

NPT Vs. NPTF Taper Pipe Threads

The two most common taper pipe threads used in the United States are NPT and NPTF. Applications range from electrical conduits and hand railings to high-pressure pipe lines that carry gas or caustic fluids. NPT threads are for mechanical or low-pressure air or fluid applications and require the use of sealing compounds like Teflon tape, to provide the seal. When the application is more critical, and the sealing compound may fail due to high heat or pressure, NPTF Dryseal threads are used. This mechanical seal is produced by the mating and slight crushing of the threads when a wrench is applied to tighten the fittings.

Visually, both threads appear to be identical. Both have a 3/4" taper over one foot of length. Both have the same pitch diameter at the top of the hole of internal threads or end of the pipe on external threads, and both have the same thread lengths or depths. However, there is a subtle difference in the thread form that differentiates the two. The major and minor diameters of both threads differ slightly. With NPT threads, after a wrench is applied, slight spaces at the major and minor diameters may exist that would allow the assembly to leak and therefore a sealing compound is used to fill any gaps. On the other hand, NPTF threads are designed to ensure that sufficient crushing of the entire thread form will take place to produce a mechanical seal.

How does the difference in thread forms effect the tooling used to produce NPT and NPTF threads? Taps are available for both NPT and NPTF threads having the appropriate form to produce each type of thread. Since NPT threaded parts require sealing compounds, it is acceptable to use an NPTF tap for NPT applications. However, NPT taps cannot be used for NPTF applications, as it will likely produce a thread that will leak. The same is true of external threads. In most cases the tap drill is the same for both forms.

The most significant difference in the two threads is the inspection required. Since sealing compounds will be used for NPT threads, only a single plug with a step, known as an L1 plug (internal thread) or a single thin L1 ring (external) are required to check size. However, since the taper and the position of major and minor diameters are so critical to the sealing of NPTF threads, the additional threads in the assembly known as L2 and L3, and the major and minor diameters are inspected with either special plug or ring gauges.