Handy Reference Information

Decimal Inch Equivalents

Decimal inch equivalents for Number and Letter drill sizes as well as Fractional Inches and Millimeter sizes.

Drill Size	Decimal	Drill Size	Decimal
#80	.0135	#11	.1910
#79	.0145	#10	.1935
1/64	.0156	#9	.1960
#78	.0160	5mm	.1969
#77	.0180	#8	.1990
#76	.0200	#7	.2010
#75	.0210	13/64	.2031
#74	.0225	#6	.2040
#73	.0240	#5	.2055
#72	.0250	#4	.2090
#71	.0260	#3	.2130
#70	.0280	**7/32**	**.2188**
#69	.0292	#2	.2210
#68	.0310	#1	.2280
1/32	**.0313**	A	.2340
#67	.0320	15/64	.2344
#66	.0330	6mm	.2362
#65	.0350	B	.2380
#64	.0360	C	.2420
#63	.0370	D	.2460
#62	.0380	E	.2500
#61	.0390	**1/4**	**.2500**
1mm	.0394	F	.2570
#60	.0400	G	.2610
#59	.0410	17/64	.2656
#58	.0420	H	.2660
#57	.0430	I	.2720
#56	.0465	7mm	.2756
3/64	.0469	J	.2770
#55	.0520	K	.2810
#54	.0550	**9/32**	**.2813**
#53	.0595	L	.2900
1/16	**.0625**	M	.2950
#52	.0635	19/64	.2969
#51	.0670	N	.3020
#50	.0700	**5/16**	**.3125**
#49	.0730	8mm	.3150
#48	.0760	O	.3160
5/64	.0781	P	.3230
#47	.0785	21/64	.3281
2mm	.0787	Q	.3320
#46	.0810	R	.3390
#45	.0820	**11/32**	**.3438**
#44	.0860	S	.3480
#43	.0890	9mm	.3543
#42	.0935	T	.3580
3/32	**.0938**	23/64	.3594
#41	.0960	U	.3680
#40	.0980	**3/8**	**.3750**
#39	.0995	V	.3770
#38	.1015	W	.3860
#37	.1040	25/64	.3906
#36	.1065	10mm	.3937
7/64	.1094	X	.3970
#35	.1100	Y	.4040
#34	.1110	**13/32**	**.4063**
#33	.1130	Z	.4130
#32	.1160	27/64	.4219
3mm	.1181	11mm	.4331
#31	.1200	**7/16**	**.4375**
1/8	**.1250**	29/64	.4531
#30	.1285	**15/32**	**.4688**
#29	.1360	12mm	.4724
#28	.1405	31/64	.4844
9/64	.1406	**1/2**	**.5000**
#27	.1440	13mm	.5118
#26	.1470	14mm	.5512
#25	.1495	**9/16**	**.5625**
#24	.1520	15mm	.5906
#23	.1540	**5/8**	**.6250**
5/32	**.1563**	16mm	.6299
#22	.1570	17mm	.6693
4mm	.1575	**11/16**	**.6875**
#21	.1590	18mm	.7087
#20	.1610	19mm	.7480
#19	.1660	**3/4**	**.7500**
#18	.1695	20mm	.7874
11/64	.1719	**13/16**	**.8125**
#17	.1730	21mm	.8268
#16	.1770	22mm	.8661
#15	.1800	**7/8**	**.8750**
#14	.1820	23mm	.9055
#13	.1850	**15/16**	**.9375**
3/16	**.1875**	24mm	.9449
#12	.1890	25mm	.9843

AN Hardware Torque & Tap Drill Specs

Recommended torque limits for bolts loaded primarily in shear. Based on oil free cadmium plated threads. **Note:** All torques are given in **inch-pounds!** Divide by 12 to convert to foot-pounds. Source: FAA AC 43.13-1B, p7-9. **Order your own copy of AC 43.13 – see page 134.**

Thread	Full Height Nuts Such as: AN365 & AN310	Shear Nuts AN364 & AN320	Tap Drill Size
Fine Thread Series			
10-32	20-25 in-lb	12-15 in-lb	#21
1/4 -28	50-70 in-lb	30-40 in-lb	#3
5/16 -24	100-140 in-lb	60-85 in-lb	I
3/8 -24	160-190 in-lb	95-110 in-lb	Q
7/16 -20	450-500 in-lb	270-300 in-lb	25/64
1/2 -20	480-690 in-lb	290-410 in-lb	29/64
9/16 -18	800-1000 in-lb	480-600 in-lb	33/64
5/8 -18	1100-1300 in-lb	600-780 in lb	37/64
3/4 -16	2300-2500 in-lb	1300-1500 in-lb	11/16
Coarse Thread Series			
8-32	12-15 in-lb	7-9 in-lb	#29
10-24	20-25 in-lb	12-15 in-lb	#25
1/4 -20	40-50 in-lb	25-30 in-lb	#7
5/16 -18	80-90 in-lb	48-55 in-lb	F
3/8 -16	160-185 in-lb	95-100 in-lb	5/16
7/16 -14	235-255 in-lb	140-155 in-lb	U
1/2 -13	400-480 in-lb	240-290 in-lb	27/64
9/16 -12	500-700 in-lb	300-420 in-lb	31/64
5/8 -11	700-900 in-lb	420-540 in lb	17/32
3/4 -10	1150-1600 in-lb	700-950 in-lb	21/32

Torque Specifications AN-818 Tube Nuts

Recommended torque limits for AN-818 tube nuts (our Pt #3235) with 37º AN-819 tube sleeves. **Note:** All torques are given in **inch-pounds!** Divide by 12 to convert to foot-pounds. Source: FAA AC 43.13-1B, p 9-19.

Dash No.	Alum. Tubing	Steel Tubing
-2 (1/8 OD)	20-30 in-lb	75-85 in-lb
-3 (3/16 OD)	25-35 in-lb	95-105 in-lb
-4 (1/4 OD)	50-65 in-lb	135-150 in-lb
-5 (5/16 OD)	70-90 in-lb	170-200 in-lb
-6 (3/8 OD)	110-130 in-lb	270-300 in-lb
-8 (1/2 OD)	230-260 in-lb	450-500 in-lb
-10 (5/8 OD)	330-360 in-lb	650-700 in lb
-12 (3/4 OD)	460-500 in-lb	900-1000 in-lb
-16 (1" OD)	500-700 in-lb	1200-1400 in-lb
-20 (1 1/4 OD)	800-900 in-lb	1520-1680 in-lb
-24 (1 1/2 OD)	800-900 in-lb	1900-2100 in-lb

Copper Electrical Wire Specifications

Current capacity is based on continuous duty for wires in bundles, harnesses or conduits at sea level. Multiply currents in chart by 0.97 to derate for 5,000 ft elevation. Resistance shown is in ohms per 1,000 feet at 20º C for tin plated conductors. Source: FAA AC 43.13-1B, Table 11-9 corrected for sea level (divided by .79).

Wire Size (AWG)	Current Limit (amps) Wire Temp Rating 105ºC	150ºC	Resistance ohms/1000 ft at 20º C
24	3.2	5.1	28.4
22	3.8	6.3	16.2
20	5.1	8.9	9.88
18	7.6	11.4	6.23
16	8.9	13.9	4.81
14	12.7	17.7	3.06
12	16.5	24	2.02
10	21.5	33	1.26
8	48	72	0.70
6	63	96	0.44
4	86	130	0.28
2	120	178	0.18
0	162	243	0.12

Sometimes (particularly on longer wire runs) it is necessary to increase the wire size from what the above table would indicate in order to minimize the voltage drop in the wire. A common rule of thumb for a 12 volt system suggests that the wiring should not drop more than ½ volt for continuous operation and no more than 1 volt for intermittent operation. You can use ohm's law to calculate this voltage drop: Assume a continuous 5 amp circuit using 20 ft of 20ga wire (10 ft supply & 10 ft ground wire). The wire resistance is 0.198 ohm (9.88/1000x20). The voltage drop is 0.99v (5A x 0.198Ω) and therefore the wire size should be increased.

Ohm's Law expressed 3 ways:

$$\text{Volts} = \text{Amps (Current)} \times \text{Ohms (Resistance)}$$

$$\text{Ohms} = \frac{\text{Volts}}{\text{Amps}}$$

$$\text{Amps} = \frac{\text{Volts}}{\text{Ohms}}$$

Calculating DC Power (Watts) 3 ways:

$$\text{Watts} = \text{Amps} \times \text{Volts}$$

$$\text{Watts} = \frac{\text{Volts}^2}{\text{Ohms}}$$

$$\text{Watts} = \text{Amps}^2 \times \text{Ohms}$$

Safety Wiring Tips

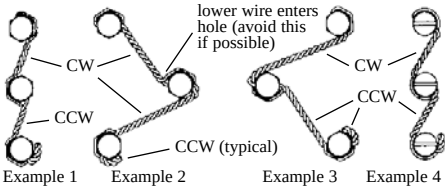
Methods: • The double-twist method is most common (see examples 1 through 8 below). • The single-wire method is used on fasteners in a closely spaced or closed pattern, as in example 9.

Wire Size: • Use .032 or larger for the double-twist method on parts drilled .045 inch or larger. • A double strand of .020 wire can be used on parts drilled .045 to .062 inch if the spacing between parts is less than two inches. This will give greater flexibility during installation. • Use the largest diameter wire possible with the single-wire method.

Do: • Install the safety wire so that it will tend to tighten the fastener. • Try to install the safety wire closely around the head of the fastener rather than over it. **The upper wire should enter the hole if possible** (see examples 1 thru 4). • Pull safety wire tight when twisting; it should maintain a light tension when secured. • Wire should have 6-8 twists per inch. • Leave at least 4-6 complete twists on the free end. • Bend free end under itself or place a small drop of silicone on the end to prevent sharp ends from causing a safety hazard.

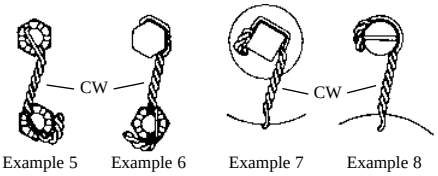
Don't: • Nick, kink, or mutilate the wire. • **Don't** overstress the wire or twist it too tightly. • **Don't** over-torque or loosen a fastener to align safety wire holes. Note: Drilled bolts do not need safety wire when installed with self-locking nuts.

Note: We now stock a reversible safety wire pliers that will do both CW and CCW twisting (see Part No. 3090, page 101).



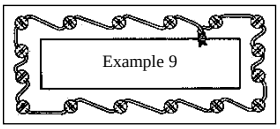
Example 1 Example 2 Example 3 Example 4

Examples 1 thru 4 are wired so that loosening any part is counteracted by tightening of another part. The direction of twist from the 2nd to the 3rd unit is CCW in examples 1, 3 and 4 to keep the loop in position against the head of the bolt. The direction of twist from the 2nd to the 3rd bolt in example 2 is CW to keep the wire in position around the 2nd bolt. The wire entering the hole in the 3rd bolt will be the lower wire (except example 2) but by making a CCW twist after it leaves the hole, the loop will be secured in place around the head of the 3rd bolt or screw.



Example 5 Example 6 Example 7 Example 8

These examples show methods for wiring various standard items. Wire may be wrapped over rather than around when wiring castellated nuts or on other items when there is a clearance problem.



Example 9 shows the correct application of single wire to a closely spaced multiple group.