

TECHNICAL

UP TO 15,000 PSI (1000 BAR)



UNIT CONVERSIONS & FORMULAS

| Measurement | Conversion | Example |
|-------------|----------------------|---------------------------------|
| Length | 1 in = 25.4 mm | 12 in x 25.4 = 304.8 mm |
| | 1 in = .0254 m | 120 in x .0254 = 3.05 m |
| | 1 ft = .3048 m | 12 ft x .3048 = 3.68 m |
| | 1 mm = .0394 in | 100 mm x .0394 = 3.94 in |
| | 1 m = 39.37 in | 10 m x 39.37 = 393.7 in |
| | 1 m = 3.281 ft | 10 m x 3.281 = 32.81 ft |
| Volume | 1 gal = 3.785 l | 10 gal x 3.785 = 37.85 l |
| | 1 L = .2642 gal | 100 L x 26.42 = 26.42 gal |
| Weight | 1 lb. = .454 kg | 10 lb x .454 = 4.54 kg |
| | 1 kg = 2.205 lb | 10 kg x 2.205 = 22.05 lb |
| Pressure | 1 psi = .06895 bar | 40,000 psi x .06895 = 2758 bar |
| | 1 bar = 14.503 psi | 2758 bar x 14.503 = 40,000 psi |
| Flow | 1 gpm = 3.785 lpm | 30 gpm x 3.785 = 113.55 lpm |
| | 1 lpm = .2642 gpm | 100 lpm x .264 = 26.42 gpm |
| Force | 1 lb = 4.448 N | 100 lb x 4.448 = 444.8 N |
| | 1 N = .2248 lb | 900 N x .2248 = 202.32 lb |
| Torque | 1 lb-ft = 1.3567 N-m | 100 lb-ft x 1.3567 = 135.67 N-m |
| | 1 N-m = .737 lb-ft | 100 N-m x .737 = 73.7 lb-ft |
| Power | 1 hp = .7457 kW | 50 hp x .7457 = 37.29 kW |
| | 1 kW = 1.341 hp | 50 kW x 1.341 = 67.05 hp |

| Formula | English Units | Metric Units |
|---------------------|-----------------------|----------------------|
| Power Requirements* | hp = gpm x psi / 1550 | kW = lpm x bar / 540 |

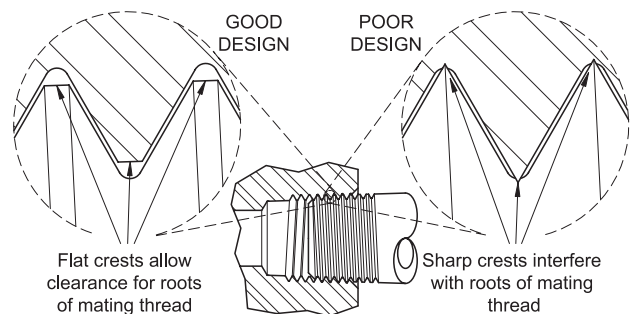
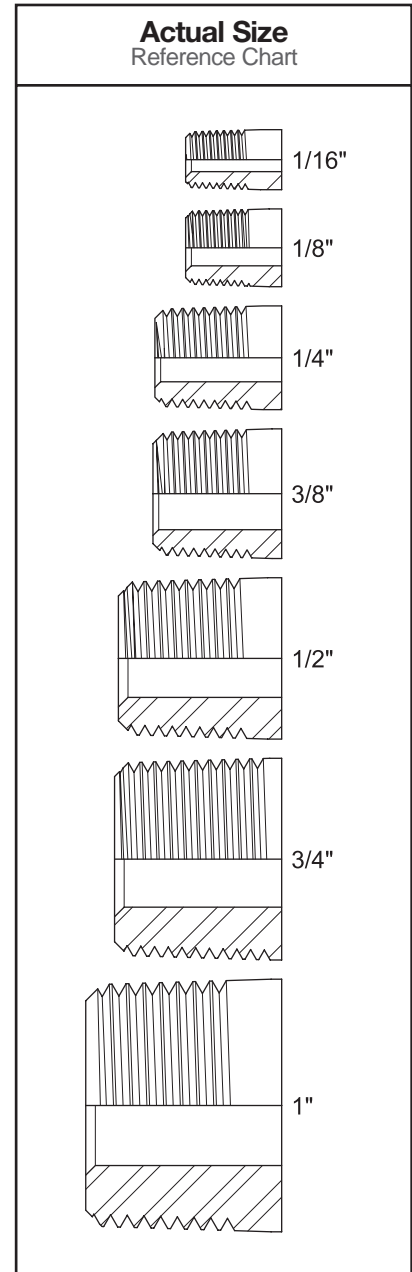
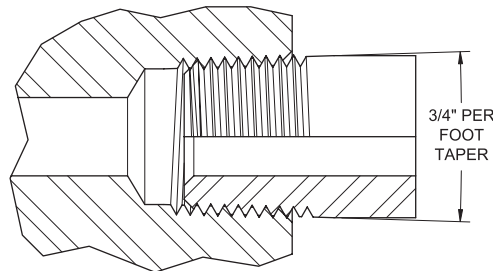
* Formulas assume 90% mechanical efficiency

CONNECTION TYPES

Several connection types are used at pressures of 15,000 psi (1000 bar) and below. The purpose of this section is to allow users to identify the connections needed and provide information on the features and proper use of each.

PIPE THREADS (NPT)

- Most widely used connection type at pressures of 15,000 psi (1000 bar) and below.
- Pipe threaded fittings are relatively inexpensive and readily available in sizes from 1/16" to 1". Larger sizes are available with limited fitting selection.
- NPT threads are tapered so that, as the thread engagement between the male and female threaded components increases, the threads get closer until the connection becomes tight.
- Unlike connection types that seal using closely machined seating surfaces or soft seals (such as O-rings), pipe threads seal around the threads, with Teflon® tape or pipe joint compound applied to the threads to prevent water from escaping through the tiny gaps between the male and female threads.
- Pipe threads, on the other hand, have a significant potential for galling — where threads seize together as threaded components are tightened. Some of the factors that affect the likelihood of galling are:
 - **Materials:** many stainless steels have a higher tendency to gall than carbon steels, and like materials are more prone to galling than two different materials.
 - **Thread quality:** a rough finish on thread surfaces increases the potential for galling.
 - **Thread profile:** some manufacturers allow sharp edges at the crest of each thread causing interference with the thread roots of mating part (see illustration at right) and significantly increasing the risk of galling. All pipe threads on Jetstream products are machined with flat thread crests to prevent damage to mating parts.
 - **Copper plating** is used on Jetstream stainless steel fittings with male pipe threads to prevent galling.
 - **Thread lubricants (anti-seize)** applied to the male threads before engagement greatly reduce the chance of galling. Consistent use of thread lubricant is **strongly recommended** for all connections but absolutely essential for pipe threads or stainless steel connections.



TECHNICAL

UP TO 15,000 PSI (1000 BAR)

CONNECTION TYPES

PIPE THREADS (NPT) (continued)

- Jetstream pipe threads are machined to a special specification to ensure greater thread engagement for increased safety and to reduce the risk of galling as noted on the previous page.

Pipe Thread Connection Instructions

1. Wrap Teflon[®] tape three or four times around the male threads in a clockwise direction (if looking at the face of the threaded end of the part).



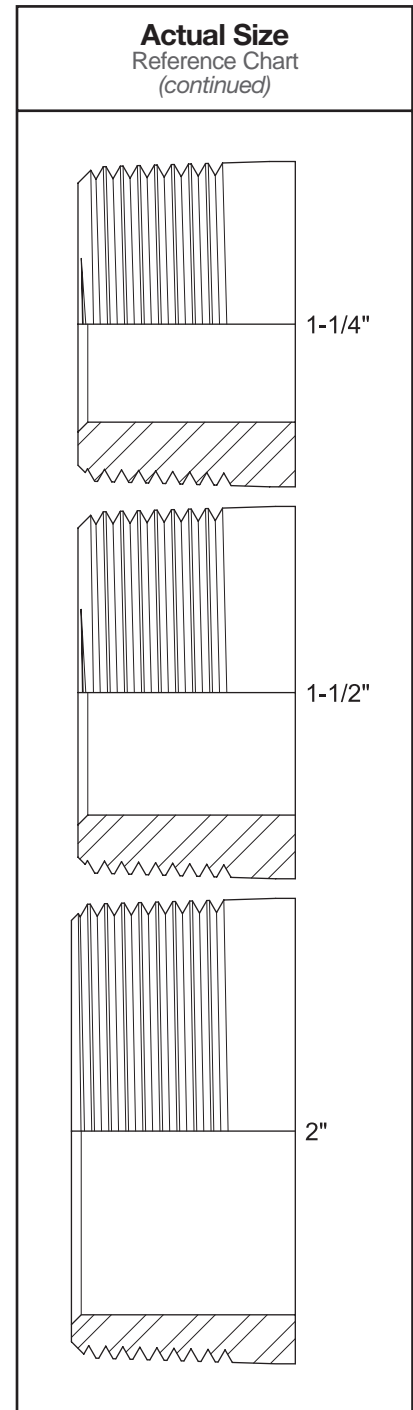
2. Brush on nickel- or silver-based thread lubricant (anti-seize) over the Teflon.



3. Install male threaded component into female threaded component and hand tighten.



4. Wrench tighten two turns past hand tight.

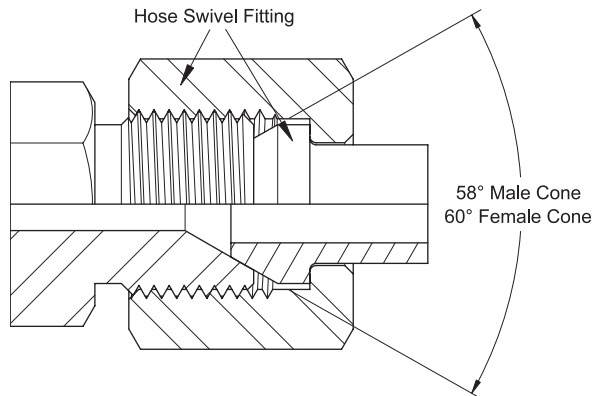


TECHNICAL

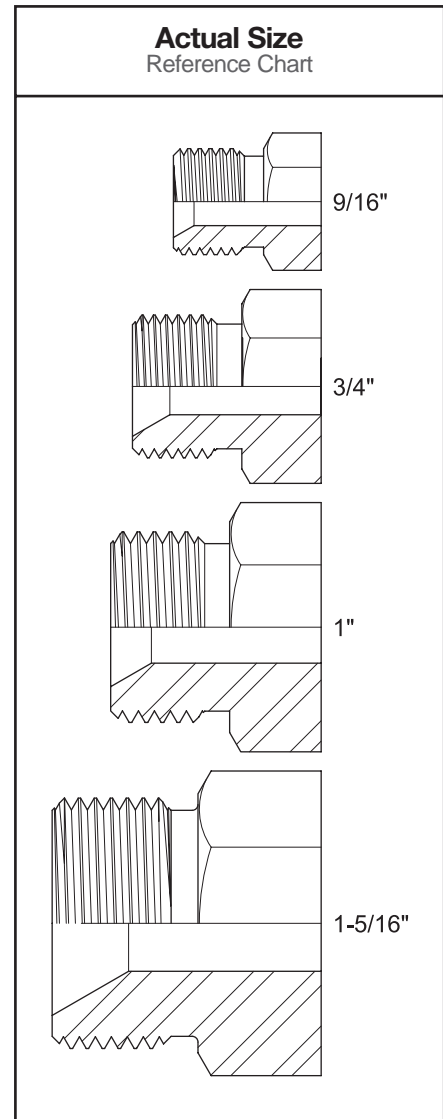
UP TO 15,000 PSI (1000 BAR)

CONNECTION TYPES

TYPE M



- Industry standard connection
- Designed for fast, simple connection of waterblast hoses and lances to waterblast equipment
- Male conical seat protected from damage by the hose swivel nut
- Unlike medium pressure connections, the seating surfaces do not rotate against each other when connections are made, resulting in a more reliable, longer lasting connection
- Verify pressure rating of Type M hoses and fittings before use as the connection type is used for a wide range of pressures due to its ease of use and reliability



| Size | Connection Thread | Recommended Torque | |
|----------------|-------------------|--------------------|-----|
| | | ft-lb | N-m |
| 9/16" Type M | 9/16" – 18UNF | 30 | 41 |
| 3/4" Type M | 3/4" – 16UNF | 45 | 61 |
| Type M | 1" – 12UNF | 70 | 95 |
| 1-5/16" Type M | 1-5/16" – 12UN | 110 | 149 |

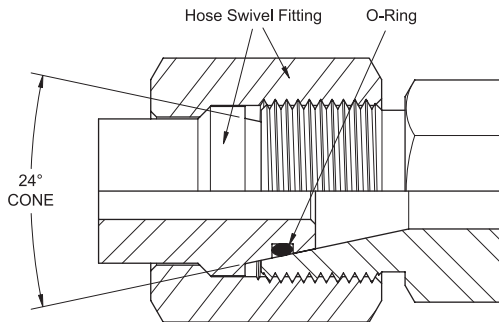
Note: Always apply thread lubricant (anti-seize) to male threads before assembling waterblast connections. See page F-1, for thread lubricants available from Jetstream.

TECHNICAL

UP TO 15,000 PSI (1000 BAR)

CONNECTION TYPES

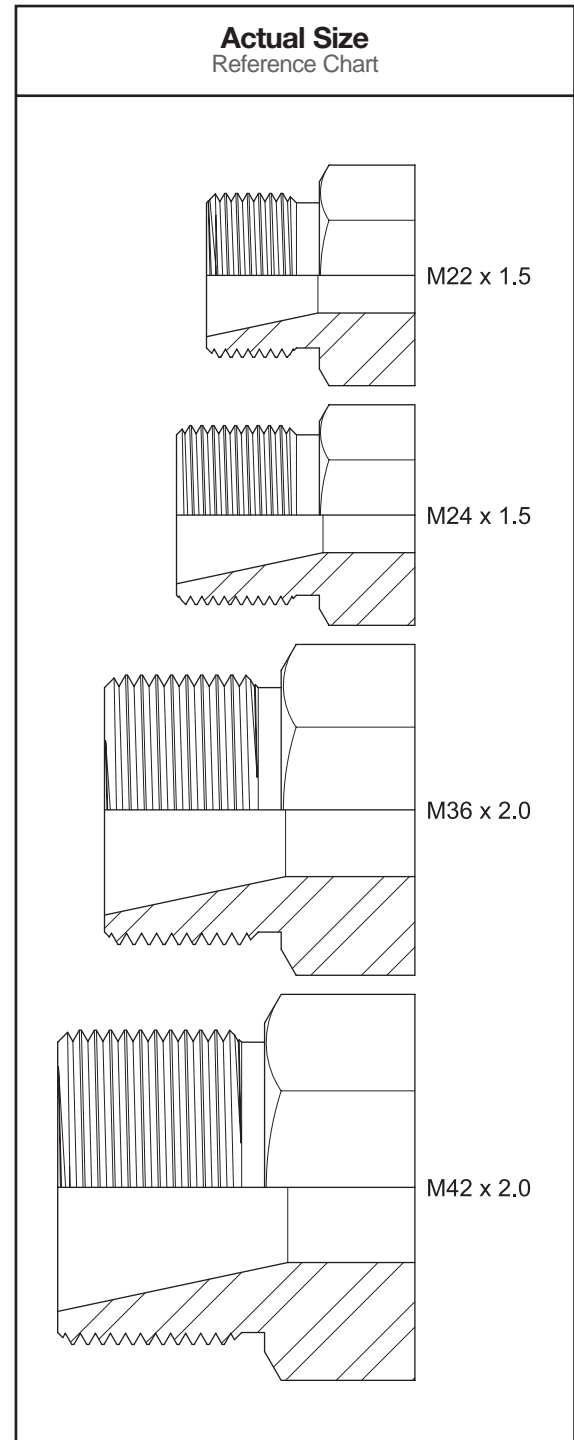
METRIC



- Internationally used connection
- Designed for fast, simple connection of waterblast hoses and lances to waterblast equipment
- Male conical seat protected from damage by the hose swivel nut

| Connection Sizes |
|------------------|
| M22 x 1.5 |
| M24 x 1.5 |
| M36 x 2.0 |
| M43 x 2.0 |

Note: Always apply thread lubricant (anti-seize) to male threads before assembling waterblast connections. See page F-1, for thread lubricants available from Jetstream.



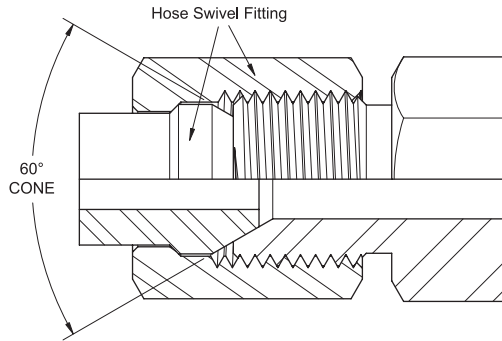
TECHNICAL

UP TO 15,000 PSI (1000 BAR)

CONNECTION TYPES

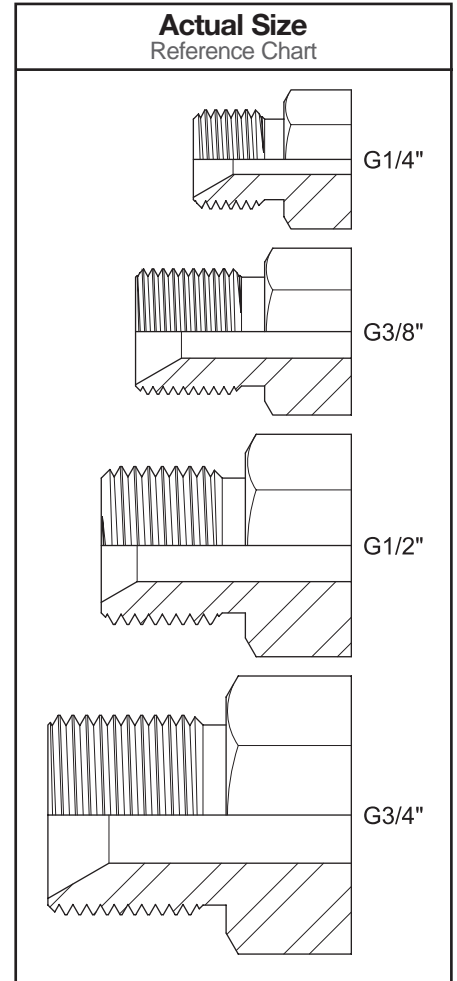
BRITISH STANDARD PIPE (BSP)

- Industry standard connection most common in Europe
- Designed for fast, simple connection of waterblast hoses and lances to waterblast equipment
- Male conical seat protected from damage by the hose swivel nut
- Products with BSP connections featured in this catalog are straight thread connection using a metal-to-metal conical seat as the sealing method. BSP is also available as a tapered thread similar in function to NPT pipe threads, but this variation is not found on products in this catalog.



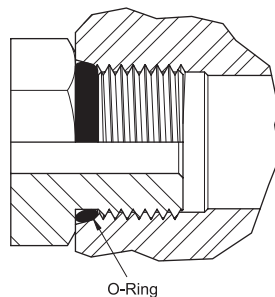
| Size | Connection Types |
|-------|------------------|
| G1/4" | 1/4"-19BSP |
| G3/8" | 3/8"-19BSP |
| G1/2" | 1/2"-14BSP |
| G3/4" | 3/4"-14BSP |

Note: Always apply thread lubricant (anti-seize) to male threads before assembling waterblast connections. See page F-1, for thread lubricants available from Jetstream.



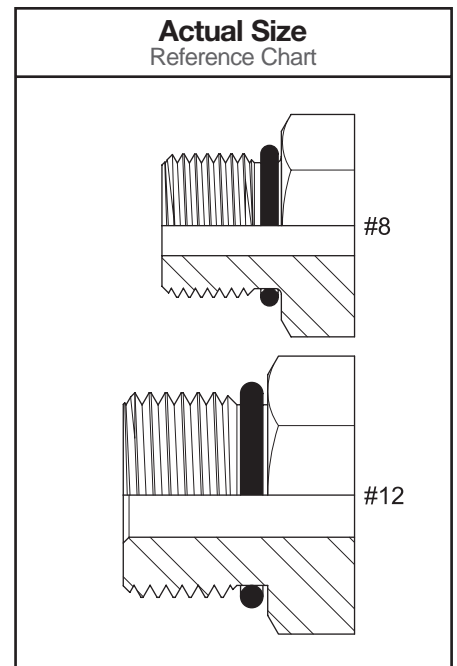
STRAIGHT BOSS

- Hydraulic connection adapted for waterblast use with American Aero pumps
- Sealing accomplished by O-ring behind male threads
- Used at 10,000 psi (700 bar) or below



| Size | Connection Thread |
|------|-------------------|
| #8 | 3/4"-16UNF |
| #12 | 1-1/16"-12UN |

Note: Always apply thread lubricant (anti-seize) to male threads before assembling waterblast connections. See page F-1, for thread lubricants available from Jetstream.

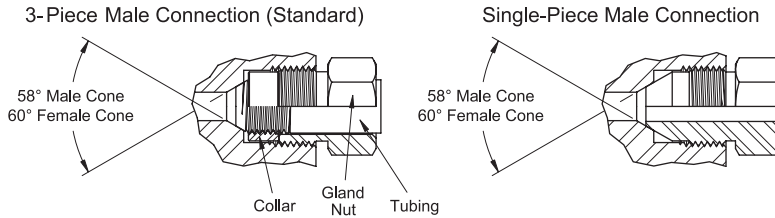


TECHNICAL

UP TO 15,000 PSI (1000 BAR)

CONNECTION TYPES

MEDIUM PRESSURE (MP)



- Industry standard connection for 20,000 psi (1400 bar) applications, medium pressure is occasionally used in applications at 15,000 psi (1000 bar) and below.
- Connections exist in two different forms:
 1. Used to connect medium pressure tubing with a conical male seat and left-handed threads to a female port using a gland nut and left-hand threaded collar (Gland, Collar & Tubing).
 2. For many medium pressure male fittings, the geometry of the gland, collar, and tubing is combined into one component that connects directly to a medium pressure female port (Single Piece Style).
- With proper care, this connection is suitable for repetitive connection/disconnection.
- Damage from repeated or improper use can often be repaired using reconing tools. For details on tubing preparation and repair equipment, contact Jetstream Sales.

| Size | Connection Thread | Tubing Thread* Left-Hand | Recommended Torque | |
|----------|-------------------|-----------------------------|--------------------|-----|
| | | | ft-lb | N-m |
| 1/4" MP | 7/16"-20UNF | 1/4"-28UNF | 20 | 27 |
| 3/8" MP | 9/16"-18UNF | 3/8"-24UNF | 30 | 41 |
| 9/16" MP | 13/16"-16UNF | 9/16"-18UNF | 50 | 68 |
| 3/4" MP | 3/4"-14NPSM | 3/4"-16UNF | 90 | 122 |
| 1" MP | 1-3/8"-12UNF | 1"-14UNF | 125 | 170 |

* For three-piece connection styles only

Pipe Thread Connection Instructions

1. *3-piece Male Connection Style only* — Liberally apply anti-seize to male tubing threads to prevent thread galling.
2. *3-piece Male Connection Style only* — Slide gland nut over tubing and thread collar (left-hand threaded) onto tubing until it is past the first one or two full threads of the tubing.
3. *Both Styles* — Liberally apply anti-seize to male connection threads and male cone.
4. *Both Styles* — Install male connection into female port and tighten according to torque specification in chart above.

Note: Always apply thread lubricant (anti-seize) to male threads before assembling waterblast connections. See page F-1, for thread lubricants available from Jetstream.

