

# FITTING ASSEMBLY GUIDELINES

Understanding the proper preparation and assembly of high pressure fittings and components is critical to the safe operation, maintenance and longevity of your tools and equipment.

## TAPERED PIPE THREADS

Tapered pipe threads (NPT) seal by contact of threads. A paste type anti-seize compound such as Parker Thread-Mate™ along with pipe thread sealing tape works most effectively with NPT threads.

- Use anti-seize compound on male thread, then 2–3 wraps of Teflon® tape (if larger than 3/4 NPT, use 3–4 wraps).
- Prepared fittings should engage about 2 turns by hand and at least 5–6 turns before reaching the recommended torque. Failure to reach minimum engagement usually indicates poorly formed or damaged threads.

THREAD SIZE	RECOMMENDED TORQUE	
1/16 NPT	4–5 Nm	3–4 ft-lb
1/8 NPT	20–23 Nm	15–17 ft-lb
1/4 NPT	24–29 Nm	18–21 ft-lb
3/8 NPT	27–34 Nm	20–25 ft-lb
1/2 NPT	54–61 Nm	40–45 ft-lb
3/4 NPT	88–102 Nm	65–75 ft-lb
1 NPT	129–163 Nm	95–120 ft-lb
1-1/4 NPT	176–203 Nm	130–150 ft-lb

## BSPP THREADS

British Standard Parallel Pipe threads (BSPP) seal with the use of a bonded or metal seal that is crushed between the male and female thread at either the face or the shoulder, they do not seal on the threads. A paste type anti-seize compound such as Swagelok Blue Goop® works most effectively with BSPP threads.

- Use anti-seize compound on male thread.
- Prepared fittings should engage fully by hand.

THREAD SIZE	RECOMMENDED TORQUE	
1/8 BSPP	20–22 Nm	15–16 ft-lb
1/4 BSPP	30–35 Nm	22–26 ft-lb
3/8 BSPP	40–50 Nm	30–37 ft-lb
1/2 BSPP	55–65 Nm	41–50 ft-lb
3/4 BSPP	90–100 Nm	66–74 ft-lb
1 BSPP	135–160 Nm	100–118 ft-lb
1-1/4 BSPP	200–230 Nm	150–170 ft-lb

## METRIC THREADS

Metric threads with cone seal (M36, M24, M7) seal with the use of an angled male and female conical surface, they do not seal on the threads. A paste type anti-seize compound such as Swagelok Blue Goop® works most effectively with metric cone seal threads.

- Use anti-seize compound on male thread.
- Prepared fittings should engage fully by hand.

THREAD SIZE	RECOMMENDED TORQUE	
M7	18–20 Nm	13–15 ft-lb
M24	90–105 Nm	66–77 ft-lb
M36	190–220 Nm	140–162 ft-lb

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## TYPE M SWIVEL

Type M swivel nut threads (TM12, AF 060-XX, AF 061-XX, AF 062-XX, AF 063-XX) seal with the use of an angled male and female cone, they do not seal on the threads. Designed for fast, simple connections of waterblast hoses and waterblast equipment. A paste type anti-seize compound such as Swagelok Blue Goop® works most effectively with metric cone seal threads.

- Use anti-seize compound on male thread.
- Prepared fittings should engage fully by hand.

THREAD SIZE	RECOMMENDED TORQUE	
9/16	46–52 Nm	34–38 ft-lb
3/4	75–81 Nm	55–60 ft-lb
7/8	102–109 Nm	75–80 ft-lb
1	122–135 Nm	90–100 ft-lb
1-5/16	176–203 Nm	130–150 ft-lb

## SAPPHIRE NOZZLES

Sapphire Nozzle threads (OS4, OS6, OS7) seal with the use of an angled male and female seat, they do not seal on the threads. A paste type anti-seize compound such as Swagelok Blue Goop® works most effectively with seat seal threads.

- Use anti-seize compound on male thread.
- Prepared fittings should engage fully by hand.

THREAD SIZE	RECOMMENDED TORQUE	
1/4-28 OS4	6–7.5 Nm	4.5–5.5 ft-lb
3/8-24 OS6	19–22 Nm	14–16 ft-lb
7/16-20 OS7	34–37 Nm	25–27 ft-lb

## SAPPHIRE/M3 NOZZLES

Sapphire and M3 Nozzle threads (OS2, OD3M) seal with the use of a thread sealing compound. Loctite® 680 is applied to the male thread. This type of thread needs to have a curing time of 24 hours before water pressure is applied.

- Use thread sealing compound on male thread.
- Prepared fittings should engage fully by hand.

THREAD SIZE	RECOMMENDED TORQUE	
M3 Drilled Nozzle	6–7.5 Nm	4.5–5.5 ft-lb
6-40 UNF Sapphire Nozzle	19–22 Nm	14–16 ft-lb

## STONEAGE PROPRIETARY

StoneAge proprietary threads (G9, G12, G16, K) seal with the use of an O-Ring on the male thread and a flat face at the bottom of the female thread, they do not seal on the threads. A paste type anti-seize compound such as Swagelok Blue Goop® works most effectively with these StoneAge propriety threads.

- Use anti-seize compound on male thread.
- Prepared fittings should engage fully by hand.

THREAD TYPE	RECOMMENDED TORQUE	
G9	46–52 Nm	34–38 ft-lb
G12	75–81 Nm	55–60 ft-lb
G16	105–115 Nm	80–90 ft-lb
K	122–135 Nm	90–100 ft-lb

## MEDIUM & HIGH PRESSURE FITTINGS

These “cone and thread” fittings use straight threads and seal on a tapered cone. There are two pressure ranges for this type of connection: medium pressure up to 22,000 psi, and high pressure up to 40,000 psi. The traditional design consists of pressure containing tubing with a cone on one end and a left-hand thread for a collar, and a larger gland nut with right-hand threads. Fitting sizes are indicated by tubing O.D.

Anti-vibe, an additional feature typically included, consists of a split tapered collet that grips the tubing in support to prevent cracking at the left-hand thread.

Variations of these fittings are made where the entire geometry is reproduced in one piece, and where the tubing itself is directly threaded into a port with either left or right hand threads.

Female ports have a weep hole that will leak if the fitting is not tightened, if the cone surface is damaged, or if the collar is not threaded on far enough to allow contact of the cone to the seat. If a connection leaks along the tubing through the inside of the gland nut, inspect for a crack in the tubing threads.

## Gland and Collar Assemblies

- Inspect cone surface for damage.
- Use Swagelok Blue Goop® anti-seize on all male threads.
- Slide gland nut onto tubing, then thread on collar until one thread shows between collar and cone.
- Tighten medium pressure anti-vibe nut last while holding other flats.

## One Piece Connections

- Inspect cone surface for damage.
- Use Swagelok Blue Goop® anti-seize on male threads and lightly on cone.

THREAD SIZE	RECOMMENDED TORQUE	
1/4-28 Left Hand	6.5 Nm	5 ft-lb
1/4-28 Right Hand	6.5 Nm	5 ft-lb
1/4 Gland and Collar 7/16-20	24 Nm	18 ft-lb
3/8-24 Left Hand	22 Nm	16 ft-lb
3/8-24 Right Hand	22 Nm	16 ft-lb
3/8 Gland and Collar 9/16-18	38 Nm	28 ft-lb
9/16-18 Left Hand	47 Nm	34 ft-lb
9/16-18 Right Hand	47 Nm	34 ft-lb
9/16 Gland and Collar 13/16-16	68 Nm	50 ft-lb
3/4-16 Left Hand	70 Nm	50 ft-lb
3/4-16 Right Hand	70 Nm	50 ft-lb
3/4 Gland and Collar 3/4-14 NPSM	102 Nm	75 ft-lb
1-12 Left Hand	98 Nm	70 ft-lb
1-12 Right Hand	98 Nm	70 ft-lb
1 Gland and Collar 1-3/8-12	135 Nm	100 ft-lb

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### **IMPORTANT!**

**If you apply these torques without an anti-seize compound on stainless steel connections, they will gall and can be permanently damaged.**

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**Always observe these precautions when tightening tools:**

- The condition of the threads is important to ensure proper engagement or strength, and threads should always be inspected before use.
- Proper tightening is important to ensure sealing and to prevent unthreading due to twisting or vibration. However, high pressure waterblast fittings are commonly made with stainless steel, and thread contact force makes them susceptible to galling if not properly prepared with an anti-seize compound before assembly.
- StoneAge recommends the use of Parker Thread-Mate™ for tapered pipe threads and Blue Goop® for straight thread. High temperature anti-seize compounds containing metallic particles are not recommended as the particles can damage sapphire nozzles.
- If wrench flats are provided on the components, use only correctly sized open-end wrenches.  
***Teeth from pipe wrenches can initiate cracks in hardened steel components.***