About Working Pressure

The tables on the following pages list the recommended working pressure for a variety of hydraulic fittings made in accordance with world standards. Many factors such as impulse, vibration, mechanical shock, and improper assembly may affect the integrity of the fitting connection.

Tompkins Industries and SAE International™ recommend sufficient testing be conducted to ensure that performance lev-els will be safe and satisfactory, especially if installed in systems operating at elevated pressures or in severe conditions. Working pressure ratings are capable of a 4 to 1 minimum burst. All steel fittings meet or exceed the minimum SAE pressure ratings. Always consider application and maximum pressure requirements when selecting fittings.

WARNING: WHEN USING A FITTING WITH VARYING CONNECTION SIZES OR TYPES, DO NOT EXCEED THE WORKING PRESSURE OF THE LOWEST RATED CONNECTION END COMPRISING THE FITTING.

For pressures exceeding SAE standards, please contact the Tompkins Technical Staff.

Methods for Installing Fittings

There are three methods for installing a fitting:

- Torque wrench
- Flats From Wrench Resistance (FFWR)
- Turns From Finger Tight (TFFT)

For Flare and NPSM Fittings, Tompkins recommends the FFWR method be used whenever possible. When torque wrenches are not available or usable, use the FFWR method.

The differences in materials, plating, and surface finish impacts the coefficient of friction when installing or connecting fittings. To minimize these variances, Tompkins recommends that fitting connections are lubricated when installed. Connections that are lubricated provide a more accurate installation torque, which results in significantly fewer leaks.

Using a Torque Wrench

The torque values given in the tables on the following pages are for reference purposes only based on industry standard practice and for low carbon steel mating with steel/iron components. Actual torque values may need to be adjusted due to variances described above.

SAE recommends always making a wet (lubricated) installation or connection to reduce friction on moving parts, O-rings, and variances in material and plating. The torque values in these tables are based off SAE values using a .17 coefficient of friction as per SAE J2593. For torque on softer materials such as brass or aluminum, reduce the value in the table by 1/3. Example, 30 ft/lbs would be 20 ft/lbs. Many hydraulic leaks are a result of over-torque, which causes excessive deformation of material or exceeds the yield strength of the material, which may reduce the load or clamping force between seal contacts.

If more than one value or range is given, use the lower value first and increase only if required. Over-torquing can damage a fitting or mating component.

Using Flats From Wrench Resistance (FFWR) For Flared Fittings

Flats From Wrench Resistance (FFWR) is the preferred method of connecting flared fittings such as JIC and NPSM. Due to variance in materials, flared fittings are more susceptible to over-torque because of the cone collapse during connection. Tompkins Industries, SAE International, and other fitting suppliers recommend that the FFWR method be used for flared fitting connections whenever possible. When torque wrenches are not available, the FFWR may be used for other fitting installation connection types.

The Flats From Wrench Resistance (FFWR) method is based on the hexagon or hex nut of a fitting. The hex nut is divided into angles of rotation of a circle or 360°. One hex nut side is a Flat and makes up of 1/6 of the circle or 60°. Hence, to turn one flat is equal to 60° of rotation.

For example, we can think of a hex nut like a clock face. One flat equals 2 hours or 60° *(Figure 1)*.

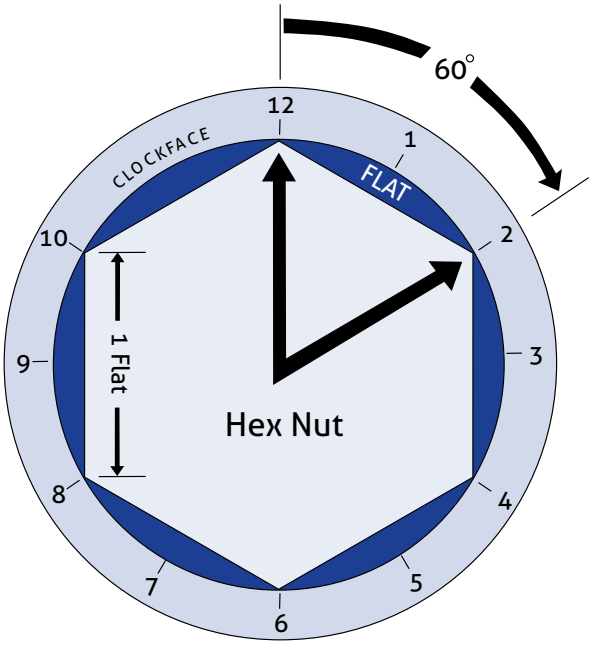

Figure 1: FFWR Diagram

Using Turns From Finger Tight (TFFT) For Tapered Fittings

Turns From Finger Tight (TFFT) is the preferred method for tapered fittings such as NPT and BSPT. Taper threaded ports and fittings seal on the threads engaging each other, but do require a sealant to insure sealing.

NPT threaded connections can have a small void at the root/crest junction when external and internal thread flanks make contact. Without the application of a proper thread sealant to fill this void, a spiral leak path will occur.

On NPTF threads *(Figure 2)*, the root and crest are machined with higher precision and a smaller tolerance enabling the flanks to contact more area, further minimizing the crest to root void. Even though NPTF threaded connections are more precise, they also require a thread sealant prior to installation to improve sealing.

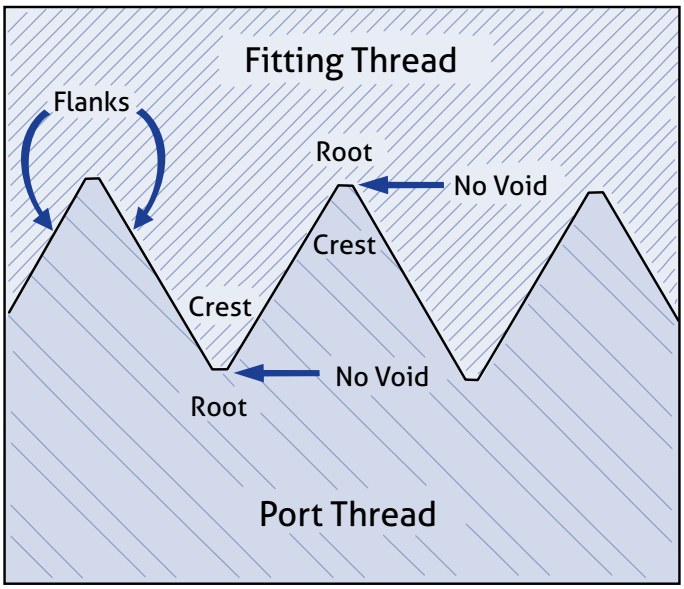

Figure 2 : NPTF Thread View

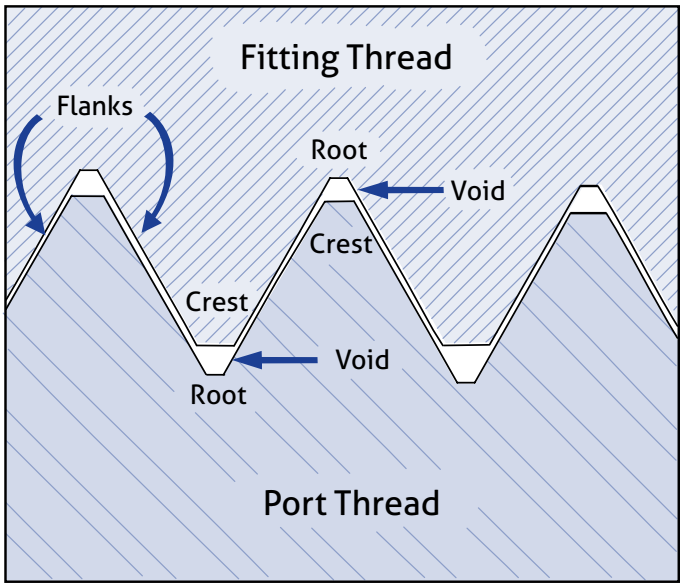

Figure 3 : NPT Thread View

BSPT and Metric tapered threads work and are installed in the same manner as NPT and NPTF. Confirm with the thread sealant supplier instructions that you are using the correct sealant for the application.

Because of the extent of variables involved in this type of seal such as material, type of sealant, thread quality and other factors, the TFFT method helps insure the correct torque is applied. This method focuses on the number of threads engaged rather than a set applied installation force (i.e. ft-lbs). From the point of finger tight is when the turns are counted. Then using a wrench, further tighten the fitting the correct number of turns or full revolutions from finger tight.

Visit the website at tompkinsind.com for more information about using our products, helpful assembly video information, product identification, CAD drawings and our wide range of product lines.