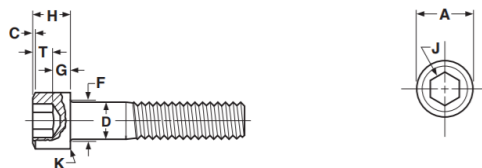


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SOCKET HEAD CAP SCREWS – ALLOY STEEL BLACK AND ZINC

The following Specification Sheet applies to all **Alloy Steel Black and Zinc Socket Head Cap Screws** in our **SHC** and **SHCZ** series of screws.



SOCKET HEAD CAP SCREWS										ASME B18.3-2012			
Basic Screw Diam.	D		A		H		C	J	F		T	G	K
	Body Diameter		Head Diameter		Head Height		Top Chamfer or Radius	Hex Socket Size	Fillet Junction Diameter at Bearing Surface		Key Engage- ment	Wall Thick- ness	Bottom Chamfer or Radius
	Max	Min	Max	Min	Max	Min	Max	Nom	Max	Min	Min	Min	Max
0	0.0600	0.0568	0.096	0.091	0.060	0.057	0.004	0.050	0.074	0.062	0.025	0.020	0.007
1	0.0730	0.0695	0.118	0.112	0.073	0.070	0.005	1/16	0.087	0.075	0.031	0.025	0.007
2	0.0860	0.0822	0.140	0.134	0.086	0.083	0.008	5/64	0.102	0.090	0.038	0.029	0.007
3	0.0990	0.0949	0.161	0.154	0.099	0.095	0.008	5/64	0.115	0.102	0.044	0.034	0.007
4	0.1120	0.1075	0.183	0.176	0.112	0.108	0.009	3/32	0.130	0.117	0.051	0.038	0.008
5	0.1250	0.1202	0.205	0.198	0.125	0.121	0.012	3/32	0.145	0.132	0.057	0.043	0.008
6	0.1380	0.1329	0.226	0.218	0.138	0.134	0.013	7/64	0.158	0.144	0.064	0.047	0.008
8	0.1640	0.1585	0.270	0.262	0.164	0.159	0.014	9/64	0.188	0.172	0.077	0.056	0.008
10	0.1900	0.1840	0.312	0.303	0.190	0.185	0.018	5/32	0.218	0.202	0.090	0.065	0.008
1/4	0.2500	0.2435	0.375	0.365	0.250	0.244	0.025	3/16	0.278	0.261	0.120	0.095	0.010
5/16	0.3125	0.3053	0.469	0.457	0.312	0.306	0.033	1/4	0.347	0.329	0.151	0.119	0.010
3/8	0.3750	0.3678	0.562	0.550	0.375	0.368	0.040	5/16	0.415	0.397	0.182	0.143	0.010
7/16	0.4375	0.4294	0.656	0.642	0.438	0.430	0.047	3/8	0.484	0.465	0.213	0.166	0.015
1/2	0.5000	0.4919	0.750	0.735	0.500	0.492	0.055	3/8	0.552	0.531	0.245	0.190	0.015
5/8	0.6250	0.6163	0.938	0.921	0.625	0.616	0.070	1/2	0.689	0.664	0.307	0.238	0.015
3/4	0.7500	0.7406	1.125	1.107	0.750	0.740	0.085	5/8	0.828	0.800	0.370	0.285	0.015
7/8	0.8750	0.8647	1.312	1.293	0.875	0.864	0.100	3/4	0.963	0.932	0.432	0.333	0.020
1	1.0000	0.9886	1.500	1.479	1.000	0.988	0.114	3/4	1.100	1.068	0.495	0.380	0.020
1 1/4	1.2500	1.2336	1.875	1.852	1.250	1.236	0.144	7/8	1.370	1.333	0.620	0.475	0.020
1 1/2	1.5000	1.4818	2.250	2.224	1.500	1.485	0.176	1	1.640	1.601	0.745	0.570	0.020
Tolerance on Length	Nominal Screw Size		Nominal Screw Length										
			Up to 1 in., Incl.										
	0 thru 3/8, Incl.		-0.03										
	7/16 thru 3/4, Incl.		-0.03										
	7/8 thru 1-1/2, Incl.		-0.05										

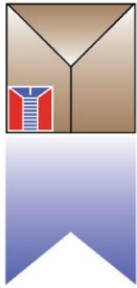
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SHEAR AND TENSILE STRENGTH - ALLOY STEEL BLACK AND ZINC

Mechanical Properties

Nominal Size	Tensile Strength PSI min.	Yield Strength* PSI min.	Elongation* In 2 Inches Percent min.	Reduction of Area* Percent min.	Hardness Rockwell C
0 to 1/2"	180,000	153,000	10%	35%	39 – 45
Over 1/2"	170,000	153,000	10%	35%	37 – 45

*The values for elongation and reduction of area apply only to cylindrical test specimens.

Performance Data

Nominal Size	Basic Screw Dia.	Tensile Stress Area		Tensile Strength (Lb. min.)		Yield Strength (Lb min.)		Single Shear Strength* (Lb min.) Body Section
		UNRC	UNRF	UNRC	UNRF	UNRC	UNRF	
0	0.0600		0.00180		324		275	280
1	0.0730	0.00263	0.00278	473	500	402	425	420
2	0.0860	0.00370	0.00394	666	709	566	603	580
3	0.0990	0.00487	0.00523	877	941	745	800	770
4	0.1120	0.00604	0.00661	1,090	1,190	924	1,011	985
5	0.1250	0.00796	0.00830	1,430	1,490	1,218	1,270	1,225
6	0.1380	0.00909	0.01015	1,640	1,830	1,391	1,553	1,495
8	0.1640	0.01400	0.01474	2,520	2,650	2,142	2,255	2,110
10	0.1900	0.01750	0.02000	3,150	3,600	2,678	3,060	2,835
1/4	0.2500	0.03180	0.03640	5,725	6,500	4,865	5,569	4,910
5/16	0.3125	0.05240	0.05800	9,430	10,400	8,017	8,874	7,670
3/8	0.3750	0.07750	0.08780	13,950	15,800	11,858	13,433	11,045
7/16	0.4375	0.10630	0.11870	19,135	21,400	16,264	18,161	15,035
1/2	0.5000	0.14190	0.15990	25,540	28,800	21,711	24,465	19,635
5/8	0.6250	0.22600	0.25600	38,400	43,500	34,550	39,150	30,680
3/4	0.7500	0.33400	0.37300	56,750	63,400	51,100	57,050	44,180
7/8	0.8750	0.46200	0.50900	78,500	86,500	70,700	77,850	60,130
1	1.0000	0.60600	0.66300	103,000	113,000	92,700	101,450	78,540
1-1/4	1.2500	0.96900	1.07300	164,700	182,000	148,250	164,150	122,720
1-1/2	1.5000	1.40500	1.48100	238,800	269,000	214,950	241,900	176,710

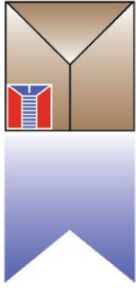
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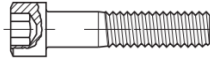
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MECHANICAL PROPERTIES OF ALLOY STEEL SOCKET CAP SCREWS							
Nominal Size	Tensile Strength (lbs., min.)		Yield Strength (lbs., min.)		Body Section	Tightening Torque (In.-Lbs.)	
	UNRC	UNRF	UNRC	UNRF	Single Shear Strength (lbs., min.)	UNRC	UNRF
0	-	320	-	290	305	-	2.6
1	475	500	425	450	450	4.5	4.8
2	665	710	600	635	625	7.5	8.0
3	875	940	790	845	830	11.0	12.0
4	1,090	1,190	975	1,070	1,060	16.0	18.0
5	1,430	1,490	1,290	1,345	1,325	24.0	24.0
6	1,640	1,825	1,470	1,645	1,615	30.0	34.0
8	2,520	2,650	2,270	2,385	2,280	55.0	58.0
10	3,150	3,600	2,835	3,240	3,060	79.0	90.0
1/4	5,725	6,550	5,150	5,900	5,295	200.0	230.0
5/16	9,430	10,440	8,490	9,395	8,285	415.0	460.0
3/8	13,950	15,805	12,555	14,225	11,910	740.0	845.0
7/16	19,135	21,365	17,220	19,230	16,200	1190.0	1305.0
1/2	25,540	28,780	22,990	25,905	21,175	1800.0	2065.0
5/8	38,400	43,500	34,550	39,150	31,300	3,400.0	3,800.0
3/4	56,750	63,400	51,100	57,050	45,050	6,000.0	6,750.0
7/8	78,500	86,500	70,700	77,850	61,350	8250.0	9,200.0
1	103,000	112,700	92,700	101,450	80,100	12,500.0	13,000.0
1 1/4	164,700	182,400	148,250	164,150	125,100	25,000.0	27,750.0
1 1/2	238,800	268,800	215,950	241,900	180,200	43,500.0	49,000.0

Description	An externally threaded fastener with unified threads, a cylindrical head with a flat chamfered top surface, knurled cylindrical sides and hexagonal recess, made from alloy steel.
Applications/Advantages	Ideal for precision assembly work with close tolerances and applications needing a well tooled appearance. Supplies greater tensile strength than equivalent sizes of Grade-5 or Grade-8 hex head cap screws while requiring less surface area or counterbore since the fastener is internally wrenched.
Material	Cap screws shall be made from an alloy steel which conforms to the following chemical composition requirements (per product analysis)-- Carbon: 0.31% minimum; Phosphorus: 0.040% maximum; Sulfur: 0.045% maximum. Also, one or more of the following elements shall be present in sufficient quantity to meet the strength requirements listed below: chromium, nickel, molybdenum or vanadium.
Heat Treatment	Cap screws shall be heat treated by oil quenching from above the transformation temperature and then tempered at a temperature not lower than 650°F.
Hardness	0 through 1/2" diameters: Rockwell C39 minimum; 5/8" diameter & larger: Rockwell C37 minimum
<i>Cap screws of a length 3D or greater, where D equals the nominal diameter of the screw, are subject to tensile strength, yield strength, elongation and reduction of area testing.</i>	
Tensile Strength	0 through 1/2" diameters: 180,000 psi. minimum; 5/8" diameter & larger: 170,000 psi. minimum
Yield Strength	0 through 1/2" diameters: 162,000 psi. minimum; 5/8" diameter & larger: 153,000 psi. minimum
Elongation	10% minimum (applies to machined specimens of length at least 4D where D equals the nominal diameter of the screw)
Reduction of Area	33% minimum (applies to machined specimens)
Plating	See Appendix-A for information on the plating of alloy steel socket cap screws.

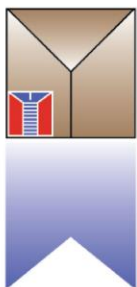
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LENGTH SPECIFICATIONS

BODY AND GRIP LENGTHS OF SOCKET HEAD CAP SCREWS																		ASME B18.3-2012
Nom. Size D	0		1		2		3		4		5		6		8		10	
Basic Thread Length L _T	0.500		0.625		0.625		0.625		0.750		0.750		0.750		0.875		0.875	
Nominal Length L	L _G	L _B	L _G	L _B	L _G	L _B	L _G	L _B	L _G	L _B	L _G	L _B	L _G	L _B	L _G	L _B	L _G	L _B
1.00	0.50	0.44	0.25	0.17	0.25	0.16	0.25	0.15	0.25	0.12	0.25	0.12						
1.25	0.75	0.69	0.62	0.55	0.62	0.54	0.62	0.52	0.25	0.12	0.25	0.12	0.50	0.34	0.38	0.22	0.38	0.17
1.50			0.88	0.80	0.88	0.79	0.88	0.77	0.75	0.62	0.75	0.62	0.50	0.34	0.38	0.22	0.38	0.17
1.75					1.12	1.04	1.12	1.02	0.75	0.62	0.75	0.62	1.00	0.84	0.88	0.72	0.88	0.67
2.00							1.38	1.27	1.25	1.12	1.25	1.12	1.00	0.84	0.88	0.72	0.88	0.67
2.25									1.25	1.12	1.25	1.12	1.50	1.34	1.38	1.22	1.38	1.17
2.50											1.75	1.62	1.50	1.34	1.38	1.22	1.38	1.17
2.75													2.00	1.84	1.88	1.72	1.88	1.67
3.00															1.88	1.72	1.88	1.67
3.50																	2.38	2.17

Nom. Size D	1/4		5/16		3/8		7/16		1/2		5/8		3/4		7/8		1	
Basic Thread Length L _T	1.000		1.125		1.250		1.375		1.500		1.750		2.000		2.250		2.500	
Nominal Length L	L _G	L _B	L _G	L _B	L _G	L _B	L _G	L _B	L _G	L _B	L _G	L _B	L _G	L _B	L _G	L _B	L _G	L _B
1.50	0.50	0.25																
1.75	0.50	0.25	0.62	0.35	0.50	0.19												
2.00	1.00	0.75	0.62	0.35	0.50	0.19	0.62	0.27										
2.25	1.00	0.75	1.12	0.85	1.00	0.69	0.62	0.27	0.75	0.36								
2.50	1.50	1.25	1.12	0.85	1.00	0.69	1.12	0.77	0.75	0.36	0.75	0.30						
2.75	1.50	1.25	1.62	1.35	1.50	1.19	1.12	0.77	0.75	0.36	0.75	0.30						
3.00	2.00	1.75	1.62	1.35	1.50	1.19	1.62	1.27	1.50	1.12	0.75	0.30	1.00	0.50				
3.25	2.00	1.75	2.12	1.85	2.00	1.69	1.62	1.27	1.50	1.12	1.50	1.04	1.00	0.50	1.00	0.44		
3.50	2.50	2.25	2.12	1.85	2.00	1.69	2.12	1.77	1.50	1.12	1.50	1.04	1.00	0.50	1.00	0.44	1.00	0.38
4.00	3.00	2.75	2.62	2.35	2.50	2.19	2.62	2.27	2.25	1.86	2.25	1.80	2.00	1.50	1.00	0.44	1.00	0.38
4.50	3.50	3.25	3.12	2.85	3.00	2.69	3.12	2.77	3.00	2.62	2.25	1.80	2.00	1.50	2.00	1.44	2.00	1.38
5.00	4.00	3.75	3.62	3.35	3.50	3.19	3.62	3.27	3.00	2.62	3.00	2.54	3.00	2.50	2.00	1.44	2.00	1.38
5.50			4.12	3.85	4.00	3.69	4.12	3.77	3.75	3.36	3.75	3.30	3.00	2.50	3.00	2.44	3.00	2.38
6.00			4.62	4.35	4.50	4.19	4.62	4.27	4.50	4.12	3.75	3.30	4.00	3.50	3.00	2.44	3.00	2.38
6.50					5.00	4.69	5.12	4.77	4.50	4.12	4.50	4.04	4.00	3.50	4.00	3.44	4.00	3.38
7.00					5.50	5.19	5.62	5.27	5.25	4.86	5.25	4.80	5.00	4.50	4.00	3.44	4.00	3.38
8.00							6.62	6.27	6.00	5.62	6.00	5.54	6.00	5.50	5.00	4.44	5.00	4.38
9.00							7.62	7.27	7.00	6.62	6.75	6.30	7.00	6.50	6.00	5.44	6.00	5.38
10.00									8.00	7.62	7.75	7.30	8.00	7.50	7.00	6.44	7.00	6.38
11.00											9.25	8.80	9.00	8.50	8.00	7.44	8.00	7.38
12.00											10.25	9.80	10.00	9.50	9.00	8.44	9.00	8.38

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