

Metric, Inch, & Fractional Inch: Drills, Sizes, Threads, & Preferred Sizes

mm	inch	dr	64	32	16	8	4	2	x/y	thread	p?
0,15 (0,149 86)	0.005,9	97									
0,16 (0,160 02)	0.006,3	96									
0,17 (0,170 18)	0.006,7	95									
0,18 (0,180 34)	0.007,1	94									
0,19 (0,190 50)	0.007,5	93									
0,20 (0,200 66)	0.007,9	92									
0,211 (0,210 82)	0.008,3	91									
0,221 (0,220 98)	0.008,7	90									
0,231 (0,231 14)	0.009,1	89									
0,241 (0,241 30)	0.009,5	88									
0,254 (0,254 00)	0.010,0	87									i
0,267 (0,266 70)	0.010,5	86									
0,280 (0,279 40)	0.011,0	85									
0,292 (0,292 10)	0.011,5	84									
0,305 (0,304 80)	0.012,0	83									i
0,318 (0,317 50)	0.012,5	82									
0,330 (0,330 20)	0.013,0	81									
0,343 (0,342 90)	0.013,5	80									
0,368 (0,368 30)	0.014,5	79									
0,396 (0,396 875)	0.015,6 (0.015,625)		1						1/64		i
0,406 (0,406 40)	0.016,0	78									i
0,457 (0,457 20)	0.018,0	77									
0,5	n/d (0.019,685)										
0,508 (0,508 00)	0.020,0	76									i
0,533 (0,533 40)	0.021,0	75									
0,572 (0,571 50)	0.022,5	74									
0,610 (0,609 60)	0.024,0	73									
0,635 (0,635 00)	0.025,0	72									i
0,660 (0,660 40)	0.026,0	71									
0,711 (0,711 20)	0.028,0	70									
0,742 (0,741 68)	0.029,2	69									
0,787 (0,787 40)	0.031,0	68									

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mm	inch	dr	64	32	16	8	4	2	x/y	thread	p?
0,792 (0,793 75)	0.031,2 (0.031,25)		2	1					1/32		i
0,813 (0,812 80)	0.032,0	67									i
0,838 (0,838 20)	0.033,0	66									
0,889 (0,889 00)	0.035,0	65									
0,914 (0,914 40)	0.036,0	64									
0,940 (0,939 80)	0.037,0	63									
0,965 (0,965 20)	0.038,0	62									
0,991 (0,990 60)	0.039,0	61									
1	n/d (0.039,370)										m1
1,016 (1,016 00)	0.040,0	60									i
1,041 (1,041 40)	0.041,0	59									
1,067 (1,066 80)	0.042,0	58									
1,092 (1,092 20)	0.043,0	57									
1,1	n/d (0.043,307)										m2
1,181 (1,181 10)	0.046,5	56									
1,191 (1,190 625)	0.046,9 (0.046 875)		3						3/64		
1,2	n/d (0.047,244)										m1
n/d (0,001 969)	0.05										i
1,3	n/d (0.051,181)										b3
1,321 (1,320 80)	0.052,0	55									
1,397 (1,397 00)	0.055,0	54									
1,4	n/d (0.055,118)										m2
1,5	n/d (0.059,055)										b3
1,511 (1,511 30)	0.059,5	53									
n/d (1,524 00)	0.060,0									UN0 -x/80/x	i
1,588 (1,587 50)	0.062,5		4	2	1				1/16		i
1,6	n/d (0.062,992)									M1,6 -0,35	m1
1,613 (1,612 90)	0.063,5	52									
1,7	n/d (0.066,929)										b3
1,702 (1,701 80)	0.067,0	51									
1,778 (1,778 00)	0.070,0	50									
1,8	n/d (0.070,866)										m2

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mm	inch	dr	64	32	16	8	4	2	x/y	thread	p?
1,854 (1,854 20)	0.073,0	49								UN1 -64/72/x	
1,9	n/d (0.074,803)										b3
1,930 (1,930 40)	0.076,0	48									
1,984 (1,984 375)	0.078,1 (0.078,125)		5						5/64		
1,994 (1,993 90)	0.078,5	47									
2	n/d (0.078,740)									M2 -0,4	m1
n/d (2,032)	0.08										i
2,057 (2,057 40)	0.081,0	46									
2,083 (2,082 80)	0.082,0	45									
2,1	n/d (0.082,677)										b3
2,184 (2,184 40)	0.086,0	44								UN2 -56/64/x	
2,2	n/d (0.086,614)										m2
2,261 (2,260 60)	0.089,0	43									
2,375 (2,374 90)	0.093,5	42									
2,383 (2,381 25)	0.093,8 (0.093,75)		6	3					3/32		i
2,4	n/d (0.094,488)										b3
2,438 (2,438 40)	0.096,0	41									
2,489 (2,489 20)	0.098,0	40									
2,5	n/d (0.098,425)									M2,5 -0,45	m1
n/d (2,514 60)	0.099,0									UN3 -48/56/x	
2,527 (2,527 30)	0.099,5	39									
n/d (2,540)	0.10										i
2,578 (2,578 10)	0.101,5	38									
2,6	n/d (0.102,362)										b3
2,642 (2,641 60)	0.104,0	37									
2,705 (2,705 10)	0.106,5	36									
2,779 (2,778 125)	0.109,4 (0.109,375)		7						7/64		
2,794 (2,794 00)	0.110,0	35									
2,8	n/d (0.110,236)										m2
2,819 (2,819 40)	0.111,0	34									
n/d (2,844 80)	0.112,0									UN4 -40/48/x	
2,870 (2,870 20)	0.113,0	33									

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mm	inch	dr	64	32	16	8	4	2	x/y	thread	p?
2,946 (2,946 40)	0.116,0	32									
3	n/d (0.118,110)									M3 -0,5	m1
3,048 (3,048 00)	0.120,0	31									i
3,175 (3,175 00)	0.125,0		8	4	2	1			1/8	UN5 -40/44/x	i
3,2	n/d (0.125,984)										m3
3,264 (3,263 90)	0.128,5	30									
3,454 (3,454 40)	0.136,0	29									
3,5	n/d (0.137,795)									M3,5 -0,6	m2
n/d (3,505 20)	0.138,0									UN6 -32/40/x	
3,569 (3,568 70)	0.140,5	28									
3,571 (3,571 875)	0.140,6 (0.140,625)		9						9/64		
3,658 (3,657 60)	0.144,0	27									
3,734 (3,733 80)	0.147,0	26									
3,797 (3,797 30)	0.149,5	25									
3,8	n/d (0.149,606)										m3
3,861 (3,860 80)	0.152,0	24									
3,912 (3,911 60)	0.154,0	23									
3,967 (3,968 75)	0.156,2 (0.156,25)		10	5					5/32		i
3,988 (3,987 80)	0.157,0	22									
4	n/d (0.157,480)									M4 -0,7	m1
4,039 (4,038 60)	0.159,0	21									
n/d (4,064)	0.16										i
4,089 (4,089 40)	0.161,0	20									
n/d (4,165 60)	0.164,0									UN 8 -32/36/x	
4,2	n/d (0.165,354)										m3
4,216 (4,216 40)	0.166,0	19									
4,305 (4,305 30)	0.169,5	18									
4,366 (4,365 625)	0.1719 (0.171,875)		11						11/64		
4,394 (4,394 20)	0.173,0	17									
4,496 (4,495 80)	0.177,0	16									
4,5	n/d (0.177,165)										m2
4,572 (4,572 00)	0.180,0	15									

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mm	inch	dr	64	32	16	8	4	2	x/y	thread	p?
4,623 (4,622 80)	0.182,0	14									
4,700 (4,699 00)	0.185,0	13									
4,762 (4,762 50)	0.187,5		12	6	3				3/16		i
4,8	n/d (0.188,976)										m3
4,800 (4,800 60)	0.189,0	12									
n/d (4,826 00)	0.190,0									UN10 -24/32/x	
4,851 (4,851 40)	0.191,0	11									
4,915 (4,914 90)	0.193,5	10									
4,978 (4,978 40)	0.196,0	9									
5	n/d (0.196,850)									M5 -0,8	m1
5,054 (5,054 60)	0.199,0	8									
n/d (5,08)	0.20										i
5,105 (5,105 40)	0.201,0	7									
5,159 (5,159 375)	0.203,1 (0.203,125)		13						13/64		
5,182 (5,181 60)	0.204,0	6									
5,2	n/d (0.204,724)										m3
5,220 (5,219 70)	0.205,5	5									
5,309 (5,308 60)	0.209,0	4									
5,410 (5,410 20)	0.213,0	3									
n/d (5,486 40)	0.216,0									UN12 -24/28/32	
5,5	n/d (0.216,535)										m2
5,558 (5,556 25)	0.218,8 (0.218,75)		14	7					7/32		
5,613 (5,613 40)	0.221,0	2									
5,791 (5,791 20)	0.228,0	1									
5,8	n/d (0.228,346)										m3
5,944 (5,943 60)	0.234,0	A									
5,954 (5,953 125)	0.2344 (0.234,375)		15						15/64		
6	n/d (0.236,220)									M6 -1	m1
6,045 (6,045 20)	0.238,0	B									
n/d (6.096)	0.24										i
6,147 (6,146 80)	0.242,0	C									
6,2	n/d (0.244,094)										m3

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mm	inch	dr	64	32	16	8	4	2	x/y	thread	p?
6,248 (6,248 40)	0.246,0	D									
6,350 (6,350 00)	0.250,0 (0.25)	E	16	8	4	2	1		1/4	UN ¼ -20/28/32	i
6,5	n/d (0.255,906)										b2
6,528 (6,527 80)	0.257,0	F									
6,629 (6,629 40)	0.261,0	G									
6,746 (6,746 875)	0.2656 (0.265,625)		17						17/64		
6,756 (6,756 40)	0.266,0	H									
6,8	n/d (0.267,717)										b3
6,909 (6,908 80)	0.272,0	I									
7	n/d (0.275,591)										m2
7,036 (7,035 80)	0.277,0	J									
7,137 (7,137 40)	0.281,0	K									
7,142 (7,143 75)	0.281,2 (0.281,25)		18	9					9/32		
7,366 (7,366 00)	0.290,0	L									
7,493 (7,493 00)	0.295,0	M									
7,5	n/d (0.295,276)										b3
7,541 (7,540 625)	0.2969 (0.296,875)		19						19/64		
n/d (7,62)	0.30										i
7,671 (7,670 80)	0.302,0	N									
7,938 (7,937 50)	0.312,5 (0.312,5)		20	10	5				5/16	UN 5/16 -18/24/32	i
8	n/d (0.314,961)									M8 -1,25/1	m1
8,026 (8,026 40)	0.316,0	O									
8,204 (8,204 20)	0.323,0	P									
8,334 (8,334 375)	0.3281 (0.328,125)		21						21/64		
8,433 (8,432 80)	0.332,0	Q									
8,5	n/d (0.334,646)										b3
8,611 (8,610 60)	0.339,0	R									
8,733 (8,731 25)	0.343,8 (0.343,75)		22	11					11/32		
8,839 (8,839 20)	0.348,0	S									
9	n/d (0.354,331)										m2
9,093 (9,093 20)	0.358,0	T									
9,129 (9,128 125)	0.359,4 (0.359,375)		23						23/64		

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mm	inch	dr	64	32	16	8	4	2	x/y	thread	p?
9,347 (9,347 20)	0.368,0	U									
9,5	n/d (0.374,016)										b3
9,525 (9,525)	0.375,0 (0.375)		24	12	6	3			3/8	UN 3/8 -16/24/32	i
9,576 (9,575 80)	0.377,0	V									
9,804 (9,804 40)	0.386,0	W									
9,921 (9,921 875)	0.390,6 (0.390,625)		25						25/64		
10	n/d (0.393,701)									M10 -1,5/1,25/0,75	m1
10,084 (10,083 80)	0.397,0	X									
n/d (10.160)	0.40										i
10,262 (10,261 60)	0.404,0	Y									
10,317 (10,318 75)	0.406,2 (0.406,25)		26	13					13/32		
10,490 (10,490 20)	0.413,0	Z									
10,5	n/d (0.413,386)										
10,716 (10,715 625)	0.421,9 (0.421,875)		27						27/64		
11	n/d (0.433,071)										m2
11,112 (11,112 5)	0.437,5 (0.437,5)		28	14	7				7/16	UN 7/16 -14/20/28	i
11,5	n/d (0.452,756)										
11,509 (11,509 375)	0.4531 (0.453,125)		29						29/64		
11,908 (11,906 25)	0.4688 (0.468,75)		30	15					15/32		
12	n/d (0.472,441)									M12-1,75/1,25/1,5 ^a	m1
12,304 (12,303 125)	0.484,4 (0.484,375)		31						31/64		
12,5	n/d (0.492,126)										
12,700 (12,7)	0.500,0 (0.5)		32	16	8	4	2	1	1/2	UN ½ -13/20/28	i
13	n/d (0.511,811)										b3
13,096 (13,096 875)	0.525,6 (0.515,625)		33						33/64		
13,492 (13,49 375)	0.531,2 (0.531,25)		34	17					17/32		
13,5	n/d (0.531,496)										
13,891 (13,890 625)	0.546,9 (0.546,875)		35						35/64		
14	n/d (0.551,181)									M14 -2/1,5	
14,288 (14,287 5)	0.562,5 (0.562,5)		36	18	9				9/16	UN 9/16 -12/18/24	i
14,5	n/d (0.570,866)										
14,684 (14,684 375)	0.578,1 (0.578,125)		37						37/64		

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15	n/d (0.590,551)									M15 -x/1	b3
15,083 (15,081 25)	0.593,8 (0.593,75)		38	19					19/32		
n/d (15,240)	0.60										i
15,479 (15,478 125)	0.609,4 (0.609,375)		39						39/64		
15,5	n/d (0.610,236)										
15,875 (15,875)	0.625,0 (0.625)		40	20	10	5			5/8	UN 5/8 -11/18/24	i
16	n/d (0.629,921)									M16 -2/1,5	m1
12,271 (16,271 875)	0.640,6 (0.640,625)		41						41/64		
16,5	n/d (0.649,606)										
16,669 (16,668 75)	0.656,2 (0.656,25)		42	21					21/32		
17	n/d (0.669,291)									M17 -x/1	b3
17,066 (17,065 625)	0.671,9 (0.671,875)		43						43/64		
17,462 (17,462 5)	0.687,5 (0.687,5)		44	22	11				11/16	UN 11/16 -x/x/24	i
17,5	n/d (0.688,976)										
n/d (17,78)	0.7										
17,859 (17,859 375)	0.703,1 (0.703,125)		45						45/64		
18	n/d (0.708,661)									M18 -x/1,5	m2
18,258 (18,256 25)	0.718,8 (0.718,75)		46	23					23/32		
18,5	n/d (0.728,346)										
18,654 (18,653 125)	0.734,4 (0.734,375)		47						47/64		
19	n/d (0.748,031)										b3
19,050 (19,05)	0.750,0 (0.75)		48	24	12	6	3		3/4	UN 3/4 -10/16/20	i
19,446 (19,446875)	0.765,6 (0.765,625)		49						49/64		
19,5	n/d (0.767,717)										
19,845 (19,843 75)	0.781,2 (0.781,25)		50	25					25/32		
n/d (20,320)	0.80										i
20	n/d (0.816,327)									M20 -2,5/1,5/1	m1
20,241 (20,240 625)	0.796,9 (0.796,875)		51						51/64		
20,5	n/d (0.807,087)										
20,638 (20,637 5)	0.812,5 (0.812,5)		52	26	13				13/16	UN 13/16 -x/x/20	
21	n/d (0.472,441)										b3
21,034 (21,034 375)	0.828,1 (0.828,125)		53						53/64		

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21,433 (21,431 25)	0.843,8 (0.843,75)		54	27					27/32		
21,5	n/d (0.846,457)										
21,829 (21,828 125)	0.859,4 (0.859,375)		55						55/64		
22	n/d (0.866,142)									M22 -2,5 ^b /1,5	m2
22,225 (22,225)	0.875,0 (0.875)		56	28	14	7			7/8	UN 7/8 -9/14/20	i
22,5	n/d (0.885,827)										
22,621 (22,621 875)	0.890,6 (0.890,625)		57						57/64		
n/d (22,86)	0.9										
23	n/d (0.905,512)										b3
23,017 (23,01 875)	0.906,2 (0.906,25)		58	29					29/32		
23,416 (23,415 625)	0.921,9 (0.921,875)		59						59/64		
23,5	n/d (0.925,197)										
23,812 (23,812 5)	0.937,5 (0.937,5)		60	30	15				15/16	UN 15/16 -x/x/20	
24	n/d (0.944,882)									M24 -3/2	b3
24,209 (24,209 375)	0.953,1 (0.953,125)		61						61/64		
24.5	n/d (0.964,567)										
24,608 (24,606 25)	0.968,8 (0.968,75)		62	31					31/32		
25	n/d (0.984,252)									M25 -x/1	m1
25,004 (25,003 125)	0.984,4 (0.984,375)		63						63/64		
25,400 (25,4)	1.000 (1)		64	32	16	8	4	2	1	UN1 -8/12/20	i
25,5	n/d (1.003,937)										

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Explanations and Rationalizations:

- **Numbered and Lettered (inch) straight shank twist drill** nominal sizes are given in column 2 in exact decimal inches to four decimal (as per reference [2], below). Trailing zeros are cited in [2], and so are assumed to be significant.
 - **Millimeter conversions of Numbered and Lettered inch twist drills** are given in two forms in column 1: first as rounded conversions as per [2] (which do not always match common rounding conventions; see for example #85), and then in parentheses as mathematically exact conversions to five decimal places (unrounded, with trailing zeros).
 - Numbered/lettered drill sizing is nearly but not quite Stubbs' Steel Wire Gage (not AWG).
- **All inch fractions in 64^{ths}** are also inch twist drill sizes. Column 2 gives these in decimal inches in two forms: first to four decimal places as defined in [2], and then in parentheses as a decimal expansion of the fraction, up to six decimal places (rounded to six if longer).
 - **Millimeter conversions of inch fractions which do not correspond to Numbered or Lettered twist drill sizes** are noted in column 1 in two forms: first to four decimal places as per [2], followed in parentheses by a conversion from the actual inch fraction, up to six decimal places (rounded to six if longer).
 - All inch fractions are given in columns 4 through 9 as 64^{ths}, 32^{nds}, 16^{ths}, 8^{ths}, 4^{ths}, and 2^{nds} (halves), as appropriate, and as “reduced” fractions in column 10 (“x/y”).
- **Nominal millimeter sizes** (e.g., 1, 1.6) are given without trailing zeros, which would not be significant. Their conversions to decimal inches in column 2 are given as “n/d” (as they are not defined in [2]) and in parentheses with up to six decimal places (rounded to six if longer).
 - Column 10 (“notes”) is used for nominal millimeter sizes to indicate **metric preferred sizes** (“p1” and “p2” for 1st and 2nd choice ANSI [4] and UK [5] preferred sizes, “p2UK” and “p3” for UK-only preferred sizes).
- Unified National (UN) thread numbers are unrelated to twist drill numbers. **UN thread nominal diameters** are given in column 2 in inches to four decimal places, as per [3]. Millimeter conversions are not defined (“n/d”), but are given in parentheses in column 1 as mathematically exact conversions to five decimal places (unrounded, with trailing zeros).
 - **UN thread-per-inch series** are given in column 11 (“threads”) as “-UNC/UNF/UNEF”.
 - **M-series pitches** are given in column 11 (“threads”) in millimeters for coarse and fine series.
- **Preferred Sizes** are given in column 12. US preferred inch sizes from [6] are indicated as “i”; these may simply be intended for design of fits, but not elsewhere. US preferred metric sizes (for all purposes) from [4] are indicated as “m1” (1st choice) and “m2” (2nd choice). Additional UK preferred metric sizes from [5] are indicated as “b2” (2nd choice, in British standard only) and “b3” (3rd choice, all of which are from the British standard).
 - The specification of preferred decimal inch sizes in [6] is to fewer decimal places than the twist drill specifications in [2]. This reduced precision is not noted when inch twist drill sizes are also preferred decimal inch sizes.
 - Some inch preferred sizes correspond to no numbered, fractional, or lettered inch twist drills. These are given in column 2 as exact (see 0.05 for example) and in column 1 in millimeter conversion as “n/d” and in parentheses with up to six decimal places (rounded to six if longer).

Metric, Inch, & Fractional Inch: Drills, Sizes, Threads, & Preferred Sizes

Notes

^a “Only for wheel studs and nuts”

^b “For high strength structural steel fasteners only”

References

- [1] *Machinery's Handbook*, 24th Edition (1992). Cited below as [MH24].
- [2] Twist drill standard is ANSI B94.11M-1979, R1987, cited in [MH24]: 847-854.
- [3] Unified thread standard is ANSI B1.1-1989 (original US/UK/Canada version was -1949), cited in [MH24]: 1525, 1529.
- [4] US preferred metric size standard is ANSI B4.2-1978, RR1984, cited in [MH24]: 621.
- [5] UK preferred metric size standard is British Standard PD 648-1977, cited in [MH24]: 644.
- [6] US preferred basic sizes, cited in [MH24]: 606. It isn't clear to me which standard [MH24] is citing here.

Metric, Inch, & Fractional Inch: Drills, Sizes, Threads, & Preferred Sizes

Revision History

- v2. 2007-02-12. Fixed an “Explanations...” reference to column name “x/y” (as it is, not “notes” as it once was).
- v1. 2007-02-07. Initial version in this form. Released 2007-02-12.