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Drill Size and Tap Drill Chart

Number, letter, fractional and metric drills in decimal inches and mm, with UNC, UNF and metric tap drills

For: Machinists, toolmakers, engineers, makers and students

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KEY RELATIONSHIP
1 in = 25.4 mm. Number drills run from #80 (0.0135 in) to #1 (0.228 in); letters A–Z continue to 0.413 in

FORMULA
Metric tap drill ≈ major diameter − pitch; % thread (UN) = TPI × (D − drill) ÷ 0.01299

REVERSE
Drill (UN) for a target thread % = D − (% × 0.01299 ÷ TPI)

WORKED EXAMPLE
M8 × 1.25: 8 − 1.25 = 6.75 mm, usually a 6.8 mm drill; 1/4-20 UNC: #7 (0.201 in) gives 75% thread

Decimal inches to 4 places, millimetres to 3 (2 for tap drills). Tap drills give about 75% thread; harder materials can use a slightly larger drill.

Inch drill sizes up to 1/2 inch (number, letter and fraction, in size order)

Drill	Inches	mm	Drill	Inches	mm	Drill	Inches	mm	Drill	Inches	mm
#80	0.0135	0.343	#49	0.0730	1.854	#20	0.1610	4.089	I	0.2720	6.909
#79	0.0145	0.368	#48	0.0760	1.930	#19	0.1660	4.216	J	0.2770	7.036
1/64	0.0156	0.397	5/64	0.0781	1.984	#18	0.1695	4.305	K	0.2810	7.137
#78	0.0160	0.406	#47	0.0785	1.994	11/64	0.1719	4.366	9/32	0.2813	7.144
#77	0.0180	0.457	#46	0.0810	2.057	#17	0.1730	4.394	L	0.2900	7.366
#76	0.0200	0.508	#45	0.0820	2.083	#16	0.1770	4.496	M	0.2950	7.493
#75	0.0210	0.533	#44	0.0860	2.184	#15	0.1800	4.572	19/64	0.2969	7.541
#74	0.0225	0.571	#43	0.0890	2.261	#14	0.1820	4.623	N	0.3020	7.671
#73	0.0240	0.610	#42	0.0935	2.375	#13	0.1850	4.699	5/16	0.3125	7.938
#72	0.0250	0.635	3/32	0.0938	2.381	3/16	0.1875	4.762	O	0.3160	8.026
#71	0.0260	0.660	#41	0.0960	2.438	#12	0.1890	4.801	P	0.3230	8.204
#70	0.0280	0.711	#40	0.0980	2.489	#11	0.1910	4.851	21/64	0.3281	8.334
#69	0.0292	0.742	#39	0.0995	2.527	#10	0.1935	4.915	Q	0.3320	8.433
#68	0.0310	0.787	#38	0.1015	2.578	#9	0.1960	4.978	R	0.3390	8.611
1/32	0.0313	0.794	#37	0.1040	2.642	#8	0.1990	5.055	11/32	0.3438	8.731
#67	0.0320	0.813	#36	0.1065	2.705	#7	0.2010	5.105	S	0.3480	8.839
#66	0.0330	0.838	7/64	0.1094	2.778	13/64	0.2031	5.159	T	0.3580	9.093
#65	0.0350	0.889	#35	0.1100	2.794	#6	0.2040	5.182	23/64	0.3594	9.128
#64	0.0360	0.914	#34	0.1110	2.819	#5	0.2055	5.220	U	0.3680	9.347
#63	0.0370	0.940	#33	0.1130	2.870	#4	0.2090	5.309	3/8	0.3750	9.525
#62	0.0380	0.965	#32	0.1160	2.946	#3	0.2130	5.410	V	0.3770	9.576
#61	0.0390	0.991	#31	0.1200	3.048	7/32	0.2188	5.556	W	0.3860	9.804
#60	0.0400	1.016	1/8	0.1250	3.175	#2	0.2210	5.613	25/64	0.3906	9.922
#59	0.0410	1.041	#30	0.1285	3.264	#1	0.2280	5.791	X	0.3970	10.084
#58	0.0420	1.067	#29	0.1360	3.454	A	0.2340	5.944	Y	0.4040	10.262
#57	0.0430	1.092	#28	0.1405	3.569	15/64	0.2344	5.953	13/32	0.4063	10.319
#56	0.0465	1.181	9/64	0.1406	3.572	B	0.2380	6.045	Z	0.4130	10.490
3/64	0.0469	1.191	#27	0.1440	3.658	C	0.2420	6.147	27/64	0.4219	10.716
#55	0.0520	1.321	#26	0.1470	3.734	D	0.2460	6.248	7/16	0.4375	11.112
#54	0.0550	1.397	#25	0.1495	3.797	1/4	0.2500	6.350	29/64	0.4531	11.509
#53	0.0595	1.511	#24	0.1520	3.861	E	0.2500	6.350	15/32	0.4688	11.906
1/16	0.0625	1.588	#23	0.1540	3.912	F	0.2570	6.528	31/64	0.4844	12.303
#52	0.0635	1.613	5/32	0.1563	3.969	G	0.2610	6.629	1/2	0.5000	12.700
#51	0.0670	1.702	#22	0.1570	3.988	17/64	0.2656	6.747			

Drill	Inches	mm	Drill	Inches	mm	Drill	Inches	mm
#50	0.0700	1.778	**#21**	0.1590	4.039	**H**	0.2660	6.756

Fractional drills over 1/2 inch

Drill	Inches	mm	Drill	Inches	mm	Drill	Inches	mm	Drill	Inches	mm
33/64	0.5156	13.097	**41/64**	0.6406	16.272	**49/64**	0.7656	19.447	**57/64**	0.8906	22.622
17/32	0.5313	13.494	**21/32**	0.6563	16.669	**25/32**	0.7813	19.844	**29/32**	0.9063	23.019
35/64	0.5469	13.891	**43/64**	0.6719	17.066	**51/64**	0.7969	20.241	**59/64**	0.9219	23.416
9/16	0.5625	14.288	**11/16**	0.6875	17.463	**13/16**	0.8125	20.638	**15/16**	0.9375	23.813
37/64	0.5781	14.684	**45/64**	0.7031	17.859	**53/64**	0.8281	21.034	**61/64**	0.9531	24.209
19/32	0.5938	15.081	**23/32**	0.7188	18.256	**27/32**	0.8438	21.431	**31/32**	0.9688	24.606
39/64	0.6094	15.478	**47/64**	0.7344	18.653	**55/64**	0.8594	21.828	**63/64**	0.9844	25.003
5/8	0.6250	15.875	**3/4**	0.7500	19.050	**7/8**	0.8750	22.225	**1**	1.0000	25.400

Metric drills with the nearest inch drill

Metric drill	Inches	Nearest inch drill	Metric drill	Inches	Nearest inch drill
1 mm	0.0394	#61 (0.0390 in)	**7 mm**	0.2756	J (0.2770 in)
1.5 mm	0.0591	#53 (0.0595 in)	**7.5 mm**	0.2953	M (0.2950 in)
2 mm	0.0787	#47 (0.0785 in)	**8 mm**	0.3150	O (0.3160 in)
2.5 mm	0.0984	#40 (0.0980 in)	**8.5 mm**	0.3346	Q (0.3320 in)
3 mm	0.1181	#31 (0.1200 in)	**9 mm**	0.3543	T (0.3580 in)
3.3 mm	0.1299	#30 (0.1285 in)	**9.5 mm**	0.3740	3/8 (0.3750 in)
3.5 mm	0.1378	#29 (0.1360 in)	**10 mm**	0.3937	25/64 (0.3906 in)
4 mm	0.1575	#22 (0.1570 in)	**10.2 mm**	0.4016	Y (0.4040 in)
4.2 mm	0.1654	#19 (0.1660 in)	**10.5 mm**	0.4134	Z (0.4130 in)
4.5 mm	0.1772	#16 (0.1770 in)	**11 mm**	0.4331	7/16 (0.4375 in)
5 mm	0.1969	#9 (0.1960 in)	**12 mm**	0.4724	15/32 (0.4688 in)
5.5 mm	0.2165	7/32 (0.2188 in)	**13 mm**	0.5118	33/64 (0.5156 in)
6 mm	0.2362	B (0.2380 in)	**14 mm**	0.5512	35/64 (0.5469 in)
6.5 mm	0.2559	F (0.2570 in)	**15 mm**	0.5906	19/32 (0.5938 in)
6.8 mm	0.2677	H (0.2660 in)	**16 mm**	0.6299	5/8 (0.6250 in)

UNC and UNF tap drill chart

Thread	Major dia. (in)	TPI	Tap drill	Drill (in)	Drill (mm)	Thread %
#0-80 UNF	0.0600	80	3/64	0.0469	1.19	81%
#1-64 UNC	0.0730	64	#53	0.0595	1.51	67%
#1-72 UNF	0.0730	72	#53	0.0595	1.51	75%
#2-56 UNC	0.0860	56	#50	0.0700	1.78	69%
#2-64 UNF	0.0860	64	#50	0.0700	1.78	79%
#3-48 UNC	0.0990	48	#47	0.0785	1.99	76%
#3-56 UNF	0.0990	56	#45	0.0820	2.08	73%
#4-40 UNC	0.1120	40	#43	0.0890	2.26	71%
#4-48 UNF	0.1120	48	#42	0.0935	2.37	68%
#5-40 UNC	0.1250	40	#38	0.1015	2.58	72%
#5-44 UNF	0.1250	44	#37	0.1040	2.64	71%
#6-32 UNC	0.1380	32	#36	0.1065	2.71	78%
#6-40 UNF	0.1380	40	#33	0.1130	2.87	77%
#8-32 UNC	0.1640	32	#29	0.1360	3.45	69%
#8-36 UNF	0.1640	36	#29	0.1360	3.45	78%

Thread	Major dia. (in)	TPI	Tap drill	Drill (in)	Drill (mm)	Thread %
#10-24 UNC	0.1900	24	#25	0.1495	3.80	75%
#10-32 UNF	0.1900	32	#21	0.1590	4.04	76%
#12-24 UNC	0.2160	24	#16	0.1770	4.50	72%
#12-28 UNF	0.2160	28	#14	0.1820	4.62	73%
1/4-20 UNC	0.2500	20	#7	0.2010	5.11	75%
1/4-28 UNF	0.2500	28	#3	0.2130	5.41	80%
5/16-18 UNC	0.3125	18	F	0.2570	6.53	77%
5/16-24 UNF	0.3125	24	I	0.2720	6.91	75%
3/8-16 UNC	0.3750	16	5/16	0.3125	7.94	77%
3/8-24 UNF	0.3750	24	Q	0.3320	8.43	79%
7/16-14 UNC	0.4375	14	U	0.3680	9.35	75%
7/16-20 UNF	0.4375	20	25/64	0.3906	9.92	72%
1/2-13 UNC	0.5000	13	27/64	0.4219	10.72	78%
1/2-20 UNF	0.5000	20	29/64	0.4531	11.51	72%
9/16-12 UNC	0.5625	12	31/64	0.4844	12.30	72%
9/16-18 UNF	0.5625	18	33/64	0.5156	13.10	65%
5/8-11 UNC	0.6250	11	17/32	0.5313	13.49	79%
5/8-18 UNF	0.6250	18	37/64	0.5781	14.68	65%
3/4-10 UNC	0.7500	10	21/32	0.6563	16.67	72%
3/4-16 UNF	0.7500	16	11/16	0.6875	17.46	77%
7/8-9 UNC	0.8750	9	49/64	0.7656	19.45	76%
7/8-14 UNF	0.8750	14	13/16	0.8125	20.64	67%
1-8 UNC	1.0000	8	7/8	0.8750	22.22	77%
1-12 UNF	1.0000	12	59/64	0.9219	23.42	72%

ISO metric tap drill chart (coarse and fine)

Thread	Pitch (mm)	Series	D − P (mm)	Usual drill (mm)	Drill (in)
M1 × 0.25	0.25	Coarse	0.75	0.75	0.0295
M1.2 × 0.25	0.25	Coarse	0.95	0.95	0.0374
M1.4 × 0.3	0.3	Coarse	1.1	1.1	0.0433
M1.6 × 0.35	0.35	Coarse	1.25	1.25	0.0492
M2 × 0.4	0.4	Coarse	1.6	1.6	0.0630
M2.5 × 0.45	0.45	Coarse	2.05	2.05	0.0807
M3 × 0.5	0.5	Coarse	2.5	2.5	0.0984
M3.5 × 0.6	0.6	Coarse	2.9	2.9	0.1142
M4 × 0.7	0.7	Coarse	3.3	3.3	0.1299
M5 × 0.8	0.8	Coarse	4.2	4.2	0.1654
M6 × 1	1	Coarse	5	5	0.1969
M8 × 1.25	1.25	Coarse	6.75	6.8	0.2677
M8 × 1	1	Fine	7	7	0.2756
M10 × 1.5	1.5	Coarse	8.5	8.5	0.3346
M10 × 1.25	1.25	Fine	8.75	8.8	0.3465
M10 × 1	1	Fine	9	9	0.3543
M12 × 1.75	1.75	Coarse	10.25	10.2	0.4016
M12 × 1.5	1.5	Fine	10.5	10.5	0.4134
M12 × 1.25	1.25	Fine	10.75	10.8	0.4252
M14 × 2	2	Coarse	12	12	0.4724
M14 × 1.5	1.5	Fine	12.5	12.5	0.4921
M16 × 2	2	Coarse	14	14	0.5512

Thread	Pitch (mm)	Series	D − P (mm)	Usual drill (mm)	Drill (in)
M16 × 1.5	1.5	Fine	14.5	14.5	0.5709
M18 × 2.5	2.5	Coarse	15.5	15.5	0.6102
M18 × 1.5	1.5	Fine	16.5	16.5	0.6496
M20 × 2.5	2.5	Coarse	17.5	17.5	0.6890
M20 × 1.5	1.5	Fine	18.5	18.5	0.7283
M22 × 2.5	2.5	Coarse	19.5	19.5	0.7677
M22 × 1.5	1.5	Fine	20.5	20.5	0.8071
M24 × 3	3	Coarse	21	21	0.8268
M24 × 2	2	Fine	22	22	0.8661

Thread pitch: threads per inch to millimetres

TPI	Pitch (mm)	Metric pitch (mm)	TPI equivalent	TPI	Pitch (mm)	Metric pitch (mm)	TPI equivalent
4	6.3500	0.25	101.60	**18**	1.4111	1.75	14.51
5	5.0800	0.35	72.57	**20**	1.2700	2	12.70
6	4.2333	0.4	63.50	**24**	1.0583	2.5	10.16
7	3.6286	0.45	56.44	**28**	0.9071	3	8.47
8	3.1750	0.5	50.80	**32**	0.7938	3.5	7.26
9	2.8222	0.6	42.33	**36**	0.7056	4	6.35
10	2.5400	0.7	36.29	**40**	0.6350	4.5	5.64
11	2.3091	0.75	33.87	**48**	0.5292	5	5.08
12	2.1167	0.8	31.75	**56**	0.4536	5.5	4.62
13	1.9538	1	25.40	**64**	0.3969	6	4.23
14	1.8143	1.25	20.32	**72**	0.3528	8	3.18
16	1.5875	1.5	16.93	**80**	0.3175	10	2.54

Sources and method

- **ASME B94.11M** — Twist drills: number, letter, fractional and metric sizes
- **ASME B1.1** — Unified inch screw threads (UN and UNR thread form): UNC and UNF series
- **ISO 261 and ISO 262** — ISO general-purpose metric screw threads: diameter and pitch combinations
- **ISO 2306 / DIN 336** — Drills for use prior to tapping screw threads
- **Machinery's Handbook** — Percentage of thread: n × (major diameter − drill) ÷ 0.01299
- **International Yard and Pound Agreement (1959)** — 1 in = 25.4 mm exactly

Number and letter drill diameters are transcribed from ASME B94.11M and cross-checked against a second published table; fractional sizes, millimetres and the percentage of thread are calculated. Interactive version, corrections and more charts: **allunitconversions.com/drill-size-chart**