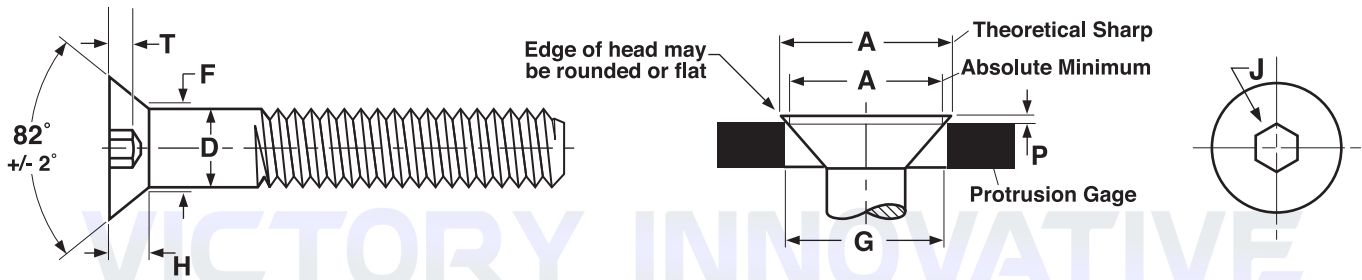


# SOCKETS

## FLAT HEAD CAP SCREWS

Alloy Steel



### SOCKET FLAT HEAD CAP SCREWS - ALLOY STEEL

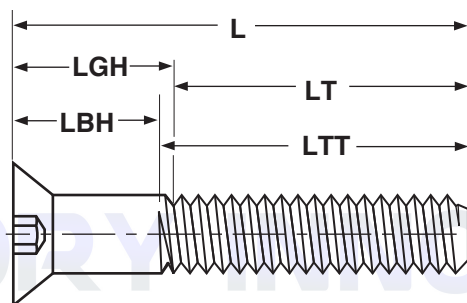
ASME B18.3-2012,  
Blue Devil®

Nominal Size	D		A		H	G		P		J	T	F	Tensile Strength, Lbs.	Single Shear Strength of Body	Recommended Seating Torques, in./lbs.	
	Body Diameter		Head Diameter		Head Height	Protrusion Gauge Diameter		Protrusion		Hex Socket Size	Key Engagement	Fillet Transition Diam.			lbs., Min	Coarse Thread
	Max	Min	Theoretical Sharp Max	Abs. Min	Ref	Max	Min	Max	Min	Nom	Min	Max	Min			
4	0.1120	0.1075	0.255	0.218	0.083	0.172	0.171	0.057	0.036	1/16	0.055	0.136	880	950	8.	8.
5	0.1250	0.1202	0.281	0.240	0.090	0.196	0.195	0.059	0.037	5/64	0.061	0.153	1150	1,150	12.	13.
6	0.1380	0.1329	0.307	0.263	0.097	0.220	0.219	0.060	0.037	5/64	0.066	0.168	1320	1,400	15.	17.
8	0.1640	0.1585	0.359	0.311	0.112	0.267	0.266	0.063	0.039	3/32	0.076	0.194	2030	2,000	30.	31.
10	0.1900	0.1840	0.411	0.359	0.127	0.313	0.312	0.066	0.041	1/8	0.087	0.220	2540	2,700	40.	45.
1/4	0.2500	0.2435	0.531	0.480	0.161	0.424	0.423	0.072	0.043	5/32	0.111	0.280	4610	4,700	100.	110.
5/16	0.3125	0.3053	0.656	0.600	0.198	0.539	0.538	0.078	0.047	3/16	0.135	0.343	7600	7,360	200.	220.
3/8	0.3750	0.3678	0.781	0.720	0.234	0.653	0.652	0.088	0.050	7/32	0.159	0.405	11,200	10,600	350.	400.
7/16	0.4375	0.4294	0.844	0.781	0.234	0.690	0.689	0.104	0.063	1/4	0.159	0.468	15,400	14,400	560.	625.
1/2	0.5000	0.4919	0.938	0.872	0.251	0.739	0.738	0.131	0.087	5/16	0.172	0.530	20,600	18,850	850.	1,000.
5/8	0.6250	0.6163	1.188	1.112	0.324	0.962	0.961	0.146	0.096	3/8	0.220	0.655	30,500	29,450	1,700.	1,900.
3/4	0.7500	0.7406	1.438	1.355	0.396	1.186	1.185	0.170	0.105	1/2	0.220	0.780	45,100	42,400	3,000	3,200.

Tolerance on Length	Nominal Screw Size	Nominal Screw Length		
		Up to 1 in., Incl.	Over 1 in. to 2-1/2 in., Incl.	Over 2-1/2 in. to 6 in., Incl.
	0 thru 3/8, Inclusive	-0.03	-0.04	-0.06
	7/16 thru 3/4, Inclusive	-0.03	-0.06	-0.08

<b>Description</b>	Similar in design to a socket button head cap screw but with an 82° countersunk flat head.
<b>Applications/ Advantages</b>	Used when a flush mounting, high strength screw is required. Commonly used in tools and dies where moving parts pass over the fastened area.
<b>Material</b>	Screws shall be made from an alloy steel which conforms to the following chemical composition requirements (per product analysis)-- <b>Carbon:</b> 0.28 to 0.50%; <b>Phosphorus:</b> 0.040% maximum; <b>Sulfur:</b> 0.045% maximum. Also, one or more of the following elements shall be present in sufficient quantity to meet the performance requirements listed below: chromium, nickel, molybdenum or vanadium.
<b>Heat Treatment</b>	Screws shall be heat treated by oil quenching from above the transformation temperature and then tempered at a temperature not lower than 650°F.
<b>Hardness</b>	<i>Thru 1/2" diam.:</i> Rockwell C 39 - 44; <i>Over 1/2" diam.:</i> Rockwell C 37 - 44
<b>Tensile Strength</b>	<i>Thru 1/2" diam.:</i> 145,000 psi. minimum; <i>Over 1/2" diam.:</i> 135,000 psi. minimum
<b>Yield Strength</b>	153,000 psi. minimum (over 1/2" diam.)
<b>Elongation</b>	8% minimum (applies to machined specimens over 1/2" diam., of length at least 4D where D equals the nominal diameter of the screw)"
<b>Reduction of Area</b>	35% minimum (applies to machined specimens over 1/2" diam.)
<b>Finish</b>	Screws are supplied plain.

**Body & Grip Lengths** **FLAT HEAD CAP SCREWS**



For screws of nominal lengths longer than those for which  $L_{GH}$  and  $L_{BH}$  values tabulated in this table and for screws over 1 inch in diameter, the maximum grip gaging length  $L_{GH}$  and the minimum body length  $L_{BH}$  of the screws shall be determined as follows:

$$L_{GH} = L - L_T$$

$$L_{BH} = L - L_{TT}$$

where  $L$  = nominal length,  $L_T$  = minimum thread length, and  $L_{TT}$  = maximum total thread length.

<b>BODY AND GRIP LENGTHS OF FLAT HEAD SOCKET CAP SCREWS</b>												ASME B18.3-2012	
Nominal Size	4		5		6		8		10		1/4		
$L_T$ MIN.	.750		.750		.750		.875		.875		1.000		
$L_{TT}$ MAX	0.99		1.00		1.05		1.19		1.27		1.50		
Nominal Length	$L_{GH}$	$L_{BH}$	$L_{GH}$	$L_{BH}$	$L_{GH}$	$L_{BH}$	$L_{GH}$	$L_{BH}$	$L_{GH}$	$L_{BH}$	$L_{GH}$	$L_{BH}$	
1.25	0.50	0.38	0.50	0.38	0.50	0.34	0.38	0.22					
1.50	0.50	0.38	0.50	0.38	0.50	0.34	0.38	0.22	0.62	0.42			
1.75	1.00	0.88	1.00	0.88	1.00	0.84	0.88	0.72	0.62	0.42	0.75	0.50	
2.00	1.00	0.88	1.00	0.88	1.00	0.84	0.88	0.72	1.12	0.92	0.75	0.50	
2.50					1.50	1.34	1.38	1.22	1.62	1.42	1.25	1.00	
3.00							1.88	1.72	2.12	1.92	1.75	1.50	
3.50									2.62	2.42	2.25	2.00	

Nominal Size	5/16		3/8		7/16		1/2		5/8		3/4	
$L_T$ MIN.	1.125		1.250		1.375		1.500		1.750		2.000	
$L_{TT}$ MAX	1.71		1.94		2.17		2.38		2.82		3.25	
Nominal Length	$L_{GH}$	$L_{BH}$	$L_{GH}$	$L_{BH}$	$L_{GH}$	$L_{BH}$	$L_{GH}$	$L_{BH}$	$L_{GH}$	$L_{BH}$	$L_{GH}$	$L_{BH}$
2.00	0.88	0.60										
2.25	0.88	0.60	1.00	0.69								
2.50	1.38	1.10	1.00	0.69	1.12	0.77	1.00	0.62				
3.00	1.88	1.60	1.50	1.19	1.62	1.27	1.00	0.62				
3.50	2.38	2.10	2.00	1.69	2.12	1.77	1.75	1.36	1.50	1.04	1.50	1.00
4.00	2.88	2.60	2.50	2.19	2.62	2.27	2.50	2.12	2.25	1.80	1.50	1.00
4.50	3.38	3.10	3.00	2.69	3.12	2.77	2.50	2.12	2.25	1.80	2.50	2.00
5.00	3.88	3.60	3.50	3.19	3.62	3.27	3.25	2.86	3.00	2.54	2.50	2.00
5.50	4.38	4.10	4.00	3.69	4.12	3.77	4.00	3.62	3.75	3.30	3.50	3.00
6.00	4.88	4.60	4.50	4.19	4.62	4.27	4.00	3.62	3.75	3.30	3.50	3.00