ACE Hardware Zimbabwe

Thread Identification & Pitch Chart

Identify an unknown thread by diameter, pitch and form: metric, unified, Whitworth, pipe, BA and lead-screw threads.

Workshop Reference Charts
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How to identify a thread

1. **Measure the outside diameter** of the bolt (or the bore of the nut and add about one pitch). Used threads measure a little under nominal, typically 0.1 – 0.2 mm.
2. **Measure the pitch.** Use a thread gauge, or measure across 10 crests and divide by 10 (mm pitch). For inch threads, count the crests in 1 inch (TPI).
3. **Check for taper.** If the diameter gets smaller along the thread it is a taper pipe thread (BSPT/R or NPT, 1 in 16 on diameter).
4. **Look at the form.** Rounded crests and roots = 55° Whitworth or BSP. Sharp V with small flats = 60° metric, unified or NPT. Square-shouldered flat teeth = trapezoidal or Acme lead screw.
5. **Match diameter and pitch** in the tables below. Remember that pipe threads are named after the pipe bore: a 1/2" BSP thread is about 21 mm across.

Common thread forms

Thread	Angle	Pitch given as	Where you'll find it
ISO metric (M)	60°	Pitch in mm	General engineering, worldwide
Unified UNC / UNF	60°	TPI	USA, Canada; American machinery
Whitworth BSW / BSF	55°	TPI	Older British machinery and vehicles
BSP parallel (G) / taper (R, Rc)	55°	TPI	Pipes, fittings, hydraulics
NPT (taper) / NPS (parallel)	60°	TPI	American pipe fittings
BA	47.5°	Pitch in mm	Instruments, electrical, models
Trapezoidal (Tr)	30°	Pitch in mm	Lead screws, vices, jacks (metric)
Acme	29°	TPI	Lead screws (inch)

Pitch and TPI

Metric pitch to TPI

Pitch mm	= TPI
0.35	72.6
0.4	63.5
0.45	56.4
0.5	50.8
0.6	42.3
0.7	36.3
0.75	33.9
0.8	31.7
1	25.4
1.25	20.3
1.5	16.9
1.75	14.5
2	12.7
2.5	10.2
3	8.5
3.5	7.3
4	6.3

TPI to pitch

TPI	= pitch mm
80	0.318
64	0.397
56	0.454
48	0.529
40	0.635
36	0.706
32	0.794
28	0.907
26	0.977
24	1.058
22	1.155
20	1.27
19	1.337
18	1.411
16	1.587
14	1.814
13	1.954
12	2.117
11	2.309
10	2.54
9	2.822
8	3.175

Easily confused threads

Metric	Similar inch thread	OD mm	Pitch mm
M5 × 0.8	#10-32 UNF	5 vs 4.83	0.8 vs 0.79
M6 × 1	1/4" BSF	6 vs 6.35	1 vs 0.98
M6 × 1	1/4" UNC	6 vs 6.35	1 vs 1.27
M8 × 1.25	5/16" UNC	8 vs 7.94	1.25 vs 1.41
M10 × 1.25	3/8" BSF	10 vs 9.52	1.25 vs 1.27
M10 × 1.5	3/8" UNC	10 vs 9.52	1.5 vs 1.59
M12 × 1.75	1/2" UNC	12 vs 12.70	1.75 vs 1.95

> Pitches that are within a few percent of each other will start by hand and then jam. If a thread binds after two or three turns, stop and check the pitch: forcing it ruins both parts.

Bolt threads by measured diameter (up to 1")

Thread	Pitch	OD mm	Family
M1.6	0.35 mm	1.6	Metric coarse
M2	0.4 mm	2	Metric coarse
#2 UNC	56 TPI	2.18	Unified coarse
#2 UNF	64 TPI	2.18	Unified fine
M2.5	0.45 mm	2.5	Metric coarse
#4 UNC	40 TPI	2.84	Unified coarse
#4 UNF	48 TPI	2.84	Unified fine
M3	0.5 mm	3	Metric coarse
#5 UNC	40 TPI	3.17	Unified coarse
1/8" BSW	40 TPI	3.17	Whitworth
#6 UNC	32 TPI	3.51	Unified coarse
#6 UNF	40 TPI	3.51	Unified fine
M4	0.7 mm	4	Metric coarse
#8 UNC	32 TPI	4.17	Unified coarse
#8 UNF	36 TPI	4.17	Unified fine
3/16" BSF	32 TPI	4.76	British fine
3/16" BSW	24 TPI	4.76	Whitworth
#10 UNC	24 TPI	4.83	Unified coarse
#10 UNF	32 TPI	4.83	Unified fine
M5	0.8 mm	5	Metric coarse
#12 UNC	24 TPI	5.49	Unified coarse
#12 UNF	28 TPI	5.49	Unified fine
7/32" BSF	28 TPI	5.56	British fine
M6	1 mm	6	Metric coarse
1/4" BSF	26 TPI	6.35	British fine
1/4" UNC	20 TPI	6.35	Unified coarse
1/4" UNF	28 TPI	6.35	Unified fine
1/4" BSW	20 TPI	6.35	Whitworth
5/16" BSF	22 TPI	7.94	British fine
5/16" UNC	18 TPI	7.94	Unified coarse
5/16" UNF	24 TPI	7.94	Unified fine
5/16" BSW	18 TPI	7.94	Whitworth
M8	1.25 mm	8	Metric coarse
3/8" BSF	20 TPI	9.52	British fine
3/8" UNC	16 TPI	9.52	Unified coarse
3/8" UNF	24 TPI	9.52	Unified fine
3/8" BSW	16 TPI	9.52	Whitworth
M10	1.5 mm	10	Metric coarse
7/16" BSF	18 TPI	11.11	British fine
7/16" UNC	14 TPI	11.11	Unified coarse
7/16" UNF	20 TPI	11.11	Unified fine
7/16" BSW	14 TPI	11.11	Whitworth
M12	1.75 mm	12	Metric coarse
1/2" BSF	16 TPI	12.7	British fine
1/2" UNC	13 TPI	12.7	Unified coarse
1/2" UNF	20 TPI	12.7	Unified fine
1/2" BSW	12 TPI	12.7	Whitworth
M14	2 mm	14	Metric coarse
9/16" BSF	16 TPI	14.29	British fine
9/16" UNC	12 TPI	14.29	Unified coarse
9/16" UNF	18 TPI	14.29	Unified fine
5/8" BSF	14 TPI	15.88	British fine
5/8" UNC	11 TPI	15.88	Unified coarse
5/8" UNF	18 TPI	15.88	Unified fine
5/8" BSW	11 TPI	15.88	Whitworth
M16	2 mm	16	Metric coarse
M18	2.5 mm	18	Metric coarse
3/4" BSF	12 TPI	19.05	British fine
3/4" UNC	10 TPI	19.05	Unified coarse
3/4" UNF	16 TPI	19.05	Unified fine
3/4" BSW	10 TPI	19.05	Whitworth
M20	2.5 mm	20	Metric coarse
M22	2.5 mm	22	Metric coarse
7/8" BSF	11 TPI	22.22	British fine
7/8" UNC	9 TPI	22.22	Unified coarse
7/8" UNF	14 TPI	22.22	Unified fine
7/8" BSW	9 TPI	22.22	Whitworth
M24	3 mm	24	Metric coarse
1" BSF	10 TPI	25.4	British fine
1" UNC	8 TPI	25.4	Unified coarse
1" UNF	12 TPI	25.4	Unified fine
1" BSW	8 TPI	25.4	Whitworth

Pipe, small and lead-screw threads

Pipe threads - BSP vs NPT

Pipe size	BSP TPI	BSP thread OD mm	NPT TPI	NPT pipe OD mm
1/8"	28	9.73	27	10.3
1/4"	19	13.16	18	13.7
3/8"	19	16.66	18	17.1
1/2"	14	20.95	14	21.3
3/4"	14	26.44	14	26.7
1"	11	33.25	11.5	33.4
1-1/4"	11	41.91	11.5	42.2
1-1/2"	11	47.8	11.5	48.3
2"	11	59.61	11.5	60.3

BSP and NPT have different thread angles (55° vs 60°) and, for most sizes, different TPI. 1/2" and 3/4" share 14 TPI, so they may start, but they will not seal. Never mix them.

BA threads

BA	OD mm	Pitch mm
0 BA	6	1
1 BA	5.3	0.9
2 BA	4.7	0.81
3 BA	4.1	0.73
4 BA	3.6	0.66
5 BA	3.2	0.59
6 BA	2.8	0.53
7 BA	2.5	0.48
8 BA	2.2	0.43
9 BA	1.9	0.39
10 BA	1.7	0.35

Trapezoidal (DIN 103 preferred)

Trapezoidal	Pitch mm
Tr8	1.5
Tr10	2
Tr12	3
Tr14	3
Tr16	4
Tr18	4
Tr20	4
Tr22	5
Tr24	5
Tr26	5
Tr28	5
Tr30	6
Tr32	6
Tr36	6
Tr40	7
Tr44	7
Tr50	8
Tr60	9

Acme (general purpose)

Acme	TPI
1/4"	16
5/16"	14
3/8"	12
7/16"	12
1/2"	10
5/8"	8
3/4"	6
7/8"	6
1"	5
1-1/4"	5
1-1/2"	4
1-3/4"	4
2"	4

Guide values for general workshop use. Always follow the equipment or fastener maker's figure where one is given, and check critical work against the relevant standard.

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