

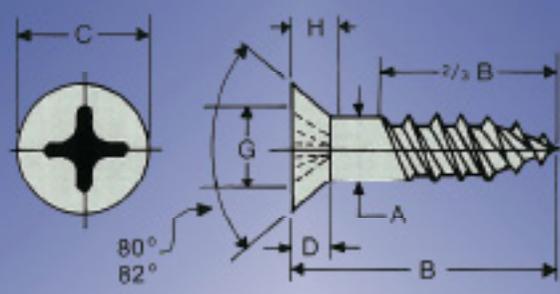


TOLL FREE
1-800-526-0341

ALUMINUM FASTENER SUPPLY CO., INC.

PRODUCT CATALOG

NOT ALL HARDWARE IS CREATED EQUAL...



PHONE: 239-643-4551

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WWW.ALUMINUMFASTENERS.COM

ADVANTAGES OF ALUMINUM FOR FASTENERS

Resistance to atmospheric corrosion. Because of its tendency to form a protective oxide coating upon exposure to the atmosphere, aluminum needs no further treatment in ordinary environments. Special alloys and anodic coatings are available for application in extra-corrosive environments.

Economy. Most often aluminum threaded fasteners cost less than those made of brass or stainless steel. Since aluminum fasteners require no maintenance, they will often offset the initial cost advantage of cheaper fasteners.

Nonstaining. The oxides of aluminum are colorless, and such corrosion products as may occur will not mar the finish of products or assemblies.

Strength. Aluminum possesses the best strength-to-weight ratio of any metal in common use. It can be made stronger than mild steel. Aluminum fasteners are strong enough to be used in high-speed, automatic production lines.

Lightness. Aluminum weighs about one-third as much as mild steel. Although weight is not a significant factor in most applications for fasteners, lightness can reduce costs and facilitate movement into, through and out of the manufacturing plant.

Compatibility with aluminum. It is standard practice to fasten aluminum with aluminum in order to minimize the danger of galvanic corrosion.

Colorability. Color-anodized fasteners are made for interior applications. Aluminum accepts paint readily. By either process, the range of shades is practically unlimited, making it a simple matter to match any designer's choice of colors.

Conductivity. Aluminum's high rate of conductivity suits it for use in many electrical applications.

Nonmagnetic. Aluminum is the preferred metal in applications where magnetism may be a problem. In addition, aluminum's nonmagnetic properties prevent "clustering" where the fastener is to be handled by tools made of ferrous metals.

Variety. Aluminum Fasteners has expanded the number of standard types of sizes of aluminum threaded fasteners to more than 3,700. Special fasteners can be made to meet specific user needs.

Resistance to chemical corrosion. Aluminum is compatible with many chemicals, and may be used safely in containers holding foods, pharmaceuticals and most chemical products.

INTRODUCTION

Dear Customer,

Aluminum Fastener Supply Co. was brought into existence to fill a void in the non-ferrous fastener market.

We strongly believed that there was a need for one company to carry in stock a full line of aluminum fasteners from A to Z, along with a knowledgeable staff who knew alloys, finishes and their applications. Are sales staff both inside and out are committed on a daily basis to helping you, the customer, with your aluminum needs and at the same time, learning and keeping pace with the new advances this metal is making in the market place.

To those who we have sold before, thank you, and to those we haven't, we are looking forward to selling you in the future.

Lori Coar, President
Aluminum Fastener Supply Co., Inc.

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Alloys Used for Aluminum Threaded Fasteners

Aluminum Fastener recommends and uses specific alloys for aluminum threaded-fastener products:

2024-T4 -- For most applications, this alloy provides a good combination of strength, corrosion resistance and economy for male threaded fasteners. It is also a suitable alloy for machine screw nuts.

6061-T6 -- This alloy is used for bolt nuts. It is also used to make male threaded fasteners for special applications requiring maximum corrosion resistance. Standard bolt nuts of 6061-T6 develop the full tensile strength of 2024-T4 bolts.

Although it would be possible to fabricate threaded fasteners from almost any of the many aluminum alloys that are available commercially, these three offer the most satisfactory combination of strength, toughness, corrosion resistance, and cost needed in a fastener material.

Heat-Treated Practice

Since the aluminum alloys recommended for threaded fasteners derive their optimum properties from thermal treatment, it follows that strict adherence to proper heat treating practices is absolutely essential. Our heat-treating procedures adhere to practices and controls specified under MIL-F-6088 and other government standards improper heat treatment results in lower strength as well as decreased resistance to corrosion.

Correction solution heat treatment also includes proper quenching. Quench-water temperatures are held below 100°F. The quenching arrangement must be such that quenching occurs in a minimum time lapse after removal from the heat-treating furnace. The same principles apply to artificial aging practices, where the variables of time and temperature must be closely controlled.

Mechanical Properties of Aluminum Alloys Used in Threaded Fasteners

The minimum mechanical properties specified for the four alloys - 2024-T4, 6061-T6, 6262-T9, and 7075-T73 - used to make aluminum threaded fasteners, are given in Table 2.

Male or externally threaded fasteners are often manufactured from material designated as "rivet and cold heading wire and rods" (ASTM B316). These fasteners usually are threaded by a rolling operation, although in a

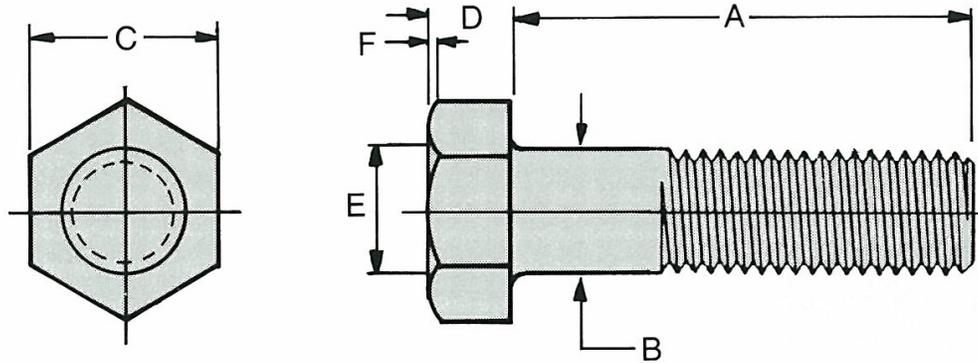
few cases the threads are machined. In comparative tests, fasteners with rolled threads developed slightly greater tensile strength than those with cut threads, and provided increased fatigue strength.

Female or internally threaded products are generally machined from material designated "rolled or cold-finished bars, rods and wire" (ASTM 211). Threads in these fasteners are, of course, cut by a tapping operation.

Minimum Mechanical Properties for Threaded Fasteners

Alloy and Temper	Diameter or thickness range of stock material, inches	Tensile strength, psi	Tensile yield strength, psi	Elongation in 2 inches or 4D, percent	Shear strength, psi	ASTM material designation
2024 - T4	0.063-1.000	62,000	40,000	10	37,000	B 316-68
	0.125-6.500	62,000	40,000	10	37,000	B 211-68
6061-T6	0.063-1.000	42,000	35,000	10	25,000	B 316-68
	0.125-8.000	42,000	35,000	10	25,000	B 211-68
6262-T9	0.125-2.000	52,000	48,000	5	30,000	B 211-68
	2.001-3.000	50,000	46,000	5	29,000	B211-68
7075-T73	0.375-1.000	68,000	56,000	12	40,000	-----

Headed Hex Bolts (Special Hexagon Head Regular Machine Bolts)

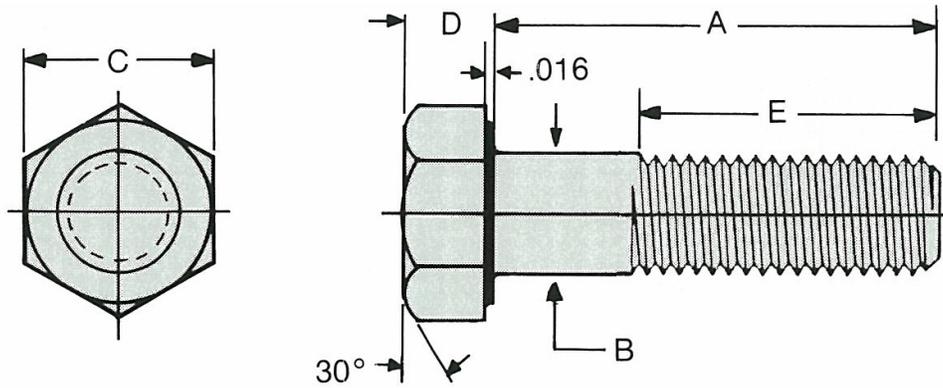


Dimensions in inches

Nominal Size or basic major	Thread Size	A	B	C	D	E	F
		Length ranges	Body Diameter	Width Across Flats	Head Height	Approximate Diameter Recess	Approximate Depth Recess
10	10-24	1/2-4	0.1900 0.1835	5/16	7/64	0.260	0.010
1/4	1/4-20	1/2-4 3/4	0.2500 0.2435	7/16	11/64	0.375	0.010
5/16	5/16-18	1/2-6	0.3125 0.3055	1/2	7/32	0.416	0.012

1. These special bolts with upset heads are in most cases an economical and satisfactory substitution for trimmed head bolts.
2. With the exception of the 10-24 size, these bolts conform to the American Standard specification B 18.2.1 dimensions for hexagon head regular machine bolts except for the head recess and a slight rounding of the bottom and outside edges of the hexagon head.
3. All threads are Class 2A free fit.
4. Normally furnished in bright finish up to 3/4-inch diameter and/or up to 4 inches long -- larger diameters and longer lengths machine finish.
5. We can furnish with Alumilite finish, if specified.
6. Bolts may be furnished with fine threads on special orders only.
7. The maximum radius of fillet under head is 1/32 inch for sizes No. 10 to 1/2 inch, 1/16 for 5/8, 3/4 and 7/8 inch sizes and 3/32 for one inch size.
8. Available in 1/8-inch increments to one-inch length and 1/4-inch increments for lengths over one inch.

Hexagon Head Cap Screws Finished Hexagon Head Bolts (USA Standard B18.2.1)

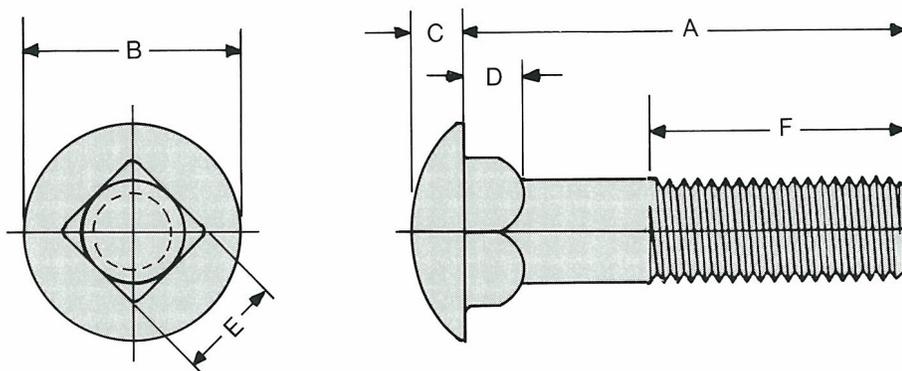


Dimensions in inches

Nominal Size or basic major diameter	Thread Size	A	B	C	D	E	
		Length ranges	Body Diameter	Width Across Flats	Head Height	Thread Length Usable	
3/8	3/8-16	1/2-7	0.3750 0.3690	9/16	15/64	1	1 1/4
1/2	1/2-13	3/4-8	0.5000 0.4930	3/4	5/16	1 1/4	1 1/2
5/8	5/8-11	1-8	0.6250 0.6170	15/16	25/64	1 1/2	1 3/4
3/4	3/4-10	1-8	0.7500 0.7410	1 1/8	15/32	1 3/4	2
7/8	7/8-9	2-8	0.8750 0.8660	1 5/16	35/64	2	2 1/4
1	1-8	2-8	1.000 0.9900	1 1/2	39/64	2 1/4	2 1/2

1. All thread are Class 2A free fit.
2. Cap screws up to 3/4 inch diameter and/or up to 4 inches in length are supplied bright finish -- larger sizes will be machine finish.
3. We can furnish with Alumilite finish, if specified.
4. Cap screws may be furnished with fine threads on special order only.
5. The radius of fillet under head is 0.009-0.023 inch for sizes to 1/2 inch diameter, 0.021-0.041 inch for sizes over 1/2 to 3/4 inch diameter, 0.041-0.062 inch for sizes 3/4 to 7/8 inch diameter and 0.062-0.093 inch for size 1 inch diameter.
6. Available in 1/8 inch increments to one inch length and 1/4 inch increments for lengths over one inch.

Round Head Square Neck Carriage Bolts (Bright Finish, USA Standard B18.5)



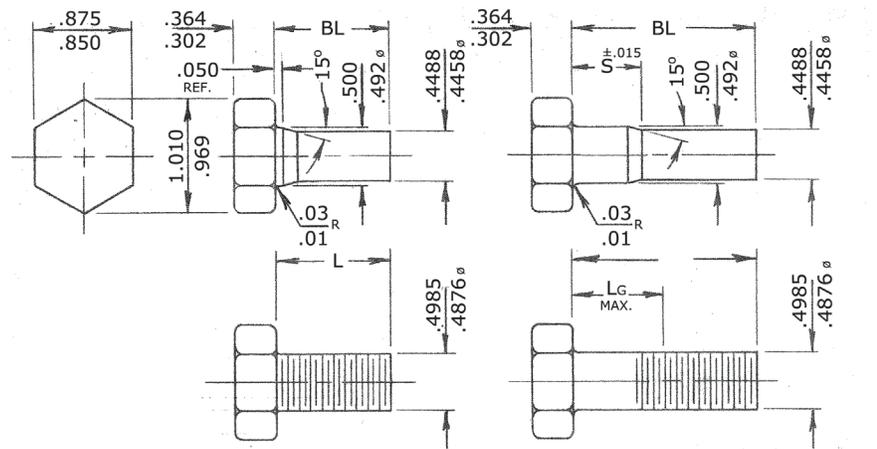
Dimensions in inches

Nominal Size or basic major diameter	Thread Size	A	B	C	D	E	F	
		Length ranges	Head Diameter (minimum)	Head Height (minimum)	Minimum Depth of Square	Width of Square (maximum)	Minimum Thread Length	
10	10-24	1/2-4	7/16	3/32	3/32	0.199	5/8	--
1/4	1/4-20	1/2-4 3/4	9/16	1/8	1/8	0.260	3/4	--
5/16	5/16-18	3/4-6	11/16	5/32	5/32	0.324	7/8	--
3/8	3/8-16	3/4-7	25/32	3/16	3/16	0.388	1	--
1/2	1/2-13	1-8	1 1/32	1/4	1/4	0.515	1 1/4	1 1/2
5/8	5/8-11	1 1/2-8	1 7/32	5/16	5/16	0.642	1 1/2	1 3/4
3/4	3/4-10	1 1/2-8	1 15/32	3/8	3/8	0.768	1 3/4	2
7/8	7/8-9	2-8	1 23/32	7/16	7/16	0.895	2	2 1/4
1	1-8	2-8	1 31/32	1/2	1/2	1.022	2 1/4	2 1/2

1. All thread are Class 2A free fit.
2. Radius of fillet under head of bolt for sizes No. 10 to 1/2 inch inclusive is 1/64-1/32 inch, and for sizes 5/8 and 3/4 inch, is 1/32-1/16 inch.
3. Bolts will have rolled threads and undersize unthreaded section.
4. Available in 1/16-inch increments to one-inch length and 1/8-inch increments for lengths over one inch.
5. Normally furnished in bright finish up to 3/4 inch diameter and/or 4 inches long -- larger diameters and longer lengths machine finish.

Heavy Hex Bolts

Rolled Thread



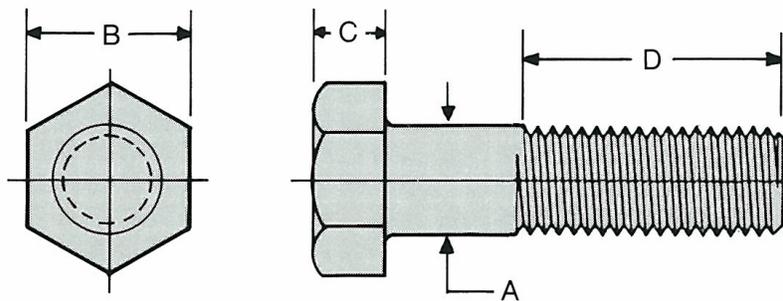
Dimensions in inches

DN	L	L TOL.	LG MAX.	R DWG. NO.	BL TOL.	S ±.015
UP TO 10	UP TO 1.00	+02 -03	--	R-3858	+00 -03	--
11 TO 15	1.12 TO 1.62	+04 -06	--	R-3858	+00 -06	--
16	1.75	+04 -06	.50	R-3859	+00 -06	.375
20	2.00	+04 -06	.75	R-3859	+00 -06	.375
22	2.25	+04 -06	1.00	R-3859	+00 -06	.375
24	2.50	+04 -06	1.25	R-3862	+00 -06	1.125
26	2.75	+06 -08	1.50	R-3862	+00 -08	1.125
30	3.00	+06 -08	1.75	R-3862	+00 -08	1.125
32	3.25	+06 -08	2.00	R-3863	+00 -08	1.875
34	3.50	+06 -08	2.25	R-3863	+00 -08	1.875
36	3.75	+06 -08	2.50	R-3863	+00 -08	1.875
40	4.00	+06 -08	2.75	R-3863	+00 -08	1.875

1. The dash number (DN) indicates the length of the bolt in inches & eighths of an inch.
2. Bolts may have washer face not exceeding .005 in height due to mismatch of header tools.
3. Bolt specs - ANSI B18.2.1
Thd. specs - ANSI B1.1
4. Bolts up to & incl. 1.500 LG. will be threaded to within 2 1/2 usable threads of head.
5. LG max. is the distance from the bearing surface of the head to the face of a non-countersunk std. go-gage threaded as far as threads will permit.
6. Nominal blank length (BL) = nominal length (L): see chart for tolerance.

Bus Bar Bolts

Heavy Hex Head 2024-T4 (with 205 finish and no-ox-id coating)



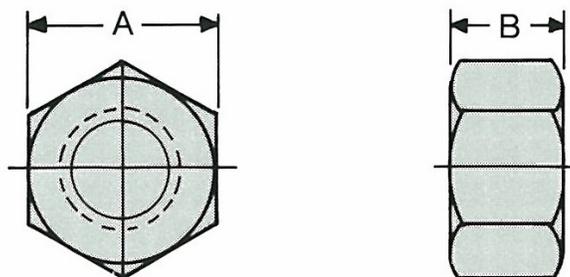
Dimensions in inches

Nominal Size or Basic Product diameter	A		B			C			D	
	Body Diameter		Width Across Flats			Head Height			Thread Length For Bolt Lengths (Basic)	
	Max	Basic	Max	Min	Basic	Max	Min	6 in. & shorter	Over 6 in.	
1/2	0.5000	0.515	7/8	0.875	0.850	11/32	0.364	0.302	1.250	1.500
5/8	0.6250	0.642	1 1/16	1.062	1.031	27/64	0.444	0.378	1.500	1.750

1. All Bus Bar Bolts to have 205 Alumilite finish with no oxide dip.

Finished Hex Nuts

Double-chamfered, Double-countersunk (USA Standard B18.2.2)



Dimensions in inches

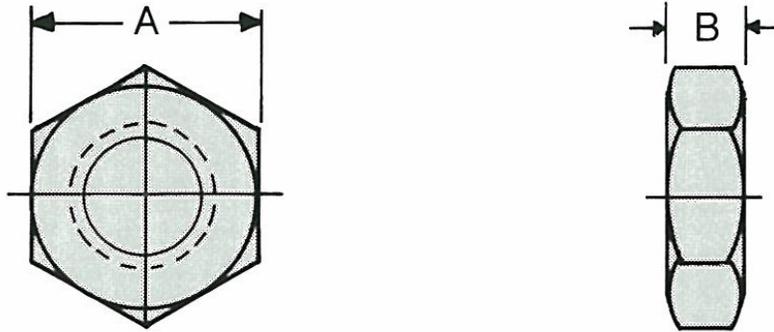
Nominal Size	Threads Per Inch Coarse	A	B	C
		Width Across Flats	Thickness	Approximate Weight (pounds) Per 1000 Pieces
1/4	20	7/16	7/32	2.81
5/16	18	1/2	17/64	4.14
3/8	16	9/16	21/64	6.10
1/2	13	3/4	7/16	14.3
5/8	11	15/16	35/64	27.9
3/4	10	1 1/8	41/64	46.6
7/8	9	1 5/16	3/4	74.0
1	8	1 1/2	53/64	110.0
1 1/8	7	1 11/16	31/32	158.0
1 1/4	7	1 7/8	1 1/16	212.0

1. All threads are Class 2B free fit.

2. Packed in bulk or boxed 100 per box through 3/8-inch size, larger sizes packed 50 pieces per box.

Hexagon Machine Screw Nuts

Double-chamfered, Double-countersunk (USA B18.6.3)



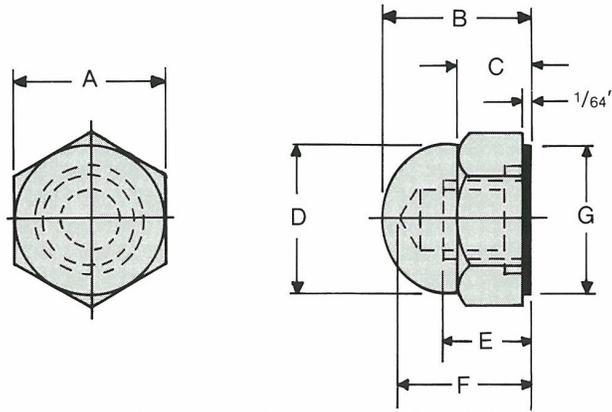
Dimensions in inches

Nominal Size	Threads Per Inch		A	B	Approximate weight (pounds) per 1000 pieces
	Coarse AN340	Fine AN345	Width Across Flats	Thickness	
4	40	48	1/4	3/32	0.420
5	40	44	5/16	7/64	0.805
6	32	40	5/16	7/64	0.783
8	32	36	11/32	1/8	1.04
10	24	32	3/8	1/8	1.22
12	24	28	7/16	3/16	2.36
1/4	20	28	7/16	3/16	2.36
5/16	18	24	9/16	7/32	4.50
3/8	16	24	5/8	1/4	6.17

1. All threads are Class 2B free fit.
2. Packed in bulk or boxed 100 per box.

Cap Nuts (Acorn Nuts)

Bright Finished - Washer Faced

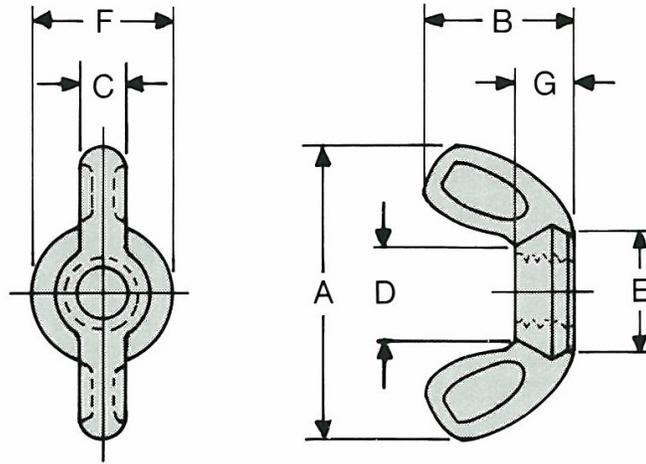


Dimensions in inches

Nominal Size	Threads Per Inch		A Hex Size	B Nut Height	C Hex Height	D Dome Diameter	E Tap Depth (usable thread)	F Drill Depth	G Washer Diameter	Approx. Weight (pounds) per 1000 pieces
	Coarse	Fine								
6	32		5/16	19/64	11/64	0.303	3/16	9/32	5/16	1.80
6		40		9/32	5/32			9/32		
8	32		5/16	19/64	11/64	0.303	3/16	9/32	5/16	1.70
8		36		9/32	5/32			1/4		
10	24		3/8	23/64	3/16	0.359	7/32	11/32	3/8	2.90
10		32	3/8	11/32	11/64	0.359	7/32	21/64		
12	24		3/8	23/64	3/16	0.359	7/32	11/32	3/8	2.70
12		28		11/32	11/64			5/16		
1/4	20		7/16	3/8	3/16	0.422	7/32	23/64	7/16	3.90
1/4		28		3/8	3/16			11/32		
5/16	18		9/16	7/16	7/32	0.531	9/32	27/64	9/16	7.10
5/16		24		7/16	7/32			13/32		
3/8	16		5/8	1/2	1/4	0.594	5/16	31/64	5/8	9.50
3/8		24		1/2	1/4			7/16		
1/2	13	20	3/4	9/16	9/32	0.719	9/32	15/32	3/4	15.3
5/8	11	18	15/16	3/4	3/8	0.906	7/16	21/32	15/16	31.2

1. All thread are Class 2B free fit.
2. Packed in buld or boxed 100 pieces per box.

Type C Wing Nuts (ANSI/ASME B18.17)



Dimensions in inches

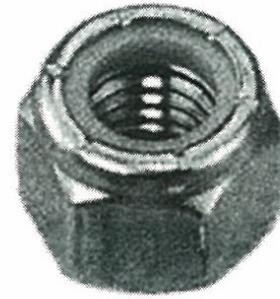
Nominal size or basic major diameter of thread	Threads per inch	Series	Nut Blank Size (ref)	A		B		C		D		E		F		G	
				Wing Spread		Wing Height		Wing Thickness		Between Wings		Boss Diameter		Boss Diameter		Boss Height	
				Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
4 (0.1120)	40	Regular	AA	0.66	0.64	0.36	0.35	0.11	0.09	0.18	0.16	0.27	0.25	0.32	0.30	0.16	0.14
5 (0.1250)	40	Regular	AA	0.66	0.64	0.36	0.35	0.11	0.09	0.18	0.16	0.27	0.25	0.32	0.30	0.16	0.14
6 (0.1380)	32	Regular Heavy	AA	0.66	0.64	0.36	0.35	0.11	0.09	0.18	0.16	0.27	0.25	0.32	0.30	0.16	0.14
			A	0.85	0.83	0.43	0.42	0.14	0.12	0.29	0.27	0.38	0.36	0.41	0.40	0.20	0.18
8 (0.1640)	32	Regular	A	0.85	0.83	0.43	0.42	0.14	0.12	0.29	0.27	0.38	0.36	0.41	0.40	0.20	0.18
10 (0.1900)	24 & 32	Regular	A	0.85	0.83	0.43	0.42	0.14	0.12	0.29	0.27	0.38	0.36	0.41	0.40	0.20	0.18
12 (0.2160)	24	Regular Heavy	A	0.85	0.83	0.43	0.42	0.14	0.12	0.29	0.27	0.38	0.36	0.41	0.40	0.20	0.18
			B	1.08	1.05	0.57	0.53	0.16	0.14	0.32	0.30	0.44	0.42	0.48	0.46	0.23	0.21
1/4 (0.2500)	20 & 28	Regular	B	1.08	1.05	0.57	0.53	0.16	0.14	0.32	0.30	0.44	0.42	0.48	0.46	0.23	0.21
5/16 (0.3125)	18 & 24	Regular	C	1.23	1.20	0.64	0.62	0.20	0.18	0.39	0.35	0.50	0.49	0.57	0.55	0.26	0.24
3/8 (0.3750)	16 & 24	Regular	D	1.45	1.42	0.74	0.72	0.23	0.21	0.46	0.42	0.62	0.60	0.69	0.67	0.29	0.27
7/16 (0.4375)	14 & 20	Regular Heavy	E	1.89	1.86	0.91	0.90	0.29	0.28	0.67	0.65	0.75	0.73	0.83	0.82	0.38	0.37
			EH	1.89	1.86	0.93	0.91	0.34	0.33	0.63	0.62	0.81	0.79	0.89	0.87	0.42	0.40
1/2 (0.5000)	13 & 20	Regular Heavy	E	1.89	1.86	0.91	0.90	0.29	0.28	0.67	0.65	0.75	0.73	0.83	0.82	0.38	0.37
			EH	1.89	1.86	0.93	0.91	0.34	0.33	0.63	0.62	0.81	0.79	0.89	0.87	0.42	0.40
see note 1		2															

1. Where specifying nominal size in decimals, zeros in the fourth decimal place shall be omitted.
2. Sizes shown in bold face type are preferred.
3. Type C, Style 1 is the same nut as Type IV, Style A of Federal Specification FF-N-845.

Nylon Insert Lock Nuts (ALLOY 2017-T4)

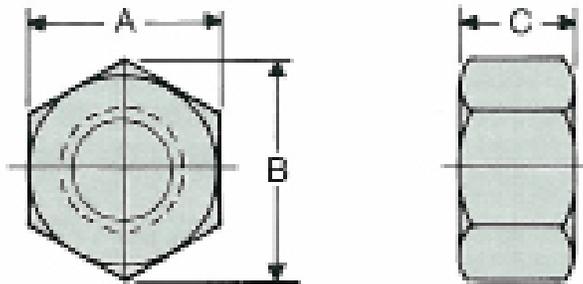
SIZES STOCKED

1/4 - 20
 5/16 - 18
 3/8 - 16



Heavy Hex Bus Bar Nuts (ALLOY 6061T6)

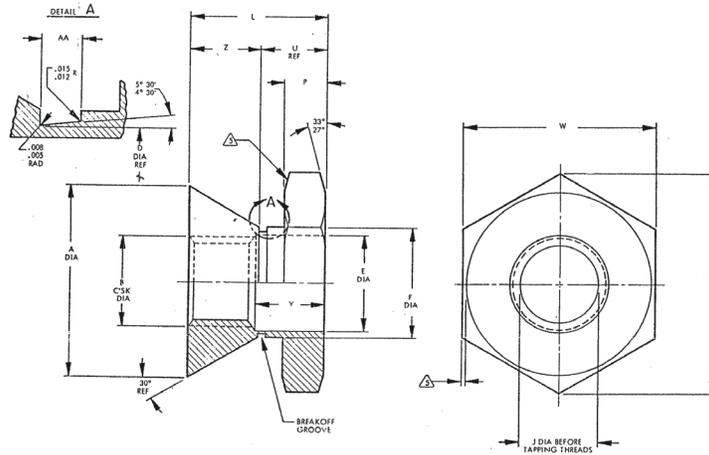
1/2 - 13 & 5/8 - 11



Dimensions in inches

Nominal Size or Basic Major Dia of Thread	A			B		C		
	Width Across Flats			Width Across Corners		Thickness Heavy Hex Nuts		
	Basic	Max	Min	Max	Min	Basic	Max	Min
3/8 0.3750	11/16	0.669	0.669	0.794	0.763	23/64	0.377	0.341
1/2 0.5000	7/8	0.875	0.850	1.010	0.969	31/64	0.504	0.464
5/8 0.6250	1 1/16	1.062	1.031	1.227	1.175	39/64	0.631	0.587
3/4 0.7500	1 1/4	1.250	1.212	1.443	1.382	47/64	0.758	0.710

Breakaway Nut

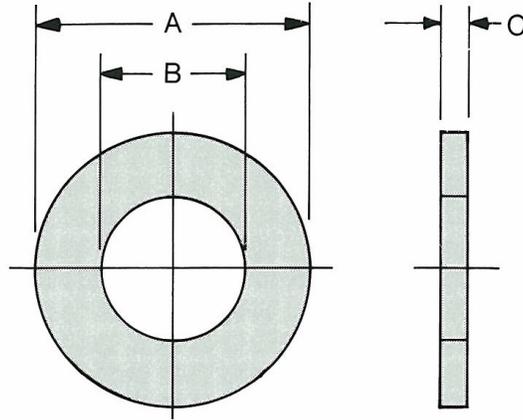


Dimensions in inches

	Thread UNC-2B	A DIA	B C'SK DIA	D DIA REF	E DIA	F DIA	J DIA	K MIN	L	P	U REF	W HEX	Y	Z	AA	LOCKING TORQUE INCH LBS	BREAKOFF TORQUE INCH LBS
-3	.1900-24	.440	.212	.218	.203	.248	.152	.484	.385	.130	.215	.440	.220	.175	.025	4-12	25-35
		.434	.208	.200	.242	.146	.375	.120	.425	.215	.170	.020					
-4	.2500-20	.566	.272	.288	.263	.323	.203	.626	.485	.165	.270	.565	.275	.220	.025	9-17	60-80
		.560	.268	.260	.317	.197	.475	.155	.550	.270	.215	.020					
-5	.3125-18	.628	.336	.362	.330	.400	.261	.698	.505	.185	.295	.628	.300	.215	.025	20-35	130-160
		.622	.330	.327	.394	.255	.495	.175	.613	.295	.210	.020					
-6	.3750-16	.753	.398	.429	.393	.466	.317	.838	.600	.215	.350	.753	.355	.255	.035	25-40	200-240
		.750	.392	.390	.460	.311	.590	.205	.736	.350	.250	.030					
-7	.4375-14	.878	.463	.493	.456	.547	.372	.981	.665	.240	.375	.878	.380	.295	.040	40-60	270-330
		.872	.457	.453	.541	.366	.655	.230	.861	.375	.290	.035					
-8	.5000-13	1.003	.528	.556	.518	.609	.430	1.123	.766	.265	.420	1.003	.425	.351	.050	55-85	370-430
		.997	.522	.515	.603	.424	.756	.255	.986	.420	.346	.045					
-10	.6250-11	1.128	.598	.675	.645	.719	.542	1.264	.819	.290	.455	1.128	.460	.369	.050	95-130	625-700
		1.123	.592	.641	.713	.536	.809	.280	1.110	.455	.364	.045					

Plain Flat Washers

Alclad 2024-T3 and 3003-H14 Alloys - Plain Finish (Army-Navy Aircraft AN960 and U.S. Standard)



Dimensions in inches

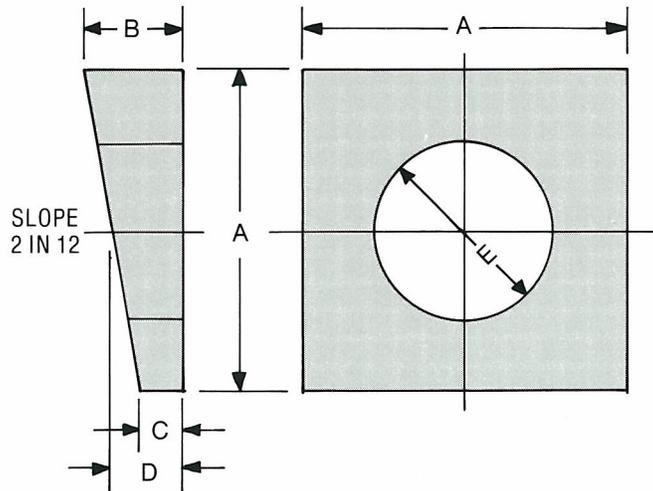
Screw or Bolt Size	AN960 dash no. (if applicable and Alcoa piece no.)	A	B	C	Weight per M pieces
		O.D.	I.D.	Thickness	
	.....	1/4	7/64	0.016	.06
	.....	1/4	7/64	0.032	.13
4	--4L	5/16	1/8	0.016	.10
	--4*	5/16	1/8	0.032	.21
6	--6L*	3/8	9/64	0.016	.15
	--6*	3/8	9/64	0.032	.31
8	--8L*	3/8	11/64	0.016	.14
	--8*	3/8	11/64	0.032	.28
10	--10L*	7/16	13/64	0.016	.19
	--10*	7/16	13/64	0.064	.76
	LL10-1392	1/2	.193	0.040	.67
1/4"	--416L*	1/2	17/64	0.016	.23
	--416*	1/2	17/64	0.064	.91
	LL10-1457	11/16	.260	0.051	1.64
	.....	5/8	9/32	0.064	1.58
	.....	11/16	17/64	0.064	2.04
	.....	3/4	5/16	0.064	2.36
5/16"	--516L*	9/16	21/64	0.016	.27
	--516*	9/16	21/64	0.064	1.05
	.....	11/16	11/32	0.064	1.80
	.....	7/8	11/32	0.064	3.28
3/8	.....	7/8	3/8	0.083	4.11
	--616L*	5/8	25/64	0.016	.30
	--616*	5/8	25/64	0.064	1.21
	.....	3/4	25/64	0.091	2.95
	.....	13/16	13/32	0.064	2.51
.....	1	7/16	0.078	5.00	

Screw or Bolt Size	AN960 dash no. (if applicable and Alcoa piece no.)	A	B	C	Weight per M pieces
		O.D.	I.D.	Thickness	
7/16"	--716L*	3/4	29/64	0.016	.45
	--716*	3/4	29/64	0.064	1.81
1/2"	.....	13/16	29/64	0.064	2.31
	--816L	7/8	33/64	0.016	.63
	--816*	7/8	33/64	0.064	2.53
	.....	1 1/16	17/32	0.109	7.30
	.....	1 1/4	9/16	0.091	8.98
	.....	1 3/8	9/16	0.094	0.70
9/16"	.....	1 3/8	9/16	0.102	12.70
	--916L	1 1/16	37/64	0.016	1.01
5/8"	--1016L	1 3/16	41/64	0.016	1.27
	--1016	1 3/16	41/64	0.064	5.07
	.....	1 5/16	21/32	0.134	13.70
	.....	1 1/2	11/16	0.102	14.40
	.....	1 3/4	11/16	0.156	32.00
	.....	1 13/16	41/64	0.064	14.60
3/4"	--1216L	1 5/16	49/64	0.016	1.44
	--1216	1 5/16	49/64	0.091	8.38
	.....	1 1/2	49/64	0.125	16.50
	.....	2	13/16	0.125	33.10
	.....	2	13/16	0.188	49.70
7/8"	--1416L	1 1/2	57/64	0.016	1.84
	--1416	1 1/2	57/64	0.091	10.80
	.....	1 1/2	57/64	0.125	14.40
	.....	2 1/4	15/16	0.125	41.40
1"	--1616	1 3/4	1 1/64	0.091	15.00
	.....	2 1/2	1 1/16	0.125	50.70

1. All items are available in alloy alclad 2024-T4. Items marked * are also available in alloy 1100-H14.

2. Shipment in bulk or packaged 1,000 pieces per box for sizes through 1/2 inch and 500 pieces per box for larger sizes.

Beveled Washers (ANSI/ASME B18.23.1)

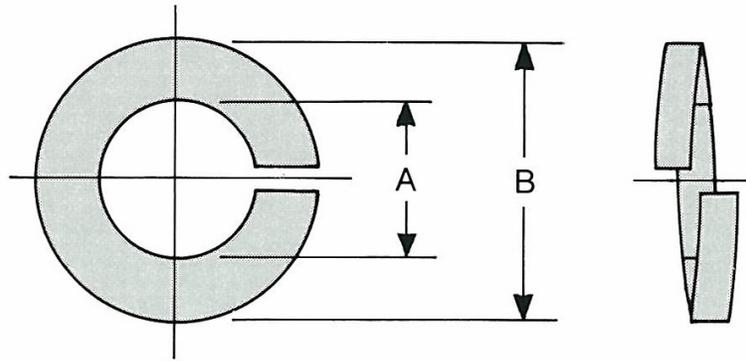


Dimensions in inches

Bolt Diameter	A	B	C	D	E	A	B	C	D	E
	Type A - Aluminum					Type B - Aluminum				
Tolerance	± 0.03	± 0.03	± 0.03	NOM	± 0.03	± 0.03	+0.02 -0.03	± 0.02	NOM	+0.03 -0.01
1/4 0.250	0.69	0.22	0.09	0.16	0.31	0.88	0.26	0.12	0.19	0.28
5/16 0.312	1.00	0.31	0.16	0.23	0.38	0.88	0.26	0.12	0.19	0.34
3/8 0.375	1.25	0.34	0.12	0.23	0.44	0.88	0.26	0.12	0.19	0.41
1/2 0.500	1.25	0.34	0.12	0.23	0.56	1.75	0.45	0.16	0.31	0.53
5/8 0.625	1.50	0.38	0.12	0.25	0.69	1.75	0.45	0.16	0.31	0.69
3/4 0.750	1.50	0.44	0.19	0.31	0.81	1.75	0.45	0.16	0.31	0.81
7/8 0.875	2.00	0.56	0.22	0.39	0.94	1.75	0.45	0.16	0.31	0.94
1 1.000	2.00	0.56	0.22	0.39	1.06	1.75	0.45	0.16	0.31	1.12
1 1/8 1.125	2.25	0.62	0.25	0.44	1.25	2.25	0.50	0.12	0.31	1.25
1 1/4 1.250	2.25	0.72	0.31	0.52	1.38	2.25	0.50	0.12	0.31	1.38
1 3/8 1.375	2.75	0.78	0.31	0.55	1.50	2.25	0.50	0.12	0.31	1.50
1 1/2 1.500	3.00	0.81	0.31	0.56	1.62	2.25	0.50	0.12	0.31	1.62

Regular Spring Lock Washers

Etched Finish (USA Standard B27.1)



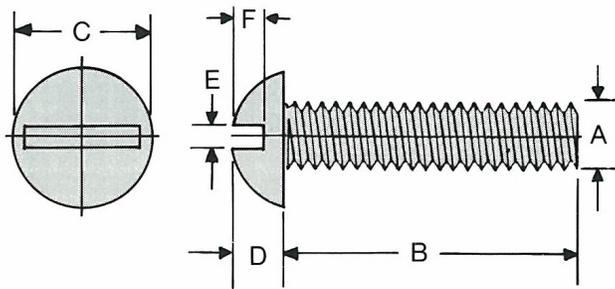
Dimensions in inches

Screw or Bolt size		Clearance		A	B	Washer Section Minimum		Weight per 1000 pieces (approx. lbs.)
Nominal	Actual	Minimum	Maximum	Minimum inside diameter	Maximum outside diameter	Width	Thickness	
2	0.086	0.002	0.011	0.088	0.172	0.035	0.020	0.036
3	0.099	0.002	0.011	0.101	0.195	0.040	0.025	0.057
4	0.112	0.003	0.012	0.115	0.209	0.040	0.025	0.063
5	0.125	0.003	0.012	0.128	0.236	0.047	0.031	0.100
6	0.138	0.003	0.013	0.141	0.250	0.047	0.031	0.106
8	0.164	0.004	0.014	0.168	0.293	0.055	0.040	0.188
10	0.190	0.004	0.015	0.194	0.334	0.062	0.047	0.283
12	0.216	0.005	0.016	0.221	0.377	0.070	0.056	0.424
1/4	0.250	0.005	0.017	0.255	0.489	0.109	0.062	0.874
5/16	0.313	0.005	0.020	0.318	0.586	0.125	0.078	1.53
3/8	0.375	0.007	0.023	0.382	0.683	0.141	0.094	2.44
7/16	0.438	0.008	0.026	0.446	0.779	0.156	0.109	3.59
1/2	0.500	0.009	0.029	0.509	0.873	0.171	0.125	5.09
9/16	0.563	0.009	0.032	0.572	0.971	0.188	0.141	7.04
5/8	0.625	0.011	0.035	0.636	1.079	0.203	0.156	9.57
3/4	0.750	0.013	0.041	0.763	1.271	0.234	0.188	15.7
7/8	0.875	0.016	0.047	0.890	1.464	0.266	0.219	23.9
1	1.000	0.017	0.053	1.017	1.661	0.297	0.250	34.8

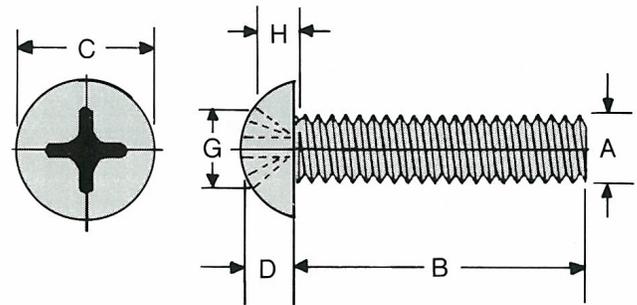
1. The thickness of the section at the inside periphery is slightly greater than the thickness at the outer periphery.
2. Maximum outside diameters specified allow for commercial tolerances on cold drawn wire.

Round Head Machine Screws

Bright Finish (USA Standard B18.6.3)



SLOTTED HEAD



PHILLIPS RECESSED HEAD

Dimensions in inches

A Nominal Size or Basic Major Diameter	Thread Size		B Length Ranges	C Head Diam- eter	D Head Height	E Width of Slot	F Depth of Slot	G Diameter of Recess	H Approximate of Depth of Recess	Phillips Driver Size Number
	Coarse	Fine								
4 0.112	4-40	4-48	3/16-1 1/2	0.211 0.193	0.086 0.075	0.039 0.031	0.058 0.044	0.118 0.105	0.063	1
5 0.125	5-40	5-44	3/16-2	0.236 0.217	0.095 0.083	0.043 0.035	0.063 0.047	0.154 0.141	0.060	2
6 0.138	6-32	6-40	3/16-2 3/8	0.260 0.240	0.103 0.091	0.048 0.039	0.068 0.051	0.162 0.149	0.070	2
8 0.164	8-32	8-36	1/4-3	0.309 0.287	0.120 0.107	0.054 0.045	0.077 0.058	0.178 0.165	0.088	2
10 0.190	10-24	10-32	1/4-3 1/2	0.359 0.334	0.137 0.123	0.060 0.050	0.087 0.065	0.195 0.182	0.106	2
12 0.216	12-24	12-28	1/4-3 3/4	0.408 0.382	0.153 0.139	0.067 0.056	0.096 0.073	0.249 0.236	0.112	3
1/4 0.250	1/4-20	1/4-28	5/16-4	0.472 0.443	0.175 0.160	0.075 0.064	0.109 0.082	0.268 0.255	0.134	3
5/16 0.3125	5/16-18	5/16-24	5/16-4	0.590 0.557	0.216 0.198	0.084 0.072	0.132 0.099	0.308 0.295	0.174	3
3/8 0.375	3/8-16	3/8-24	3/8-4	0.708 0.670	0.256 0.237	0.094 0.081	0.155 0.117	0.387 0.374	0.215	4

1. All threads are Class 2A free fit.

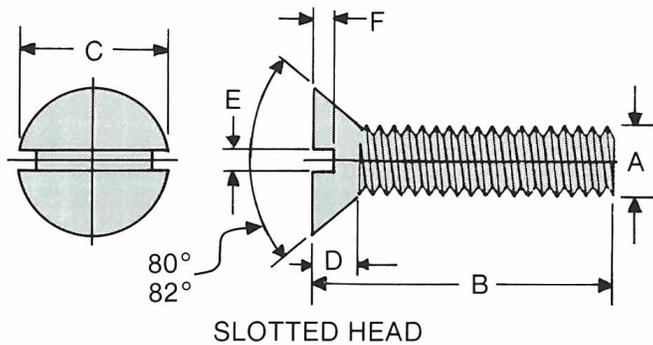
2. Screws 2 inches long and shorter are threaded to within two threads of the head. Screws over 2 inches long have a minimum of 1 3/4 inches of thread. The unthreaded portion of the shank is not less than the minimum pitch diameter and not more than the maximum major diameter of the thread.

3. Shipped in bulk or packed 100 per box.

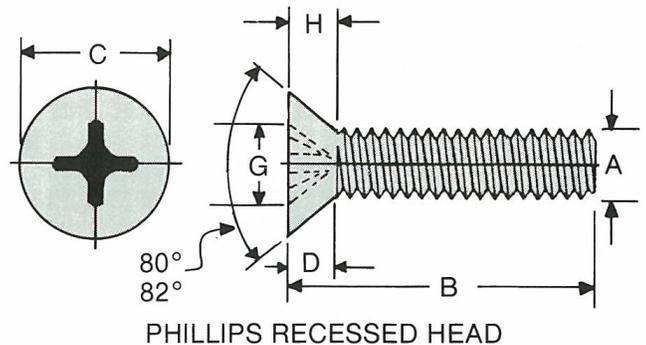
15 4. Available in 1/16 inch increments to one-inch length and 1/8-inch increments for lengths over one inch.

Flat Head Machine Screws

Bright Finish (USA Standard B18.6.3)



SLOTTED HEAD



PHILLIPS RECESSED HEAD

Dimensions in inches

A Nominal size or basic major diameter	Thread Size		B Length ranges	C Head Diameter	D Head Height	E Width of slot	F Depth of slot	G Diameter of recess	H Approximate depth of recess	Phillips driver size number
	Coarse	Fine								
4 0.112	4-40	4-48	3/16-1 1/2	0.225	0.067	0.039	0.030	0.128	0.081	1
				0.207	0.055	0.031	0.020	0.115		
5 0.125	5-40	5-44	3/16-2	0.252	0.075	0.043	0.034	0.154	0.075	2
				0.232	0.062	0.035	0.022	0.141		
6 0.138	6-32	6-40	3/16-2 3/4	0.279	0.083	0.048	0.038	0.174	0.095	2
				0.257	0.069	0.039	0.024	0.161		
8 0.164	8-32	8-36	1/4-3	0.332	0.100	0.054	0.045	0.189	0.110	2
				0.308	0.084	0.045	0.029	0.176		
10 0.190	10-24	10-32	1/4-3 1/2	0.385	0.116	0.060	0.053	0.204	0.125	2
				0.359	0.098	0.050	0.034	0.191		
12 0.216	12-24	12-28	1/4-3 3/4	0.438	0.132	0.067	0.060	0.268	0.145	3
				0.410	0.112	0.056	0.039	0.255		
1/4 0.250	1/4-20	1/4-28	5/16-4	0.507	0.153	0.075	0.070	0.283	0.160	3
				0.477	0.131	0.064	0.046	0.270		
5/16 0.3125	5/16-18	5/16-24	5/16-4	0.635	0.191	0.084	0.088	0.365	0.205	4
				0.600	0.165	0.072	0.058	0.352		
3/8 0.375	3/8-16	3/8-24	3/8-4	0.762	0.230	0.094	0.106	0.393	0.234	4
				0.722	0.200	0.081	0.070	0.380		

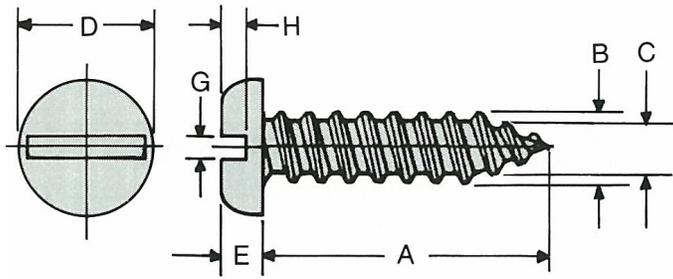
- All threads are Class 2A free fit.
- Screws 2 inches long and shorter are threaded to within two threads of the head. Screws over 2 inches long have a minimum of 1 3/4 inches of thread. The unthreaded portion of the shank is not less than the minimum pitch diameter and not more than the maximum major diameter for the thread.
- Shipped in bulk or packed 100 per box.
- Available in 1/16-inch increments to one-inch length and 1/8-inch increments for lengths over one inch.

5. Short-length flat-head screws with a length equal to or less than the list below have undercut heads, with the conical bearing surface approximately two-thirds of the standard height, with slot depths and recess dimensions proportionately less but with standard head diameters.

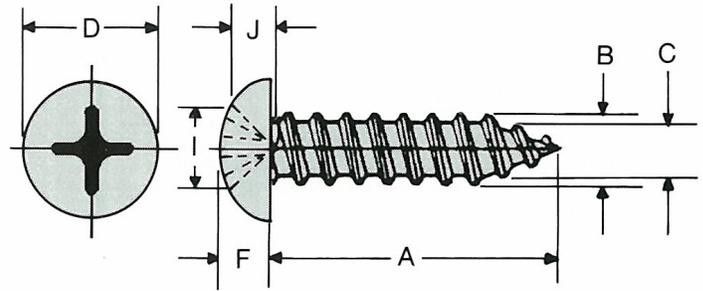
Screw Size	Screw Length equal to or less than	Screw Size	Screw Length equal to or less than
4	3/16	10	5/16
5	3/16	1/4	7/16
8	1/4	5/16	1/2

Pan Head Sheet Metal Screws

(A Type & A/B) Bright Finish (USA Standard B18.6.4)



SLOTTED HEAD



PHILLIPS RECESSED HEAD

Dimensions in inches

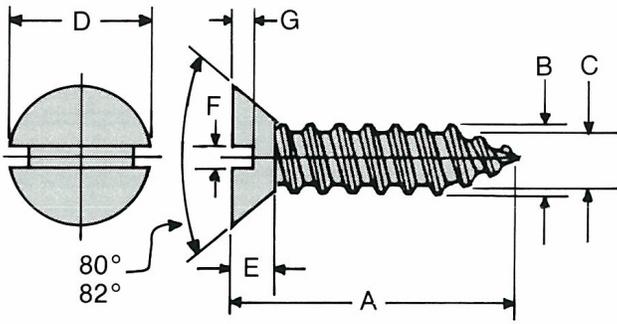
Nominal Size	Threads per inch	A	B	C	D	E	F	G	H	I	J	Phillips driver size number
		Length ranges	Major diameter	Minor diameter	Head diameter	Head height (slotted)	Head height (Phillips)	Width of slot	Depth of slot	Diameter of recess	Approx. depth of recess	
4	24	1/4 to 3/4	0.114	0.083	0.219	0.068	0.080	0.039	0.040	0.122	0.069	1
			0.110	0.078	0.205	0.058	0.070	0.031	0.030	0.109		
5	20	1/4 to 1	0.130	0.095	0.245	0.075	0.089	0.043	0.045	0.158	0.070	2
			0.126	0.090	0.231	0.065	0.079	0.035	0.034	0.145		
6	18	1/4 to 1 1/2	0.141	0.102	0.270	0.082	0.097	0.048	0.050	0.166	0.079	2
			0.136	0.096	0.256	0.072	0.087	0.039	0.037	0.153		
7	16	3/8 to 1 1/2	0.158	0.114	0.296	0.089	0.106	0.048	0.054	0.176	0.088	2
			0.152	0.108	0.281	0.079	0.096	0.039	0.031	0.163		
8	15	3/8 to 2	0.168	0.123	0.322	0.096	0.115	0.054	0.058	0.182	0.093	2
			0.162	0.116	0.306	0.085	0.105	0.045	0.045	0.169		
10	12	3/8 to 2	0.194	0.133	0.373	0.110	0.133	0.060	0.063	0.199	0.112	2
			0.188	0.126	0.357	0.099	0.122	0.050	0.053	0.186		
12	11	1/2 to 1 1/2	0.221	0.162	0.425	0.125	0.151	0.067	0.077	0.259	0.128	3
			0.215	0.155	0.407	0.112	0.139	0.056	0.061	0.246		
14	10	1/2 to 2	0.254	0.185	0.476	0.139	0.169	0.075	0.085	0.281	0.148	3
			0.248	0.178	0.457	0.126	0.156	0.064	0.068	0.268		

1. Shipped in bulk or packed 100 per box.

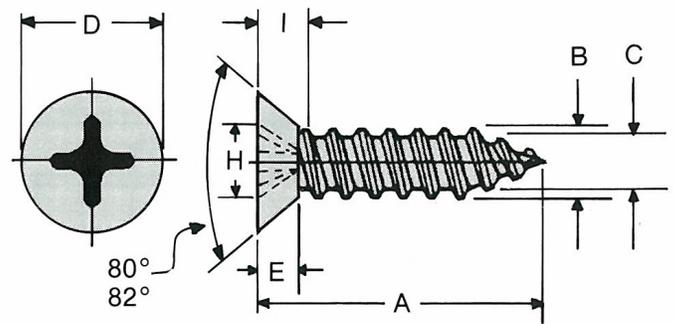
2. Available in 1/16-inch increments to one-inch length and 1/8-inch increments for lengths over one inch. For specific sizes carried in stock and weights, call 800-526-0341

Flat Head Sheet Metal Screws

(A Type & A/B) Bright Finish (USA Standard B18.6.4)



SLOTTED HEAD



PHILLIPS RECESSED HEAD

Dimensions in inches

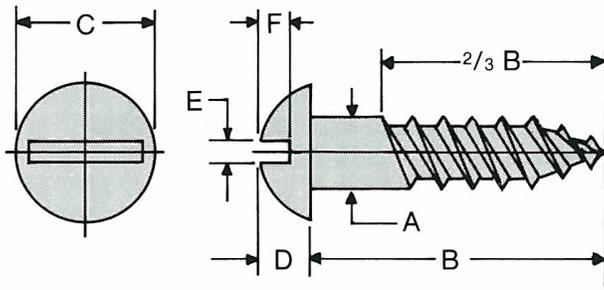
Nominal Size	Threads per inch	A	B	C	D	E	F	G	H	I	Phillips driver size number
		Length ranges	Major diameter	Minor diameter	Head diameter	Head height	Width of slot	Depth of slot	Diameter of recess	Approx. depth of recess	
4	24	1/4 to 3/4	0.114	0.083	0.225	0.067	0.039	0.030	0.128	0.081	1
			0.110	0.078	0.207	0.055	0.031	0.020	0.115		
5	20	1/4 to 1	0.130	0.095	0.52	0.075	0.043	0.034	0.154	0.075	2
			0.126	0.090	0.232	0.062	0.035	0.022	0.141		
6	18	1/4 to 1 1/2	0.141	0.102	0.279	0.083	0.048	0.038	0.174	0.095	2
			0.136	0.096	0.257	0.069	0.039	0.024	0.161		
7	16	3/8 to 1 1/2	0.158	0.114	0.305	0.091	0.048	0.041	0.182	0.103	2
			0.152	0.108	0.283	0.076	0.039	0.027	0.169		
8	15	3/8 to 2	0.168	0.123	0.332	0.100	0.054	0.045	0.189	0.110	2
			0.162	0.116	0.308	0.084	0.045	0.029	0.176		
10	12	3/8 to 2	0.194	0.133	0.385	0.116	0.060	0.053	0.204	0.125	2
			0.188	0.126	0.359	0.098	0.050	0.034	0.191		
12	11	1/2 to 1 1/2	0.221	0.162	0.438	0.132	0.067	0.060	0.268	0.145	3
			0.215	0.155	0.410	0.112	0.056	0.039	0.255		
14	10	1/2 to 2	0.254	0.185	0.491	0.148	0.075	0.068	0.283	0.160	3
			0.248	0.178	0.461	0.127	0.064	0.044	0.270		

1. Shipped in bulk or packed 100 per box.

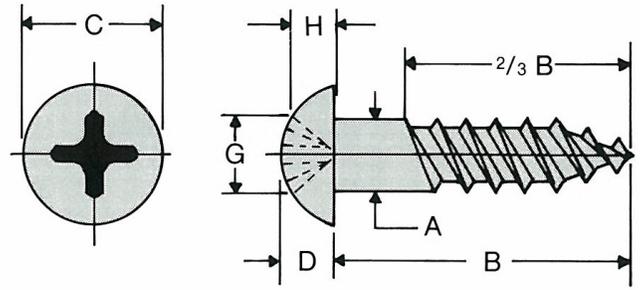
2. Available in 1/16-inch increments to one-inch length and 1/8-inch increments for lengths over one inch. For specific sizes carried in stock and weights, call 800-526-0341.

Round Head Wood Screws

Bright Finish (USA Standard B18.6.1)



SLOTTED HEAD



PHILLIPS RECESSED HEAD

Dimensions in inches

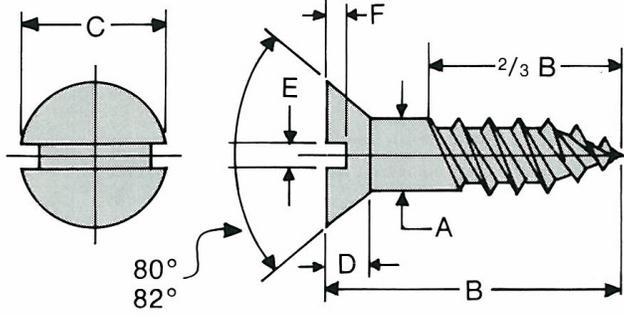
A	Number of threads per inch	B	C	D	E	F	G	H	Phillips driver size number
Nominal size or basic diameter of screw		Length ranges	Head diameter	Head height	Width of slot	Depth of slot	Diameter of recess	Approximate depth of recess	
4 0.112	22	3/8-1 1/2	0.211 0.193	0.086 0.075	0.039 0.031	0.058 0.044	0.130 0.117	0.073	1
5 0.125	20	3/8-1 1/2	0.236 0.217	0.095 0.083	0.043 0.035	0.063 0.047	0.154 0.141	0.060	2
6 0.138	18	3/8-1 3/4	0.260 0.240	0.103 0.091	0.048 0.039	0.068 0.051	0.162 0.149	0.070	2
7 0.151	16	3/8-1 3/4	0.285 0.264	0.111 0.099	0.048 0.039	0.072 0.055	0.170 0.157	0.079	2
8 0.164	15	3/8-2	0.309 0.287	0.120 0.107	0.054 0.045	0.077 0.058	0.178 0.165	0.088	2
9 0.177	14	1/2-2	0.334 0.311	0.128 0.115	0.054 0.045	0.082 0.062	0.186 0.173	0.097	2
10 0.190	13	1/2-2 1/2	0.359 0.334	0.137 0.123	0.060 0.050	0.087 0.065	0.195 0.182	0.106	2
12 0.216	11	3/4-3	0.408 0.382	0.153 0.139	0.067 0.056	0.096 0.073	0.249 0.236	0.112	3
14 0.242	10	1-3	0.457 0.429	0.170 0.155	0.075 0.064	0.106 0.080	0.265 0.252	0.129	3
16 0.268	9	1-3	0.506 0.476	0.187 0.171	0.075 0.064	0.115 0.087	0.281 0.263	0.148	3

1. Shipped in bulk or packed 100 per box.

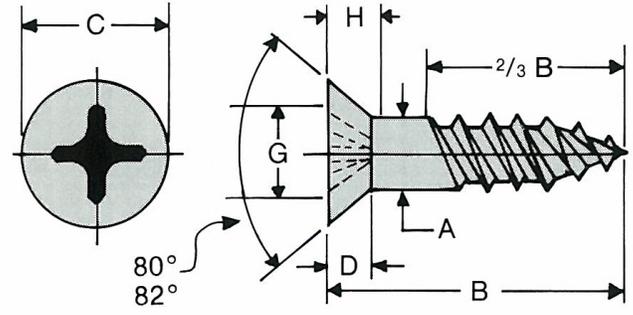
2. Available in 1/16-inch increments to one-inch length and 1/8-inch increments for lengths over one inch. For specific sizes carried in stock and weights, call 800-526-0341.

Flat Head Wood Screws

Bright Finish (USA Standard B18.6.1)



SLOTTED HEAD



PHILLIPS RECESSED HEAD

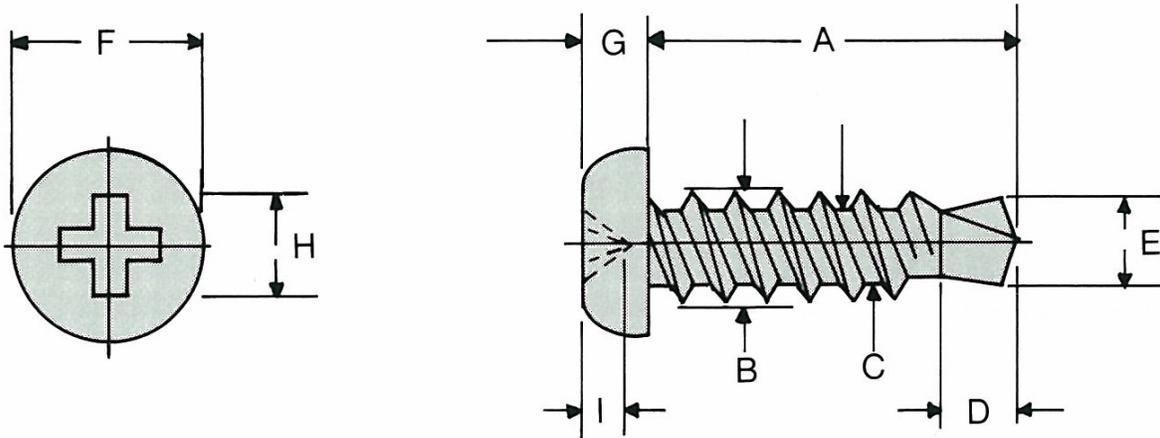
Dimensions in inches

A	Number of threads per inch	B	C	D	E	F	G	H	Phillips driver size number
Nominal size or basic diameter of screw		Length ranges	Head diameter	Head height	Width of slot	Depth of slot	Diameter of recess	Approximate depth of recess	
4 0.112	22	3/8-1 1/2	0.225 0.207	0.067 0.055	0.039 0.031	0.030 0.020	0.128 0.115	0.081	1
5 0.125	20	3/8-1 1/2	0.252 0.232	0.075 0.062	0.043 0.035	0.034 0.022	0.154 0.141	0.075	2
6 0.138	18	3/8-1 3/4	0.279 0.257	0.083 0.069	0.048 0.039	0.038 0.024	0.174 0.161	0.095	2
7 0.151	16	3/8-1 3/4	0.305 0.283	0.091 0.076	0.048 0.039	0.041 0.027	0.189 0.176	0.110	2
8 0.164	15	3/8-2	0.332 0.308	0.100 0.084	0.054 0.045	0.045 0.029	0.204 0.191	0.125	2
9 0.177	14	1/2-2	0.358 0.334	0.108 0.091	0.054 0.045	0.049 0.032	0.214 0.201	0.135	2
10 0.190	13	1/2-2 1/2	0.385 0.359	0.116 0.098	0.060 0.050	0.053 0.034	0.258 0.245	0.135	3
12 0.216	11	3/4-3	0.438 0.410	0.132 0.112	0.067 0.056	0.068 0.039	0.283 0.270	0.160	3
14 0.242	10	1-3	0.491 0.461	0.148 0.127	0.075 0.064	0.068 0.044	0.303 0.290	0.180	3
16 0.268	9	1-3	0.544 0.512	0.164 0.141	0.075 0.064	0.075 0.049	0.327 0.314	0.205	3

1. Shipped in bulk or packed 100 per box.

2. Available in 1/8-inch increments to one-inch length and 1/4-inch increments for lengths over one inch. For specific sizes carried in stock and weights, call 800-526-0341.

Phillips Pan Head Self-Drill Screw



Dimensions in inches

Size	Threads per inch	A	B	C	D	E	F	G	H	I	Phillips driver size number
		Length range	Major diameter	Minor diameter	point length (ref.)	point diameter (max.)	head diameter	head height	recess diameter	(Approx.) depth of recess	
6	20	.38	.139	.104	.093	.114	.270	.097	.166	.079	2
		1.00	.135	.099			.256	.087	.153		
8	18	.50	.166	.122	.125	.136	.322	.115	.182	.095	2
		1.25	.151	.116			.306	.105	.169		
10	16	.50	.189	.141	.156	.160	.373	.133	.199	.112	2
		1.25	.183	.135			.357	.122	.186		

The aluminum self-drilling Type B sheet metal screw is made from alloy 7075, an aircraft alloy which gives it high strength. It will drill its own lead hole in a wide range of aluminum alloys and other materials. While the aluminum is more expensive than a standard sheet metal screw, in appropriate applications, its in-place cost is less, due to elimination of lead hole preparation and simplified installation.

Materials will penetrate aluminum alloys 6063, 1100, 3003, 5052 and 5005, corrugated fiberglass and plastics. The aluminum self-drilling screw may be found satisfactory in other aluminum alloys depending on their hardness and thickness. Surface finishes such as paint, chemical conversion coat and anodic will not impair the use of the aluminum screw.

Suggested composite material thickness:

No. 6	.090 in.
No. 8	.110 in.
No. 10	.125 in.

Multiple thickness can be joined but must be pressed together tight enough so that drill point penetration is completed before thread engagement occurs.

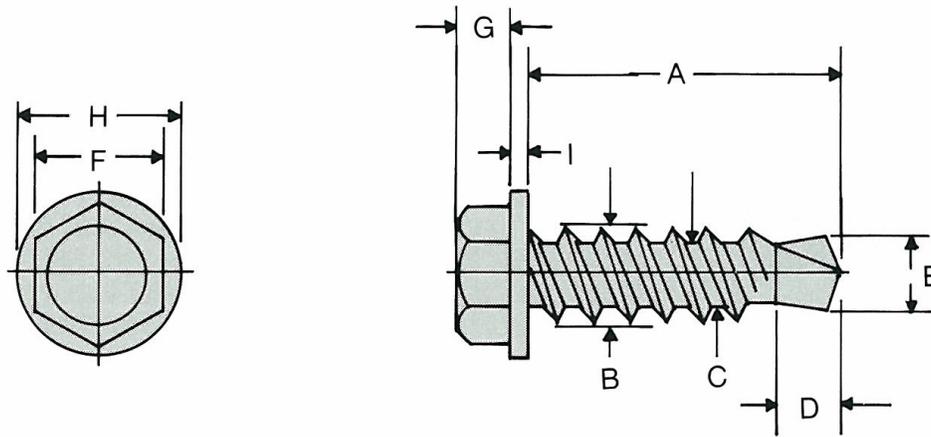
Power drivers -- a drilling speed of 2500 rpm is desirable, although speeds from 1800 to 2500 rpm are entirely satisfactory. Drivers should be equipped with torque limited clutches or depth-locating clutch releases are preferable. End pressure up to 30 to 35 lbs. may be required. The feel for the varying amount of end pressure is very quickly attained in practice.

Recommended torque settings for power drivers --

No. 6	4 to 8 in. - lb
No. 8	6 to 18 in. - lb
No. 10	6 to 25 in. - lb

The lower torque values are desirable for the lighter gauge and lower strength materials. The optimum driver torque setting should be determined in actual practice. Driving as well as seating torques are below the free breaking torque.

Hex Washer Head Self-Drill Screw



Dimensions in inches

Nominal size	Threads per inch	A	B	C	D	E	F	G	H	I
		Length range	Major diameter	Minor diameter	Point length (ref.)	Point diameter (max.)	Across flats	Head height	Washer diameter	Washer thickness
6	20	.38	.135	.104	.093	.114	.250	.080	.328	.015
		.75	.139	.099			.244				.093	.302	.025
8	18	.50	.166	.122	.125	.136	.250	.096	.348	.019
		2.00	.161	.116			.244				.110	.322	.031
10	16	.50	.189	.141	.156	.160	.312	.105	.414	.019
		3.00	.183	.135			.305				.120	.384	.031

The aluminum self-drilling Type B sheet metal screw is made from alloy 7075, an aircraft alloy which gives it high strength. It will drill its own lead hole in a wide range of aluminum alloys and other materials. While the aluminum is more expensive than a standard sheet metal screw, in appropriate applications, its in-place cost is less, due to elimination of lead hole preparation and simplified installation.

Materials will penetrate aluminum alloys 6063, 1100, 3003, 5052 and 5005, corrugated fiberglass and plastics. The aluminum self-drilling screw may be found satisfactory in other aluminum alloys depending on their hardness and thickness. Surface finishes such as paint, chemical conversion coat and anodic will not impair the use of the aluminum screw.

Suggested composite material thickness:

No. 6	.090 in.
No. 8	.110 in.
No. 10	.125 in.

Multiple thickness can be joined but must be pressed together tight enough so that drill point penetration is completed before thread engagement occurs.

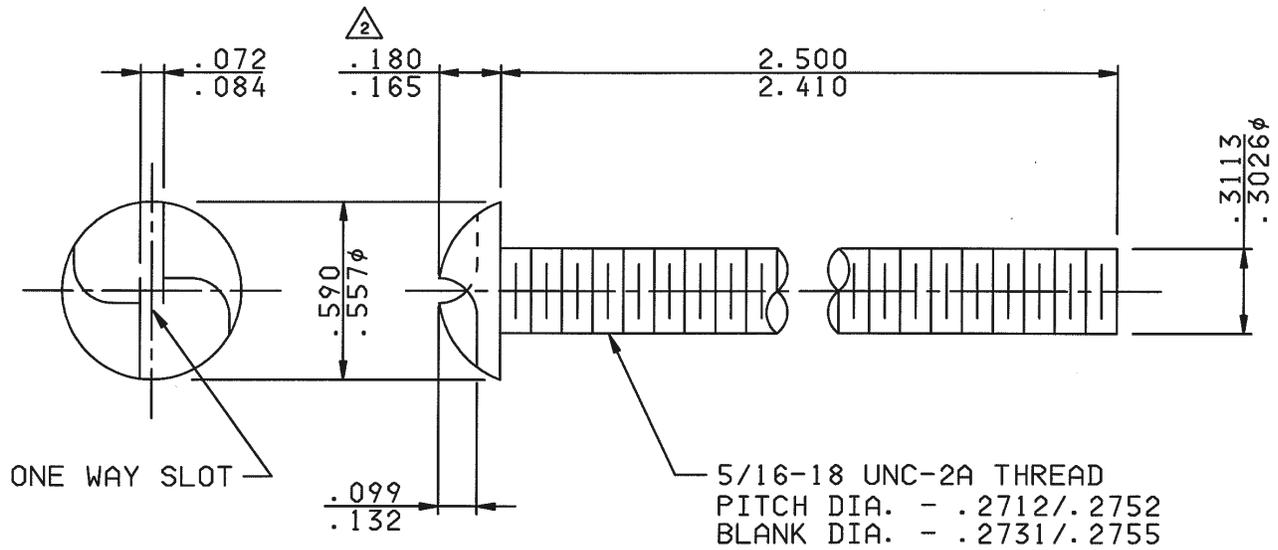
Power drivers -- a drilling speed of 2500 rpm is desirable, although speeds from 1800 to 2500 rpm are entirely satisfactory. Drivers should be equipped with torque limited clutches or depth-locating clutch releases are preferable. End pressure up to 30 to 35 lbs. may be required. The feel for the varying amount of end pressure is very quickly attained in practice.

Recommended torque settings for power drivers --

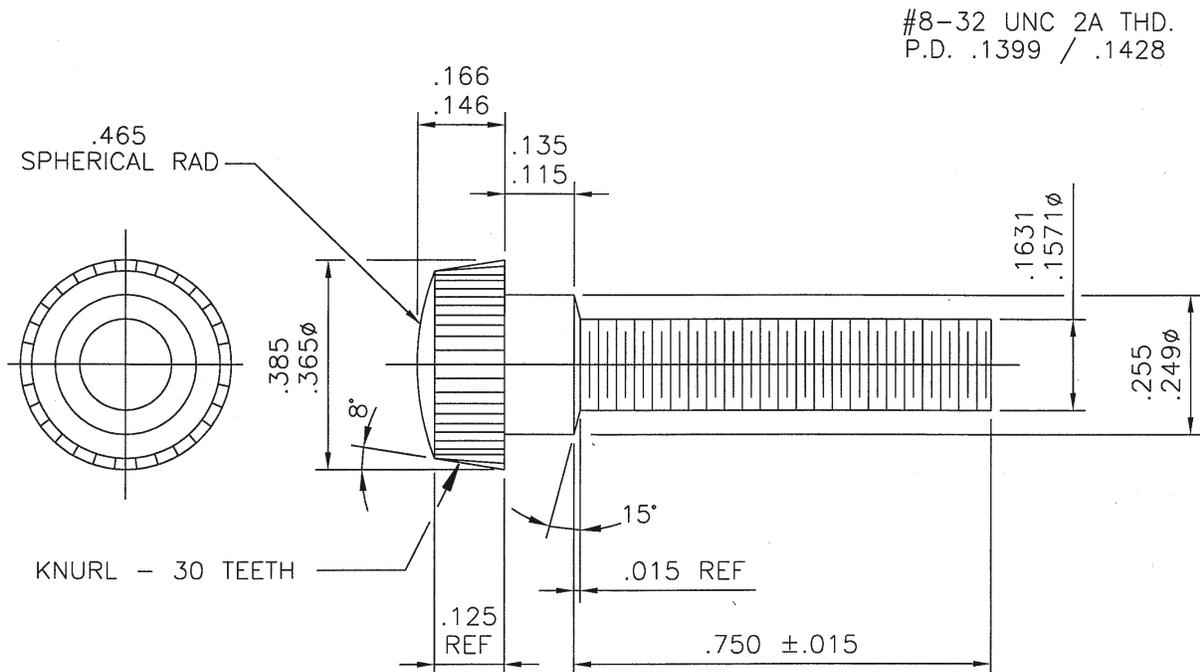
No. 6	4 to 8 in. - lb
No. 8	6 to 18 in. - lb
No. 10	6 to 25 in. - lb

The lower torque values are desirable for the lighter gauge and lower strength materials. The optimum driver torque setting should be determined in actual practice. Driving as well as seating torques are below the free breaking torque.

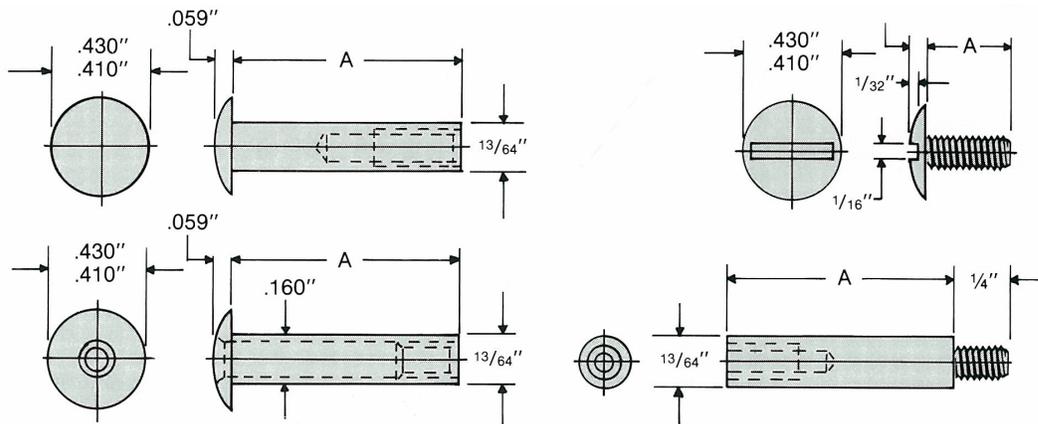
Tamper-Resistant Machine Screw



Knurled Thumb Screw



Binding Posts - Full Expansion Posts - Screws - Extensions Bright Finish



Dimensions in inches

A	Binding posts		Full expansion posts		Screws		Extensions	
Length	Weight per 100 pieces, approximate pounds	Package quantity	Weight per 1000 pieces, approximate pounds	Package quantity	Weight per 1000 pieces, approximate pounds	Package quantity	Weight per 1000 pieces, approximate pounds	Package quantity
1/4	0.85	1000	0.88	1.00	Normally shipped in bulk
3/8	1.05	1000	.....	.....	1.08	.....	.....
1/2	1.25	1000	1.25	1000	1.21	.....	1.29
5/8	1.64	1000	1.33	1000	1.40	.....	.....
3/4	2.04	1000	1.32	500	1.59	.....	2.03
7/8	2.43	1000	.....	.....	.....	.....	.....
1	2.83	1000	1.62	500	1.96	.....	2.77
1 1/4	3.62	500	1.92	500	2.34	.....	.....
1 1/2	4.41	500	.....	.....	.....	.....	.....
1 3/4	5.21	500	.....	.....	.....	.....	.....
2	6.00	500	.....	.....	.....	.....	.....
2 1/4	6.79	500	.....	.....	.....	.....	.....
2 1/2	7.55	250	.....	.....	.....	.....	.....
3	9.17	250	.....	.....	.....	.....	.....
3 1/2	10.8	250	.....	.....	.....	.....	.....
4	12.3	250	.....	.....	.....	.....	.....
4 1/2	14.1	250	.....	.....	.....	.....	.....
5	15.7	250	.....	.....	.....	.....	.....

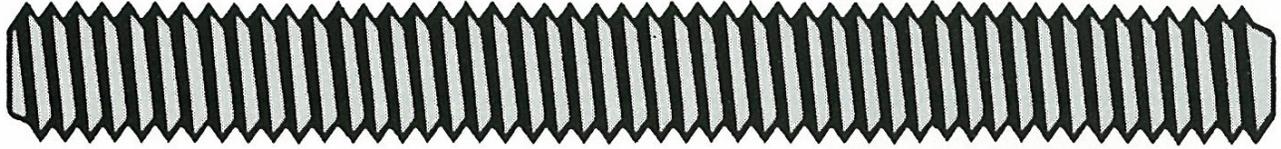
1. 1/4-inch long binding posts use 1/4-inch long screws. All other binding posts use 3/8-inch long screws.
2. Full expansion posts use screws of same length as posts.
3. The 1/2-inch long binding post is used as a 1/2-inch long full expansion post.
4. Length of usable internal thread: Binding Posts: Posts 1/2-inch long and under are drilled and tapped full length. Posts over 1/2-inch long have 3/8 inch of usable thread.

Full Expansion Posts: 1/2 and 5/8 inch long posts are drilled and tapped full length. All other lengths of posts have 1/4 inch usable thread with a clearance hole the remainder of the length of the post.

Extensions: All lengths of extensions have 3/8 inch of usable thread.

Threaded Rod

Stocked in 6061-T6

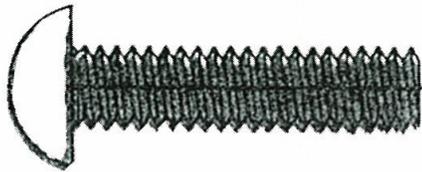


Size	Stock Status
6-32	X
8-32	X
10-24	X
10-32	X
1/4-20	X
3/8-16	X
1/2-13	X
5/8-11	X
3/4-10	X

Standard Lengths: 6-32 up thru 12-24 are 3' lengths.
1/4-20 and above are 6' lengths.

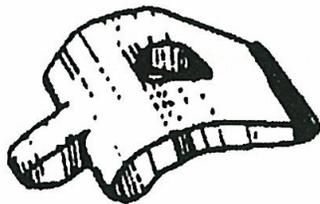
Additional lengths and diameters, and fine thread available -- check with sales department. Double end and full thread studs available -- check with sales department.

Sign Bolts & Clips



10-24 Large Round Head

Machine Screw - Unslotted
Full Thread - Lengths Starting 3/4" and up
Minimum order required
ALLOY 2024-T4



Post Clips

This clip is designed to give proper clamping on all post flanges (tapered or parallel), from 1/8" to 19/32" thick. The universal action of this clip is designed to solve stocking and maintenance problems on proper size selection. A flat washer should be used under the nut to prevent gouging of the clip.
Part No. SC100 ALLOY 2024-T4



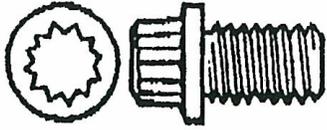
Post Clip Bolts

Designed to fit the bolt slots on Panels. Recommended tightening torque for locknuts on clean, dry, "as-received threads" is 225 inch-pounds. Dirt or water on the threads can upset the desired torque tension relationship in the bolt.
Rectangular Head Size 3/8 - 16 x 1-3/4 ALLOY 2024-T4



Special Installation Tool for Vandal-Pruf Fasteners
VPA 12 Point #T43

Tamper Proof Fasteners



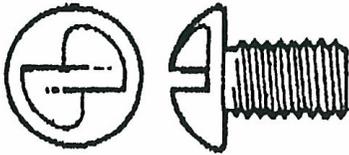
Vandal Pruf Bolts

5/16" - 18x1/2"

Aluminum bolts with special head which defeats vandalism.

Requires special tool N43 for installation.

VPA12



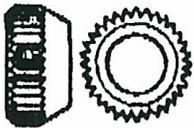
One Way Bolt

5/16" x 2- 1/2"

Machine Screw

Full Thread

ALLOY 2024-T4



SIZES STOCKED

10 - 24

1/4 - 20

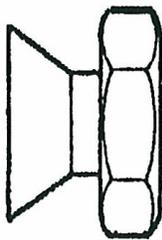
5/16 - 18

Tamper Proof Nuts

For protection against vandals and pranksters, use this special tamper-resistant nut. These nuts, when tightened with special wrench, cannot be removed. These are used quite extensively in the sign fastening business.

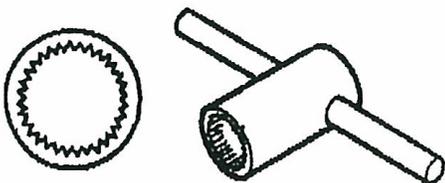
Uses installation tool #T2

ALLOY 2011-T3



5/16" Breakaway Nut

Use a wrench to tighten the nut. When the nut is tight, keep twisting firmly and the hex head breaks off, leaving the vandal proof tapered nut secured.



Special Installation Tool for Tamper-Pruf Fluted Nuts

#T2

Technical Data

Finishes and Protective Coatings

Aluminum threaded fasteners can be supplied with a variety of finishes, colors and protective coatings.

In standard practice, small bolts, screws and nuts have bright finishes, produced by burnishing in a tumbling barrel or other special mechanical finishing device. The same parts can be supplied with machine or etched finishes by specification. A wide variety of special finishes can be applied for aesthetic reasons, functional characteristics or both. Chemical, electrochemical and applied coatings have been developed to meet a variety of needs.

Where special service requirements, appearance, or color cannot be satisfied by the standard finish described below, special finishes are available and inquiries are invited.

Anodizing of fasteners is used frequently to improve resistance to corrosion and abrasion. For maximum resistance to saline environments, a dichromate seal should be specified. The dichromate sealed Alumilite* 205 finish will have a characteristic yellow color that may be objectionable for certain applications. Alumilite 204 finishes have a characteristic aluminum color and are applied when the typical yellow color from the dichromate seal is not suitable. When clear finish is desirable along with higher resistance to corrosion, the Alumilite 204 finish is usually specified.

Small items are anodized by bulk techniques, being solidly packed in perforated baskets. While these techniques are the only ones practical for small items, they provide a lower degree of coating control than individual rack techniques, and some rejects must be expected with each load. Large fasteners are occasionally racked separately for more uniform finishes.

Anodic coatings are available in a wide variety of colors. The final choice of color match or contract usually requires meeting specific service needs, and can best be ascertained by special inquiry and the submission of samples.

Prepainting is becoming increasingly popular. High gloss or flat enamel finishes can be applied to the entire surface of any fastener that forms its own thread and the coating on the head will suffer little, if any, damage in driving. Fasteners engaging pretapped holes require a more expensive painting of the heads only.

Chemical conversion coatings may be applied as paint bases or used without further treatment in order to improve corrosion resistance. Those which contain chromates are especially resistant to saline environments. Chemical conversion coatings are extremely thin. They are softer, less corrosion resistant than anodic coatings and offer little improvement in abrasion resistance.

Metallurgical Aspects

In high-purity form aluminum is soft and ductile. Most commercial uses however, require greater strength than pure aluminum affords. This is achieved in aluminum first by the addition of other elements to produce various alloys, which singly or in combination impart strength to the metal. Further strengthening is possible by means which classify the alloys roughly into two categories, non-heat-treatable and heat-treatable.

Non-heat treatable alloys

The initial strength of alloys in this group depends upon the hardening effect of elements such as manganese, silicon, iron and magnesium, singly or in various combinations. The non-heat-treatable alloys are usually designated, therefore, in the 1000, 3000, 4000 or 5000 series. Since these alloys are work-hardenable, further strengthening is made possible by various degrees of cold working, denoted by the "H" series of tempers. Alloys containing appreciable amounts of magnesium when supplied in strain-hardened tempers are usually given a final elevated-temperature treatment called stabilizing to insure stability of properties.

Heat-treatable alloys

The initial strength of alloys in this group is enhanced by the addition of alloying elements such as copper, magnesium, zinc and silicon. Since these elements singly or in various combinations show increasing solid solubility in aluminum with increasing temperature, it is possible to subject them to thermal treatments which will impart pronounced strengthening.

The first step, called heat treatment or solution heat treatment, is an elevated-temperature process designed to put the soluble element or elements in solid solution. This is followed by rapid quenching, usually in water, which momentarily "freezes" the structure and for a short time renders the alloy very workable. It is at this stage that some fabricators retain this more workable structure by storing the alloys at below freezing temperatures until they are ready to form them. At room or elevated temperatures the alloys are not stable after quenching, however, and precipitation of the constituents from the super-saturated solution begins. After a period of several precipitation, the alloy is considerably stronger. Many alloys approach a stable condition at room temperature, but some alloys, particularly those containing magnesium and silicon or magnesium and zinc, continue to age-harden for long periods of time at room temperature.

By heating for a controlled time at slightly elevated temperatures, even further strengthening is possible and properties are stabilized. This process is called artificial aging or precipitation hardening. By the proper combination of solution heat treatment, quenching, cold working and artificial aging, the highest strengths are obtained.

Technical Data - cont.

Clad alloys

The heat-treatable in which copper or zinc are major alloying constituents, are less resistant to corrosive attack than the majority of non-heat-treatable alloys. To increase the corrosion resistance of these alloys in sheet and plate form they are often clad with high-purity aluminum, a low magnesium-silicon alloy, or an alloy containing 1 percent zinc. The cladding, usually from 2 1/2 to 5 percent of the total thickness on each side, not only protects the composite due to its own inherently excellent corrosion resistance, but also exerts a galvanic effect which further protects the core materials.

Special composites may be obtained such as clad non-heat-treatable alloys for extra corrosion protection, for brazing purposes, or for special surface finishes. Some alloys in wire and tubular form are clad for similar reasons and on an experimental basis extrusions also have been clad.

Annealing characteristics

All wrought aluminum alloys are available in annealed form. In addition, it may be desirable to anneal an alloy from any other initial temper, after working, or between successive stages of working such as in deep drawing.

Effect of Alloying Elements

1000 series

Aluminum of 99 percent or higher purity has many applications, especially in the electrical and chemical fields. These alloys are characterized by excellent corrosion resistance, high thermal and electrical conductivity, low mechanical properties and excellent workability. Moderate increases in strength may be obtained by strain-hardening. Iron and silicon are the major impurities.

2000 series

Copper is the principal alloying element in this group. These alloys require solution heat-treatment to obtain optimum properties; in the heat treated condition mechanical properties are similar to, and sometimes exceed, those of mild steel. In some instances artificial aging is employed to further increase the mechanical properties. This treatment materially increases yield strength, with attendant loss in elongation; its effect on tensile (ultimate) strength is not as great. The alloys in the 2000 series do not have as good corrosion resistance as most other aluminum alloys and under certain conditions they may be subject to intergranular corrosion. Therefore, these alloys in the form of sheet are usually clad with a high-purity alloy or a magnesium-silicon alloy of the 6000 series which provides galvanic protection to the core material and thus greatly increases resistance to corrosion. Alloy 2024 is perhaps the best known and most widely used aircraft alloy.

3000 series

Manganese is the major alloying element of alloys in this group, which are generally non-heat-treatable.

Because only a limited percentage of manganese, up to about 1.5 percent, can be effectively added to aluminum, it is used as a major element in only a few instances. One of these, however, is the popular 3003, which is widely used as a general purpose alloy for moderate-strength applications requiring good workability.

4000 series

Major alloying element of this group is silicon, which can be added in sufficient quantities to cause substantial lowering of the melting point without producing brittleness in the resulting alloys. For these reason aluminum-silicon alloys are used in welding wire and as brazing alloys where a lower melting point than that of the parent metal is required. Most alloys in this series are non-heat-treatable, but when used in welding heat-treatable alloys they will pick up some of the alloying constituents of the latter and so respond to heat treatment to a limited extent. The alloys containing appreciable amounts of silicon become dark gray when anodic oxide finishes are applied, and hence are in demand for architectural applications.

5000 series

Magnesium is one of the most effective and widely used alloying elements for aluminum. When it is used as the major alloying element or with manganese, the result is a moderate to high strength non-heat-treatable alloy. Magnesium is considerably more effective than manganese as a hardener, about 0.8 percent magnesium being equal to 1.25 percent manganese, and it can be added in considerably higher quantities. Alloys in this series possess good welding characteristics and good resistance to corrosion in marine atmosphere. However, certain limitations should be placed on the amount of cold work and the safe operating temperatures permissible for the higher magnesium content alloys (over about 3 1/2 percent for operating temperatures above about 150° F) to avoid susceptibility to stress corrosion.

6000 series

Alloys in this group contain silicon and magnesium in approximate proportions to form magnesium silicide, thus making them heat-treatable. Major alloy in this series is 6061, one of the most versatile of the heat-treatable alloys. Though less strong than most of the 2000 or 7000 alloys, the magnesium-silicon (or magnesium-silicide) alloys possess good formability and corrosion resistance, with medium strength. Alloys in this heat-treatable group may be formed in the T4 temper (solution heat-treated but not artificially aged) and then reach full T6 properties by artificial aging.

7000 series

Zinc is the major alloying element in this group, and when coupled with a smaller percentage of magnesium results in heat-treatable alloys of very high strength. Usually other elements such as copper and chromium are also added in small quantities. Outstanding member of this group is 7075, which is among the highest strength alloys available and is used in air-frame structures and for highly stressed parts.

Terms and Conditions of Sale

- Terms:** Net 30 days.
- Prices:** Prices are subject to change without notice.
- Freight:** F.O.B. Naples, Florida.
- Minimum:** \$35.00 per order.
- Returns:** Request for authorization for all claims of shortages, price changes or return of material must be received within 5 days after receipt of goods. All returns subject to 20% restocking charge. All returns must have a return authorization number marked on the outside of the carton.
- Liability:** All goods returned to and accepted by us as defective or incorrect shall be replaced or credited in full. Any claims for reimbursement of labor or other expenditures shall not be accepted unless covered by specific certification.
- Non-stock items:** All non-stock orders will be received on a non-cancelable basis and are not refundable.
- Quotations:** Written price quotations remain in effect at time of quotation only, and are subject to change without notice.
- Specifications:** All products listed conform with "United American Standards" specifications.

Additional Items In Stock

- **Thumb Screw**
- **Stadium Seat Bolt**
- **Spacers**
- **Square Nuts**
- **Flange Nuts**
- **Cotter Pins**