Identifying Threads

TAPERED PARALLEL

Step 1 – Determine if the thread is tapered or parallel. NPT/NPTF and BSPT are tapered threads while UN/UNF and BSPP are parallel. Metric Tapered and Metric Parallel speak for themselves. In some cases, Step 1 can be accomplished by visual inspection alone. Tapered threads get smaller in diameter toward the end of the fitting while parallel threads maintain the same diameter from start to finish. If this is not obvious by looking at the fitting, use the parallel jaws of a caliper to make a comparison.

Step 2 – Determine the pitch. This can be deciphered using a pitch gage for comparison or by accurately measuring and calculating the number of threads within a given distance. It is much easier to compare threads against a lighted background with a pitch gage. Because some thread pitches are relatively similar, it is advisable to try a number of gages before deciding which one fits best. The result from Step 2 will narrow down the possible thread forms even more because most have a distinct pitch. Consult the "Step 2" column in *Table 1* for possible pitches.

Step 3 – Determine the size. Combining the results of Steps 1 and 2 will determine – or help predict, in some cases – the correct procedure for Step 3. There are two methods for determining the thread size – which to use depends on whether the thread is a pipe thread (NPT/NPTF, BSPT, BSPP) or is not a pipe thread (UN/UNF, Metric Parallel, Metric Tapered). Keep in mind that tapered (as determined in step 1) does not necessarily mean that it is a pipe thread (e.g. Metric Tapered). Likewise, pipe thread can be parallel (e.g. BSPP). For pipe thread, determine the size by comparing it with a nominal size profile, as shown in Figure 1 (a useful tip – pipe sizes up to 2" nominal size can be determined by measuring the actual outside diameter, subtracting ¼" then rounding-off). For non- pipe thread, the actual size can be determined by measuring the outside diameter (major diameter) with a caliper, as shown in Figure 2.

Step 4 – Designate the thread. Technically, this final step does not pertain to identifying the thread. Rather, it is a method of designating the thread type in an industry standard format for others to understand. Examples of the various formats are shown in the "Step 4" column of Table 1. These typically have an indication of the thread size (whether nominal or actual), the type and – in some cases – the pitch. Your company's maintenance and repair professionals can put this easy four-step process to use to minimize machine downtime, avoid the expense of acquiring (and returning) incorrect parts and help ensure a safe, accident- free work environment.

Summary of How to Identify Threads – In order to differentiate between the various thread types, all that is needed is this reference chart, a caliper and a thread gage. The most important tool is the thread gage (or pitch gage). This tool, which has a "saw tooth" appearance, helps determine the thread pitch. It has a specified number of serrations within a certain distance and is (usually) marked accordingly. For metric threads, the pitch is considered as the distance, in millimeters, between each thread. For all other threads, the pitch is considered as the number of threads per inch.

Thread Type	**Step 1** Determine Type	**Step 2** Determine Pitch	**Step 3** Determine Size	**Step 4** Define Thread
UN/UNF (SAE)	Parallel	12,14,16,18, 20, 24	Measure with caliper	Size-pitch, type (3/4-16 UN/UNF)
NPT/NPTF (American Pipe)	Tapered	11½ ,14,18, 27	Compare with profile	Size-pitch, type (1/4-18 NPT)
BSPP (British Pipe)	Parallel	11,14,19, 28	Compare with profile	G, size (G1/8)
BSPT (British Pipe)	Tapered	11,14,19, 28	Compare with profile	R, size (R1/2)
Metric (Parallel)	Parallel	1.0, 1.5, 2.0	Measure with caliper	M, size x pitch (M14x1.5)
Metric (Tapered)	Tapered	1.0, 1.5, 2.0	Measure with caliper	M, size x pitch, keg or Taper (M10 x 1 keg or Taper)

Thread Compatibility

Threads	System Name	Compatibility	Seal Method
BSPP	**B**ritish **S**tandard **P**ipe **P**arallel	Male BSPP with Female BSPP Female BSPP with Male BSPP Female BSPP with Male BSPTr	Washer Washer Washer
BSPTr	**B**ritish **S**tandard **P**ipe **T**aper	Male BSPTr with Female BSPTr Male BSPTr with Female BSPP Female BSPTr with Male BSPTr	Thread Washer Thread
IPS	**I**ron **P**ipe **S**traight **T**hread	Generic Name for Straight Pipe Thread *See NPSH for compatibility*	Washer
IPT	**I**ron **P**ipe **T**hread	Generic Name for All Pipe Thread *More information required*	
NH or **NST**	American Standard Fire Hose Coupling Thread (**N**ational **H**ose thread also known as **N**ational **S**tandard **T**hread)	Male NH (NST) with Female NH (NST) Female NH (NST) with Male NH (NST) *Not compatible with other systems*	Washer Washer
NPT	American Standard Taper Pipe Thread (**N**ational **P**ipe **T**apered)	Male NPT with Female NPT Male NPT with Female NPTF Male NPT with Female NPSM Male NPT with Female NPSH Female NPT with Male NPT Female NPT with Male NPTF	Thread Thread Washer Washer Thread Thread
NPSM	American Standard Straight Mechanical Joints (**N**ational **P**ipe **S**traight **M**echanical)	Male NPSM with Female NPSM Male NPSM with Female NPSH Female NPSM with Male NPSM Female NPSM with Male NPT Female NPSM with Male NPTF	Seal can be either mechanical or washer. Mating fittings must be of same type.
SIPT	**S**traight **I**ron **P**ipe **T**hread	Generic name for Straight Pipe Thread	Washer
TIPT	**T**apered **I**ron **P**ipe **T**hread	Generic name for Tapered Pipe Thread	Thread

Thread Dimensions

Nominal Dimensions of Standard Threads

Size	Pipe O.D.	Tapered Threads		Straight Threads											
		NPT	BSPTr	NPSH			NPSM			NST (NH)			BSPP		
		TPI	TPI	TPI	ODM (max)	IDF (min)	TPI	ODM (max)	IDF (min)	TPI	ODM (max)	IDF (min)	TPI	ODM (max)	IDF (min)
1/8"	.405	27	28				27	0.397	0.358					0.383	0.337
1/4"	.504	18	19				18	0.526	0.468					0.516	0.450
3/8"	.675	18	19				18	0.662	0.603					0.656	0.588
1/2"	.840	14	14	14	0.8248	0.7395	14	0.823	0.747					0.825	0.733
3/4"	1.050	14	14	14	1.0353	0.9500	14	1.034	0.958	8	1.375	1.2246		1.041	0.950
1"	1.315	11.5	11	11.5	1.2951	1.1921	11.5	1.293	1.201	8	1.375	1.2246	11	1.309	1.193
1-1/4"	1.660	11.5	11	11.5	1.6399	1.5369	11.5	1.638	1.546				11	1.650	1.534
1-1/2"	1.900	11.5	11	11.5	1.8788	1.7758	11.5	1.877	1.785	9	1.990	1.8577		1.882	1.766
2"	2.375	11.5	11	11.5	2.3528	2.2498	11.5	2.351	2.259				11	2.347	2.231
2-1/2"	2.875	8	11	8	2.8434	2.6930	8	2.841	2.708	7.5	3.068	2.9104	11	2.960	2.844
3"	3.500	8	11				8	3.467	3.334	6	3.623	3.5306	11	3.460	3.344
4"	4.500	8	11				8	4.466	4.333	4	5.010	4.7111		4.450	4.334
4-1/2"										4	5.760	5.4611	11		
5"	5.563	8	11				8	5.528	5.395	4	6.260	5.9602	11	5.450	5.359
6"	6.625	8	11				8	6.585	6.452	4	7.025	6.7252		6.450	6.359
8"	8.625	8													
10"	10.750	8													
12"	12.750	8													

ODM – Outside Diameter of the Male

IDF – Inside Diameter of the Female

TPI – Threads per Inch

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