | 1/8" | UMBWS* 5/16 1/8 | 1.35 | 0.64 | 14 | 0.405 |
| 5/16" | 1/4" | UMBWS* 5/16 1/4 | 1.56 | 0.64 | 14 | 0.540 |
| 3/8" | 1/4" | UMBWS* 3/8 1/4 | 1.61 | 0.66 | 17 | 0.540 |
| 3/8" | 3/8" | UMBWS* 3/8 3/8 | 1.61 | 0.66 | 19 | 0.675 |
| 3/8" | 1/2" | UMBWS* 3/8 1/2 | 1.83 | 0.66 | 22 | 0.840 |
| 1/2" | 3/8" | UMBWS* 1/2 3/8 | 1.71 | 0.90 | 22 | 0.675 |
| 1/2" | 1/2" | UMBWS* 1/2 1/2 | 1.93 | 0.90 | 22 | 0.840 |
| 1/2" | 3/4" | UMBWS* 1/2 3/4 | 1.99 | 0.90 | 27 | 1.050 |
| 5/8" | 1/2" | UMBWS* 5/8 1/2 | 1.93 | 0.96 | 24 | 0.840 |
| 3/4" | 1/2" | UMBWS* 3/4 1/2 | 1.99 | 0.96 | 27 | 0.840 |
| 3/4" | 3/4" | UMBWS* 3/4 3/4 | 1.99 | 0.96 | 27 | 1.050 |
| 1" | 1" | UMBWS* 1" 1" | 2.45 | 1.23 | 36 | 1.315 |

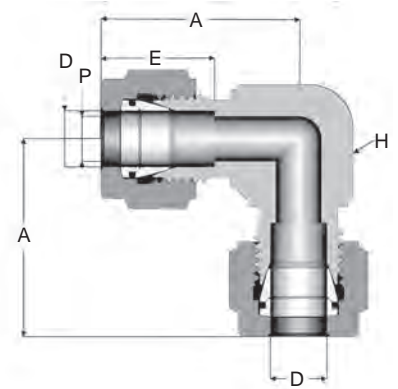
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

ELBOW | EQS

APPLICATION

Connects two tubes of the same dimension at a 90° angle.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference | A | E | H | P |
|----|-----------|-------|------|----|------|
| 3 | EQS* 3 | 23,25 | 12,9 | 12 | 2,4 |
| 4 | EQS* 4 | 24,05 | 13,7 | 12 | 3,2 |
| 6 | EQS* 6 | 27,2 | 15,3 | 14 | 4,8 |
| 8 | EQS* 8 | 28,1 | 16,2 | 14 | 6,4 |
| 10 | EQS* 10 | 32,6 | 17,2 | 19 | 7,1 |
| 12 | EQS* 12 | 36,3 | 22,8 | 22 | 9,5 |
| 14 | EQS* 14 | 37,1 | 24,4 | 24 | 11,1 |
| 16 | EQS* 16 | 37,1 | 24,4 | 24 | 12,7 |
| 18 | EQS* 18 | 39,5 | 24,4 | 27 | 15,1 |
| 20 | EQS* 20 | 41,9 | 26,0 | 30 | 15,9 |
| 22 | EQS* 22 | 41,9 | 26,0 | 30 | 19,1 |
| 25 | EQS* 25 | 45,6 | 31,3 | 36 | 22,2 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | A | E | H (mm) | P |
|-------|-----------|------|------|--------|--------|
| 1/16" | EQS* 1/16 | 0.70 | 0.34 | 12 | 3/64" |
| 1/8" | EQS* 1/8 | 0.91 | 0.51 | 12 | 3/32" |
| 3/16" | EQS* 3/16 | 0.94 | 0.54 | 12 | 1/8" |
| 1/4" | EQS* 1/4 | 1.07 | 0.60 | 14 | 3/16" |
| 5/16" | EQS* 5/16 | 1.11 | 0.64 | 14 | 1/4" |
| 3/8" | EQS* 3/8 | 1.27 | 0.68 | 19 | 9/32" |
| 1/2" | EQS* 1/2 | 1.43 | 0.90 | 22 | 13/32" |
| 5/8" | EQS* 5/8 | 1.46 | 0.96 | 24 | 1/2" |
| 3/4" | EQS* 3/4 | 1.56 | 0.96 | 27 | 5/8" |
| 7/8" | EQS* 7/8 | 1.62 | 1.02 | 30 | 3/4" |
| 1" | EQS* 1" | 1.80 | 1.23 | 36 | 7/8" |

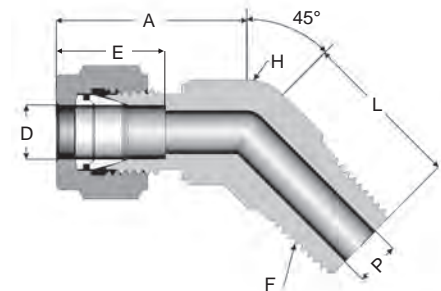
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

45° MALE ELBOW | EQM45S

APPLICATION

Connects a tube with a female taper-threaded apparatus or pipe at a 45° angle.

Special requirements on request



NPT (N)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | L | P |
|---|------|-----------------|------|------|----|------|-----|
| 6 | 1/8" | EQM45S* 6 1/8 N | 27,2 | 15,3 | 14 | 19,1 | 4,8 |
| 6 | 1/4" | EQM45S* 6 1/4 N | 27,2 | 15,3 | 14 | 23,8 | 4,8 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | L | P |
|------|------|-------------------|------|------|--------|---------|-------|
| 1/4" | 1/8" | EQM45S* 1/4 1/8 N | 1.07 | 0.60 | 14 | 3/4" | 3/16" |
| 1/4" | 1/4" | EQM45S* 1/4 1/4 N | 1.07 | 0.60 | 14 | 15/16" | 3/16" |
| 3/8" | 1/8" | EQM45S* 3/8 1/8 N | 1.27 | 0.68 | 19 | 7/8" | 3/16" |
| 3/8" | 1/4" | EQM45S* 3/8 1/4 N | 1.27 | 0.68 | 19 | 1 1/16" | 9/32" |
| 1/2" | 1/4" | EQM45S* 1/2 1/4 N | 1.43 | 0.90 | 22 | 1 1/8" | 9/32" |
| 1/2" | 3/8" | EQM45S* 1/2 3/8 N | 1.43 | 0.90 | 22 | 1 1/8" | 3/8" |

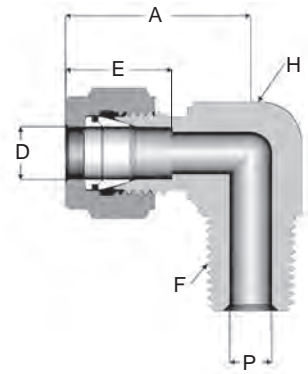
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

MALE ELBOW | EQMS

APPLICATION

Connects a tube to a female threaded apparatus or pipe on a 90° angle.

Special requirements on request



NPT (N)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H (mm) | P |
|----|------|----------------|------|------|--------|------|
| 3 | 1/8" | EQMS* 3 1/8 N | 23,3 | 12,9 | 12 | 2,4 |
| 3 | 1/4" | EQMS* 3 1/4 N | 24,9 | 12,9 | 14 | 2,4 |
| 4 | 1/8" | EQMS* 4 1/8 N | 24,1 | 13,7 | 12 | 3,2 |
| 6 | 1/8" | EQMS* 6 1/8 N | 27,2 | 15,3 | 14 | 4,8 |
| 6 | 1/4" | EQMS* 6 1/4 N | 27,2 | 15,3 | 14 | 4,8 |
| 6 | 3/8" | EQMS* 6 3/8 N | 29,7 | 15,3 | 19 | 4,8 |
| 6 | 1/2" | EQMS* 6 1/2 N | 31,9 | 15,3 | 22 | 4,8 |
| 8 | 1/8" | EQMS* 8 1/8 N | 28,1 | 16,2 | 14 | 4,8 |
| 8 | 1/4" | EQMS* 8 1/4 N | 28,1 | 16,2 | 14 | 6,4 |
| 8 | 3/8" | EQMS* 8 3/8 N | 28,1 | 16,2 | 19 | 6,4 |
| 8 | 1/2" | EQMS* 8 1/2 N | 28,1 | 16,2 | 22 | 6,4 |
| 10 | 1/8" | EQMS* 10 1/8 N | 32,2 | 17,2 | 19 | 7,1 |
| 10 | 1/4" | EQMS* 10 1/4 N | 32,2 | 17,2 | 19 | 7,1 |
| 10 | 3/8" | EQMS* 10 3/8 N | 31,0 | 17,2 | 19 | 7,1 |
| 10 | 1/2" | EQMS* 10 1/2 N | 31,8 | 17,2 | 22 | 7,1 |
| 12 | 1/4" | EQMS* 12 1/4 N | 36,3 | 22,8 | 22 | 7,1 |
| 12 | 3/8" | EQMS* 12 3/8 N | 36,3 | 22,8 | 22 | 9,5 |
| 12 | 1/2" | EQMS* 12 1/2 N | 36,3 | 22,8 | 22 | 9,5 |
| 12 | 3/4" | EQMS* 12 3/4 N | 36,3 | 22,8 | 27 | 9,5 |
| 14 | 3/8" | EQMS* 14 3/8 N | 36,6 | 24,4 | 24 | 7,1 |
| 14 | 1/2" | EQMS* 14 1/2 N | 36,6 | 24,4 | 24 | 9,5 |
| 16 | 3/8" | EQMS* 16 3/8 N | 37,1 | 24,4 | 24 | 9,5 |
| 16 | 1/2" | EQMS* 16 1/2 N | 37,1 | 24,4 | 24 | 11,9 |
| 16 | 3/4" | EQMS* 16 3/4 N | 37,1 | 24,4 | 27 | 13 |
| 18 | 1/2" | EQMS* 18 1/2 N | 39,5 | 26,0 | 27 | 11,9 |
| 18 | 3/4" | EQMS* 18 3/4 N | 39,5 | 26,0 | 27 | 15,1 |
| 20 | 1/2" | EQMS* 20 1/2 N | 41,1 | 26,0 | 30 | 11,9 |
| 20 | 3/4" | EQMS* 20 3/4 N | 41,1 | 26,0 | 30 | 15,9 |
| 22 | 3/4" | EQMS* 22 3/4 N | 41,1 | 26,0 | 30 | 15,9 |
| 22 | 1" | EQMS* 22 1" N | 41,1 | 26,0 | 36 | 18,5 |
| 25 | 3/4" | EQMS* 25 3/4 N | 45,6 | 31,3 | 36 | 15,9 |
| 25 | 1" | EQMS* 25 1" N | 45,6 | 31,3 | 36 | 22,2 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P |
|-------|-------|-------------------|------|------|--------|-------|
| 1/16" | 1/16" | EQMS* 1/16 1/16 N | 0.70 | 0.34 | 8 | 3/16" |
| 1/16" | 1/8" | EQMS* 1/16 1/8 N | 0.92 | 0.34 | 12 | 3/16" |
| 1/8" | 1/8" | EQMS* 1/8 1/8 N | 0.92 | 0.51 | 12 | 3/32" |
| 1/8" | 1/4" | EQMS* 1/8 1/4 N | 0.98 | 0.51 | 14 | 3/32" |
| 3/16" | 1/8" | EQMS* 3/16 1/8 N | 0.95 | 0.54 | 12 | 3/32" |
| 1/4" | 1/8" | EQMS* 1/4 1/8 N | 1.46 | 0.96 | 14 | 3/16" |
| 1/4" | 1/4" | EQMS* 1/4 1/4 N | 1.56 | 1.02 | 14 | 3/16" |
| 1/4" | 3/8" | EQMS* 1/4 3/8 N | 1.17 | 0.60 | 19 | 3/16" |
| 1/4" | 1/2" | EQMS* 1/4 1/2 N | 1.20 | 0.60 | 22 | 3/16" |
| 5/16" | 1/8" | EQMS* 5/16 1/8 N | 1.11 | 0.64 | 14 | 3/16" |
| 5/16" | 1/4" | EQMS* 5/16 1/4 N | 1.11 | 0.64 | 14 | 1/4" |
| 3/8" | 1/8" | EQMS* 3/8 1/8 N | 1.80 | 1.23 | 19 | 3/16" |
| 3/8" | 1/4" | EQMS* 3/8 1/4 N | 1.80 | 1.23 | 19 | 9/32" |
| 3/8" | 3/8" | EQMS* 3/8 3/8 N | 1.22 | 0.68 | 19 | 9/32" |
| 3/8" | 1/2" | EQMS* 3/8 1/2 N | 1.25 | 0.68 | 22 | 9/32" |
| 1/2" | 1/4" | EQMS* 1/2 1/4 N | 1.43 | 0.90 | 22 | 9/32" |
| 1/2" | 3/8" | EQMS* 1/2 3/8 N | 1.43 | 0.90 | 22 | 3/8" |
| 1/2" | 1/2" | EQMS* 1/2 1/2 N | 1.43 | 0.90 | 22 | 3/8" |
| 1/2" | 3/4" | EQMS* 1/2 3/4 N | 1.56 | 0.90 | 22 | 3/8" |
| 5/8" | 3/8" | EQMS* 5/8 3/8 N | 1.46 | 0.96 | 24 | 3/8" |
| 5/8" | 1/2" | EQMS* 5/8 1/2 N | 1.46 | 0.96 | 24 | 1/2" |
| 3/4" | 1/2" | EQMS* 3/4 1/2 N | 1.56 | 1.02 | 27 | 5/8" |
| 3/4" | 3/4" | EQMS* 3/4 3/4 N | 1.56 | 1.02 | 27 | 5/8" |
| 7/8" | 3/4" | EQMS* 7/8 3/4 N | 1.62 | 1.02 | 30 | 3/4" |
| 1" | 3/4" | EQMS* 1" 3/4 N | 1.80 | 1.23 | 36 | 5/8" |
| 1" | 1" | EQMS* 1" 1" N | 1.80 | 1.23 | 36 | 7/8" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

MALE ELBOW | EQMS

BSPT - ISO BSP Tapered Thread (T)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H (mm) | P |
|----|------|----------------|------|------|--------|------|
| 3 | 1/8" | EQMS* 3 1/8 T | 23,3 | 12,9 | 12 | 2,4 |
| 3 | 1/4" | EQMS* 3 1/4 T | 24,9 | 12,9 | 14 | 2,4 |
| 4 | 1/8" | EQMS* 4 1/8 T | 24,1 | 13,7 | 12 | 3,2 |
| 6 | 1/8" | EQMS* 6 1/8 T | 27,2 | 15,3 | 14 | 4,8 |
| 6 | 1/4" | EQMS* 6 1/4 T | 27,2 | 15,3 | 14 | 4,8 |
| 6 | 3/8" | EQMS* 6 3/8 T | 29,7 | 15,3 | 19 | 4,8 |
| 6 | 1/2" | EQMS* 6 1/2 T | 31,9 | 15,3 | 22 | 4,8 |
| 8 | 1/8" | EQMS* 8 1/8 T | 28,1 | 16,2 | 14 | 4,8 |
| 8 | 1/4" | EQMS* 8 1/4 T | 28,1 | 16,2 | 14 | 6,4 |
| 8 | 3/8" | EQMS* 8 3/8 T | 28,1 | 16,2 | 19 | 6,4 |
| 8 | 1/2" | EQMS* 8 1/2 T | 28,1 | 16,2 | 22 | 6,4 |
| 10 | 1/8" | EQMS* 10 1/8 T | 32,2 | 17,2 | 19 | 7,1 |
| 10 | 1/4" | EQMS* 10 1/4 T | 32,2 | 17,2 | 19 | 7,1 |
| 10 | 3/8" | EQMS* 10 3/8 T | 31,0 | 17,2 | 19 | 7,1 |
| 10 | 1/2" | EQMS* 10 1/2 T | 31,8 | 17,2 | 22 | 7,1 |
| 12 | 1/4" | EQMS* 12 1/4 T | 36,3 | 22,8 | 22 | 7,1 |
| 12 | 3/8" | EQMS* 12 3/8 T | 36,3 | 22,8 | 22 | 9,5 |
| 12 | 1/2" | EQMS* 12 1/2 T | 36,3 | 22,8 | 22 | 9,5 |
| 12 | 3/4" | EQMS* 12 3/4 T | 36,3 | 22,8 | 27 | 9,5 |
| 14 | 3/8" | EQMS* 14 3/8 T | 36,6 | 24,4 | 24 | 7,1 |
| 14 | 1/2" | EQMS* 14 1/2 T | 36,6 | 24,4 | 24 | 9,5 |
| 16 | 3/8" | EQMS* 16 3/8 T | 37,1 | 24,4 | 24 | 9,5 |
| 16 | 1/2" | EQMS* 16 1/2 T | 37,1 | 24,4 | 24 | 11,9 |
| 18 | 1/2" | EQMS* 18 1/2 T | 39,5 | 26,0 | 27 | 11,9 |
| 18 | 3/4" | EQMS* 18 3/4 T | 39,5 | 26,0 | 27 | 15,1 |
| 20 | 1/2" | EQMS* 20 1/2 T | 41,1 | 26,0 | 30 | 11,9 |
| 20 | 3/4" | EQMS* 20 3/4 T | 41,1 | 26,0 | 30 | 15,9 |
| 22 | 3/4" | EQMS* 22 3/4 T | 41,1 | 26,0 | 30 | 15,9 |
| 22 | 1" | EQMS* 22 1 T | 41,1 | 26,0 | 36 | 18,5 |
| 25 | 3/4" | EQMS* 25 3/4 T | 45,6 | 31,3 | 36 | 15,9 |
| 25 | 1" | EQMS* 25 1 T | 45,6 | 31,3 | 36 | 22,2 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P |
|-------|-------|-------------------|------|------|--------|-------|
| 1/16" | 1/16" | EQMS* 1/16 1/16 T | 0.70 | 0.34 | 8 | 3/16" |
| 1/16" | 1/8" | EQMS* 1/16 1/8 T | 0.92 | 0.34 | 12 | 3/16" |
| 1/8" | 1/8" | EQMS* 1/8 1/8 T | 0.92 | 0.51 | 12 | 3/32" |
| 1/8" | 1/4" | EQMS* 1/8 1/4 T | 0.98 | 0.51 | 14 | 3/32" |
| 1/4" | 1/8" | EQMS* 1/4 1/8 T | 1.46 | 0.96 | 14 | 3/16" |
| 1/4" | 1/4" | EQMS* 1/4 1/4 T | 1.56 | 1.02 | 14 | 3/16" |
| 1/4" | 3/8" | EQMS* 1/4 3/8 T | 1.17 | 0.60 | 19 | 3/16" |
| 1/4" | 1/2" | EQMS* 1/4 1/2 T | 1.20 | 0.60 | 22 | 3/16" |
| 5/16" | 1/4" | EQMS* 5/16 1/4 T | 1.11 | 0.64 | 14 | 1/4" |
| 3/8" | 1/8" | EQMS* 3/8 1/8 T | 1.80 | 1.23 | 19 | 3/16" |
| 3/8" | 1/4" | EQMS* 3/8 1/4 T | 1.80 | 1.23 | 19 | 9/32" |
| 3/8" | 3/8" | EQMS* 3/8 3/8 T | 1.22 | 0.68 | 19 | 9/32" |
| 1/2" | 1/4" | EQMS* 1/2 1/4 T | 1.43 | 0.90 | 22 | 9/32" |
| 1/2" | 3/8" | EQMS* 1/2 3/8 T | 1.43 | 0.90 | 22 | 3/8" |
| 1/2" | 1/2" | EQMS* 1/2 1/2 T | 1.43 | 0.90 | 22 | 3/8" |
| 3/4" | 1/2" | EQMS* 3/4 1/2 T | 1.56 | 1.02 | 27 | 5/8" |
| 1" | 1" | EQMS* 1" 1" T | 1.80 | 1.23 | 36 | 7/8" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

BSPP - ISO BSP Parallel Thread (G)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H (mm) | P |
|----|------|----------------|------|------|--------|------|
| 6 | 1/8" | EQMS* 6 1/8 G | 27,2 | 15,3 | 14 | 4,8 |
| 6 | 1/4" | EQMS* 6 1/4 G | 27,2 | 15,3 | 14 | 4,8 |
| 6 | 3/8" | EQMS* 6 3/8 G | 29,7 | 15,3 | 19 | 4,8 |
| 12 | 3/8" | EQMS* 12 3/8 G | 36,3 | 22,8 | 22 | 9,5 |
| 12 | 1/2" | EQMS* 12 1/2 G | 36,3 | 22,8 | 22 | 9,5 |
| 12 | 3/4" | EQMS* 12 3/4 G | 36,3 | 22,8 | 27 | 9,5 |
| 16 | 1/2" | EQMS* 16 1/2 G | 37,1 | 24,4 | 24 | 11,9 |

BSPP G end connections should be used with sealing gaskets.
See page 9 for further information. See page 59 for gaskets.
*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P |
|------|------|-----------------|------|------|--------|-------|
| 1/8" | 1/4" | EQMS* 1/8 1/4 G | 0.98 | 0.51 | 14 | 3/32" |
| 1/4" | 1/8" | EQMS* 1/4 1/8 G | 1.10 | 0.60 | 14 | 3/16" |
| 1/4" | 3/8" | EQMS* 1/4 3/8 G | 1.17 | 0.60 | 19 | 3/16" |
| 1/4" | 1/2" | EQMS* 1/4 1/2 G | 1.20 | 0.60 | 22 | 3/16" |
| 3/8" | 3/8" | EQMS* 3/8 3/8 G | 1.22 | 0.68 | 19 | 9/32" |
| 1/2" | 3/8" | EQMS* 1/2 3/8 G | 1.43 | 0.90 | 22 | 3/8" |
| 1/2" | 1/2" | EQMS* 1/2 1/2 G | 1.43 | 0.90 | 22 | 3/8" |
| 3/4" | 3/4" | EQMS* 3/4 3/4 G | 1.56 | 1.02 | 27 | 5/8" |

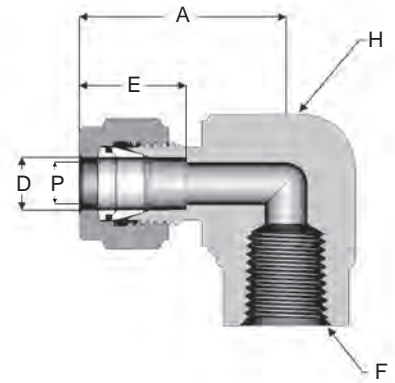
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

FEMALE ELBOW | EQFS

APPLICATION

Connects a tube to a male taper-threaded apparatus or pipe at a 90° angle.

Special requirements on request



NPT (N)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P |
|----|------|----------------|------|------|----|------|
| 3 | 1/4" | EQFS* 3 1/4 N | 28,0 | 12,9 | 19 | 2,4 |
| 6 | 1/8" | EQFS* 6 1/8 N | 27,2 | 15,3 | 14 | 4,8 |
| 6 | 1/4" | EQFS* 6 1/4 N | 30,4 | 15,3 | 19 | 4,8 |
| 6 | 1/2" | EQFS* 6 1/2 N | 34,6 | 15,3 | 27 | 4,8 |
| 8 | 1/4" | EQFS* 8 1/4 N | 31,3 | 16,2 | 19 | 6,4 |
| 10 | 1/8" | EQFS* 10 1/8 N | 32,2 | 17,2 | 19 | 8 |
| 10 | 1/4" | EQFS* 10 1/4 N | 32,2 | 17,2 | 19 | 8 |
| 10 | 3/8" | EQFS* 10 3/8 N | 33,8 | 17,2 | 22 | 8 |
| 10 | 1/2" | EQFS* 10 1/2 N | 37,0 | 17,2 | 27 | 8 |
| 12 | 1/4" | EQFS* 12 1/4 N | 36,3 | 22,8 | 22 | 7,1 |
| 12 | 1/2" | EQFS* 12 1/2 N | 39,5 | 22,8 | 27 | 9,5 |
| 16 | 1/2" | EQFS* 16 1/2 N | 39,5 | 24,4 | 27 | 11,9 |
| 20 | 3/4" | EQFS* 20 3/4 N | 41,1 | 26,0 | 36 | 15,9 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P |
|-------|-------|-------------------|------|------|--------|--------|
| 1/16" | 1/16" | EQFS* 1/16 1/16 N | 0,70 | 0,50 | 12 | 3/16" |
| 1/8" | 1/8" | EQFS* 1/8 1/8 N | 0,97 | 0,51 | 14 | 3/32" |
| 1/8" | 1/4" | EQFS* 1/8 1/4 N | 1,09 | 0,51 | 19 | 3/32" |
| 3/16" | 1/8" | EQFS* 3/16 1/8 N | 0,95 | 0,54 | 14 | 5/16" |
| 1/4" | 1/8" | EQFS* 1/4 1/8 N | 1,00 | 0,60 | 14 | 3/16" |
| 1/4" | 1/4" | EQFS* 1/4 1/4 N | 1,17 | 0,60 | 19 | 3/16" |
| 1/4" | 3/8" | EQFS* 1/4 3/8 N | 1,26 | 0,60 | 22 | 3/16" |
| 1/4" | 1/2" | EQFS* 1/4 1/2 N | 1,44 | 0,60 | 27 | 9/32" |
| 5/16" | 1/8" | EQFS* 5/16 1/8 N | 1,11 | 0,64 | 14 | 1/4" |
| 5/16" | 1/4" | EQFS* 5/16 1/4 N | 1,23 | 0,64 | 19 | 1/4" |
| 3/8" | 1/8" | EQFS* 3/8 1/8 N | 1,26 | 0,66 | 19 | 9/32" |
| 3/8" | 1/4" | EQFS* 3/8 1/4 N | 1,26 | 0,66 | 19 | 9/32" |
| 3/8" | 3/8" | EQFS* 3/8 3/8 N | 1,32 | 0,66 | 22 | 9/32" |
| 3/8" | 1/2" | EQFS* 3/8 1/2 N | 1,48 | 0,66 | 27 | 9/32" |
| 1/2" | 1/4" | EQFS* 1/2 1/4 N | 1,46 | 0,90 | 22 | 3/8" |
| 1/2" | 3/8" | EQFS* 1/2 3/8 N | 1,46 | 0,90 | 22 | 3/8" |
| 1/2" | 1/2" | EQFS* 1/2 1/2 N | 1,56 | 0,90 | 27 | 3/8" |
| 5/8" | 3/8" | EQFS* 5/8 3/8 N | 1,45 | 0,96 | 24 | 1/2" |
| 5/8" | 1/2" | EQFS* 5/8 1/2 N | 1,56 | 0,96 | 27 | 1/2" |
| 3/4" | 1/2" | EQFS* 3/4 1/2 N | 1,55 | 0,96 | 27 | 5/8" |
| 3/4" | 3/4" | EQFS* 3/4 3/4 N | 1,61 | 0,96 | 36 | 5/8" |
| 7/8" | 3/4" | EQFS* 7/8 3/4 N | 1,68 | 1,02 | 36 | 47/64" |
| 1" | 3/4" | EQFS* 1" 3/4 N | 1,80 | 1,23 | 36 | 7/8" |
| 1" | 1" | EQFS* 1" 1" N | 2,04 | 1,23 | 41 | 7/8" |

Hex flats (H) are metric. Fractional upon request

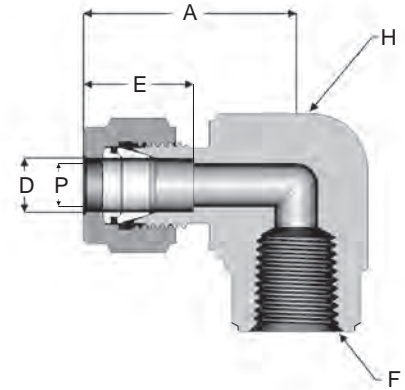
*Specify material when ordering. See page 8 for materials and codes.

FEMALE ELBOW | EQFS

APPLICATION

Connects a tube to a male taper-threaded apparatus or pipe at a 90° angle.

Special requirements on request



BSPT - ISO BSP Tapered Thread (T)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P |
|----|------|----------------|------|------|----|------|
| 3 | 1/8" | EQFS* 3 1/8 T | 24,9 | 12,9 | 14 | 2,4 |
| 3 | 1/4" | EQFS* 3 1/4 T | 28,0 | 12,9 | 19 | 2,4 |
| 4 | 1/8" | EQFS* 4 1/8 T | 25,7 | 13,7 | 14 | 3,2 |
| 6 | 1/8" | EQFS* 6 1/8 T | 27,2 | 15,3 | 14 | 4,8 |
| 6 | 1/4" | EQFS* 6 1/4 T | 30,4 | 15,3 | 19 | 4,8 |
| 6 | 1/2" | EQFS* 6 1/2 T | 34,6 | 15,3 | 27 | 4,8 |
| 8 | 1/8" | EQFS* 8 1/8 T | 28,1 | 16,2 | 14 | 6,4 |
| 8 | 1/4" | EQFS* 8 1/4 T | 31,3 | 16,2 | 19 | 6,4 |
| 10 | 1/8" | EQFS* 10 1/8 T | 32,2 | 17,2 | 19 | 8 |
| 10 | 1/4" | EQFS* 10 1/4 T | 32,2 | 17,2 | 19 | 8 |
| 10 | 3/8" | EQFS* 10 3/8 T | 33,8 | 17,2 | 22 | 8 |
| 10 | 1/2" | EQFS* 10 1/2 T | 37,0 | 17,2 | 27 | 8 |
| 12 | 1/4" | EQFS* 12 1/4 T | 36,3 | 22,8 | 22 | 7,1 |
| 12 | 3/8" | EQFS* 12 3/8 T | 36,3 | 22,8 | 22 | 9,5 |
| 12 | 1/2" | EQFS* 12 1/2 T | 39,5 | 22,8 | 27 | 9,5 |
| 14 | 3/8" | EQFS* 14 3/8 T | 37,1 | 24,4 | 24 | 7,1 |
| 14 | 1/2" | EQFS* 14 1/2 T | 39,5 | 24,4 | 27 | 9,5 |
| 16 | 3/8" | EQFS* 16 3/8 T | 37,1 | 24,4 | 24 | 9,5 |
| 16 | 1/2" | EQFS* 16 1/2 T | 39,5 | 24,4 | 27 | 11,9 |
| 18 | 1/2" | EQFS* 18 1/2 T | 39,5 | 24,4 | 27 | 11,9 |
| 20 | 1/2" | EQFS* 20 1/2 T | 41,1 | 26,0 | 30 | 11,9 |
| 20 | 3/4" | EQFS* 20 3/4 T | 41,1 | 26,0 | 36 | 15,9 |
| 22 | 3/4" | EQFS* 22 3/4 T | 41,1 | 26,0 | 36 | 15,9 |
| 25 | 3/4" | EQFS* 25 3/4 T | 45,5 | 31,3 | 36 | 15,9 |
| 25 | 1" | EQFS* 25 1" T | 51,9 | 31,3 | 41 | 22,2 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P |
|-------|-------|-------------------|------|------|--------|--------|
| 1/16" | 1/16" | EQFS* 1/16 1/16 T | 0,70 | 0,50 | 12 | 3/16" |
| 1/16" | 1/8" | EQFS* 1/16 1/8 T | 0,70 | 0,50 | 12 | 3/16" |
| 1/8" | 1/8" | EQFS* 1/8 1/8 T | 0,97 | 0,51 | 14 | 3/32" |
| 1/8" | 1/4" | EQFS* 1/8 1/4 T | 1,09 | 0,51 | 19 | 3/32" |
| 3/16" | 1/8" | EQFS* 3/16 1/8 T | 0,95 | 0,54 | 14 | 5/16" |
| 1/4" | 1/8" | EQFS* 1/4 1/8 T | 1,00 | 0,60 | 14 | 3/16" |
| 1/4" | 1/4" | EQFS* 1/4 1/4 T | 1,17 | 0,60 | 19 | 3/16" |
| 1/4" | 3/8" | EQFS* 1/4 3/8 T | 1,26 | 0,60 | 22 | 3/16" |
| 1/4" | 1/2" | EQFS* 1/4 1/2 T | 1,44 | 0,60 | 27 | 9/32" |
| 5/16" | 1/8" | EQFS* 5/16 1/8 T | 1,11 | 0,64 | 14 | 1/4" |
| 5/16" | 1/4" | EQFS* 5/16 1/4 T | 1,23 | 0,64 | 19 | 1/4" |
| 3/8" | 1/8" | EQFS* 3/8 1/8 T | 1,26 | 0,66 | 19 | 9/32" |
| 3/8" | 1/4" | EQFS* 3/8 1/4 T | 1,26 | 0,66 | 19 | 9/32" |
| 3/8" | 3/8" | EQFS* 3/8 3/8 T | 1,32 | 0,66 | 22 | 9/32" |
| 3/8" | 1/2" | EQFS* 3/8 1/2 T | 1,48 | 0,66 | 27 | 9/32" |
| 1/2" | 1/4" | EQFS* 1/2 1/4 T | 1,46 | 0,90 | 22 | 3/8" |
| 1/2" | 3/8" | EQFS* 1/2 3/8 T | 1,46 | 0,90 | 22 | 3/8" |
| 1/2" | 1/2" | EQFS* 1/2 1/2 T | 1,56 | 0,90 | 27 | 3/8" |
| 5/8" | 3/8" | EQFS* 5/8 3/8 T | 1,45 | 0,96 | 24 | 1/2" |
| 5/8" | 1/2" | EQFS* 5/8 1/2 T | 1,56 | 0,96 | 27 | 1/2" |
| 3/4" | 1/2" | EQFS* 3/4 1/2 T | 1,55 | 0,96 | 27 | 5/8" |
| 3/4" | 3/4" | EQFS* 3/4 3/4 T | 1,61 | 0,96 | 36 | 5/8" |
| 7/8" | 3/4" | EQFS* 7/8 3/4 T | 1,68 | 1,02 | 36 | 47/64" |
| 1" | 3/4" | EQFS* 1" 3/4 T | 1,80 | 1,23 | 36 | 7/8" |
| 1" | 1" | EQFS* 1" 1" T | 2,04 | 1,23 | 41 | 7/8" |

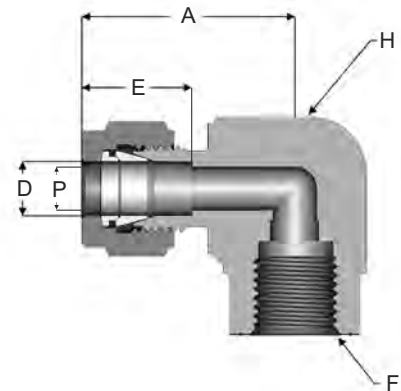
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

FEMALE ELBOW | EQFS

APPLICATION

Connects a tube to a male parallel-threaded apparatus or pipe at a 90° angle.

Special requirements on request



BSPP - ISO BSP Parallel Thread (G)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P |
|----|------|----------------|------|------|----|------|
| 3 | 1/8" | EQFS* 3 1/8 G | 24,9 | 12,9 | 14 | 2,4 |
| 3 | 1/4" | EQFS* 3 1/4 G | 28,0 | 12,9 | 19 | 2,4 |
| 4 | 1/8" | EQFS* 4 1/8 G | 25,7 | 13,7 | 14 | 3,2 |
| 6 | 1/8" | EQFS* 6 1/8 G | 27,2 | 15,3 | 14 | 4,8 |
| 6 | 1/4" | EQFS* 6 1/4 G | 30,4 | 15,3 | 19 | 4,8 |
| 6 | 1/2" | EQFS* 6 1/2 G | 34,6 | 15,3 | 27 | 4,8 |
| 8 | 1/8" | EQFS* 8 1/8 G | 28,1 | 16,2 | 14 | 6,4 |
| 8 | 1/4" | EQFS* 8 1/4 G | 31,3 | 16,2 | 19 | 6,4 |
| 10 | 1/8" | EQFS* 10 1/8 G | 32,2 | 17,2 | 19 | 8 |
| 10 | 1/4" | EQFS* 10 1/4 G | 32,2 | 17,2 | 19 | 8 |
| 10 | 3/8" | EQFS* 10 3/8 G | 33,8 | 17,2 | 22 | 8 |
| 10 | 1/2" | EQFS* 10 1/2 G | 37,0 | 17,2 | 27 | 8 |
| 12 | 1/4" | EQFS* 12 1/4 G | 36,3 | 22,8 | 22 | 7,1 |
| 12 | 3/8" | EQFS* 12 3/8 G | 36,3 | 22,8 | 22 | 9,5 |
| 12 | 1/2" | EQFS* 12 1/2 G | 39,5 | 22,8 | 27 | 9,5 |
| 14 | 3/8" | EQFS* 14 3/8 G | 37,1 | 24,4 | 24 | 7,1 |
| 14 | 1/2" | EQFS* 14 1/2 G | 39,5 | 24,4 | 27 | 9,5 |
| 16 | 3/8" | EQFS* 16 3/8 G | 37,1 | 24,4 | 24 | 9,5 |
| 16 | 1/2" | EQFS* 16 1/2 G | 39,5 | 24,4 | 27 | 11,9 |
| 18 | 1/2" | EQFS* 18 1/2 G | 39,5 | 24,4 | 27 | 11,9 |
| 18 | 3/4" | EQFS* 18 3/4 G | 41,1 | 24,4 | 30 | 15,1 |
| 20 | 1/2" | EQFS* 20 1/2 G | 41,1 | 26,0 | 30 | 11,9 |
| 20 | 3/4" | EQFS* 20 3/4 G | 41,1 | 26,0 | 36 | 15,9 |
| 22 | 3/4" | EQFS* 22 3/4 G | 41,1 | 26,0 | 36 | 15,9 |
| 25 | 3/4" | EQFS* 25 3/4 G | 45,5 | 31,3 | 36 | 15,9 |
| 25 | 1" | EQFS* 25 1" G | 51,9 | 31,3 | 41 | 22,2 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P |
|-------|------|------------------|------|------|--------|--------|
| 1/8" | 1/8" | EQFS* 1/8 1/8 G | 0.97 | 0.51 | 14 | 3/32" |
| 1/8" | 1/4" | EQFS* 1/8 1/4 G | 1.09 | 0.51 | 19 | 3/32" |
| 3/16" | 1/8" | EQFS* 3/16 1/8 G | 0.95 | 0.54 | 14 | 5/16" |
| 1/4" | 1/8" | EQFS* 1/4 1/8 G | 1.00 | 0.60 | 14 | 3/16" |
| 1/4" | 1/4" | EQFS* 1/4 1/4 G | 1.17 | 0.60 | 19 | 3/16" |
| 1/4" | 3/8" | EQFS* 1/4 3/8 G | 1.26 | 0.60 | 22 | 3/16" |
| 1/4" | 1/2" | EQFS* 1/4 1/2 G | 1.44 | 0.60 | 27 | 9/32" |
| 5/16" | 1/8" | EQFS* 5/16 1/8 G | 1.11 | 0.64 | 14 | 1/4" |
| 5/16" | 1/4" | EQFS* 5/16 1/4 G | 1.23 | 0.64 | 19 | 1/4" |
| 3/8" | 1/8" | EQFS* 3/8 1/8 G | 1.26 | 0.66 | 19 | 9/32" |
| 3/8" | 1/4" | EQFS* 3/8 1/4 G | 1.26 | 0.66 | 19 | 9/32" |
| 3/8" | 3/8" | EQFS* 3/8 3/8 G | 1.32 | 0.66 | 22 | 9/32" |
| 3/8" | 1/2" | EQFS* 3/8 1/2 G | 1.48 | 0.66 | 27 | 9/32" |
| 1/2" | 1/4" | EQFS* 1/2 1/4 G | 1.46 | 0.90 | 22 | 3/8" |
| 1/2" | 3/8" | EQFS* 1/2 3/8 G | 1.46 | 0.90 | 22 | 3/8" |
| 1/2" | 1/2" | EQFS* 1/2 1/2 G | 1.56 | 0.90 | 27 | 3/8" |
| 5/8" | 3/8" | EQFS* 5/8 3/8 G | 1.45 | 0.96 | 24 | 1/2" |
| 5/8" | 1/2" | EQFS* 5/8 1/2 G | 1.56 | 0.96 | 27 | 1/2" |
| 3/4" | 1/2" | EQFS* 3/4 1/2 G | 1.55 | 0.96 | 27 | 5/8" |
| 3/4" | 3/4" | EQFS* 3/4 3/4 G | 1.61 | 0.96 | 36 | 5/8" |
| 7/8" | 3/4" | EQFS* 7/8 3/4 G | 1.68 | 1.02 | 36 | 47/64" |
| 1" | 3/4" | EQFS* 1" 3/4 G | 1.80 | 1.23 | 36 | 7/8" |
| 1" | 1" | EQFS* 1" 1" G | 2.04 | 1.23 | 41 | 7/8" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

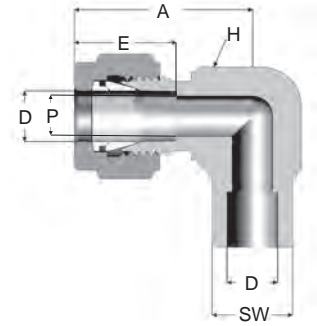
BSPP G end connections should be used with sealing gaskets. See page 9 for further information. See page 59 for gaskets.

SOCKET WELD | EQSWS

APPLICATION

Connects a tube to another tube of the same diameter at a 90° angle via a socket weld.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference | A | E | H | P | SW |
|----|-----------|------|------|----|-----|------|
| 12 | EQSWS* 12 | 36,3 | 22,8 | 22 | 9,5 | 19,1 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | A | E | H (mm) | P | SW |
|-------|-------------|------|------|--------|--------|------|
| 1/4" | EQSWS* 1/4 | 1.07 | 0.60 | 14 | 3/16" | 0.44 |
| 5/16" | EQSWS* 5/16 | 1.11 | 0.64 | 14 | 1/4" | 0.50 |
| 3/8" | EQSWS* 3/8 | 1.26 | 0.66 | 19 | 9/32" | 0.63 |
| 1/2" | EQSWS* 1/2 | 1.42 | 0.90 | 22 | 13/32" | 0.75 |
| 3/4" | EQSWS* 3/4 | 1.56 | 0.96 | 27 | 5/8" | 1.06 |
| 1" | EQSWS* 1" | 1.79 | 1.23 | 36 | 7/8" | 1.31 |

Hex flats (H) are metric. Fractional upon request

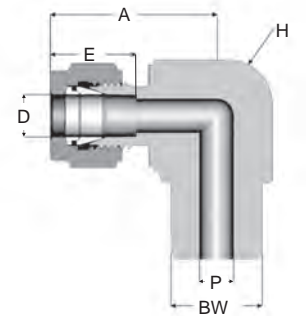
*Specify material when ordering. See page 8 for materials and codes.

MALE PIPE WELD ELBOW | EQBWS

APPLICATION

Connects a tube to a pipe at a 90° angle via a butt weld.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Nominal Pipe Size | Reference | A | E | H | P | BW |
|----|-------------------|---------------|------|------|----|-----|-------|
| 6 | 1/8" | EQBWS* 6 1/8 | 25,8 | 15,3 | 14 | 4,8 | 10,28 |
| 6 | 1/4" | EQBWS* 6 1/4 | 25,8 | 15,3 | 14 | 4,8 | 13,72 |
| 10 | 1/4" | EQBWS* 10 1/4 | 28,7 | 17,2 | 17 | 7,9 | 13,72 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Nominal Pipe Size | Reference | A | E | H (mm) | P | BW |
|------|-------------------|----------------|------|------|--------|-------|-------|
| 1/4" | 1/8" | EQBWS* 1/4 1/8 | 1.07 | 0.60 | 14 | 3/16" | 0.405 |
| 1/4" | 1/4" | EQBWS* 1/4 1/4 | 1.07 | 0.60 | 14 | 3/16" | 0.54 |
| 3/8" | 1/4" | EQBWS* 3/8 1/4 | 1.26 | 0.66 | 19 | 9/32" | 0.54 |
| 1/2" | 1/2" | EQBWS* 1/2 1/2 | 1.42 | 0.90 | 22 | 3/8" | 0.84 |
| 3/4" | 3/4" | EQBWS* 3/4 3/4 | 1.55 | 0.96 | 27 | 5/8" | 1.05 |
| 1" | 3/4" | EQBWS* 1" 3/4 | 1.79 | 1.23 | 36 | 7/8" | 1.05 |

Hex flats (H) are metric. Fractional upon request

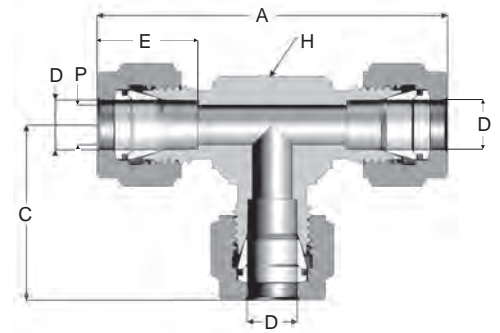
*Specify material when ordering. See page 8 for materials and codes.

UNION TEE | TS

APPLICATION

Connects tubes of the same dimension in a T configuration.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference | A | C | E | H | P |
|----|-----------|------|-------|------|----|------|
| 3 | TS* 3 | 46,5 | 23,25 | 12,9 | 12 | 2,4 |
| 4 | TS* 4 | 48,1 | 24,05 | 13,7 | 12 | 3,2 |
| 6 | TS* 6 | 54,4 | 27,2 | 15,3 | 14 | 4,8 |
| 8 | TS* 8 | 56,2 | 28,1 | 16,2 | 14 | 6,4 |
| 10 | TS* 10 | 65,2 | 32,6 | 17,2 | 19 | 7,9 |
| 12 | TS* 12 | 72,6 | 36,3 | 22,8 | 22 | 9,5 |
| 14 | TS* 14 | 74,2 | 37,1 | 24,4 | 24 | 11,1 |
| 16 | TS* 16 | 74,2 | 37,1 | 24,4 | 24 | 12,7 |
| 18 | TS* 18 | 79,0 | 39,5 | 24,4 | 27 | 15,1 |
| 20 | TS* 20 | 83,7 | 41,85 | 26,0 | 30 | 15,9 |
| 22 | TS* 22 | 82,1 | 41,85 | 26,0 | 30 | 19,1 |
| 25 | TS* 25 | 91,1 | 45,55 | 31,3 | 36 | 22,2 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | A | C | E | H (mm) | P |
|-------|-----------|------|------|------|--------|-------|
| 1/16" | TS* 1/16 | 1.40 | 0.70 | 0.34 | 12 | 3/64" |
| 1/8" | TS* 1/8 | 1.84 | 0.92 | 0.51 | 12 | 3/32" |
| 3/16" | TS* 3/16 | 1.90 | 0.95 | 0.54 | 12 | 1/8" |
| 1/4" | TS* 1/4 | 2.04 | 1.02 | 0.60 | 14 | 3/16" |
| 5/16" | TS* 5/16 | 2.22 | 1.11 | 0.64 | 14 | 1/4" |
| 3/8" | TS* 3/8 | 2.26 | 1.13 | 0.68 | 19 | 9/32" |
| 1/2" | TS* 1/2 | 2.74 | 1.37 | 0.90 | 22 | 3/8" |
| 5/8" | TS* 5/8 | 2.88 | 1.44 | 0.96 | 24 | 1/2" |
| 3/4" | TS* 3/4 | 3.12 | 1.56 | 0.96 | 27 | 5/8" |
| 7/8" | TS* 7/8 | 3.24 | 1.62 | 1.02 | 30 | 3/4" |
| 1" | TS* 1" | 3.60 | 1.80 | 1.23 | 36 | 7/8" |

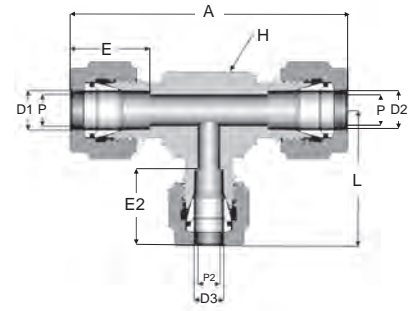
Hex flats (H) are metric. Fractional upon request
 *Specify material when ordering. See page 8 for materials and codes.

REDUCING TEE | TRS

APPLICATION

Connects tubes of different dimensions in a T configuration.

Special requirements on request



TUBE SIZE - METRIC (mm)

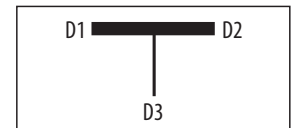
| D1 | D2 | D3 | Reference | A | E | P | L | E2 | P2 | H |
|----|----|----|---------------|------|------|------|------|------|-----|----|
| 8 | 8 | 12 | TRS* 8 8 12 | 64,0 | 16,2 | 6,4 | 36,2 | 22,8 | 9,5 | 22 |
| 10 | 10 | 6 | TRS* 10 10 6 | 65,2 | 17,2 | 7,9 | 30,6 | 15,3 | 4,8 | 19 |
| 10 | 10 | 8 | TRS* 10 10 8 | 65,2 | 17,2 | 7,9 | 31,2 | 16,2 | 6,4 | 19 |
| 12 | 12 | 6 | TRS* 12 12 6 | 72,6 | 22,8 | 9,5 | 32,1 | 15,3 | 4,8 | 22 |
| 12 | 12 | 8 | TRS* 12 12 8 | 72,6 | 22,8 | 9,5 | 32,8 | 16,2 | 6,4 | 22 |
| 12 | 12 | 10 | TRS* 12 12 10 | 72,6 | 22,8 | 9,5 | 33,6 | 17,2 | 7,9 | 22 |
| 14 | 14 | 6 | TRS* 14 14 6 | 74,2 | 24,4 | 11,1 | 32,1 | 15,3 | 4,8 | 24 |
| 14 | 14 | 10 | TRS* 14 14 10 | 74,2 | 24,4 | 11,1 | 33,6 | 17,2 | 7,9 | 24 |
| 16 | 16 | 6 | TRS* 16 16 6 | 74,2 | 24,4 | 12,7 | 32,9 | 15,3 | 4,8 | 24 |
| 16 | 16 | 8 | TRS* 16 16 8 | 74,2 | 24,4 | 12,7 | 33,6 | 16,2 | 6,4 | 24 |
| 16 | 16 | 10 | TRS* 16 16 10 | 74,2 | 24,4 | 12,7 | 34,4 | 17,2 | 7,9 | 24 |
| 16 | 16 | 12 | TRS* 16 16 12 | 74,2 | 24,4 | 12,7 | 37 | 22,8 | 9,5 | 24 |
| 22 | 22 | 10 | TRS* 22 22 10 | 82,1 | 26 | 19,1 | 38,4 | 17,2 | 7,9 | 30 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D1 | D2 | D3 | Reference | A | E | P | L | E2 | P2 | H (mm) |
|------|------|-------|-------------------|------|------|-------|------|------|-------|--------|
| 1/8" | 1/8" | 1/16" | TRS* 1/8 1/8 1/16 | 1.84 | 0.51 | 3/32" | 0.75 | 0.34 | 3/64" | 12 |
| 1/4" | 1/4" | 1/16" | TRS* 1/4 1/4 1/16 | 2.04 | 0.6 | 3/16" | 0.82 | 0.34 | 3/64" | 14 |
| 1/4" | 1/4" | 1/8" | TRS* 1/4 1/4 1/8 | 2.04 | 0.6 | 3/16" | 0.99 | 0.51 | 3/32" | 14 |
| 1/4" | 1/4" | 5/16" | TRS* 1/4 1/4 5/16 | 2.04 | 0.6 | 3/16" | 1.10 | 0.64 | 1/4" | 14 |
| 1/4" | 1/4" | 1/2" | TRS* 1/4 1/4 1/2 | 2.5 | 0.6 | 3/16" | 1.44 | 0.90 | 3/8" | 22 |
| 3/8" | 3/8" | 1/4" | TRS* 3/8 3/8 1/4 | 2.26 | 0.68 | 9/32" | 1.22 | 0.60 | 3/16" | 19 |
| 1/2" | 1/2" | 1/4" | TRS* 1/2 1/2 1/4 | 2.74 | 0.9 | 3/8" | 1.28 | 0.90 | 3/16" | 22 |
| 1/2" | 1/2" | 3/8" | TRS* 1/2 1/2 3/8 | 2.74 | 0.9 | 3/8" | 1.33 | 0.68 | 9/32" | 22 |
| 3/4" | 3/4" | 3/8" | TRS* 3/4 3/4 3/8 | 3.12 | 0.96 | 5/8" | 1.46 | 0.68 | 9/32" | 27 |
| 3/4" | 3/4" | 1/2" | TRS* 3/4 3/4 1/2 | 3.12 | 0.96 | 5/8" | 1.57 | 0.90 | 3/8" | 27 |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

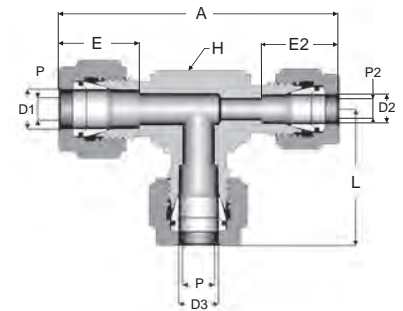


REDUCING RUN TEE | TRS

APPLICATION

Connects tubes of different dimensions in a T configuration.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D1 | D2 | D3 | Reference | A | E | P | L | E2 | P2 | H |
|----|----|----|---------------|------|------|------|------|------|------|----|
| 6 | 10 | 6 | TRS* 6 10 6 | 62,6 | 15,3 | 4,8 | 30,6 | 17,2 | 7,9 | 19 |
| 6 | 12 | 6 | TRS* 6 12 6 | 68,3 | 15,3 | 4,8 | 32,1 | 22,8 | 9,5 | 22 |
| 8 | 12 | 8 | TRS* 8 12 8 | 69,0 | 16,2 | 6,4 | 32,8 | 22,8 | 9,5 | 22 |
| 10 | 6 | 10 | TRS* 10 6 10 | 62,6 | 17,2 | 7,9 | 32 | 15,3 | 4,8 | 19 |
| 10 | 8 | 10 | TRS* 10 8 10 | 63,2 | 17,2 | 7,9 | 32 | 16,2 | 6,4 | 19 |
| 10 | 14 | 10 | TRS* 10 14 10 | 69,6 | 17,2 | 7,9 | 33,4 | 24,4 | 11,1 | 24 |
| 12 | 6 | 12 | TRS* 12 6 12 | 68,3 | 22,8 | 9,5 | 36,2 | 15,3 | 4,8 | 22 |
| 12 | 8 | 12 | TRS* 12 8 12 | 69,0 | 22,8 | 9,5 | 36,2 | 16,2 | 6,4 | 22 |
| 12 | 10 | 12 | TRS* 12 10 12 | 69,8 | 22,8 | 9,5 | 36,2 | 17,2 | 7,9 | 22 |
| 22 | 10 | 22 | TRS* 22 10 22 | 79,3 | 26,0 | 19,1 | 40,9 | 17,2 | 7,9 | 30 |
| 22 | 16 | 22 | TRS* 22 16 22 | 81,9 | 26,0 | 19,1 | 40,9 | 24,4 | 12,7 | 30 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D1 | D2 | D3 | Reference | A | E | P | L | E2 | P2 | H (mm) |
|------|------|------|------------------|------|------|-------|------|------|-------|--------|
| 1/8" | 1/4" | 1/8" | TRS* 1/8 1/4 1/8 | 2.08 | 0.51 | 3/32" | 0.99 | 0.6 | 3/16" | 14 |
| 3/8" | 1/8" | 3/8" | TRS* 3/8 1/8 3/8 | 2.38 | 0.68 | 9/32" | 1.27 | 0.51 | 3/32" | 19 |
| 3/8" | 1/4" | 3/8" | TRS* 3/8 1/4 3/8 | 2.49 | 0.68 | 9/32" | 1.27 | 0.6 | 3/16" | 19 |
| 1" | 1/2" | 1" | TRS* 1 1/2 1 | 3.40 | 1.24 | 7/8" | 1.79 | 0.9 | 3/8" | 36 |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

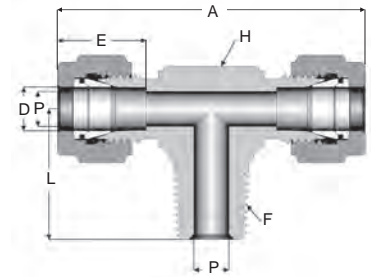


MALE BRANCH TEE | TMS

APPLICATION

Connects a female taper-threaded apparatus or a pipe to a gas line of two tubes with the same dimension in a T configuration.

Special requirements on request



NPT (N)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | L | P |
|----|------|---------------|------|------|----|------|------|
| 3 | 1/8" | TMS* 3 1/8 N | 46,6 | 12,9 | 12 | 17,5 | 2,4 |
| 3 | 1/4" | TMS* 3 1/4 N | 49,8 | 12,9 | 14 | 23,8 | 2,4 |
| 4 | 1/8" | TMS* 4 1/8 N | 48,2 | 13,7 | 12 | 17,5 | 3,2 |
| 6 | 1/8" | TMS* 6 1/8 N | 54,4 | 15,3 | 14 | 19,1 | 4,8 |
| 6 | 1/4" | TMS* 6 1/4 N | 54,4 | 15,3 | 14 | 23,8 | 4,8 |
| 8 | 1/8" | TMS* 8 1/8 N | 56,2 | 16,2 | 14 | 19,1 | 4,8 |
| 8 | 1/4" | TMS* 8 1/4 N | 56,2 | 16,2 | 14 | 23,8 | 6,4 |
| 10 | 1/4" | TMS* 10 1/4 N | 64,4 | 17,2 | 19 | 27,0 | 7,1 |
| 12 | 1/4" | TMS* 12 1/4 N | 72,6 | 22,8 | 22 | 28,6 | 7,1 |
| 12 | 3/8" | TMS* 12 3/8 N | 72,6 | 22,8 | 22 | 28,6 | 9,5 |
| 12 | 1/2" | TMS* 12 1/2 N | 72,6 | 22,8 | 22 | 33,3 | 9,5 |
| 14 | 1/2" | TMS* 14 1/2 N | 73,2 | 24,4 | 24 | 34,1 | 9,5 |
| 16 | 1/2" | TMS* 16 1/2 N | 74,2 | 24,4 | 24 | 34,1 | 11,9 |
| 18 | 3/4" | TMS* 18 3/4 N | 79,0 | 26,0 | 27 | 36,5 | 15,1 |
| 22 | 3/4" | TMS* 22 3/4 N | 82,2 | 26,0 | 30 | 38,1 | 15,9 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | L | P |
|-------|-------|------------------|------|------|--------|----------|-------|
| 1/16" | 1/16" | TMS* 1/16 1/16 N | 1.88 | 0.34 | 8 | 2 1/32" | 3/16" |
| 1/8" | 1/8" | TMS* 1/8 1/8 N | 1.84 | 0.51 | 12 | 1 1/16" | 3/32" |
| 1/8" | 1/4" | TMS* 1/8 1/4 N | 1.96 | 0.51 | 14 | 1 5/16" | 3/32" |
| 3/16" | 1/8" | TMS* 3/16 1/8 N | 1.90 | 0.54 | 12 | 1 1/16" | 3/32" |
| 1/4" | 1/8" | TMS* 1/4 1/8 N | 2.14 | 0.60 | 14 | 3/4" | 3/16" |
| 1/4" | 1/4" | TMS* 1/4 1/4 N | 2.14 | 0.60 | 14 | 1 5/16" | 3/16" |
| 5/16" | 1/8" | TMS* 5/16 1/8 N | 2.22 | 0.64 | 14 | 3/4" | 3/16" |
| 5/16" | 1/4" | TMS* 5/16 1/4 N | 2.22 | 0.64 | 14 | 1 5/16" | 1/4" |
| 3/8" | 1/4" | TMS* 3/8 1/4 N | 2.54 | 0.68 | 19 | 1 1/16" | 9/32" |
| 1/2" | 1/4" | TMS* 1/2 1/4 N | 2.86 | 0.90 | 22 | 1 1/8" | 9/32" |
| 1/2" | 3/8" | TMS* 1/2 3/8 N | 2.86 | 0.90 | 22 | 1 1/8" | 3/8" |
| 1/2" | 1/2" | TMS* 1/2 1/2 N | 2.86 | 0.90 | 22 | 1 5/16" | 3/8" |
| 5/8" | 1/2" | TMS* 5/8 1/2 N | 2.92 | 0.96 | 24 | 1 11/32" | 1/2" |
| 3/4" | 3/8" | TMS* 3/4 3/8 N | 3.12 | 1.02 | 27 | 1 1/4" | 5/8" |
| 3/4" | 3/4" | TMS* 3/4 3/4 N | 3.12 | 1.02 | 27 | 1 1/2" | 5/8" |
| 1" | 1" | TMS* 1" 1" N | 3.60 | 1.23 | 36 | 1 11/16" | 7/8" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

BSPT - ISO BSP Tapered Thread (T)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | L | P |
|----|------|---------------|------|------|----|------|------|
| 3 | 1/8" | TMS* 3 1/8 T | 46,6 | 12,9 | 12 | 17,5 | 2,4 |
| 3 | 1/4" | TMS* 3 1/4 T | 49,8 | 12,9 | 14 | 23,8 | 2,4 |
| 6 | 1/8" | TMS* 6 1/8 T | 54,4 | 15,3 | 14 | 19,1 | 4,8 |
| 6 | 1/4" | TMS* 6 1/4 T | 54,4 | 15,3 | 14 | 23,8 | 4,8 |
| 8 | 1/8" | TMS* 8 1/8 T | 56,2 | 16,2 | 14 | 19,1 | 4,8 |
| 8 | 1/4" | TMS* 8 1/4 T | 56,2 | 16,2 | 14 | 23,8 | 6,4 |
| 10 | 1/4" | TMS* 10 1/4 T | 64,4 | 17,2 | 19 | 27,0 | 7,1 |
| 12 | 1/4" | TMS* 12 1/4 T | 72,6 | 22,8 | 22 | 28,6 | 7,1 |
| 12 | 3/8" | TMS* 12 3/8 T | 72,6 | 22,8 | 22 | 28,6 | 9,5 |
| 12 | 1/2" | TMS* 12 1/2 T | 72,6 | 22,8 | 22 | 33,3 | 9,5 |
| 14 | 1/2" | TMS* 14 1/2 T | 73,2 | 24,4 | 24 | 34,1 | 9,5 |
| 16 | 1/2" | TMS* 16 1/2 T | 74,2 | 24,4 | 24 | 34,1 | 11,9 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | L | P |
|-------|------|-----------------|------|------|--------|----------|-------|
| 1/8" | 1/4" | TMS* 1/8 1/4 T | 1.96 | 0.51 | 14 | 1 5/16" | 3/32" |
| 3/16" | 1/8" | TMS* 3/16 1/8 T | 1.90 | 0.54 | 12 | 1 1/16" | 3/32" |
| 1/4" | 1/8" | TMS* 1/4 1/8 T | 2.14 | 0.60 | 14 | 3/4" | 3/16" |
| 1/4" | 1/4" | TMS* 1/4 1/4 T | 2.14 | 0.60 | 14 | 1 5/16" | 3/16" |
| 5/16" | 1/8" | TMS* 5/16 1/8 T | 2.22 | 0.64 | 14 | 3/4" | 3/16" |
| 5/16" | 1/4" | TMS* 5/16 1/4 T | 2.22 | 0.64 | 14 | 1 5/16" | 1/4" |
| 3/8" | 1/4" | TMS* 3/8 1/4 T | 2.54 | 0.68 | 19 | 1 1/16" | 9/32" |
| 1/2" | 3/8" | TMS* 1/2 3/8 T | 2.86 | 0.90 | 22 | 1 1/8" | 3/8" |
| 1/2" | 1/2" | TMS* 1/2 1/2 T | 2.86 | 0.90 | 22 | 1 5/16" | 3/8" |
| 5/8" | 1/2" | TMS* 5/8 1/2 T | 2.92 | 0.96 | 24 | 1 11/32" | 1/2" |
| 3/4" | 3/4" | TMS* 3/4 3/4 T | 3.12 | 1.02 | 27 | 1 1/2" | 5/8" |
| 7/8" | 3/4" | TMS* 7/8 3/4 T | 3.24 | 1.02 | 30 | 1 1/2" | 3/4" |
| 1" | 1" | TMS* 1" 1" T | 3.60 | 1.23 | 36 | 1 11/16" | 7/8" |

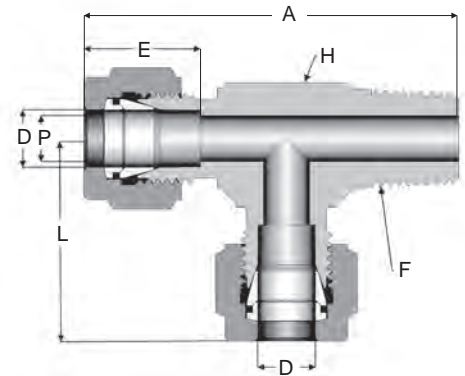
*Specify material when ordering. See page 8 for materials and codes.

MALE RUN TEE | TMRS

APPLICATION

Connects a female taper-threaded apparatus or pipe to a gas line at a 90° elbow.

Special requirements on request



NPT (N)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | L | P |
|----|------|----------------|------|------|----|------|------|
| 3 | 1/8" | TMRS* 3 1/8 N | 40,8 | 12,9 | 14 | 23,3 | 2,4 |
| 6 | 1/8" | TMRS* 6 1/8 N | 46,3 | 15,3 | 14 | 27,2 | 4,8 |
| 6 | 1/4" | TMRS* 6 1/4 N | 51,0 | 15,3 | 14 | 27,2 | 4,8 |
| 8 | 1/8" | TMRS* 8 1/8 N | 47,2 | 16,2 | 14 | 28,1 | 4,8 |
| 8 | 1/4" | TMRS* 8 1/4 N | 51,9 | 16,2 | 14 | 28,1 | 6,4 |
| 10 | 1/4" | TMRS* 10 1/4 N | 59,2 | 17,2 | 19 | 32,2 | 7,1 |
| 12 | 1/4" | TMRS* 12 1/4 N | 64,9 | 22,8 | 22 | 36,3 | 7,1 |
| 12 | 3/8" | TMRS* 12 3/8 N | 64,9 | 22,8 | 22 | 36,3 | 9,5 |
| 12 | 1/2" | TMRS* 12 1/2 N | 69,6 | 22,8 | 22 | 36,3 | 9,5 |
| 16 | 1/2" | TMRS* 16 1/2 N | 71,2 | 24,4 | 24 | 37,1 | 11,9 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H | L | P |
|-------|-------|-------------------|------|------|----|------|-------|
| 1/16" | 1/16" | TMRS* 1/16 1/16 N | 1.60 | 0.34 | 14 | 0.94 | 3/16" |
| 1/8" | 1/8" | TMRS* 1/8 1/8 N | 1.61 | 0.51 | 14 | 0.92 | 3/32" |
| 1/8" | 1/4" | TMRS* 1/8 1/4 N | 1.92 | 0.51 | 14 | 0.98 | 3/32" |
| 3/16" | 1/8" | TMRS* 3/16 1/8 N | 1.64 | 0.54 | 14 | 0.95 | 3/32" |
| 1/4" | 1/8" | TMRS* 1/4 1/8 N | 1.82 | 0.60 | 14 | 1.07 | 3/16" |
| 1/4" | 1/4" | TMRS* 1/4 1/4 N | 2.01 | 0.60 | 14 | 1.07 | 3/16" |
| 5/16" | 1/8" | TMRS* 5/16 1/8 N | 1.86 | 0.64 | 14 | 1.11 | 3/16" |
| 3/8" | 1/4" | TMRS* 3/8 1/4 N | 2.33 | 0.68 | 19 | 1.27 | 9/32" |
| 1/2" | 1/4" | TMRS* 1/2 1/4 N | 2.56 | 0.90 | 22 | 1.43 | 9/32" |
| 1/2" | 3/8" | TMRS* 1/2 3/8 N | 2.56 | 0.90 | 22 | 1.43 | 3/8" |
| 1/2" | 1/2" | TMRS* 1/2 1/2 N | 2.74 | 0.90 | 22 | 1.43 | 3/8" |
| 5/8" | 1/2" | TMRS* 5/8 1/2 N | 2.80 | 0.96 | 24 | 1.46 | 1/2" |
| 3/4" | 3/4" | TMRS* 3/4 3/4 N | 3.06 | 1.02 | 27 | 1.56 | 5/8" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

BSPT - ISO BSP Tapered Thread (T)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | L | P |
|----|------|----------------|------|------|----|------|------|
| 3 | 1/4" | TMRS* 3 1/4 T | 42,4 | 12,9 | 14 | 24,9 | 2,4 |
| 6 | 1/8" | TMRS* 6 1/8 T | 46,3 | 15,3 | 14 | 27,2 | 4,8 |
| 6 | 1/4" | TMRS* 6 1/4 T | 51,0 | 15,3 | 14 | 27,2 | 4,8 |
| 8 | 1/8" | TMRS* 8 1/8 T | 47,2 | 16,2 | 14 | 28,1 | 4,8 |
| 8 | 1/4" | TMRS* 8 1/4 T | 51,9 | 16,2 | 14 | 28,1 | 6,4 |
| 10 | 1/4" | TMRS* 10 1/4 T | 59,2 | 17,2 | 19 | 32,2 | 7,1 |
| 12 | 3/8" | TMRS* 12 3/8 T | 64,9 | 22,8 | 22 | 36,3 | 9,5 |
| 12 | 1/2" | TMRS* 12 1/2 T | 64,9 | 22,8 | 22 | 36,3 | 9,5 |
| 16 | 1/2" | TMRS* 16 1/2 T | 70,4 | 24,4 | 24 | 37,1 | 11,9 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | L | P |
|------|------|-----------------|------|------|--------|------|-------|
| 1/4" | 1/8" | TMRS* 1/4 1/8 T | 1.82 | 0.60 | 14 | 1.07 | 3/16" |
| 1/4" | 1/4" | TMRS* 1/4 1/4 T | 2.01 | 0.60 | 14 | 1.07 | 3/16" |
| 3/8" | 1/4" | TMRS* 3/8 1/4 T | 2.33 | 0.68 | 19 | 1.27 | 9/32" |
| 1/2" | 3/8" | TMRS* 1/2 3/8 T | 2.56 | 0.90 | 22 | 1.43 | 3/8" |
| 1/2" | 1/2" | TMRS* 1/2 1/2 T | 2.74 | 0.90 | 22 | 1.43 | 3/8" |
| 5/8" | 1/2" | TMRS* 5/8 1/2 T | 2.80 | 0.96 | 24 | 1.46 | 1/2" |
| 3/4" | 3/4" | TMRS* 3/4 3/4 T | 3.06 | 1.02 | 27 | 1.56 | 5/8" |
| 1" | 1" | TMRS* 1" 1" T | 3.49 | 1.23 | 36 | 1.80 | 7/8" |

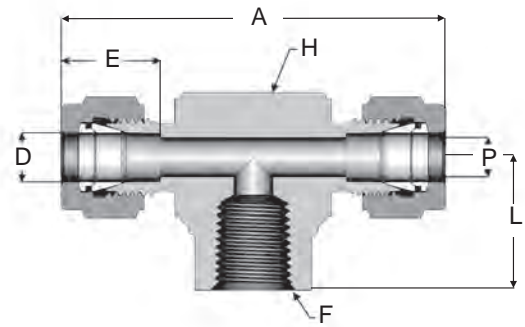
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

FEMALE BRANCH TEE | TFS

APPLICATION

Connects a male taper-threaded apparatus or pipe to a gas line in a T configuration.

Special requirements on request



NPT (N)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | L | P |
|----|------|---------------|------|------|----|------|------|
| 6 | 1/8" | TFS* 6 1/8 N | 52,5 | 15,3 | 14 | 19,1 | 4,8 |
| 6 | 1/4" | TFS* 6 1/4 N | 60,8 | 15,3 | 19 | 21,4 | 4,8 |
| 8 | 1/8" | TFS* 8 1/8 N | 56,2 | 16,2 | 14 | 19,1 | 6,4 |
| 8 | 1/4" | TFS* 8 1/4 N | 62,6 | 16,2 | 19 | 21,4 | 6,4 |
| 10 | 1/4" | TFS* 10 1/4 N | 64,4 | 17,2 | 19 | 21,4 | 8,0 |
| 12 | 1/4" | TFS* 12 1/4 N | 72,6 | 22,8 | 22 | 21,4 | 9,5 |
| 12 | 3/8" | TFS* 12 3/8 N | 72,6 | 22,8 | 22 | 21,4 | 9,5 |
| 12 | 1/2" | TFS* 12 1/2 N | 79,0 | 22,8 | 27 | 28,6 | 9,5 |
| 16 | 1/2" | TFS* 16 1/2 N | 79,0 | 24,4 | 27 | 28,6 | 13,0 |
| 20 | 3/4" | TFS* 20 3/4 N | 82,2 | 26,0 | 36 | 31,8 | 16,0 |
| 22 | 3/4" | TFS* 22 3/4 N | 82,2 | 26,0 | 36 | 31,8 | 18,5 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | L | P |
|------|------|----------------|------|------|--------|------|--------|
| 1/8" | 1/8" | TFS* 1/8 1/8 N | 1.94 | 0.50 | 14 | 0.75 | 3/32" |
| 1/8" | 1/4" | TFS* 1/8 1/4 N | 2.08 | 0.50 | 19 | 0.84 | 3/32" |
| 1/4" | 1/8" | TFS* 1/4 1/8 N | 2.08 | 0.60 | 14 | 0.75 | 3/16" |
| 1/4" | 1/4" | TFS* 1/4 1/4 N | 2.40 | 0.60 | 19 | 0.84 | 3/16" |
| 3/8" | 1/4" | TFS* 3/8 1/4 N | 2.52 | 0.66 | 19 | 0.84 | 9/32" |
| 1/2" | 1/4" | TFS* 1/2 1/4 N | 2.84 | 0.90 | 22 | 0.84 | 3/8" |
| 1/2" | 3/8" | TFS* 1/2 3/8 N | 2.84 | 0.90 | 22 | 0.84 | 3/8" |
| 1/2" | 1/2" | TFS* 1/2 1/2 N | 3.10 | 0.90 | 27 | 1.13 | 3/8" |
| 5/8" | 1/2" | TFS* 5/8 1/2 N | 3.10 | 0.96 | 27 | 1.13 | 33/64" |
| 3/4" | 3/4" | TFS* 3/4 3/4 N | 3.22 | 0.96 | 36 | 1.25 | 33/64" |
| 1" | 3/4" | TFS* 1" 3/4 N | 3.60 | 1.23 | 36 | 1.25 | 55/64" |
| 1" | 1" | TFS* 1" 1" N | 4.04 | 1.23 | 41 | 1.50 | 55/64" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

BSPT - ISO BSP Tapered Thread (T)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | L | P |
|----|------|---------------|------|------|----|------|-----|
| 6 | 1/4" | TFS* 6 1/4 T | 60,8 | 15,3 | 19 | 21,4 | 4,8 |
| 8 | 1/8" | TFS* 8 1/8 T | 62,6 | 16,2 | 14 | 19,1 | 6,4 |
| 8 | 1/4" | TFS* 8 1/4 T | 62,6 | 16,2 | 19 | 21,4 | 6,4 |
| 10 | 1/4" | TFS* 10 1/4 T | 64,4 | 17,2 | 19 | 21,4 | 8,0 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | L | P |
|------|------|----------------|------|------|--------|------|-------|
| 1/4" | 1/4" | TFS* 1/4 1/4 T | 2.40 | 0.60 | 19 | 0.84 | 3/16" |
| 3/8" | 1/4" | TFS* 3/8 1/4 T | 2.52 | 0.66 | 19 | 0.84 | 9/32" |
| 1/2" | 1/4" | TFS* 1/2 1/4 T | 2.84 | 0.90 | 22 | 0.84 | 3/8" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

BSPP - ISO BSP Parallel Thread (G)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | L | P |
|----|------|---------------|------|------|----|------|------|
| 6 | 1/8" | TFS* 6 1/8 G | 60,8 | 15,3 | 14 | 19,1 | 4,8 |
| 6 | 1/4" | TFS* 6 1/4 G | 60,8 | 15,3 | 19 | 21,4 | 4,8 |
| 8 | 1/4" | TFS* 8 1/4 G | 62,6 | 16,2 | 19 | 21,4 | 6,4 |
| 10 | 1/4" | TFS* 10 1/4 G | 64,4 | 17,2 | 19 | 21,4 | 8,0 |
| 12 | 1/4" | TFS* 12 1/4 G | 72,6 | 22,8 | 22 | 21,4 | 9,5 |
| 12 | 3/8" | TFS* 12 3/8 G | 72,6 | 22,8 | 22 | 21,4 | 9,5 |
| 14 | 1/2" | TFS* 14 1/2 G | 79 | 24,4 | 27 | 28,6 | 11,0 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | L | P |
|-------|------|-----------------|------|------|--------|------|--------|
| 1/4" | 1/4" | TFS* 1/4 1/4 G | 2.40 | 0.60 | 19 | 0.84 | 3/16" |
| 5/16" | 1/4" | TFS* 5/16 1/4 G | 2.07 | 0.64 | 19 | 1.23 | 1/4" |
| 3/8" | 1/4" | TFS* 3/8 1/4 G | 2.52 | 0.66 | 19 | 0.84 | 9/32" |
| 1/2" | 3/8" | TFS* 1/2 3/8 G | 2.84 | 0.90 | 22 | 0.84 | 3/8" |
| 3/4" | 3/4" | TFS* 3/4 3/4 G | 3.22 | 0.96 | 36 | 1.25 | 33/64" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

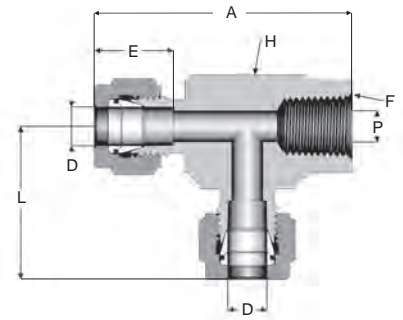
BSPP G end connections should be used with sealing gaskets.
See page 9 for further information. See page 59 for gaskets.

FEMALE RUN TEE | TFRS

APPLICATION

Connects a male taper-threaded apparatus or pipe to a gas line at a 90° elbow.

Special requirements on request



NPT (N)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | L | P |
|----|------|----------------|------|------|----|------|------|
| 6 | 1/8" | TFRS* 6 1/8 N | 54,4 | 15,3 | 14 | 19,1 | 4,8 |
| 6 | 1/4" | TFRS* 6 1/4 N | 60,8 | 15,3 | 19 | 21,4 | 4,8 |
| 8 | 1/8" | TFRS* 8 1/8 N | 56,2 | 16,2 | 14 | 19,1 | 6,4 |
| 8 | 1/4" | TFRS* 8 1/4 N | 62,6 | 16,2 | 19 | 21,4 | 6,4 |
| 10 | 1/4" | TFRS* 10 1/4 N | 67,4 | 17,2 | 19 | 21,4 | 7,1 |
| 12 | 1/4" | TFRS* 12 1/4 N | 72,6 | 22,8 | 22 | 21,4 | 9,5 |
| 12 | 3/8" | TFRS* 12 3/8 N | 72,6 | 22,8 | 22 | 21,4 | 9,5 |
| 12 | 1/2" | TFRS* 12 1/2 N | 79,0 | 22,8 | 27 | 28,6 | 9,5 |
| 16 | 1/2" | TFRS* 16 1/2 N | 79,0 | 24,4 | 27 | 28,6 | 13,0 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H(mm) | L | P |
|-------|-------|-------------------|------|------|-------|------|-------|
| 1/16" | 1/16" | TFRS* 1/16 1/16 N | 1.48 | 0.34 | 12 | 0.92 | 3/16" |
| 1/8" | 1/8" | TFRS* 1/8 1/8 N | 1.72 | 0.50 | 14 | 0.97 | 3/32" |
| 3/16" | 1/8" | TFRS* 3/16 1/8 N | 1.75 | 0.54 | 14 | 1,00 | 1/8" |
| 1/4" | 1/8" | TFRS* 1/4 1/8 N | 1.82 | 0.60 | 14 | 1.07 | 3/16" |
| 1/4" | 1/4" | TFRS* 1/4 1/4 N | 2.04 | 0.60 | 19 | 1.2 | 3/16" |
| 3/8" | 1/4" | TFRS* 3/8 1/4 N | 2.16 | 0.66 | 19 | 1.32 | 9/32" |
| 1/2" | 3/8" | TFRS* 1/2 3/8 N | 2.26 | 0.90 | 22 | 1.42 | 3/8" |
| 1/2" | 1/2" | TFRS* 1/2 1/2 N | 2.68 | 0.90 | 27 | 1.55 | 3/8" |
| 3/4" | 3/4" | TFRS* 3/4 3/4 N | 2.86 | 0.96 | 36 | 1.61 | 5/8" |
| 1" | 3/4" | TFRS* 1" 3/4 N | 3.04 | 1.23 | 36 | 1.79 | 7/8" |
| 1" | 1" | TFRS* 1" 1" N | 3.54 | 1.23 | 41 | 2.04 | 7/8" |

Hex flats (H) are metric. Fractional upon request

*Specify material when ordering. See page 8 for materials and codes.

BSPT

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | L | P |
|----|------|----------------|------|------|----|------|-----|
| 6 | 1/8" | TFRS* 6 1/8 T | 54,4 | 15,3 | 14 | 19,1 | 4,8 |
| 6 | 1/4" | TFRS* 6 1/4 T | 60,8 | 15,3 | 19 | 21,4 | 4,8 |
| 8 | 1/8" | TFRS* 8 1/8 T | 56,2 | 16,2 | 14 | 19,1 | 6,4 |
| 8 | 1/4" | TFRS* 8 1/4 T | 62,6 | 16,2 | 19 | 21,4 | 6,4 |
| 10 | 1/4" | TFRS* 10 1/4 T | 67,4 | 17,2 | 19 | 21,4 | 7,1 |
| 12 | 3/8" | TFRS* 12 3/8 T | 72,6 | 22,8 | 22 | 21,4 | 9,5 |
| 12 | 1/2" | TFRS* 12 1/2 T | 79,0 | 22,8 | 27 | 21,4 | 9,5 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H(mm) | L | P |
|------|------|-----------------|------|------|-------|------|--------|
| 1/4" | 1/8" | TFRS* 1/4 1/8 T | 1.82 | 0.60 | 14 | 1.07 | 3/16" |
| 1/4" | 1/4" | TFRS* 1/4 1/4 T | 2.04 | 0.60 | 19 | 1.2 | 3/16" |
| 3/8" | 1/4" | TFRS* 3/8 1/4 T | 2.16 | 0.66 | 19 | 1.32 | 9/32" |
| 1/2" | 3/8" | TFRS* 1/2 3/8 T | 2.26 | 0.90 | 22 | 1.42 | 3/8" |
| 1/2" | 1/2" | TFRS* 1/2 1/2 T | 2.68 | 0.90 | 27 | 1.55 | 3/8" |
| 5/8" | 1/2" | TFRS* 5/8 1/2 T | 2.68 | 0.96 | 27 | 1.55 | 33/64" |
| 3/4" | 3/4" | TFRS* 3/4 3/4 T | 2.86 | 0.96 | 36 | 1.61 | 5/8" |
| 1" | 1" | TFRS* 1" 1" T | 3.54 | 1.23 | 41 | 2.04 | 7/8" |

Hex flats (H) are metric. Fractional upon request

*Specify material when ordering. See page 8 for materials and codes.

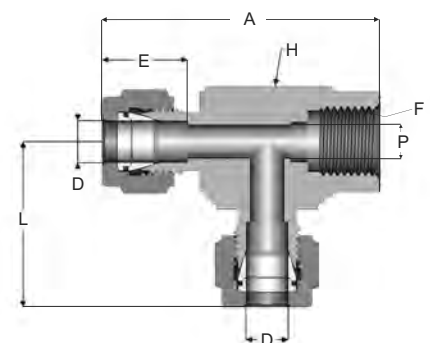
BSPP - ISO BSP Parallel Thread (G)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | E | H | P | L |
|----|------|----------------|------|------|----|------|------|
| 6 | 1/8" | TFRS* 6 1/8 G | 54,4 | 15,3 | 14 | 4,8 | 19,1 |
| 10 | 1/4" | TFRS* 10 1/4 G | 67,4 | 17,2 | 19 | 7,1 | 21,4 |
| 22 | 3/4" | TFRS* 22 3/4 G | 82,2 | 26,0 | 36 | 18,5 | 31,8 |

BSPP G end connections should be used with sealing gaskets. See page 9 for further information. See page 59 for gaskets.

*Specify material when ordering. See page 8 for materials and codes.

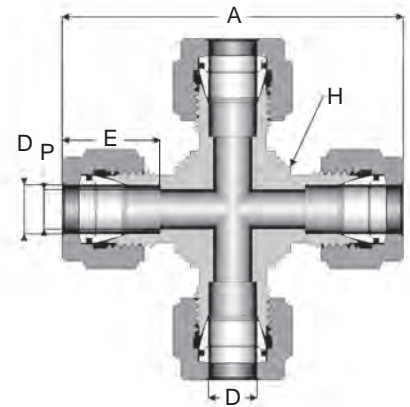


CROSS | CS

APPLICATION

Connects tubes of the same dimension in a cross configuration.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference | A | E | H | P |
|----|-----------|------|------|----|------|
| 3 | CS* 3 | 46,5 | 12,9 | 12 | 2,4 |
| 4 | CS* 4 | 48,1 | 13,7 | 12 | 3,2 |
| 6 | CS* 6 | 54,4 | 15,3 | 14 | 4,8 |
| 8 | CS* 8 | 56,2 | 16,2 | 14 | 6,4 |
| 10 | CS* 10 | 65,2 | 17,2 | 19 | 7,9 |
| 12 | CS* 12 | 72,6 | 22,8 | 22 | 9,5 |
| 14 | CS* 14 | 74,2 | 24,4 | 24 | 11,1 |
| 16 | CS* 16 | 74,2 | 24,4 | 24 | 12,7 |
| 18 | CS* 18 | 79,0 | 24,4 | 27 | 15,1 |
| 20 | CS* 20 | 83,7 | 26,0 | 30 | 15,9 |
| 22 | CS* 22 | 82,1 | 26,0 | 30 | 19,1 |
| 25 | CS* 25 | 91,1 | 31,3 | 36 | 22,2 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | A | E | H (mm) | P |
|-------|-----------|------|------|--------|-------|
| 1/16" | CS* 1/16 | 1.40 | 0.34 | 12 | 3/64" |
| 1/8" | CS* 1/8 | 1.84 | 0.51 | 12 | 3/32" |
| 1/4" | CS* 1/4 | 2.04 | 0.60 | 14 | 3/16" |
| 5/16" | CS* 5/16 | 2.22 | 0.64 | 14 | 1/4" |
| 3/8" | CS* 3/8 | 2.26 | 0.68 | 19 | 9/32" |
| 1/2" | CS* 1/2 | 2.74 | 0.90 | 22 | 3/8" |
| 3/4" | CS* 3/4 | 3.12 | 0.96 | 27 | 5/8" |
| 1" | CS* 1" | 3.60 | 1.23 | 36 | 7/8" |

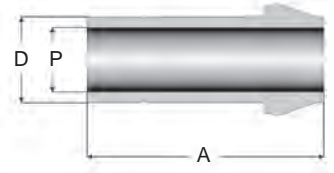
Hex flats (H) are metric. Fractional upon request
 *Specify material when ordering. See page 8 for materials and codes.

PORT CONNECTOR | APS

APPLICATION

Converts a female tube fitting end to a male tube stem of the same diameter.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference | A | P |
|----|-----------|------|------|
| 3 | APS* 3 | 23,0 | 1,8 |
| 4 | APS* 4 | 23,8 | 2,4 |
| 6 | APS* 6 | 26,2 | 4,0 |
| 8 | APS* 8 | 27,0 | 6,0 |
| 10 | APS* 10 | 27,8 | 7,5 |
| 12 | APS* 12 | 38,1 | 9,5 |
| 14 | APS* 14 | 38,1 | 11,0 |
| 16 | APS* 16 | 38,1 | 13,0 |
| 18 | APS* 18 | 38,1 | 15,0 |
| 20 | APS* 20 | 41,9 | 16,0 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | A | P |
|-------|-----------|------|--------|
| 1/16" | APS* 1/16 | 0.66 | 1/32" |
| 1/8" | APS* 1/8 | 0.91 | 5/64" |
| 3/16" | APS* 3/16 | 0.94 | 3/32" |
| 1/4" | APS* 1/4 | 1.03 | 3/16" |
| 5/16" | APS* 5/16 | 1.16 | 1/4" |
| 3/8" | APS* 3/8 | 1.16 | 15/64" |
| 1/2" | APS* 1/2 | 1.50 | 3/8" |
| 5/8" | APS* 5/8 | 1.50 | 1/2" |
| 3/4" | APS* 3/4 | 1.50 | 5/8" |

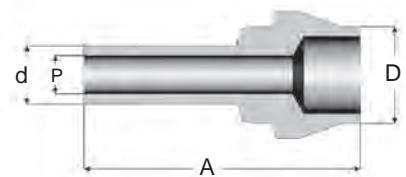
*Specify material when ordering. See page 8 for materials and codes.

REDUCING PORT CONNECTOR | APRS

APPLICATION

Converts a female tube fitting end to a male tube stem of a different diameter.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | d | Reference | A | P |
|----|----|-------------|------|-----|
| 4 | 3 | APRS* 4 3 | 26,2 | 2,4 |
| 6 | 3 | APRS* 6 3 | 26,2 | 2,4 |
| 6 | 4 | APRS* 6 4 | 27,0 | 3,2 |
| 8 | 6 | APRS* 8 6 | 27,8 | 4,8 |
| 10 | 6 | APRS* 10 6 | 28,6 | 4,8 |
| 10 | 8 | APRS* 10 8 | 30,3 | 6,0 |
| 12 | 6 | APRS* 12 6 | 36,9 | 4,8 |
| 12 | 8 | APRS* 12 8 | 37,6 | 6,0 |
| 12 | 10 | APRS* 12 10 | 38,1 | 7,9 |
| 18 | 12 | APRS* 18 12 | 44,1 | 9,5 |
| 20 | 12 | APRS* 20 12 | 44,1 | 9,5 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | d | Reference | A | P |
|-------|-------|----------------|------|--------|
| 1/8" | 1/16" | APRS* 1/8 1/16 | 0.81 | 3/64" |
| 1/4" | 1/16" | APRS* 1/4 1/16 | 0.84 | 3/64" |
| 1/4" | 1/8" | APRS* 1/4 1/8 | 1.03 | 3/32" |
| 1/4" | 3/16" | APRS* 1/4 3/16 | 1.06 | 1/8" |
| 5/16" | 1/4" | APRS* 5/16 1/4 | 1.09 | 3/16" |
| 3/8" | 1/16" | APRS* 3/8 1/16 | 0.84 | 3/64" |
| 3/8" | 1/8" | APRS* 3/8 1/8 | 1.03 | 3/32" |
| 3/8" | 1/4" | APRS* 3/8 1/4 | 1.13 | 3/16" |
| 1/2" | 1/4" | APRS* 1/2 1/4 | 1.45 | 3/16" |
| 1/2" | 3/8" | APRS* 1/2 3/8 | 1.50 | 5/32" |
| 3/4" | 1/2" | APRS* 3/4 1/2 | 1.73 | 13/32" |

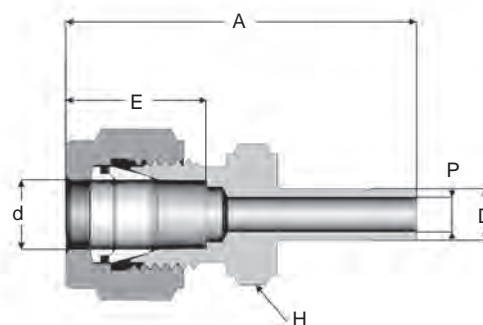
*Specify material when ordering. See page 8 for materials and codes.

REDUCER | ADRS

APPLICATION

Converts a tube of one diameter to a tube stem of a larger or smaller diameter.

Special requirements on request



TUBE SIZE - METRIC (mm)

| d | D | Reference | A | E | H | P |
|----|----|-------------|------|------|----|------|
| 3 | 4 | ADRS* 3 4 | 34,4 | 12,9 | 8 | 2,0 |
| 3 | 6 | ADRS* 3 6 | 36,1 | 12,9 | 8 | 2,0 |
| 3 | 8 | ADRS* 3 8 | 36,8 | 12,9 | 12 | 2,0 |
| 3 | 10 | ADRS* 3 10 | 37,6 | 12,9 | 12 | 2,0 |
| 4 | 6 | ADRS* 4 6 | 36,8 | 13,7 | 12 | 3,0 |
| 4 | 8 | ADRS* 4 8 | 37,6 | 13,7 | 12 | 3,0 |
| 6 | 3 | ADRS* 6 3 | 36,8 | 15,3 | 14 | 1,8 |
| 6 | 4 | ADRS* 6 4 | 37,6 | 15,3 | 14 | 2,4 |
| 6 | 6 | ADRS* 6 6 | 39,2 | 15,3 | 14 | 4,0 |
| 6 | 8 | ADRS* 6 8 | 40,1 | 15,3 | 14 | 4,0 |
| 6 | 10 | ADRS* 6 10 | 40,7 | 15,3 | 14 | 4,5 |
| 6 | 12 | ADRS* 6 12 | 46,3 | 15,3 | 14 | 4,5 |
| 8 | 6 | ADRS* 8 6 | 40,4 | 16,2 | 14 | 4,0 |
| 8 | 10 | ADRS* 8 10 | 42,0 | 16,2 | 14 | 6,4 |
| 8 | 12 | ADRS* 8 12 | 47,6 | 16,2 | 14 | 9,5 |
| 10 | 6 | ADRS* 10 6 | 42,4 | 17,2 | 17 | 4,0 |
| 10 | 8 | ADRS* 10 8 | 42,5 | 17,2 | 17 | 6,0 |
| 10 | 12 | ADRS* 10 12 | 48,9 | 17,2 | 17 | 8,0 |
| 10 | 18 | ADRS* 10 18 | 51,3 | 17,2 | 22 | 8,0 |
| 10 | 22 | ADRS* 10 22 | 52,1 | 17,2 | 24 | 8,0 |
| 12 | 6 | ADRS* 12 6 | 45,0 | 22,8 | 22 | 4,0 |
| 12 | 10 | ADRS* 12 10 | 46,6 | 22,8 | 22 | 7,5 |
| 12 | 16 | ADRS* 12 16 | 53,8 | 22,8 | 22 | 9,5 |
| 12 | 18 | ADRS* 12 18 | 53,8 | 22,8 | 22 | 9,5 |
| 12 | 25 | ADRS* 12 25 | 60,1 | 22,8 | 24 | 9,5 |
| 16 | 12 | ADRS* 16 12 | 53,0 | 24,4 | 24 | 13,0 |
| 16 | 18 | ADRS* 16 18 | 54,6 | 24,4 | 24 | 13,0 |
| 18 | 12 | ADRS* 18 12 | 55,4 | 24,4 | 27 | 9,5 |
| 18 | 16 | ADRS* 18 16 | 56,9 | 24,4 | 27 | 13,0 |
| 18 | 22 | ADRS* 18 22 | 56,9 | 24,4 | 27 | 15,0 |
| 18 | 25 | ADRS* 18 25 | 64,1 | 24,4 | 27 | 15,0 |
| 22 | 20 | ADRS* 22 20 | 61,7 | 24,4 | 30 | 19,1 |
| 22 | 25 | ADRS* 22 25 | 64,9 | 24,4 | 30 | 19,1 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| d | D | Reference | A | E | H (mm) | P |
|-------|-------|------------------|------|------|--------|-------|
| 1/16" | 1/8" | ADRS* 1/16" 1/8" | 1.10 | 0.34 | 8 | 1/16" |
| 1/8" | 1/8" | ADRS* 1/8" 1/8" | 1.29 | 0.50 | 8 | 1/16" |
| 1/8" | 3/16" | ADRS* 1/8" 3/16" | 1.32 | 0.50 | 8 | 5/64" |
| 1/8" | 1/4" | ADRS* 1/8" 1/4" | 1.39 | 0.50 | 8 | 5/64" |
| 3/16" | 1/8" | ADRS* 3/16" 1/8" | 1.31 | 0.54 | 12 | 1/16" |
| 3/16" | 1/4" | ADRS* 3/16" 1/4" | 1.41 | 0.54 | 12 | 1/8" |
| 1/4" | 1/8" | ADRS* 1/4" 1/8" | 1.41 | 0.60 | 14 | 1/16" |
| 1/4" | 3/16" | ADRS* 1/4" 3/16" | 1.44 | 0.60 | 14 | 3/16" |
| 1/4" | 1/4" | ADRS* 1/4" 1/4" | 1.50 | 0.60 | 14 | 5/32" |
| 1/4" | 5/16" | ADRS* 1/4" 5/16" | 1.54 | 0.60 | 14 | 3/16" |
| 1/4" | 3/8" | ADRS* 1/4" 3/8" | 1.57 | 0.60 | 14 | 3/16" |
| 1/4" | 1/2" | ADRS* 1/4" 1/2" | 1.79 | 0.60 | 14 | 3/16" |
| 1/4" | 3/4" | ADRS* 1/4" 3/4" | 1.97 | 0.60 | 22 | 3/16" |
| 1/4" | 5/8" | ADRS* 1/4" 5/8" | 1.89 | 0.60 | 17 | 3/16" |
| 5/16" | 3/8" | ADRS* 5/16" 3/8" | 1.58 | 0.64 | 14 | 1/4" |
| 5/16" | 1/2" | ADRS* 5/16" 1/2" | 1.80 | 0.64 | 14 | 1/4" |
| 3/8" | 1/4" | ADRS* 3/8" 1/4" | 1.59 | 0.66 | 17 | 5/32" |
| 3/8" | 3/8" | ADRS* 3/8" 3/8" | 1.65 | 0.66 | 17 | 9/32" |
| 3/8" | 1/2" | ADRS* 3/8" 1/2" | 1.87 | 0.66 | 17 | 9/32" |
| 3/8" | 5/8" | ADRS* 3/8" 5/8" | 1.94 | 0.66 | 19 | 9/32" |
| 3/8" | 3/4" | ADRS* 3/8" 3/4" | 2.02 | 0.66 | 22 | 9/32" |
| 1/2" | 1/4" | ADRS* 1/2" 1/4" | 1.78 | 0.90 | 22 | 5/32" |
| 1/2" | 3/8" | ADRS* 1/2" 3/8" | 1.83 | 0.90 | 22 | 9/32" |
| 1/2" | 1/2" | ADRS* 1/2" 1/2" | 1.96 | 0.90 | 22 | 3/8" |
| 1/2" | 5/8" | ADRS* 1/2" 5/8" | 2.13 | 0.90 | 22 | 3/8" |
| 1/2" | 3/4" | ADRS* 1/2" 3/4" | 2.13 | 0.90 | 22 | 3/8" |
| 5/8" | 3/8" | ADRS* 5/8" 3/8" | 1.88 | 0.96 | 24 | 9/32" |
| 5/8" | 1/2" | ADRS* 5/8" 1/2" | 2.10 | 0.96 | 24 | 3/8" |
| 5/8" | 3/4" | ADRS* 5/8" 3/4" | 2.16 | 0.96 | 24 | 1/2" |
| 5/8" | 7/8" | ADRS* 5/8" 7/8" | 2.29 | 0.96 | 24 | 1/2" |
| 5/8" | 1" | ADRS* 5/8" 1" | 2.45 | 0.96 | 27 | 1/2" |
| 3/4" | 1/2" | ADRS* 3/4" 1/2" | 2.14 | 0.96 | 27 | 3/8" |
| 3/4" | 1" | ADRS* 3/4" 1" | 2.48 | 0.96 | 27 | 5/8" |

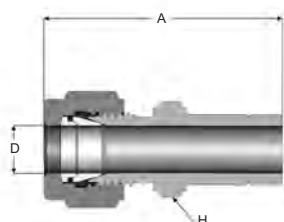
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

HEAT EXCHANGER REDUCER | ADTS

For ordering use ADTS instead of ADRS

Same as the ADRS with a straight bore-through to accommodate heat exchanger and sensor apparatus.

Special requirements on request

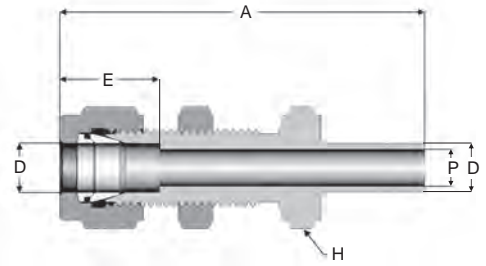


BULKHEAD REDUCER | UCAS

APPLICATION

Converts a tube fitting end to a tube stem through a wall panel. The tube stem is useful to set the direction through a panel construction.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference | A | E | H | P | B'Head Hole Drill Size | MA. B'Head Thick. |
|----|-----------|-------|------|----|------|------------------------|-------------------|
| 3 | UCAS* 3 | 50,2 | 12,9 | 14 | 1,8 | 8,3 | 12,7 |
| 4 | UCAS* 4 | 51,9 | 13,7 | 14 | 2,4 | 9,8 | 12,7 |
| 6 | UCAS* 6 | 55,8 | 15,3 | 17 | 4,8 | 11,5 | 10,3 |
| 8 | UCAS* 8 | 59,1 | 16,2 | 17 | 6,4 | 13,1 | 11,1 |
| 10 | UCAS* 10 | 61,6 | 17,2 | 22 | 7,5 | 16,3 | 11,1 |
| 12 | UCAS* 12 | 72,8 | 22,8 | 24 | 9,5 | 19,5 | 12,7 |
| 14 | UCAS* 14 | 75,2 | 24,4 | 27 | 11,0 | 21,0 | 12,7 |
| 16 | UCAS* 16 | 76,8 | 24,4 | 27 | 12,7 | 22,5 | 12,7 |
| 18 | UCAS* 18 | 83,1 | 24,4 | 30 | 12,7 | 26,0 | 16,7 |
| 20 | UCAS* 20 | 83,9 | 26,0 | 32 | 15,9 | 29,0 | 19,1 |
| 22 | UCAS* 22 | 90,3 | 26,0 | 36 | 18,5 | 29,0 | 20,6 |
| 25 | UCAS* 25 | 101,1 | 31,3 | 38 | 22,0 | 33,8 | 23,8 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | A | E | H (mm) | P | B'Head Hole Drill Size | MA. B'Head Thick. |
|------|-----------|------|------|--------|-------|------------------------|-------------------|
| 1/8" | UCAS* 1/8 | 1.98 | 0.50 | 14 | 1/32" | 21/64" | 1/2" |
| 1/4" | UCAS* 1/4 | 2.20 | 0.60 | 17 | 3/16" | 29/64" | 17/32" |
| 3/8" | UCAS* 3/8 | 2.42 | 0.66 | 22 | 9/32" | 37/64" | 9/16" |
| 1/2" | UCAS* 1/2 | 2.86 | 0.90 | 24 | 3/8" | 49/64" | 19/32" |
| 5/8" | UCAS* 5/8 | 3.02 | 0.96 | 27 | 1/2" | 57/64" | 19/32" |
| 3/4" | UCAS* 3/4 | 3.27 | 0.96 | 30 | 5/8" | 1 1/64" | 25/32" |
| 1" | UCAS* 1" | 3.98 | 1.23 | 38 | 7/8" | 1 21/64" | 15/16" |

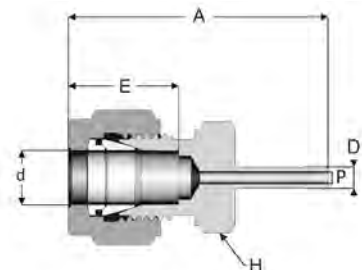
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

CONVERTING REDUCER | AMOD

APPLICATION

Converts a metric tube to a fractional tube stem or vice-versa.

Special requirements on request



TUBE SIZE - METRIC TO FRACTIONAL - (mm)

| d | D | Reference | A | E | H | P |
|----|-------|--------------|------|------|----|------|
| 3 | 1/8" | AMOD* 3 1/8 | 33,6 | 12,9 | 12 | 2,4 |
| 3 | 1/4" | AMOD* 3 1/4 | 34,4 | 12,9 | 12 | 2,4 |
| 4 | 1/4" | AMOD* 4 1/4 | 36,8 | 13,7 | 12 | 3,2 |
| 6 | 1/8" | AMOD* 6 1/8 | 36,8 | 15,3 | 14 | 4,8 |
| 6 | 1/4" | AMOD* 6 1/4 | 37,6 | 15,3 | 14 | 4,8 |
| 6 | 5/16" | AMOD* 6 5/16 | 40,2 | 15,3 | 14 | 4,8 |
| 6 | 3/8" | AMOD* 6 3/8 | 40,7 | 15,3 | 14 | 4,8 |
| 6 | 1/2" | AMOD* 6 1/2 | 46,3 | 15,3 | 14 | 4,8 |
| 8 | 3/8" | AMOD* 8 3/8 | 42,0 | 16,2 | 14 | 7,9 |
| 8 | 1/2" | AMOD* 8 1/2 | 47,6 | 16,2 | 14 | 7,9 |
| 10 | 3/8" | AMOD* 10 3/8 | 43,1 | 17,2 | 17 | 7,9 |
| 10 | 1/2" | AMOD* 10 1/2 | 48,9 | 17,2 | 17 | 7,9 |
| 12 | 1/2" | AMOD* 12 1/2 | 52,2 | 22,8 | 22 | 9,5 |
| 12 | 3/4" | AMOD* 12 3/4 | 53,8 | 22,8 | 22 | 9,5 |
| 18 | 3/4" | AMOD* 18 3/4 | 56,1 | 24,4 | 27 | 12,7 |
| 18 | 1" | AMOD* 18 1" | 62,4 | 24,4 | 27 | 12,7 |
| 25 | 1" | AMOD* 25 1" | 70,1 | 31,3 | 36 | 19,1 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL TO METRIC - (inch)

| d | D | Reference | A | E | H (mm) | P |
|------|---|-------------|------|-----|--------|-----|
| 1/8" | 6 | AMOD* 1/8 6 | 1.46 | 0.5 | 8 | 2.4 |

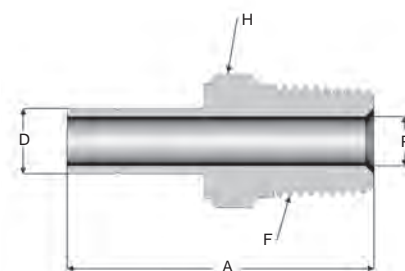
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

MALE ADAPTOR | ADS

APPLICATION

Converts a female tapered-thread (NPT) end to a tube stem.

Special requirements on request



NPT (N)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | H | P |
|----|------|----------------|------|----|------|
| 4 | 1/8" | ADS* 4 1/8 N | 28,6 | 12 | 3,2 |
| 4 | 1/4" | ADS* 4 1/4 N | 34,1 | 14 | 3,2 |
| 6 | 1/8" | ADS* 6 1/8 N | 31,0 | 14 | 4,8 |
| 6 | 1/4" | ADS* 6 1/4 N | 35,7 | 14 | 4,8 |
| 6 | 3/8" | ADS* 6 3/8 N | 36,5 | 19 | 4,8 |
| 6 | 1/2" | ADS* 6 1/2 N | 42,1 | 22 | 4,8 |
| 8 | 1/8" | ADS* 8 1/8 N | 31,8 | 14 | 4,8 |
| 8 | 1/4" | ADS* 8 1/4 N | 37,3 | 14 | 6,4 |
| 8 | 3/8" | ADS* 8 3/8 N | 37,3 | 19 | 6,4 |
| 10 | 1/8" | ADS* 10 1/8 N | 33,3 | 17 | 4,8 |
| 10 | 1/4" | ADS* 10 1/4 N | 38,1 | 17 | 7,9 |
| 10 | 3/8" | ADS* 10 3/8 N | 38,1 | 19 | 7,9 |
| 10 | 1/2" | ADS* 10 1/2 N | 43,7 | 22 | 7,9 |
| 12 | 1/4" | ADS* 12 1/4 N | 42,9 | 14 | 7,1 |
| 12 | 3/8" | ADS* 12 3/8 N | 43,7 | 19 | 9,5 |
| 12 | 1/2" | ADS* 12 1/2 N | 49,2 | 22 | 9,5 |
| 14 | 3/8" | ADS* 14 3/8 N | 45,2 | 19 | 7,1 |
| 16 | 3/8" | ADS* 16 3/8 N | 45,2 | 19 | 9,5 |
| 16 | 1/2" | ADS* 16 1/2 N | 50,8 | 22 | 11,9 |
| 16 | 3/4" | ADS* 16 3/4 N | 50,8 | 27 | 12,7 |
| 20 | 3/4" | ADS* 20 3/4 N | 54,0 | 27 | 15,9 |
| 22 | 3/4" | ADS* 22 3/4 N | 54,0 | 27 | 15,9 |
| 25 | 3/4" | ADS* 25 3/4*** | 60,3 | 27 | 15,9 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | H (mm) | P |
|-------|------|-----------------|------|--------|--------|
| 1/8" | 1/8" | ADS* 1/8 1/8 N | 1.16 | 12 | 3/32" |
| 1/8" | 1/4" | ADS* 1/8 1/4 N | 1.38 | 14 | 3/32" |
| 3/16" | 1/8" | ADS* 3/16 1/8 N | 1.19 | 12 | 1/8" |
| 3/16" | 1/4" | ADS* 3/16 1/4 N | 1.41 | 14 | 1/8" |
| 1/4" | 1/8" | ADS* 1/4 1/8 N | 1.25 | 14 | 3/16" |
| 1/4" | 1/4" | ADS* 1/4 1/4 N | 1.47 | 14 | 3/16" |
| 1/4" | 3/8" | ADS* 1/4 3/8 N | 1.97 | 19 | 3/16" |
| 1/4" | 1/2" | ADS* 1/4 1/2 N | 1.70 | 22 | 3/16" |
| 5/16" | 1/8" | ADS* 5/16 1/8 N | 1.30 | 14 | 3/16" |
| 5/16" | 1/4" | ADS* 5/16 1/4 N | 1.50 | 14 | 1/4" |
| 5/16" | 3/8" | ADS* 5/16 3/8 N | 1.44 | 14 | 1/4" |
| 3/8" | 1/8" | ADS* 3/8 1/8 N | 1.33 | 17 | 3/16" |
| 3/8" | 1/4" | ADS* 3/8 1/4 N | 1.53 | 17 | 9/32" |
| 3/8" | 3/8" | ADS* 3/8 3/8 N | 1.56 | 19 | 9/32" |
| 3/8" | 1/2" | ADS* 3/8 1/2 N | 1.78 | 22 | 9/32" |
| 1/2" | 1/4" | ADS* 1/2 1/4 N | 1.75 | 14 | 9/32" |
| 1/2" | 3/8" | ADS* 1/2 3/8 N | 1.78 | 19 | 3/8" |
| 1/2" | 1/2" | ADS* 1/2 1/2 N | 2.00 | 22 | 13/32" |
| 5/8" | 1/2" | ADS* 5/8 1/2 N | 2.06 | 22 | 15/32" |
| 3/4" | 1/2" | ADS* 3/4 1/2 N | 2.06 | 22 | 15/32" |
| 3/4" | 3/4" | ADS* 3/4 3/4 N | 2.06 | 27 | 5/8" |
| 1" | 3/4" | ADS* 1" 3/4 N | 2.31 | 36 | 5/8" |
| 1" | 1" | ADS* 1" 1" N | 2.61 | 36 | 7/8" |

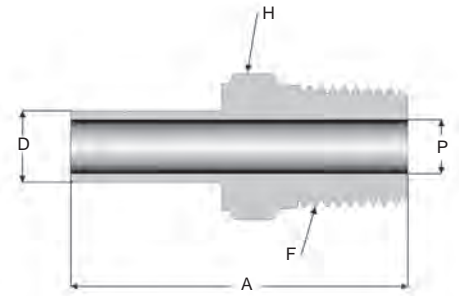
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

MALE ADAPTOR | ADS

APPLICATION

Converts a female tapered-thread (BSPT) end to a tube stem.

Special requirements on request



BSPT - ISO BSP Tapered Thread (T)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | H | P |
|----|------|---------------|------|----|------|
| 3 | 1/8" | ADS* 3 1/8 T | 27,8 | 12 | 2,4 |
| 3 | 1/4" | ADS* 3 1/4 T | 33,3 | 14 | 2,4 |
| 4 | 1/8" | ADS* 4 1/8 T | 28,6 | 12 | 3,2 |
| 4 | 1/4" | ADS* 4 1/4 T | 34,1 | 14 | 3,2 |
| 6 | 1/8" | ADS* 6 1/8 T | 31,0 | 14 | 4,8 |
| 6 | 1/4" | ADS* 6 1/4 T | 35,7 | 14 | 4,8 |
| 6 | 3/8" | ADS* 6 3/8 T | 36,5 | 19 | 4,8 |
| 8 | 1/8" | ADS* 8 1/8 T | 31,8 | 14 | 4,8 |
| 8 | 1/4" | ADS* 8 1/4 T | 37,3 | 14 | 6,4 |
| 8 | 3/8" | ADS* 8 3/8 T | 37,3 | 19 | 6,4 |
| 10 | 1/8" | ADS* 10 1/8 T | 33,3 | 17 | 4,8 |
| 10 | 1/4" | ADS* 10 1/4 T | 38,1 | 17 | 7,9 |
| 10 | 3/8" | ADS* 10 3/8 T | 38,1 | 19 | 7,9 |
| 10 | 1/2" | ADS* 10 1/2 T | 43,7 | 22 | 7,9 |
| 12 | 1/4" | ADS* 12 1/4 T | 42,9 | 14 | 7,1 |
| 12 | 3/8" | ADS* 12 3/8 T | 43,7 | 19 | 9,5 |
| 12 | 1/2" | ADS* 12 1/2 T | 49,2 | 22 | 9,5 |
| 14 | 3/8" | ADS* 14 3/8 T | 45,2 | 19 | 7,1 |
| 16 | 3/8" | ADS* 16 3/8 T | 45,2 | 19 | 9,5 |
| 16 | 1/2" | ADS* 16 1/2 T | 50,8 | 22 | 11,9 |
| 16 | 3/4" | ADS* 16 3/4 T | 50,8 | 27 | 12,7 |
| 20 | 1/2" | ADS* 20 1/2 T | 51,6 | 22 | 11,9 |
| 20 | 3/4" | ADS* 20 3/4 T | 54,0 | 27 | 15,9 |
| 25 | 3/4" | ADS* 25 3/4 T | 60,3 | 27 | 15,9 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | H (mm) | P |
|-------|------|-----------------|------|--------|--------|
| 1/8" | 1/8" | ADS* 1/8 1/8 T | 1.16 | 12 | 3/32" |
| 1/8" | 1/4" | ADS* 1/8 1/4 T | 1.38 | 14 | 3/32" |
| 1/4" | 1/8" | ADS* 1/4 1/8 T | 1.25 | 14 | 3/16" |
| 1/4" | 1/4" | ADS* 1/4 1/4 T | 1.47 | 14 | 3/16" |
| 1/4" | 3/8" | ADS* 1/4 3/8 T | 1.97 | 19 | 3/16" |
| 1/4" | 1/2" | ADS* 1/4 1/2 T | 1.70 | 22 | 3/16" |
| 5/16" | 1/4" | ADS* 5/16 1/4 T | 1.50 | 14 | 1/4" |
| 3/8" | 1/4" | ADS* 3/8 1/4 T | 1.53 | 17 | 9/32" |
| 3/8" | 3/8" | ADS* 3/8 3/8 T | 1.56 | 19 | 9/32" |
| 3/8" | 1/2" | ADS* 3/8 1/2 T | 1.78 | 22 | 9/32" |
| 1/2" | 1/4" | ADS* 1/2 1/4 T | 1.75 | 14 | 9/32" |
| 1/2" | 3/8" | ADS* 1/2 3/8 T | 1.78 | 19 | 3/8" |
| 1/2" | 1/2" | ADS* 1/2 1/2 T | 2.00 | 22 | 13/32" |
| 3/4" | 3/4" | ADS* 3/4 3/4 T | 2.06 | 27 | 5/8" |
| 1" | 1" | ADS* 1" 1" T | 2.61 | 36 | 7/8" |

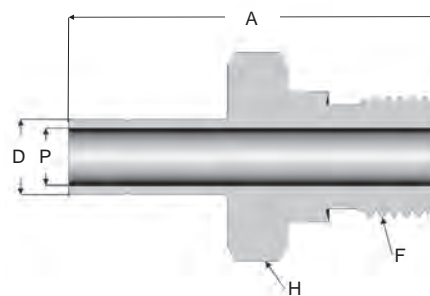
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

MALE ADAPTOR | ADS

APPLICATION

Converts a female parallel thread (BSPP) end to a tube stem.

Special requirements on request



BSPP - ISO BSP Parallel Thread (G)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | H | P |
|----|------|---------------|------|----|------|
| 3 | 1/8" | ADS* 3 1/8 G | 31,0 | 14 | 1,8 |
| 3 | 1/4" | ADS* 3 1/4 G | 35,7 | 19 | 1,8 |
| 4 | 1/8" | ADS* 4 1/8 G | 31,8 | 14 | 2,4 |
| 6 | 1/8" | ADS* 6 1/8 G | 33,3 | 14 | 4,8 |
| 6 | 1/4" | ADS* 6 1/4 G | 38,1 | 19 | 4,8 |
| 6 | 3/8" | ADS* 6 3/8 G | 38,9 | 22 | 4,0 |
| 8 | 1/8" | ADS* 8 1/8 G | 34,2 | 14 | 4,0 |
| 8 | 1/4" | ADS* 8 1/4 G | 38,9 | 19 | 6,0 |
| 8 | 3/8" | ADS* 8 3/8 G | 39,7 | 22 | 6,0 |
| 8 | 1/2" | ADS* 8 1/2 G | 43,7 | 27 | 6,0 |
| 10 | 1/4" | ADS* 10 1/4 G | 39,7 | 19 | 6,0 |
| 10 | 3/8" | ADS* 10 3/8 G | 40,5 | 22 | 7,1 |
| 10 | 1/2" | ADS* 10 1/2 G | 43,7 | 27 | 7,1 |
| 12 | 1/4" | ADS* 12 1/4 G | 45,3 | 19 | 6,0 |
| 12 | 3/8" | ADS* 12 3/8 G | 46,0 | 22 | 7,9 |
| 12 | 1/2" | ADS* 12 1/2 G | 49,2 | 27 | 9,5 |
| 16 | 3/4" | ADS* 16 3/4 G | 54,8 | 36 | 13,0 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | H (mm) | P |
|------|------|----------------|------|--------|--------|
| 1/8" | 1/8" | ADS* 1/8 1/8 G | 1.53 | 14 | 1/16" |
| 1/8" | 1/4" | ADS* 1/8 1/4 G | 1.11 | 19 | 1/16" |
| 1/4" | 1/8" | ADS* 1/4 1/8 G | 1.25 | 14 | 3/32" |
| 1/4" | 1/4" | ADS* 1/4 1/4 G | 1.50 | 19 | 3/32" |
| 1/4" | 3/8" | ADS* 1/4 3/8 G | 1.50 | 22 | 3/32" |
| 3/8" | 1/4" | ADS* 3/8 1/4 G | 1.56 | 19 | 15/64" |
| 3/8" | 3/8" | ADS* 3/8 3/8 G | 1.59 | 22 | 9/32" |
| 1/2" | 1/4" | ADS* 1/2 1/4 G | 1.78 | 19 | 9/32" |
| 1/2" | 3/8" | ADS* 1/2 3/8 G | 1.81 | 22 | 3/8" |
| 3/4" | 3/4" | ADS* 3/4 3/4 G | 1.78 | 36 | 5/8" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

BSPP G end connections should be used with sealing gaskets. See page 9 for further information. See page 59 for gaskets.

BSPP - ISO BSP Parallel Thread (K)

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | H | P |
|----|------|---------------|------|----|-----|
| 6 | 1/8" | ADS* 6 1/8 K | 33,3 | 14 | 4,8 |
| 6 | 1/4" | ADS* 6 1/4 K | 38,1 | 19 | 4,8 |
| 8 | 1/4" | ADS* 8 1/4 K | 38,9 | 19 | 6 |
| 10 | 1/4" | ADS* 10 1/4 K | 39,7 | 19 | 6 |
| 10 | 3/8" | ADS* 10 3/8 K | 40,5 | 22 | 7,1 |
| 10 | 1/2" | ADS* 10 1/2 K | 43,7 | 27 | 7,1 |
| 12 | 1/4" | ADS* 12 1/4 K | 45,3 | 19 | 6 |
| 12 | 3/8" | ADS* 12 3/8 K | 46,0 | 22 | 7,9 |
| 12 | 1/2" | ADS* 12 1/2 K | 49,2 | 27 | 9,5 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | H (mm) | P |
|------|------|----------------|------|--------|--------|
| 1/4" | 1/8" | ADS* 1/4 1/8 K | 1.25 | 14 | 3/32" |
| 1/4" | 1/4" | ADS* 1/4 1/4 K | 1.50 | 19 | 3/32" |
| 1/4" | 3/8" | ADS* 1/4 3/8 K | 1.50 | 22 | 3/32" |
| 1/4" | 1/2" | ADS* 1/4 1/2 K | 1.66 | 27 | 5/32" |
| 3/8" | 1/8" | ADS* 3/8 1/8 K | 1.38 | 14 | 1/8" |
| 3/8" | 1/4" | ADS* 3/8 1/4 K | 1.56 | 19 | 15/64" |
| 3/8" | 1/2" | ADS* 3/8 1/2 K | 1.72 | 27 | 9/32" |
| 1/2" | 1/4" | ADS* 1/2 1/4 K | 1.78 | 19 | 9/32" |
| 1/2" | 3/8" | ADS* 1/2 3/8 K | 1.81 | 22 | 3/8" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

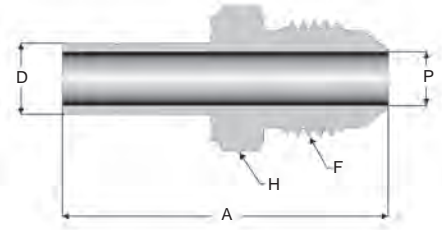
BSPP K end connections must be used with sealing gaskets. See page 9 for further information. See page 59 for gaskets.

MALE ADAPTOR «AN» | ADS AN

APPLICATION

Converts a female AN thread end to a male tube stem.

Special requirements on request



AN 37 (AN)

TUBE SIZE - METRIC (mm)

| D | AN tube flare size | Reference | A | H | P | F |
|----|--------------------|----------------|------|----|------|--------------|
| 6 | 1/4" | ADS* 6 1/4 AN | 37,3 | 14 | 4,8 | 7/16" - 20 |
| 10 | 1/4" | ADS* 10 1/4 AN | 38,9 | 14 | 7,1 | 7/16" - 20 |
| 10 | 3/8" | ADS* 10 3/8 AN | 39,7 | 17 | 7,1 | 9/16" - 18 |
| 12 | 1/2" | ADS* 12 1/2 AN | 48,4 | 22 | 9,5 | 3/4" - 16 |
| 18 | 3/4" | ADS* 18 3/4 AN | 56,4 | 27 | 9,5 | 1 1/16" - 12 |
| 25 | 1" | ADS* 25 1" AN | 65,5 | 36 | 21,4 | 1 5/16" - 12 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | AN tube flare size | Reference | A | H (mm) | P | F |
|------|--------------------|-----------------|----------|--------|-------|--------------|
| 1/4" | 1/4" | ADS* 1/4 1/4 AN | 1 15/32" | 14 | 3/16" | 7/16" - 20 |
| 3/8" | 1/4" | ADS* 3/8 1/4 AN | 1 17/32" | 14 | 9/32" | 7/16" - 20 |
| 3/8" | 3/8" | ADS* 3/8 3/8 AN | 1 9/16" | 17 | 9/32" | 9/16" - 18 |
| 1/2" | 1/2" | ADS* 1/2 1/2 AN | 1 29/32" | 22 | 3/8" | 3/4" - 16 |
| 3/4" | 3/4" | ADS* 3/4 3/4 AN | 2 7/32" | 27 | 3/8" | 1 1/16" - 12 |
| 1" | 1" | ADS* 1" 1" AN | 2 37/64" | 36 | 7/8" | 1 5/16" - 12 |

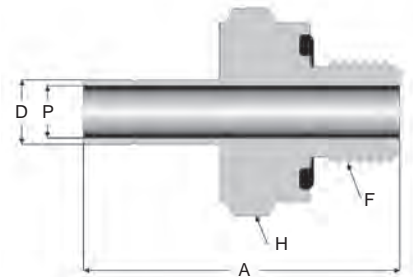
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

MALE O-RING ADAPTOR «UN» | AOMSS

APPLICATION

Converts a female UN threaded end connection apparatus to a male tube stem.

Special requirements on request



UN (UN)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | H | P |
|----|--------------|------------------|------|----|------|
| 3 | 5/16" - 24 | AOMSS* 3 5/16 | 31,0 | 14 | 2,4 |
| 4 | 3/8" - 24 | AOMSS* 4 3/8 | 32,5 | 17 | 3,2 |
| 6 | 7/16" - 20 | AOMSS* 6 7/16 | 36,5 | 19 | 4,8 |
| 8 | 1/2" - 20 | AOMSS* 8 1/2 | 38,9 | 22 | 6,4 |
| 10 | 9/16" - 18 | AOMSS* 10 9/16 | 40,5 | 24 | 8,0 |
| 12 | 3/4" - 16 | AOMSS* 12 3/4 | 46,8 | 30 | 9,5 |
| 16 | 7/8" - 14 | AOMSS* 16 7/8 | 50,8 | 36 | 13,0 |
| 18 | 1 1/16" - 12 | AOMSS* 18 1 1/16 | 53,2 | 38 | 15,0 |
| 20 | 1 1/16" - 12 | AOMSS* 20 1 1/16 | 55,6 | 38 | 16,0 |
| 22 | 1 1/16" - 12 | AOMSS* 22 1 1/16 | 55,6 | 38 | 18,5 |
| 25 | 1 5/16" - 12 | AOMSS* 25 1 5/16 | 62,7 | 46 | 22,0 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | H (mm) | P |
|-------|------------|-----------------|------|--------|--------|
| 1/8" | 5/16" - 24 | AOMSS* 1/8 5/16 | 1.22 | 14 | 3/32" |
| 3/16" | 3/8" - 24 | AOMSS* 3/16 3/8 | 1.28 | 17 | 1/8" |
| 1/4" | 7/16" - 20 | AOMSS* 1/4 7/16 | 1.44 | 19 | 3/16" |
| 5/16" | 1/2" - 20 | AOMSS* 5/16 1/2 | 1.53 | 22 | 1/4" |
| 3/8" | 9/16" - 18 | AOMSS* 3/8 9/16 | 1.59 | 24 | 5/16" |
| 1/2" | 3/4" - 16 | AOMSS* 1/2 3/4 | 1.84 | 30 | 13/32" |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

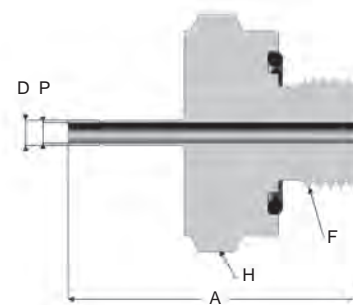
UN fittings are supplied with sealing O-rings in Nitrile (NBR).
Fluorocarbon (FPM) O-rings are available upon request.
See page 8 for additional information.

MALE O-RING ADAPTOR «NPSM» | AOMS

APPLICATION

Converts a female NPSM threaded end connection apparatus to a male tube stem.

Special requirements on request



NPSM (NPSM)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | H | P |
|----|------|--------------|------|----|-----|
| 6 | 1/8" | AOMS* 6 1/8 | 33,3 | 19 | 4,8 |
| 6 | 1/4" | AOMS* 6 1/4 | 36,5 | 24 | 4,8 |
| 6 | 3/8" | AOMS* 6 3/8 | 38,1 | 30 | 4,8 |
| 10 | 1/4" | AOMS* 10 1/4 | 38,1 | 24 | 7,1 |

NPSM fittings are supplied with sealing O-rings in Nitrile (NBR). Fluorocarbon (FPM) O-rings are available upon request. See page 8 for additional information.

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | H (mm) | P |
|-------|------|----------------|------|--------|--------|
| 1/16" | 1/8" | AOMS* 1/8 1/16 | 1.03 | 19 | 3/64" |
| 1/8" | 1/8" | AOMS* 1/8 1/8 | 1.22 | 19 | 3/32" |
| 1/8" | 1/4" | AOMS* 1/8 1/4 | 1.34 | 24 | 3/32" |
| 3/16" | 1/8" | AOMS* 3/16 1/8 | 1.25 | 19 | 1/8" |
| 3/16" | 1/4" | AOMS* 3/16 1/4 | 1.38 | 24 | 1/8" |
| 1/4" | 1/8" | AOMS* 1/4 1/8 | 1.31 | 19 | 3/16" |
| 1/4" | 1/4" | AOMS* 1/4 1/4 | 1.44 | 24 | 3/16" |
| 1/4" | 3/8" | AOMS* 1/4 3/8 | 1.50 | 30 | 3/16" |
| 5/16" | 1/8" | AOMS* 5/16 1/8 | 1.34 | 19 | 3/16" |
| 5/16" | 1/4" | AOMS* 5/16 1/4 | 1.47 | 24 | 1/4" |
| 3/8" | 1/8" | AOMS* 3/8 1/8 | 1.38 | 19 | 3/16" |
| 3/8" | 1/4" | AOMS* 3/8 1/4 | 1.50 | 24 | 9/32" |
| 3/8" | 3/8" | AOMS* 3/8 3/8 | 1.56 | 30 | 9/32" |
| 1/2" | 3/8" | AOMS* 1/2 3/8 | 1.78 | 30 | 13/32" |
| 5/8" | 1/2" | AOMS* 5/8 1/2 | 2.06 | 36 | 1/2" |
| 3/4" | 3/4" | AOMS* 3/4 3/4 | 2.16 | 41 | 5/8" |
| 1" | 1" | AOMS* 1" 1" | 2.56 | 46 | 7/8" |

Hex flats (H) are metric. Fractional upon request

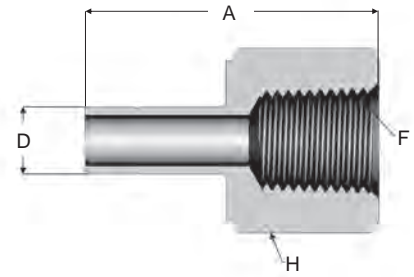
*Specify material when ordering. See page 8 for materials and codes.

FEMALE ADAPTOR | AFS

APPLICATION

Converts a male tapered-thread (NPT) end to a tube stem.

Special requirements on request



NPT (N)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | H |
|----|------|---------------|------|----|
| 3 | 1/8" | AFS* 3 1/8 N | 27,0 | 14 |
| 3 | 1/4" | AFS* 3 1/4 N | 31,8 | 19 |
| 4 | 1/8" | AFS* 4 1/8 N | 27,8 | 14 |
| 4 | 1/4" | AFS* 4 1/4 N | 32,5 | 19 |
| 6 | 1/8" | AFS* 6 1/8 N | 29,4 | 14 |
| 6 | 1/4" | AFS* 6 1/4 N | 34,1 | 19 |
| 6 | 3/8" | AFS* 6 3/8 N | 35,7 | 22 |
| 6 | 1/2" | AFS* 6 1/2 N | 40,5 | 27 |
| 8 | 1/8" | AFS* 8 1/8 N | 30,2 | 14 |
| 8 | 1/4" | AFS* 8 1/4 N | 34,9 | 19 |
| 8 | 3/8" | AFS* 8 3/8 N | 36,5 | 22 |
| 8 | 1/2" | AFS* 8 1/2 N | 41,3 | 27 |
| 10 | 1/8" | AFS* 10 1/8 N | 31,0 | 14 |
| 10 | 1/4" | AFS* 10 1/4 N | 35,7 | 19 |
| 10 | 3/8" | AFS* 10 3/8 N | 37,3 | 22 |
| 10 | 1/2" | AFS* 10 1/2 N | 42,1 | 27 |
| 12 | 1/4" | AFS* 12 1/4 N | 41,3 | 19 |
| 12 | 3/8" | AFS* 12 3/8 N | 42,9 | 22 |
| 12 | 1/2" | AFS* 12 1/2 N | 47,6 | 27 |
| 14 | 3/8" | AFS* 14 3/8 N | 44,5 | 22 |
| 14 | 1/2" | AFS* 14 1/2 N | 49,2 | 27 |
| 14 | 3/4" | AFS* 14 3/4 N | 51,6 | 32 |
| 16 | 3/8" | AFS* 16 3/8 N | 44,5 | 22 |
| 16 | 1/2" | AFS* 16 1/2 N | 49,2 | 27 |
| 16 | 3/4" | AFS* 16 3/4 N | 51,6 | 32 |
| 18 | 1/2" | AFS* 18 1/2 N | 49,2 | 27 |
| 18 | 3/4" | AFS* 18 3/4 N | 51,5 | 32 |
| 18 | 1" | AFS* 18 1" N | 60,3 | 41 |
| 22 | 3/4" | AFS* 22 3/4 N | 52,4 | 32 |
| 25 | 3/4" | AFS* 25 3/4 N | 58,8 | 32 |
| 25 | 1" | AFS* 25 1" N | 67,5 | 41 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | H (mm) |
|-------|------|-----------------|------|--------|
| 1/8" | 1/8" | AFS* 1/8 1/8 N | 1.06 | 14 |
| 1/8" | 1/4" | AFS* 1/8 1/4 N | 1.25 | 19 |
| 3/16" | 1/8" | AFS* 3/16 1/8 N | 1.09 | 14 |
| 3/16" | 1/4" | AFS* 3/16 1/4 N | 1.28 | 19 |
| 1/4" | 1/8" | AFS* 1/4 1/8 N | 1.16 | 14 |
| 1/4" | 1/4" | AFS* 1/4 1/4 N | 1.34 | 19 |
| 1/4" | 3/8" | AFS* 1/4 3/8 N | 1.41 | 22 |
| 1/4" | 1/2" | AFS* 1/4 1/2 N | 1.59 | 27 |
| 5/16" | 1/8" | AFS* 5/16 1/8 N | 1.19 | 14 |
| 5/16" | 1/4" | AFS* 5/16 1/4 N | 1.38 | 19 |
| 5/16" | 3/8" | AFS* 5/16 3/8 N | 1.44 | 22 |
| 5/16" | 1/2" | AFS* 5/16 1/2 N | 1.63 | 27 |
| 3/8" | 1/8" | AFS* 3/8 1/8 N | 1.22 | 17 |
| 3/8" | 1/4" | AFS* 3/8 1/4 N | 1.41 | 19 |
| 3/8" | 3/8" | AFS* 3/8 3/8 N | 1.47 | 22 |
| 3/8" | 1/2" | AFS* 3/8 1/2 N | 1.66 | 27 |
| 1/2" | 1/4" | AFS* 1/2 1/4 N | 1.63 | 22 |
| 1/2" | 3/8" | AFS* 1/2 3/8 N | 1.69 | 22 |
| 1/2" | 1/2" | AFS* 1/2 1/2 N | 1.88 | 27 |
| 5/8" | 3/8" | AFS* 5/8 3/8 N | 1.75 | 24 |
| 5/8" | 1/2" | AFS* 5/8 1/2 N | 1.94 | 27 |
| 5/8" | 3/4" | AFS* 5/8 3/4 N | 2.03 | 32 |
| 3/4" | 1/2" | AFS* 3/4 1/2 N | 1.94 | 27 |
| 3/4" | 3/4" | AFS* 3/4 3/4 N | 2.03 | 32 |
| 3/4" | 1" | AFS* 3/4 1" N | 2.38 | 41 |
| 7/8" | 3/4" | AFS* 7/8 3/4 N | 2.06 | 32 |
| 1" | 3/4" | AFS* 1" 3/4 N | 2.31 | 36 |
| 1" | 1" | AFS* 1" 1" N | 2.66 | 41 |

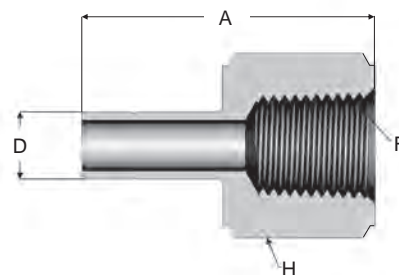
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

FEMALE ADAPTOR | AFS

APPLICATION

Converts a male tapered-thread (BSPT) end to a tube stem.

Special requirements on request



BSPT - ISO BSP Tapered Thread (T)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | H |
|----|------|---------------|------|----|
| 3 | 1/8" | AFS* 3 1/8 T | 27,0 | 14 |
| 3 | 1/4" | AFS* 3 1/4 T | 31,8 | 19 |
| 4 | 1/8" | AFS* 4 1/8 T | 27,8 | 14 |
| 4 | 1/4" | AFS* 4 1/4 T | 32,5 | 19 |
| 6 | 1/8" | AFS* 6 1/8 T | 29,4 | 14 |
| 6 | 1/4" | AFS* 6 1/4 T | 34,1 | 19 |
| 6 | 3/8" | AFS* 6 3/8 T | 35,7 | 22 |
| 6 | 1/2" | AFS* 6 1/2 T | 40,5 | 27 |
| 8 | 1/8" | AFS* 8 1/8 T | 30,2 | 14 |
| 8 | 1/4" | AFS* 8 1/4 T | 34,9 | 19 |
| 8 | 3/8" | AFS* 8 3/8 T | 36,5 | 22 |
| 8 | 1/2" | AFS* 8 1/2 T | 41,3 | 27 |
| 10 | 1/4" | AFS* 10 1/4 T | 35,7 | 19 |
| 10 | 3/8" | AFS* 10 3/8 T | 37,3 | 22 |
| 10 | 1/2" | AFS* 10 1/2 T | 42,1 | 27 |
| 12 | 1/4" | AFS* 12 1/4 T | 41,3 | 19 |
| 12 | 3/8" | AFS* 12 3/8 T | 42,9 | 22 |
| 12 | 1/2" | AFS* 12 1/2 T | 47,6 | 27 |
| 14 | 3/8" | AFS* 14 3/8 T | 44,5 | 22 |
| 16 | 3/8" | AFS* 16 3/8 T | 44,5 | 22 |
| 16 | 1/2" | AFS* 16 1/2 T | 49,2 | 27 |
| 18 | 1/2" | AFS* 18 1/2 T | 49,2 | 27 |
| 18 | 3/4" | AFS* 18 3/4 T | 51,5 | 32 |
| 22 | 3/4" | AFS* 22 3/4 T | 52,4 | 32 |
| 25 | 1" | AFS* 25 1" T | 67,5 | 41 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | H (mm) |
|-------|------|-----------------|------|--------|
| 1/8" | 1/8" | AFS* 1/8 1/8 T | 1.06 | 14 |
| 1/8" | 1/4" | AFS* 1/8 1/4 T | 1.25 | 19 |
| 3/16" | 1/8" | AFS* 3/16 1/8 T | 1.09 | 14 |
| 3/16" | 1/4" | AFS* 3/16 1/4 T | 1.28 | 19 |
| 1/4" | 1/8" | AFS* 1/4 1/8 T | 1.16 | 14 |
| 1/4" | 1/4" | AFS* 1/4 1/4 T | 1.34 | 19 |
| 1/4" | 3/8" | AFS* 1/4 3/8 T | 1.41 | 22 |
| 1/4" | 1/2" | AFS* 1/4 1/2 T | 1.59 | 27 |
| 5/16" | 1/8" | AFS* 5/16 1/8 T | 1.19 | 14 |
| 5/16" | 1/4" | AFS* 5/16 1/4 T | 1.38 | 19 |
| 5/16" | 3/8" | AFS* 5/16 3/8 T | 1.44 | 22 |
| 5/16" | 1/2" | AFS* 5/16 1/2 T | 1.63 | 27 |
| 3/8" | 1/8" | AFS* 3/8 1/8 T | 1.22 | 17 |
| 3/8" | 1/4" | AFS* 3/8 1/4 T | 1.41 | 19 |
| 3/8" | 3/8" | AFS* 3/8 3/8 T | 1.47 | 22 |
| 3/8" | 1/2" | AFS* 3/8 1/2 T | 1.66 | 27 |
| 1/2" | 1/4" | AFS* 1/2 1/4 T | 1.63 | 22 |
| 1/2" | 3/8" | AFS* 1/2 3/8 T | 1.69 | 22 |
| 1/2" | 1/2" | AFS* 1/2 1/2 T | 1.88 | 27 |
| 5/8" | 3/8" | AFS* 5/8 3/8 T | 1.75 | 24 |
| 5/8" | 1/2" | AFS* 5/8 1/2 T | 1.94 | 27 |
| 5/8" | 3/4" | AFS* 5/8 3/4 T | 2.03 | 32 |
| 3/4" | 1/2" | AFS* 3/4 1/2 T | 1.94 | 27 |
| 3/4" | 3/4" | AFS* 3/4 3/4 T | 2.03 | 32 |
| 3/4" | 1" | AFS* 3/4 1" T | 2.38 | 41 |
| 7/8" | 3/4" | AFS* 7/8 3/4 T | 2.06 | 32 |
| 1" | 3/4" | AFS* 1" 3/4 T | 2.31 | 36 |
| 1" | 1" | AFS* 1" 1" T | 2.66 | 41 |

Hex flats (H) are metric. Fractional upon request

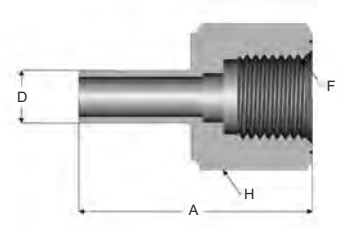
*Specify material when ordering. See page 8 for materials and codes.

FEMALE ADAPTOR | AFS

APPLICATION

Converts a male parallel thread (BSPP) end to a tube stem.

Special requirements on request



BSPP - ISO BSP Parallel Thread (G)

TUBE SIZE - METRIC (mm)

| D | F | Reference | A | H |
|----|------|---------------|-------|----|
| 3 | 1/4" | AFS* 3 1/4 G | 33,5 | 19 |
| 6 | 1/8" | AFS* 6 1/8 G | 29,4 | 14 |
| 6 | 1/4" | AFS* 6 1/4 G | 34,1 | 19 |
| 6 | 3/8" | AFS* 6 3/8 G | 35,7 | 22 |
| 6 | 1/2" | AFS* 6 1/2 G | 40,5 | 27 |
| 8 | 1/4" | AFS* 8 1/4 G | 34,9 | 19 |
| 8 | 3/8" | AFS* 8 3/8 G | 36,5 | 22 |
| 8 | 1/2" | AFS* 8 1/2 G | 41,3 | 27 |
| 10 | 1/8" | AFS* 10 1/8 G | 30,95 | 14 |
| 10 | 1/4" | AFS* 10 1/4 G | 35,7 | 19 |
| 10 | 3/8" | AFS* 10 3/8 G | 37,3 | 22 |
| 10 | 1/2" | AFS* 10 1/2 G | 42,1 | 27 |
| 12 | 1/4" | AFS* 12 1/4 G | 41,3 | 19 |
| 12 | 1/2" | AFS* 12 1/2 G | 47,6 | 27 |
| 14 | 3/8" | AFS* 14 3/8 G | 42,9 | 22 |
| 16 | 3/8" | AFS* 16 3/8 G | 44,5 | 22 |
| 16 | 1/2" | AFS* 16 1/2 G | 49,2 | 27 |
| 18 | 1/2" | AFS* 18 1/2 G | 49,2 | 27 |
| 18 | 3/4" | AFS* 18 3/4 G | 51,6 | 32 |
| 22 | 3/4" | AFS* 22 3/4 G | 52,4 | 32 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | H (mm) |
|-------|------|-----------------|------|--------|
| 1/8" | 1/4" | AFS* 1/8 1/4 G | 1.25 | 19 |
| 1/4" | 1/4" | AFS* 1/4 1/4 G | 1.34 | 19 |
| 1/4" | 3/8" | AFS* 1/4 3/8 G | 1.41 | 22 |
| 1/4" | 1/2" | AFS* 1/4 1/2 G | 1.59 | 27 |
| 5/16" | 1/4" | AFS* 5/16 1/4 G | 1.38 | 19 |
| 5/16" | 1/2" | AFS* 5/16 1/2 G | 1.63 | 27 |
| 3/8" | 1/4" | AFS* 3/8 1/4 G | 1.41 | 19 |
| 3/8" | 3/8" | AFS* 3/8 3/8 G | 1.47 | 22 |
| 3/8" | 1/2" | AFS* 3/8 1/2 G | 1.66 | 27 |
| 1/2" | 1/4" | AFS* 1/2 1/4 G | 1.63 | 19 |
| 1/2" | 1/2" | AFS* 1/2 1/2 G | 1.88 | 27 |
| 5/8" | 1/2" | AFS* 5/8 1/2 G | 1.94 | 27 |
| 3/4" | 1/2" | AFS* 3/4 1/2 G | 1.94 | 27 |
| 1" | 3/4" | AFS* 1 3/4 G | 2.31 | 32 |

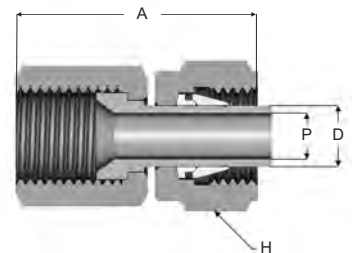
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

BSPP G end connections should be used with sealing gaskets.
See page 9 for further information. See page 59 for gaskets.

FEMALE ADAPTOR «AN» | AFS AN



Note that the ferrules are already pre-swaged on the fitting, that means you have to use the re-assembling instructions.



AN 37 (AN)

TUBE SIZE - METRIC (mm)

| D | AN tube flare size | Reference | A | H | P | F |
|----|--------------------|----------------|------|----|------|--------------|
| 3 | 1/8" | AFS* 3 1/8 AN | 27,0 | 12 | 1,6 | 5/16" - 24 |
| 3 | 1/4" | AFS* 3 1/4 AN | 29,4 | 12 | 2,4 | 7/16" - 20 |
| 4 | 3/16" | AFS* 4 3/16 AN | 30,2 | 12 | 3,2 | 3/8" - 24 |
| 6 | 1/4" | AFS* 6 1/4 AN | 31,8 | 14 | 4,4 | 7/16" - 20 |
| 8 | 5/16" | AFS* 8 5/16 AN | 33,4 | 17 | 5,9 | 1/2" - 20 |
| 10 | 3/8" | AFS* 10 3/8 AN | 35,8 | 19 | 9,9 | 9/16" - 18 |
| 12 | 1/2" | AFS* 12 1/2 AN | 44,4 | 22 | 9,9 | 3/4" - 16 |
| 16 | 5/8" | AFS* 16 5/8 AN | 49,2 | 27 | 12,3 | 7/8" - 14 |
| 25 | 1" | AFS* 25 1" AN | 60,4 | 38 | 21,4 | 1 5/16" - 12 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | AN tube flare size | Reference | A (mm) | H (mm) | P | F |
|------|--------------------|-----------------|--------|--------|--------|------------|
| 1/8" | 1/8" | AFS* 1/8 1/8 AN | 1.06 | 12 | 1/16" | 5/16" - 24 |
| 1/8" | 1/4" | AFS* 1/8 1/4 AN | 1.16 | 12 | 3/32" | 7/16" - 20 |
| 1/4" | 1/4" | AFS* 1/4 1/4 AN | 1.25 | 14 | 1/64" | 7/16" - 20 |
| 3/8" | 3/8" | AFS* 3/8 3/8 AN | 1.41 | 19 | 19/64" | 9/16" - 18 |
| 1/2" | 1/2" | AFS* 1/2 1/2 AN | 1.75 | 22 | 25/64" | 3/4" - 16 |
| 1" | 1" | AFS* 1" 1" AN | 2.38 | 38 | 27/32" | 5/8" - 12 |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

CHROMATOGRAPH FITTINGS

Rotarex chromatograph fittings are designed to cover a wide range of analytical applications.

Rotarex technology allows to maintain a laminar flow for liquid chromatography, where turbulences are not permitted. Also, to avoid impacting the resolution of the chromatograph, the design is minimizing internal cavities.

Rotarex chromatograph column end and union embodies the proven Rotarex high quality standards for production and quality control.

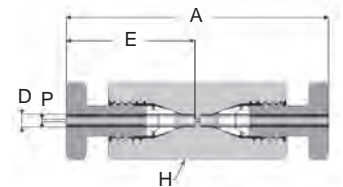
CHROMATOGRAPH STRAIGHT UNION - Low dead volume | USFVM

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | A | E | H (mm) | P |
|-------|--------------|------|------|--------|-------|
| 1/16" | USFVM I 1/16 | 1.25 | 0.61 | 8 | 0.013 |

SS 316L version only

Hex flats (H) are metric. Fractional upon request



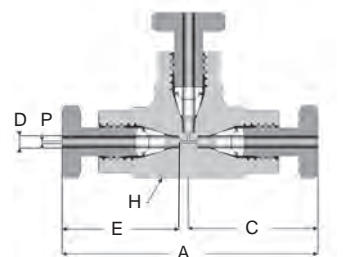
CHROMATOGRAPH UNION TEE - Low dead volume | TSFVM

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | A | E | H (mm) | P |
|-------|--------------|------|------|--------|-------|
| 1/16" | TSFVM I 1/16 | 1.30 | 0.61 | 12 | 0.013 |

SS 316L version only

Hex flats (H) are metric. Fractional upon request



CHROMATOGRAPH MALE CONNECTOR - Low dead volume | UMSFVM

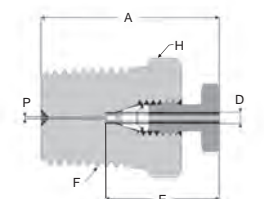
NPT (N)

TUBE SIZE - FRACTIONAL (inch)

| D | F | Reference | A | E | H (mm) | P |
|-------|------|--------------------|------|------|--------|-------|
| 1/16" | 1/8" | UMSFVM I 1/16 1/8N | 0.75 | 0.61 | 12 | 0.013 |
| 1/16" | 1/4" | UMSFVM I 1/16 1/4N | 1.35 | 0.61 | 14 | 0.013 |
| 1/16" | 3/8" | UMSFVM I 1/16 3/8N | 1.44 | 0.61 | 17 | 0.013 |

SS 316L version only

Hex flats (H) are metric. Fractional upon request

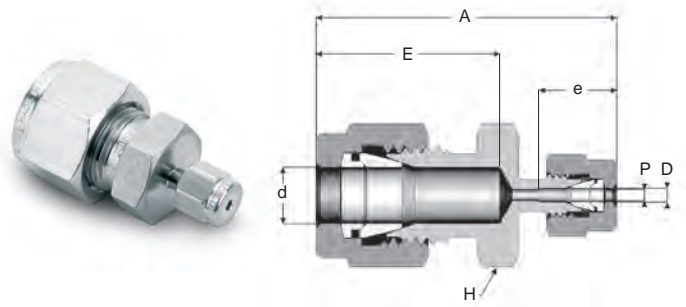


COLUMN END REDUCING UNION - Low dead volume | URSFVM

TUBE SIZE - FRACTIONAL (inch)

| d | D | Reference | A | E | H (mm) | P |
|------|--------------|-------------------|------|------|--------|-------|
| 1/8" | 1/16" (1.58) | URSFVM I 1/8 1/16 | 1.22 | 0.73 | 12 | 0.013 |
| 1/4" | 1/16" (1.58) | URSFVM I 1/4 1/16 | 1.35 | 0.82 | 14 | 0.013 |
| 3/8" | 1/16" (1.58) | URSFVM I 3/8 1/16 | 1.44 | 0.92 | 19 | 0.013 |

SS 316L version only Hex flats (H) are metric. Fractional upon request

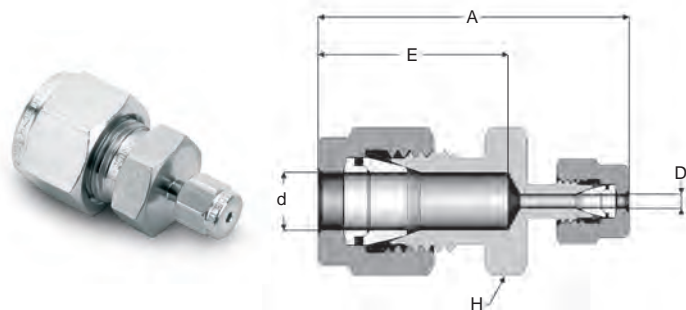


COLUMN END REDUCING UNION - Zero dead volume | URSZVM

TUBE SIZE - FRACTIONAL (inch)

| d | D | Reference | A | E | H (mm) |
|------|--------------|-------------------|------|------|--------|
| 1/8" | 1/16" (1.58) | URSZVM I 1/8 1/16 | 1.22 | 0.73 | 12 |
| 1/4" | 1/16" (1.58) | URSZVM I 1/4 1/16 | 1.35 | 0.82 | 14 |
| 3/8" | 1/16" (1.58) | URSZVM I 3/8 1/16 | 1.44 | 0.92 | 19 |

SS 316L version only Hex flats (H) are metric. Fractional upon request

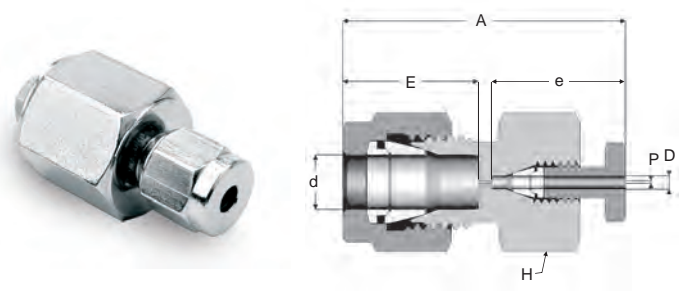


COLUMN END FEMALE CONNECTOR - Low dead volume | UFSFVM

TUBE SIZE - FRACTIONAL (inch)

| d | D | Reference | A | E | e | H (mm) | P |
|-------|------|-------------------|------|------|------|--------|-------|
| 1/16" | 1/8" | UFSFVM I 1/8 1/16 | 1.17 | 0.51 | 0.61 | 12 | 0.013 |
| 1/16" | 1/4" | UFSFVM I 1/4 1/16 | 1.25 | 0.60 | 0.61 | 14 | 0.013 |
| 1/16" | 3/8" | UFSFVM I 3/8 1/16 | 1.35 | 0.68 | 0.61 | 19 | 0.013 |

SS 316L version only Hex flats (H) are metric. Fractional upon request



MALE NUT | EDS

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | A | H (mm) |
|-------|-----------|------|--------|
| 1/16" | EDS 1/16 | 0.38 | 8 |
| 1/8" | EDS 1/8 | 0.53 | 12 |
| 1/4" | EDS 1/4 | 0.63 | 14 |

SS 316L version only Hex flats (H) are metric. Fractional upon request

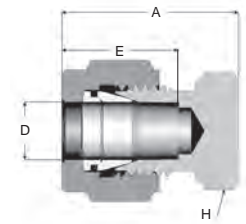


CAP | BPS

APPLICATION

Compression fitting to cap a tube.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference | A | E | H |
|----|-----------|------|------|----|
| 3 | BPS* 3 | 20,1 | 12,9 | 12 |
| 4 | BPS* 4 | 21,3 | 13,7 | 12 |
| 6 | BPS* 6 | 23,3 | 15,3 | 14 |
| 8 | BPS* 8 | 24,6 | 16,2 | 17 |
| 10 | BPS* 10 | 25,9 | 17,2 | 19 |
| 12 | BPS* 12 | 29,2 | 22,8 | 22 |
| 14 | BPS* 14 | 29,9 | 24,4 | 24 |
| 15 | BPS* 15 | 29,9 | 24,4 | 24 |
| 16 | BPS* 16 | 29,9 | 24,4 | 27 |
| 18 | BPS* 18 | 31,5 | 24,4 | 30 |
| 20 | BPS* 20 | 33,9 | 26,0 | 32 |
| 22 | BPS* 22 | 33,9 | 26,0 | 32 |
| 25 | BPS* 25 | 38,4 | 31,3 | 38 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | A | E | H (mm) |
|-------|-----------|------|------|--------|
| 1/16" | BPS* 1/16 | 0.99 | 0.34 | 8 |
| 1/8" | BPS* 1/8 | 0.79 | 0.50 | 12 |
| 3/16" | BPS* 3/16 | 0.84 | 0.54 | 12 |
| 1/4" | BPS* 1/4 | 0.91 | 0.60 | 14 |
| 5/16" | BPS* 5/16 | 0.96 | 0.64 | 17 |
| 3/8" | BPS* 3/8 | 1.07 | 0.66 | 19 |
| 1/2" | BPS* 1/2 | 1.15 | 0.90 | 22 |
| 5/8" | BPS* 5/8 | 1.18 | 0.96 | 27 |
| 3/4" | BPS* 3/4 | 1.24 | 0.96 | 30 |
| 7/8" | BPS* 7/8 | 1.34 | 1.02 | 32 |
| 1" | BPS* 1" | 1.52 | 1.23 | 38 |

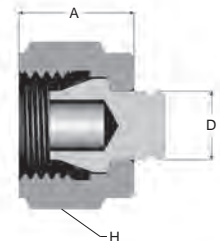
Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

PLUG | OBS

APPLICATION

Plug to seal an apparatus with a compression fitting end.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference | A | H |
|----|-----------|------|----|
| 3 | OBS* 3 | 11,9 | 12 |
| 4 | OBS* 4 | 11,9 | 12 |
| 6 | OBS* 6 | 12,7 | 14 |
| 8 | OBS* 8 | 13,5 | 17 |
| 10 | OBS* 10 | 15,1 | 19 |
| 12 | OBS* 12 | 17,5 | 22 |
| 14 | OBS* 14 | 17,5 | 24 |
| 16 | OBS* 16 | 17,5 | 27 |
| 18 | OBS* 18 | 17,5 | 30 |
| 20 | OBS* 20 | 17,5 | 32 |
| 22 | OBS* 22 | 17,5 | 32 |
| 25 | OBS* 25 | 20,6 | 38 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | A | H (mm) |
|-------|-----------|------|--------|
| 1/16" | OBS* 1/16 | 0.31 | 8 |
| 1/8" | OBS* 1/8 | 0.47 | 12 |
| 3/16" | OBS* 3/16 | 0.47 | 12 |
| 1/4" | OBS* 1/4 | 0.50 | 14 |
| 5/16" | OBS* 5/16 | 0.53 | 17 |
| 3/8" | OBS* 3/8 | 0.56 | 19 |
| 1/2" | OBS* 1/2 | 0.69 | 22 |
| 5/8" | OBS* 5/8 | 0.69 | 27 |
| 3/4" | OBS* 3/4 | 0.69 | 30 |
| 7/8" | OBS* 7/8 | 0.69 | 32 |
| 1" | OBS* 1" | 0.81 | 38 |

Hex flats (H) are metric. Fractional upon request
*Specify material when ordering. See page 8 for materials and codes.

FRONT FERRULE | FF

APPLICATION

Spare part for a double ferrule compression tube fitting.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference |
|----|-----------|
| 3 | FF* 3 |
| 4 | FF* 4 |
| 6 | FF* 6 |
| 8 | FF* 8 |
| 10 | FF* 10 |
| 12 | FF* 12 |
| 14 | FF* 14 |
| 15 | FF* 15 |
| 16 | FF* 16 |
| 18 | FF* 18 |
| 20 | FF* 20 |
| 22 | FF* 22 |
| 25 | FF* 25 |

*Specify material when ordering.
See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Reference |
|-------|-----------|
| 1/16" | FF* 1/16 |
| 1/8" | FF* 1/8 |
| 3/16" | FF* 3/16 |
| 1/4" | FF* 1/4 |
| 5/16" | FF* 5/16 |
| 3/8" | FF* 3/8 |
| 1/2" | FF* 1/2 |
| 5/8" | FF* 5/8 |
| 3/4" | FF* 3/4 |
| 7/8" | FF* 7/8 |
| 1" | FF* 1" |

*Specify material when ordering.
See page 8 for materials and codes.

BACK FERRULE | BF

APPLICATION

Spare part for a double ferrule compression tube fitting.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference |
|----|-----------|
| 3 | BF* 3 |
| 4 | BF* 4 |
| 6 | BF* 6 |
| 8 | BF* 8 |
| 10 | BF* 10 |
| 12 | BF* 12 |
| 14 | BF* 14 |
| 15 | BF* 15 |
| 16 | BF* 16 |
| 18 | BF* 18 |
| 20 | BF* 20 |
| 22 | BF* 22 |
| 25 | BF* 25 |

*Specify material when ordering.
See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Reference |
|-------|-----------|
| 1/16" | BF* 1/16 |
| 1/8" | BF* 1/8 |
| 3/16" | BF* 3/16 |
| 1/4" | BF* 1/4 |
| 5/16" | BF* 5/16 |
| 3/8" | BF* 3/8 |
| 1/2" | BF* 1/2 |
| 5/8" | BF* 5/8 |
| 3/4" | BF* 3/4 |
| 7/8" | BF* 7/8 |
| 1" | BF* 1" |

*Specify material when ordering.
See page 8 for materials and codes.

FERRULE SET (10 of each) | SET

APPLICATION

Set of 10 front and back ferrules.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference |
|----|-----------|
| 3 | SET* 3 |
| 4 | SET* 4 |
| 6 | SET* 6 |
| 8 | SET* 8 |
| 10 | SET* 10 |
| 12 | SET* 12 |
| 14 | SET* 14 |
| 15 | SET* 15 |
| 16 | SET* 16 |
| 18 | SET* 18 |
| 20 | SET* 20 |
| 22 | SET* 22 |
| 25 | SET* 25 |

*Specify material when ordering.
See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Reference |
|-------|-----------|
| 1/16" | SET* 1/16 |
| 1/8" | SET* 1/8 |
| 3/16" | SET* 3/16 |
| 1/4" | SET* 1/4 |
| 5/16" | SET* 5/16 |
| 3/8" | SET* 3/8 |
| 1/2" | SET* 1/2 |
| 5/8" | SET* 5/8 |
| 3/4" | SET* 3/4 |
| 7/8" | SET* 7/8 |
| 1" | SET* 1" |

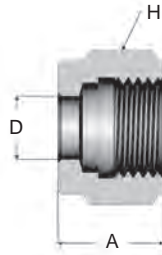
*Specify material when ordering.
See page 8 for materials and codes.

NUT | ES

APPLICATION

Spare part for a double ferrule compression tube fitting.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference | A | H |
|----|-----------|------|----|
| 3 | ES* 3 | 11,9 | 12 |
| 4 | ES* 4 | 11,9 | 12 |
| 6 | ES* 6 | 12,7 | 14 |
| 8 | ES* 8 | 13,5 | 17 |
| 10 | ES* 10 | 15,1 | 19 |
| 12 | ES* 12 | 17,5 | 22 |
| 14 | ES* 14 | 17,5 | 27 |
| 15 | ES* 15 | 17,5 | 27 |
| 16 | ES* 16 | 17,5 | 27 |
| 18 | ES* 18 | 17,5 | 30 |
| 20 | ES* 20 | 17,5 | 32 |
| 22 | ES* 22 | 17,5 | 32 |
| 25 | ES* 25 | 20,6 | 38 |

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | A | H (mm) |
|-------|-----------|------|--------|
| 1/16" | ES* 1/16 | 0.31 | 8 |
| 1/8" | ES* 1/8 | 0.47 | 12 |
| 3/16" | ES* 3/16 | 0.47 | 12 |
| 1/4" | ES* 1/4 | 0.50 | 14 |
| 5/16" | ES* 5/16 | 0.53 | 17 |
| 3/8" | ES* 3/8 | 0.56 | 19 |
| 1/2" | ES* 1/2 | 0.69 | 22 |
| 5/8" | ES* 5/8 | 0.69 | 27 |
| 3/4" | ES* 3/4 | 0.69 | 30 |
| 7/8" | ES* 7/8 | 0.69 | 32 |
| 1" | ES* 1" | 0.81 | 38 |

Hex flats (H) are metric. Fractional upon request
 *Specify material when ordering.
 See page 8 for materials and codes.

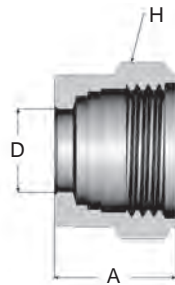
*Specify material when ordering.
 See page 8 for materials and codes.

KNURLED NUT | EMS

APPLICATION

Alternative knurled nut for a double ferrule compression tube fitting. Design for easier finger tightening.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference | A | H |
|----|-----------|------|----|
| 3 | EMS* 3 | 11,9 | 12 |
| 4 | EMS* 4 | 11,9 | 12 |
| 6 | EMS* 6 | 12,7 | 14 |
| 8 | EMS* 8 | 13,5 | 17 |
| 10 | EMS* 10 | 15,1 | 19 |
| 12 | EMS* 12 | 17,5 | 22 |
| 14 | EMS* 14 | 17,5 | 27 |
| 16 | EMS* 16 | 17,5 | 27 |
| 18 | EMS* 18 | 17,5 | 30 |
| 20 | EMS* 20 | 17,5 | 32 |
| 22 | EMS* 22 | 17,5 | 32 |

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | A | H (mm) |
|-------|-----------|------|--------|
| 1/16" | EMS* 1/16 | 0.31 | 8 |
| 1/8" | EMS* 1/8 | 0.47 | 12 |
| 3/16" | EMS* 3/16 | 0.47 | 12 |
| 1/4" | EMS* 1/4 | 0.50 | 14 |
| 5/16" | EMS* 5/16 | 0.53 | 17 |
| 3/8" | EMS* 3/8 | 0.56 | 19 |
| 1/2" | EMS* 1/2 | 0.69 | 22 |
| 5/8" | EMS* 5/8 | 0.69 | 27 |
| 3/4" | EMS* 3/4 | 0.69 | 30 |
| 7/8" | EMS* 7/8 | 0.69 | 32 |
| 1" | EMS* 1" | 0.81 | 38 |

*Specify material when ordering.
 See page 8 for materials and codes.

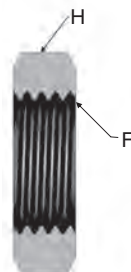
*Specify material when ordering.
 See page 8 for materials and codes.

BULKHEAD LOCKNUT | ECS

APPLICATION

Spare part for a double ferrule compression bulkhead fitting.

Special requirements on request



TUBE SIZE

| Metric | Fractional | Reference | H | F (UNF) |
|----------|------------|-----------------|----|--------------|
| 3 | 1/8" | ECS* H14 5/16 | 14 | 5/16" - 20 |
| 4 | 3/16" | ECS* H14 3/8 | 14 | 3/8" - 20 |
| 6 | 1/4" | ECS* H17 7/16 | 17 | 7/16" - 20 |
| 8 | 5/16" | ECS* H17 1/2 | 17 | 1/2" - 20 |
| - | 3/8" | ECS* H19 9/16 | 19 | 9/16" - 20 |
| 10 | - | ECS* H19 5/8 | 19 | 5/8" - 20 |
| 12 | 1/2" | ECS* H24 3/4 | 24 | 3/4" - 20 |
| 14-15-16 | 5/8" | ECS* H27 7/8 | 27 | 7/8" - 20 |
| 18 | 3/4" | ECS* H30 1 | 30 | 1" - 20 |
| 20-22 | 7/8" | ECS* H36 1 1/8 | 36 | 1 1/8" - 20 |
| 25 | 1" | ECS* H38 1 5/16 | 38 | 1 5/16" - 20 |

*Specify material when ordering.
 See page 8 for materials and codes.

INSERT FOR PLASTIC TUBE | INS

APPLICATION

Hose connector insert. Allows connection of a flexible hose and/or to increase the rigidity.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference | d | P |
|----|------------|----|------|
| 4 | INS* 4 2 | 2 | 0,8 |
| 6 | INS* 6 4 | 4 | 2 |
| 8 | INS* 8 6 | 6 | 4 |
| 10 | INS* 10 8 | 8 | 6,4 |
| 12 | INS* 12 8 | 8 | 7,5 |
| 12 | INS* 12 10 | 10 | 10,3 |
| 14 | INS* 14 12 | 12 | 11,1 |
| 16 | INS* 16 13 | 13 | 11,9 |
| 16 | INS* 16 14 | 14 | 14,3 |
| 18 | INS* 18 16 | 16 | 15,8 |

*Specify material when ordering. See page 8 for materials and codes.

TUBE SIZE - FRACTIONAL (inch)

| D | Reference | d | P |
|-------|----------------|-------|--------|
| 1/8" | INS* 1/8 2 | 2 | 13/16" |
| 3/16" | INS* 3/16 1/8 | 1/8" | 3/32" |
| 1/4" | INS* 1/4 1/8 | 1/8" | 3/32" |
| 1/4" | INS* 1/4 3/16 | 3/16" | 1/8" |
| 5/16" | INS* 5/16 3/16 | 3/16" | 1/8" |
| 5/16" | INS* 5/16 1/4 | 1/4" | 3/16" |
| 3/8" | INS* 3/8 3/16 | 3/16" | 1/8" |
| 3/8" | INS* 3/8 1/4 | 1/4" | 3/16" |
| 1/2" | INS* 1/2 1/4 | 1/4" | 3/16" |
| 1/2" | INS* 1/2 3/8 | 3/8" | 5/16" |
| 5/8" | INS* 5/8 3/8 | 3/8" | 5/16" |
| 5/8" | INS* 5/8 1/2 | 1/2" | 7/16" |
| 3/4" | INS* 3/4 1/2 | 1/2" | 7/16" |
| 3/4" | INS* 3/4 5/8 | 5/8" | 9/16" |
| 1" | INS* 1" 3/4 | 3/4" | 11/16" |

*Specify material when ordering. See page 8 for materials and codes.

GAUGE | CCS

APPLICATION

Gauge to measure correct tightness of compression tube fittings (see page 7).

Special requirements on request



TUBE SIZE - FRACTIONAL & METRIC

| D (inch) | D2 (mm) | Reference |
|----------|---------|------------|
| 1/8" | 3 | 1/8 CCS 3 |
| 3/16" | 4 | 3/16 CCS 4 |
| 1/4" | 6 | 1/4 CCS 6 |
| 5/16" | 8 | 5/16 CCS 8 |
| 3/8" | - | 3/8 CCS |
| - | 10 | CCS 10 |
| 1/2" | 12 | 1/2 CCS 12 |
| - | 14 | CCS 14 |
| 5/8" | 16 | 5/8 CCS 16 |
| 3/4" | 18 | 3/4 CCS 18 |
| - | 20 | CCS 20 |
| 7/8" | 22 | 7/8 CCS 22 |
| 1" | 25 | 1" CCS 25 |

Dimensions D and D2 correspond to the tube dimension not to the gauge dimension

PRE-ASSEMBLY TOOL | PSS

APPLICATION

Tool to pre-tighten compression tube fittings before first-time installation. Ideal for access restricted installations.

Special requirements on request



TUBE SIZE - METRIC (mm)

| D | Reference |
|----|-----------|
| 3 | PSS 3 |
| 4 | PSS 4 |
| 6 | PSS 6 |
| 8 | PSS 8 |
| 10 | PSS 10 |
| 12 | PSS 12 |
| 14 | PSS 14 |
| 16 | PSS 16 |
| 18 | PSS 18 |
| 20 | PSS 20 |
| 22 | PSS 22 |
| 25 | PSS 25 |

TUBE SIZE - FRACTIONAL (inch)

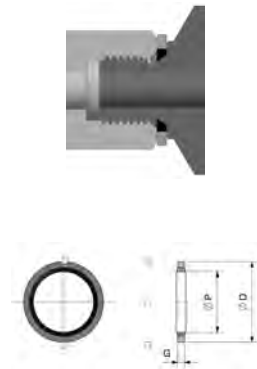
| D | Reference |
|-------|-----------|
| 1/8" | PSS 1/8 |
| 3/16" | PSS 3/16 |
| 1/4" | PSS 1/4 |
| 5/16" | PSS 5/16 |
| 3/8" | PSS 3/8 |
| 1/2" | PSS 1/2 |
| 5/8" | PSS 5/8 |
| 7/8" | PSS 7/8 |
| 1" | PSS 1" |

GASKETS (steel/elastomer) | GBS

APPLICATION

- Provides a seal with male ISO/BSPP K parallel thread. The standard gasket is composed of a nitrile NBR inner ring bonded to a carbon steel outer ring. To order a fluorocarbon gasket, add FPM.
- See page 9 for details.

Special requirements on request



ISO/BSPP PARALLEL THREAD

| ISO thread size | Reference | D (mm / inch) | P (mm / inch) | G (mm / inch) |
|-----------------|-----------|---------------|---------------|---------------|
| 1/8" | GBS 1/8 | 15,88 / 0.63 | 10,35 / 0.41 | 2,00 / 0.08 |
| 1/4" | GBS 1/4 | 20,57 / 0.81 | 13,74 / 0.54 | 2,03 / 0.08 |
| 3/8" | GBS 3/8 | 23,80 / 0.94 | 17,28 / 0.68 | |
| 1/2" | GBS 1/2 | 28,58 / 1.13 | 21,54 / 0.85 | |
| 3/4" | GBS 3/4 | 34,93 / 1.38 | 27,05 / 1.06 | 2,50 / 0.10 |
| 1" | GBS 1" | 42,80 / 1.69 | 33,89 / 1.33 | |

| ISO thread size | Reference | D (mm / inch) | P (mm / inch) | G (mm / inch) |
|-----------------|-------------|---------------|---------------|---------------|
| 1/8" | GBS/FPM 1/8 | 15,88 / 0.63 | 10,35 / 0.41 | 2,00 / 0.08 |
| 1/4" | GBS/FPM 1/4 | 20,57 / 0.81 | 13,74 / 0.54 | 2,03 / 0.08 |
| 3/8" | GBS/FPM 3/8 | 23,80 / 0.94 | 17,28 / 0.68 | |
| 1/2" | GBS/FPM 1/2 | 28,58 / 1.13 | 21,54 / 0.85 | |
| 3/4" | GBS/FPM 3/4 | 34,93 / 1.38 | 27,05 / 1.06 | 2,50 / 0.10 |
| 1" | GBS/FPM 1" | 42,80 / 1.69 | 33,89 / 1.33 | |

GASKETS (copper) | GCU

APPLICATION

- Provides a seal with male ISO/BSPP G parallel threads.
- The gasket material is copper.
- See page 9 for details.

Special requirements on request



ISO/BSPP PARALLEL THREAD

| ISO thread size | Reference | D (mm / inch) | P (mm / inch) | G (mm / inch) |
|-----------------|-----------|---------------|---------------|---------------|
| 1/8" | GCU 1/8 | 14,98 / 0.59 | 9,91 / 0.39 | 1,0 / 0.04 |
| 1/4" | GCU 1/4 | 18,03 / 0.71 | 13,97 / 0.55 | 1,5 / 0.06 |
| 3/8" | GCU 3/8 | 23,11 / 0.91 | 17,02 / 0.67 | |
| 1/2" | GCU 1/2 | 26,92 / 1.06 | 21,34 / 0.84 | |
| 3/4" | GCU 3/4 | 33,02 / 1.30 | 26,67 / 1.05 | 2,0 / 0.08 |
| 1" | GCU 1" | 38,10 / 1.50 | 33,53 / 1.32 | |

GASKETS (PCTFE) | GKF

APPLICATION

- Provides a seal on stainless steel pressure gauges equipped with ISO/BSPP G parallel female threads.
- The gasket material is PCTFE.
- See page 9 for details.

Special requirements on request



ISO/BSPP PARALLEL THREAD

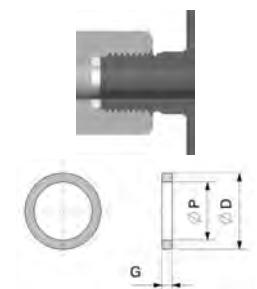
| | ISO thread size | Reference | D (mm / inch) | P (mm / inch) | G (mm / inch) |
|-----------------|-----------------|-----------|---------------|---------------|---------------|
| Regular gaskets | 1/4" | GKF 1/4 | 11,0 / 0.43 | 5,2 / 0.20 | 2,0 / 0.08 |
| | 3/8" | GKF 3/8 | 14,7 / 0.58 | 8,0 / 0.31 | 4,0 / 0.16 |
| | 1/2" | GKF 1/2 | 18,3 / 0.72 | 14,0 / 0.5 | 2,5 / 0.10 |
| Thin gaskets | 1/4" | GKF 1/4 | 11,0 / 0.43 | 5,2 / 0.20 | 1,5 / 0.06 |
| | 1/4" | GKF 1/4 | 11,0 / 0.43 | 5,2 / 0.20 | 1,0 / 0.04 |
| | 1/4" | GKF 1/4 | 11,0 / 0.43 | 5,2 / 0.20 | 0,5 / 0.02 |
| | 3/8" | GKF 3/8 | 14,7 / 0.58 | 8,0 / 0.31 | 1,5 / 0.06 |
| | 3/8" | GKF 3/8 | 14,7 / 0.58 | 8,0 / 0.31 | 1,0 / 0.04 |
| | 3/8" | GKF 3/8 | 14,7 / 0.58 | 8,0 / 0.31 | 0,5 / 0.02 |

GASKETS (PTFE) | GTE

APPLICATION

- Provides a seal on stainless steel pressure gauges equipped with ISO/BSPP G parallel female threads. The gasket material is PTFE.
- See page 9 for details.

Special requirements on request



ISO/BSPP PARALLEL THREAD

| | ISO thread size | Reference | D | P | G |
|-----------------|-----------------|-----------|------|------|-----|
| Regular gaskets | 1/4" | GTE 1/4 | 11,0 | 5,2 | 2,0 |
| | 3/8" | GTE 3/8 | 14,7 | 8,0 | 2,0 |
| | 1/2" | GTE 1/2 | 18,3 | 14,0 | 2,5 |
| | 3/4" | GTE 3/4 | 23,8 | 18,0 | 3,0 |
| Thin gaskets | 1/4" | GTE 1/4 | 11,0 | 5,2 | 1,5 |
| | 1/4" | GTE 1/4 | 11,0 | 5,2 | 1,0 |
| | 1/4" | GTE 1/4 | 11,0 | 5,2 | 0,5 |

MANUAL TUBE BENDER

APPLICATION

Enables reliable and high precision bends in tubing made from materials that can be used with Rotarex tube fittings. Bending range from 3 to 14 mm, and ¼ to ½ inch, according to the selected model, Perfect handling by pre-molded wrists.

Special requirements on request



| Reference | Tube Thickness |
|-----------|--|
| 474900312 | min. ≤ 1 mm Ø 3 to 10 mm |
| 474900409 | min. ≤ 1 mm Ø ¼ to ½ mm R 3 - 3,5 D |
| 474900610 | min. ≤ 1 mm Ø 6 to 10 mm R 3 - 3,5 D |
| 474900611 | min. ≤ 1 mm Ø ¼" - ½" - R 3 D |
| 474900612 | min. ≤ 1 mm Ø 10 mm R 3,5 D |
| 474900613 | min. ≤ 1 mm Ø 12 mm R 3,5 D |
| 474901214 | min. ≤ 1 mm Ø 12 to 14 mm R 3 to 3,5 D |
| 474901654 | min. ≤ 1 mm Ø ⅝" R 54 mm |

DEBURRING TOOL

APPLICATION

To deburr copper tubing. Deburs the inside and outside diameters of 4 mm to 25 mm, and ⅛" to 1" inch tubing.

Reference: 47490000.

Special requirements on request



TUBE CUTTER

APPLICATION

The Rotarex tube cutter cuts stainless steel, soft copper and aluminium tubing from 3 to 25 mm and ⅛ to 1 inch outside diameter.

Special requirements on request



PTFE TAPE

APPLICATION

Tape 12 mm x 0,1 mm x 12 m
Density: 1g/cm³
Reference 13008006.

Special requirements on request



ASSEMBLY GUIDELINES

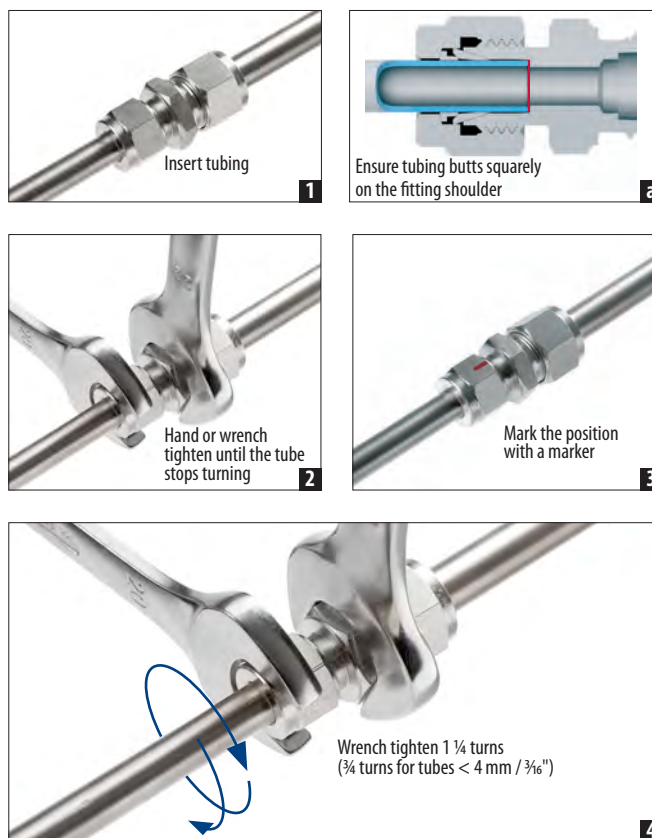
INITIAL ASSEMBLY

Rotarex Compression Tube Fittings are quick & easy to assemble:

Initial Assembly in 4 easy steps

1. Insert the tube in the ready-to-use fitting so that the tube end rests squarely against the shoulder (a).
2. Finger-tighten the nut on the body. The tube should not be able to turn freely. If the tube turns by hand or axially in the fitting, tighten the nut lightly with a wrench until the tube stops turning.
3. Mark the initial position of the nut with a marking pen. This is necessary to control the exact rotation to achieve the proper tightness.
4. Use a wrench to tighten the nut clockwise:
 - Fittings for tubes $\frac{1}{4}$ " / 6 mm and higher: $1\frac{1}{4}$ turns
 - Fittings for tubes $\frac{3}{16}$ " / 4 mm and lower: $\frac{3}{4}$ turn

Confirm proper tightness with the inspection gauge (see page 7).



DISASSEMBLY & REASSEMBLY

To disassemble:

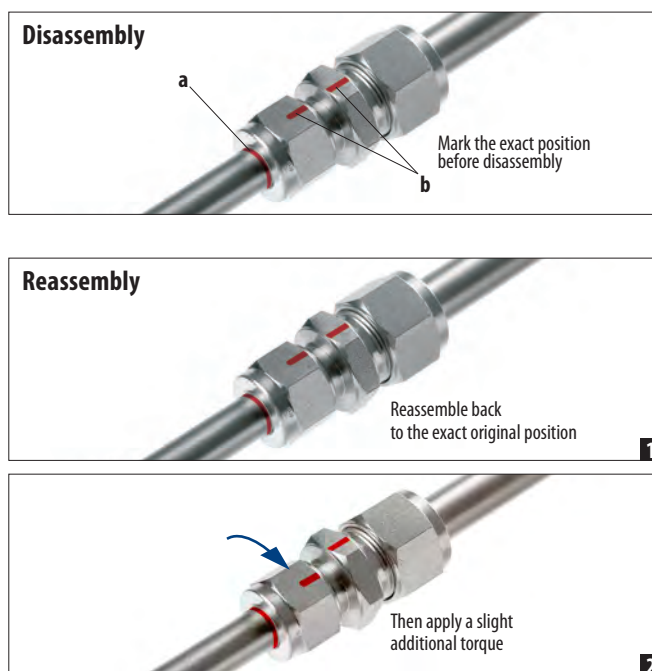
Before disassembling, mark the exact position of the nut as shown in the Disassembly image. You will need these markings to return to the exact assembly position when reassembling:

- a - Mark the depth of the nut on the tube (at the back of the nut)
- b - Mark the alignment between the nut and the body (use the flats).

To reassemble:

1. Insert the tube with the crimped ferrules into the fitting. Make sure the tube end sits squarely against the fitting seat and that the front ferrule realigns with the tube crimp. Hand tighten as far as possible. Then, tighten the nut with a wrench until the nut returns to its exact original position. The marks are now aligned and you feel a significant resistance in the torque.
2. Now, give a slight additional torque on the wrench to ensure tightness

N.B: Inspection gauges are not relevant when reassembling fittings.

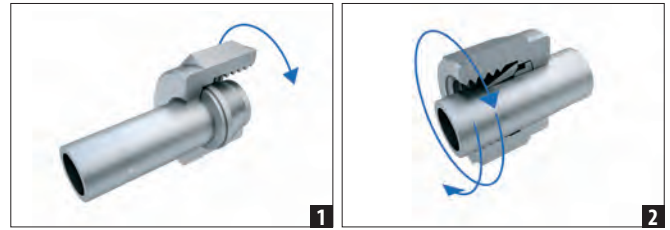


ASSEMBLY GUIDELINES (continued)

PORT CONNECTOR AND TUBE ADAPTORS

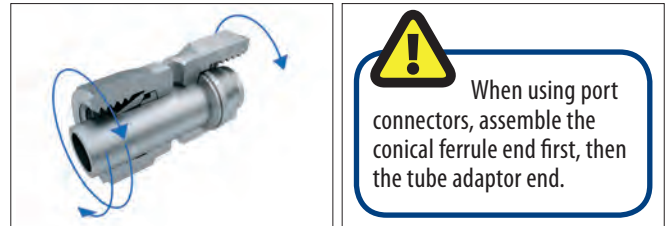
Port connector

- To assemble the conical ferrule into a compression fitting, use a wrench to tighten the nut clockwise:
 - for Port connector $\frac{1}{4}$ " (6 mm) and higher : $\frac{1}{4}$ turn from the hand tightening position.
 - for port connector $\frac{3}{16}$ " (4 mm) and lower: $\frac{1}{8}$ turn from the hand tightening position.



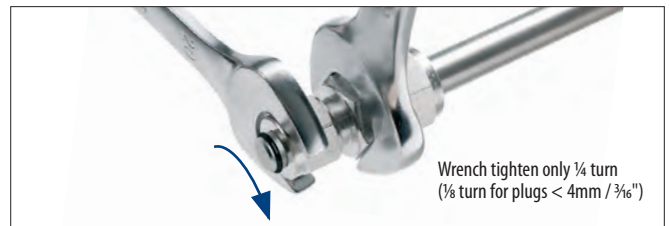
Adaptor

- To assembly the tube adaptor end into a Rotarex compression tube fitting, use a wrench to tighten the nut clockwise:
 - Fittings for tube $\frac{1}{4}$ " (6 mm) and higher : $1 \frac{1}{4}$ turn
 - Fittings for tube $\frac{3}{16}$ " (4 mm) and lower: $\frac{3}{4}$ turn



PLUGS

- For plugs, use a wrench to tighten the nut clockwise:
- for plugs $\frac{1}{4}$ " (6 mm) and higher : Use $\frac{1}{4}$ turn from the hand tightening position.
 - for plugs $\frac{3}{16}$ " (4 mm) and lower: $\frac{1}{8}$ turn from the hand tightening position.



O-RING MALE CONNECTORS

- To assembly an O-ring fitting:
- Lubricate the O-ring with a lubricant compatible to both the O-ring material and the system fluid
 - Tighten by hand the male end into the female connector
 - Tighten slightly with a wrench until the male and female faces creates a metal-to-metal sealing
 - Give a slight extra effort with the wrench.



We advise you to keep the fitting still during assembly and disassembly.

WELD CONNECTORS

- For weld connectors, proceed as follows:
- Remove the nut and ferrules from the tube fitting end
 - Protect the tube fitting end with an OBS plug (or other type of protection)
 - Tack weld the fitting on the pipe or tube
 - You can control the alignment before completing the welding.
 - Remove the OBS.



N.B.: A simple hand tightening of the OBS is enough

INSERT FOR PLASTIC TUBE

- An INS insert helps to support plastic tubing within the fitting to prevent it from collapsing:
- Fully insert the INS into the soft tube

- Place the INS against the shoulder within the body
- Tighten the nut and the ferrules following the standard assembling instructions.

GAS COMPATIBILITY

Best Practice requires that you always verify the gas compatibility of any gas handling equipment before installation and operation. The chart below can help you verify the right material for your gas type.

Rotarex Fittings are standardly available in 2 material types, Brass and Stainless Steel 316L, each with its own advantage in different applications. For highly specialized applications, we offer 10 additional materials on request (see page 8). Please go to www.rotarex.com for gas compatibility of these optional materials.

KEY TO GAS COMPATIBILITY:

Locate your gas type in the below chart and see the gas compatibility of each standard material type. Only select materials that are compatible with your gas type.

GAS COMPATIBILITY WITH MATERIALS

| GAS | | Brass | SS 316L | PA 6.6 | PTFE | PCTFE | NBR | FPM | EPDM |
|----------------------|-------------|-------|-----------------------|--------|---|-------|-----|-----|------|
| Acetylene | C_2H_2 | OK | OK | | OK | OK | | | |
| Ammonia | NH_3 | | OK | OK | OK | OK | | | OK |
| Argon | Ar | OK | OK | OK | OK | OK | OK | OK | OK |
| Butane | C_4H_{10} | OK | OK | OK | OK | OK | OK | OK | |
| Carbon dioxide | CO_2 | OK | OK | OK | OK | OK | OK | | OK |
| Carbon monoxide | CO | OK | OK | OK | OK | OK | OK | | OK |
| Ethane | C_2H_6 | OK | OK | OK | OK | OK | OK | OK | |
| Ethylene | C_2H_4 | OK | OK | OK | OK | OK | | | |
| Helium | He | OK | OK | OK | | OK | OK | OK | OK |
| Hydrogen | H_2 | OK | OK | OK | | OK | OK | OK | OK |
| Hydrogen Sulfide | H_2S | | OK | OK | OK | OK | | OK | OK |
| Krypton | Kr | OK | OK | OK | OK | OK | OK | OK | |
| Methane | CH_4 | OK | OK | OK | OK | OK | OK | OK | |
| Nitric Oxide | NO | | OK | | Please consult - depends on proportion of NO in the mixture | | | | |
| Nitrogen | N_2 | OK | OK | OK | OK | OK | OK | OK | OK |
| Nitrous Oxide | N_2O | | OK | | Please consult - depends on proportion of N_2O in the mixture | | | | |
| Oxygen | O_2 | OK | OK < 30 bar / 435 psi | | | | | OK | OK |
| Propane | C_3H_8 | OK | OK | OK | OK | OK | OK | | |
| Silane | SiH_4 | | OK | | OK | OK | | OK | |
| Sulphur Dioxide | SO_2 | | OK | | OK | OK | | | OK |
| Sulphur Hexafluoride | SF_6 | OK | OK | OK | OK | OK | OK | OK | OK |

CONVERSION CHARTS

FLOW CONVERSION

| | m ³ /h | l/h | foot ³ /min | l/s | cm ³ /s |
|------------------------|------------------------|-------------------------|--------------------------|--------------------------|--------------------|
| m ³ /h | 1 | 1 x 10 ³ | 0.589 | 0,2778 | 277,78 |
| l/h | 1 x 10 ⁻³ | 1 | 5.885 x 10 ⁻⁴ | 2,778 x 10 ⁻⁴ | 0,2778 |
| foot ³ /min | 1,69 | 1,699 x 10 ³ | 1 | 0,4719 | 471,95 |
| l/s | 3,6 | 3,6 x 10 ³ | 2.119 | 1 | 10 ³ |
| cm ³ /s | 3,6 x 10 ⁻³ | 3,6 | 2.119 x 10 ⁻³ | 10 ⁻³ | 1 |

PRESSURE CONVERSION

| | bar | mbar | kPa | MPa | atm | psi |
|------|-------------------------|-----------------|-----------------|--------------------------|--------------------------|-------------------------|
| bar | 1 | 10 ³ | 100 | 0,1 | 0,987 | 14.5 |
| mbar | 10 ⁻³ | 1 | 0,1 | 10 ⁻⁴ | 9,869 x 10 ⁻⁴ | 14.5 x 10 ⁻³ |
| kPa | 10 ⁻² | 10 | 1 | 10 ⁻³ | 9,869 x 10 ⁻³ | 0.145 |
| MPa | 10 | 10 ⁴ | 10 ³ | 1 | 9,869 | 145 |
| atm | 1,013 | 1013 | 101,3 | 1,013 x 10 ⁻¹ | 1 | 14.69 |
| psi | 6,89 x 10 ⁻² | 68,9 | 6,89 | 6,89 x 10 ⁻³ | 6,8 x 10 ⁻² | 1 |

TEMPERATURE

| C° | F° | K° | R° |
|------|------|------|------|
| -20 | -4 | 253 | 456 |
| -10 | 14 | 263 | 474 |
| 0 | 32 | 273 | 492 |
| 10 | 50 | 283 | 510 |
| 20 | 68 | 293 | 528 |
| 30 | 86 | 303 | 546 |
| 40 | 104 | 313 | 564 |
| 50 | 122 | 323 | 582 |
| 60 | 140 | 333 | 600 |
| 70 | 158 | 343 | 618 |
| 80 | 176 | 353 | 636 |
| 90 | 194 | 363 | 654 |
| 100 | 212 | 373 | 672 |
| 200 | 392 | 473 | 852 |
| 300 | 572 | 573 | 1032 |
| 400 | 752 | 673 | 1212 |
| 500 | 932 | 773 | 1392 |
| 600 | 1112 | 873 | 1572 |
| 700 | 1292 | 973 | 1752 |
| 800 | 1472 | 1073 | 1932 |
| 900 | 1652 | 1173 | 2112 |
| 1000 | 1832 | 1273 | 2292 |

DIMENSION

| metric | inches | inch fractional | inch decimal | metric (mm) |
|--------|--------|-----------------|--------------|-------------|
| 3 | 0.135 | 1/16" | 0.063 | 1,59 |
| 6 | 0.270 | 1/8" | 0.125 | 3,18 |
| 8 | 0.360 | 3/16" | 0.188 | 4,76 |
| 10 | 0.450 | 1/4" | 0.250 | 6,35 |
| 12 | 0.540 | 5/16" | 0.313 | 7,94 |
| 14 | 0.630 | 3/8" | 0.375 | 9,53 |
| 16 | 0.720 | 1/2" | 0.500 | 12,70 |
| 18 | 0.810 | 7/16" | 0.438 | 11,11 |
| 20 | 0.900 | 5/8" | 0.625 | 15,88 |
| 22 | 0.990 | 3/4" | 0.750 | 19,05 |
| 25 | 1.125 | 7/8" | 0.875 | 22,23 |
| | | 1" | 1.000 | 25,40 |

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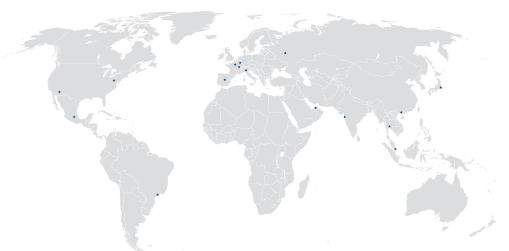
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