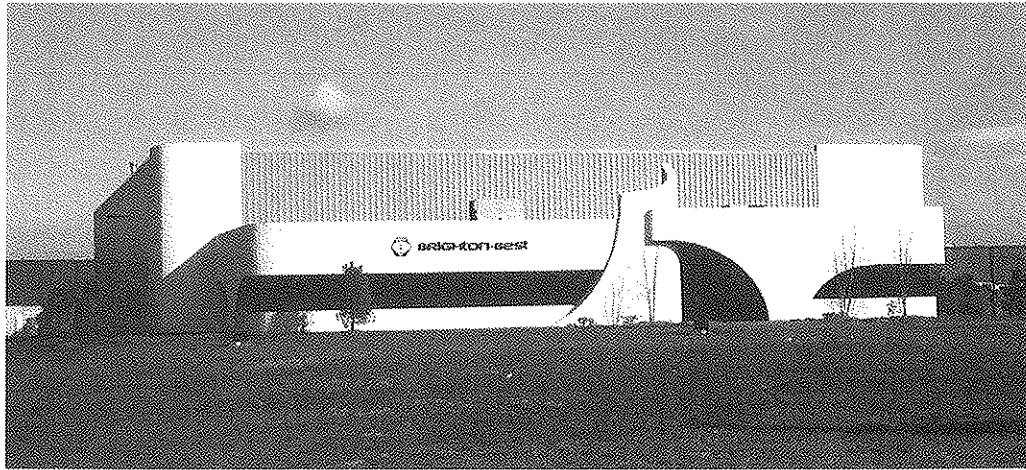


# 97 EXPANDED TECHNICAL CATALOG



*Home of Brighton-Best Testing Laboratory and Export Center, Swedesboro, New Jersey.*

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**BRIGHTON-BEST SOCKET SCREW MFG., INC.**  
3105 Medlock Bridge Road, Norcross, GA 30071-1423  
TEL. (770) 368-2300 • FAX (770) 368-2315

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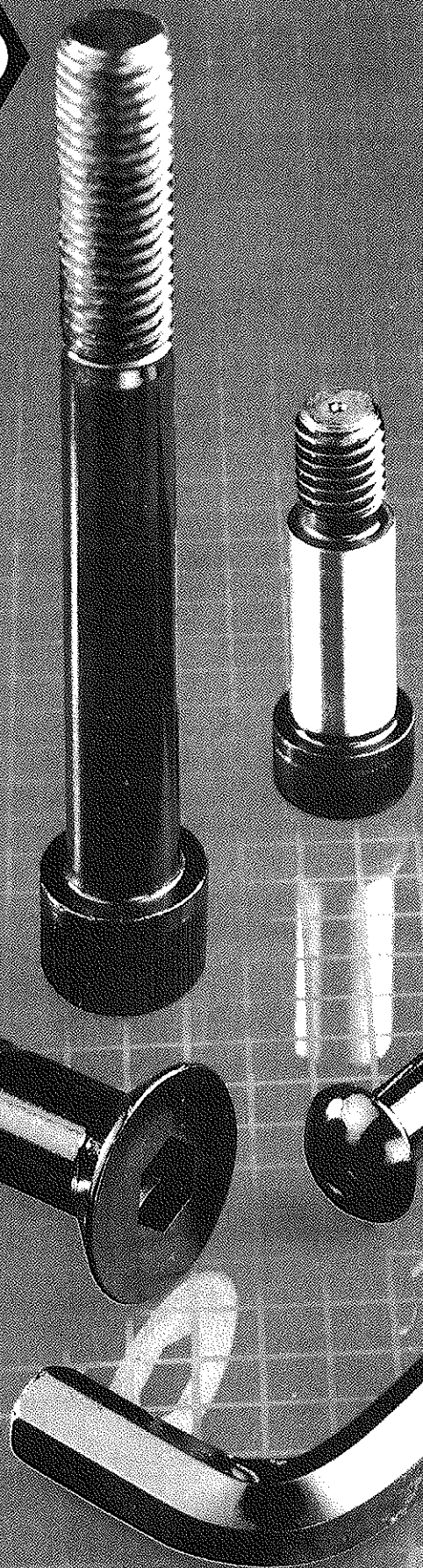


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## Commitment To Distributors:

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### Traceability

The most modern testing equipment is used on an on going basis during production runs to guarantee the quality Brighton-Best has produced for over 70 years. Rockwell hardness, tensile testing and carburization analysis are only a few of the tests performed on Brighton-Best socket screws to guarantee the end-user a quality tested product. Certification of these tests are kept on file for a minimum of 10 years.

### Engineering Standards

Only the finest grade steels and the most modern heat-treating facilities are used to produce Brighton-Best quality products. Our socket screws are manufactured to meet the rigid specifications demanded by BS, DIN, ISO and ANSI Standards. SPC controls are used throughout the entire manufacturing process assuring a premier socket screw product upon completion.

### Diversification

Since our founding in 1925, Brighton-Best has been committed to providing our distributors with the finest quality socket products. Brighton products are associated with the ever-changing technological advances in industry. Our socket screws can be found in use at aerospace and aeronautical plants, in computers, construction and mining operations. Wherever there's a need for socket screws you will find Brighton-Best products in use. Brighton socket screws are stocked in varying metals including alloy, 18.8 stainless (A-2), 316 stainless (A-4), monel, brass and silicon bronze meeting the ever-changing needs of industry.

### Packaging

Sturdy, tamper-proof packages with unique bar-coding guarantees the integrity of Brighton socket screws. Manageable box quantities will increase your sales and reduce your inventory costs. Sophisticated Delta and Sigma packaging equipment are used exclusively guaranteeing accurate counts for each box of socket screws. The label on our box offers a clear pictorial description of size, type, material and count. All packages are factory-sealed and bar-coded to prevent tampering.

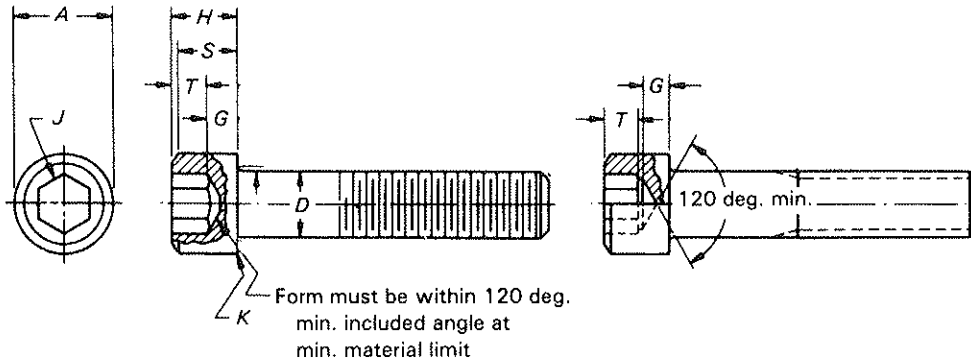


## LABORATORY TESTING DIVISION

Swedesboro, New Jersey  
TEL: (609) 467-3774 • FAX (609) 467-4113

# Dimensions Of Socket Head Cap Screws (1960 Series)

CLASS FIT 3A  
HARDNESS RC 38-43

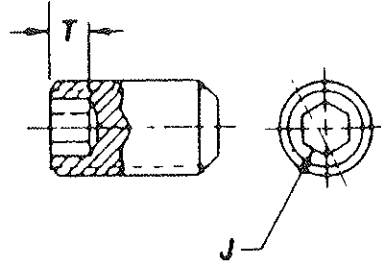


Nominal Size or Basic Screw Diameter	D		A		H		S	J	T	G	K	
	Body Diameter		Head Diameter		Head Height		Head Side Height	Hexagon Socket Size	Key Engagement	Wall Thickness	Chamfer of Radius	
	Max.	Min.	Max.	Min.	Max.	Min.	Min.	Norm.	Min.	Min.	Max.	
0	0.0600	0.0600	0.0568	0.096	0.091	0.060	0.057	0.054	0.050	0.025	0.020	0.003
1	0.0730	0.0730	0.0504	0.118	0.112	0.073	0.070	0.066	1/16	0.062	0.031	0.003
2	0.0860	0.0860	0.0822	0.140	0.134	0.086	0.083	0.077	5/64	0.078	0.038	0.003
3	0.0990	0.0990	0.0949	0.161	0.154	0.099	0.095	0.089	5/64	0.078	0.044	0.003
4	0.1120	0.1120	0.1075	0.183	0.176	0.112	0.108	0.101	3/32	0.094	0.051	0.005
5	0.1250	0.1250	0.1202	0.205	0.198	0.125	0.121	0.112	3/32	0.094	0.057	0.005
6	0.1380	0.1380	0.1329	0.226	0.218	0.138	0.134	0.124	7/64	0.109	0.064	0.005
8	0.1640	0.1640	0.1585	0.270	0.262	0.164	0.159	0.148	9/64	0.141	0.077	0.005
10	0.1900	0.1900	0.1840	0.312	0.303	0.190	0.185	0.171	5/32	0.156	0.090	0.005
12	0.216	0.2160	0.2100	0.324	0.314	0.216	0.210	0.194	5/32	0.156	0.103	0.005
1/4	0.2500	0.2500	0.2435	0.375	0.365	0.250	0.244	0.225	3/16	0.188	0.120	0.008
5/16	0.3125	0.3125	0.3053	0.469	0.457	0.312	0.306	0.281	1/4	0.250	0.151	0.008
3/8	0.3750	0.3750	0.3678	0.561	0.550	0.375	0.368	0.337	5/16	0.312	0.182	0.008
7/16	0.4375	0.4375	0.4294	0.656	0.642	0.438	0.430	0.394	3/8	0.375	0.213	0.010
1/2	0.5000	0.5000	0.4919	0.750	0.735	0.500	0.492	0.450	3/8	0.375	0.245	0.010
5/8	0.6250	0.6250	0.6163	0.938	0.921	0.625	0.616	0.562	1/2	0.500	0.307	0.010
3/4	0.7500	0.7500	0.7406	1.125	1.107	0.750	0.740	0.675	5/8	0.625	0.370	0.010
7/8	0.8750	0.8750	0.8647	1.312	1.293	0.875	0.864	0.787	3/4	0.750	0.432	0.015
1	1.0000	1.0000	0.9886	1.500	1.479	1.000	0.988	0.900	3/4	0.750	0.495	0.015
1-1/8	1.1250	1.1250	1.1086	1.688	1.665	1.125	1.111	1.012	7/8	0.875	0.557	0.015
1-1/4	1.2500	1.2500	1.2336	1.875	1.852	1.250	1.236	1.125	7/8	0.875	0.620	0.015
1-3/8	1.3750	1.3750	1.3568	2.062	2.038	1.375	1.360	1.237	1	1.000	0.682	0.015
1-1/2	1.5000	1.5000	1.4818	2.250	2.224	1.500	1.485	1.350	1	1.000	0.745	0.015
1-3/4	1.7500	1.7500	1.7295	2.625	2.597	1.750	1.734	1.575	1-1/4	1.250	0.870	0.015
2	2.0000	2.0000	1.9780	3.000	2.970	2.000	1.983	1.800	1-1/2	1.500	0.995	0.015
2-1/4	2.2500	2.2500	2.2280	3.375	3.344	2.250	2.232	2.025	1-3/4	1.750	1.120	0.031
2-1/2	2.5000	2.5000	2.4762	3.750	3.717	2.500	2.481	2.250	1-3/4	1.750	1.245	0.031
2-3/4	2.7500	2.7500	2.7262	4.125	4.090	2.750	2.730	2.475	2-1/4	2.000	1.370	0.031
3	3.0000	3.0000	2.9762	4.500	4.464	3.000	2.979	2.700	2-1/4	2.250	1.495	0.031
3-1/4	3.2500	3.2500	3.2262	4.875	4.837	3.250	3.228	2.925	2-1/4	2.250	1.620	0.031
3-1/2	3.5000	3.5000	3.4762	5.250	5.211	3.500	3.478	3.150	2-3/4	2.750	1.745	0.031
3-3/4	3.7500	3.7500	3.7262	5.625	5.584	3.750	3.727	3.375	2-3/4	2.750	1.870	0.031
4	4.0000	4.0000	3.9762	6.000	5.958	4.000	3.976	3.600	3-1/4	3.000	1.995	0.031

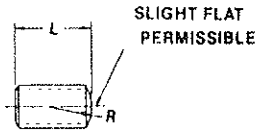
For additional information refer to ASME/ANSI B18.3 1986 & ASTM A574-92A  
All dimensions in inches

# Dimensions Of Socket Set Screws

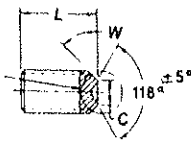
CLASS FIT 3A  
HARDNESS RC 45-53



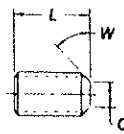
OVAL POINT



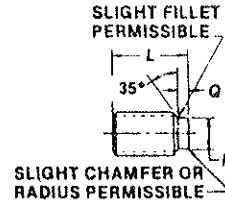
CUP POINT (KNURL)



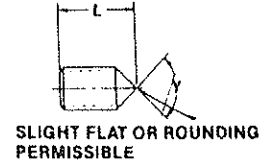
FLAT POINT



HALF DOG POINT



CONE POINT

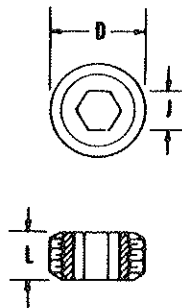


Nominal Size or Basic Screw Diameter	J		T	C		R	Y	P		Q		Recommended Seating Torques (Inch-lbs.)		
	Hexagon Socket Size		Min Key Engagement to Develop Functional Capability of Key	Cup and Flat Point Diameters		Oval Point Radius	Cone Point Angle 90° ± 2 Deg These Lengths or Longer	Half Dog Point						
	Nom		Hex Socket $r_{\text{H}}/_{\text{Min}}$	Max	Min	Basic	118° ± 2 Deg for Shorter Nominal Lengths	Diameter	Length					
								Max	Min	Max	Min			
0	0.0600	0.028	0.050	0.033	0.027	0.045	0.09	0.040	0.037	0.017	0.013	1.0	.4	3/32
1	0.0730	0.028	0.060	0.040	0.033	0.055	0.09	0.049	0.045	0.021	0.017	1.8	1.2	1/8
2	0.0860	0.035	0.060	0.047	0.039	0.064	0.13	0.057	0.053	0.024	0.020	1.8	1.2	1/8
3	0.0990	0.050	0.070	0.054	0.045	0.074	0.13	0.066	0.062	0.027	0.023	5	4	5/32
4	0.1120	0.050	0.070	0.061	0.051	0.084	0.19	0.075	0.070	0.030	0.026	5	4	5/32
5	0.1250	1/16	0.080	0.067	0.057	0.094	0.19	0.083	0.078	0.033	0.027	10	7	5/32
6	0.1380	1/16	0.080	0.074	0.064	0.104	0.19	0.092	0.087	0.038	0.032	10	7	3/16
8	0.1640	5/64	0.090	0.087	0.076	0.123	0.25	0.109	0.103	0.043	0.037	20	16	3/16
10	0.1900	3/32	0.100	0.102	0.088	0.142	0.25	0.127	0.120	0.049	0.041	36	26	3/16
1/4	0.2500	1/8	0.125	0.132	0.118	0.188	0.31	0.156	0.149	0.067	0.059	87	70	5/16
5/16	0.3125	5/32	0.156	0.172	0.156	0.234	0.38	0.203	0.195	0.082	0.074	165	130	3/8
3/8	0.3750	3/16	0.188	0.212	0.194	0.281	0.44	0.250	0.241	0.099	0.089	290	230	7/16
7/16	0.4375	7/32	0.219	0.252	0.232	0.328	0.50	0.297	0.287	0.114	0.104	430	340	1/2
1/2	0.5000	1/4	0.250	0.291	0.270	0.375	0.57	0.344	0.334	0.130	0.120	620	500	9/16
5/8	0.6250	5/16	0.312	0.371	0.347	0.469	0.75	0.469	0.456	0.164	0.148	1,325	980	1 1/16
3/4	0.7500	3/8	0.375	0.450	0.425	0.562	0.88	0.562	0.549	0.196	0.180	2,400	1,700	3/4
7/8	0.8750	1/2	0.500	0.530	0.502	0.656	1.00	0.658	0.642	0.227	0.211	3,600	3,000	3/4
1-1/8	1.0000	9/16	0.562	0.609	0.579	0.750	1.13	0.750	0.734	0.260	0.240	5,000	4,000	7/8
1-1/8	1.1250	9/16	0.562	0.689	0.655	0.844	1.25	0.844	0.826	0.291	0.271	7,200	5,600	1
1-1/4	1.2500	5/8	0.625	0.767	0.733	0.938	1.50	0.938	0.920	0.323	0.303	9,600	7,700	1-1/8
1-3/8	1.3750	5/8	0.625	0.848	0.808	1.031	1.63	1.031	1.011	0.354	0.334	9,600	7,700	1-1/4
1-1/2	1.5000	3/4	0.750	0.926	0.886	1.125	1.75	1.125	1.105	0.385	0.365	11,320	9,100	1-1/4

For additional information refer to ASME/ANSI B18.3 1986  
All dimensions in inches

## Dimensions Of Locking Socket Jam Screws

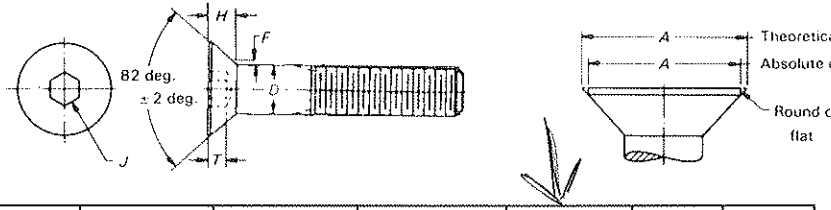
CLASS FIT 3A  
HARDNESS RC 45-53



D Nominal Diameter	Nom.	L Length Max.	L Length Min.	J Socket Width	
				Max.	Nom.
4	5/64	.088	.068	.0510	.050
5	3/32	.103	.083	.0635	1/16
6	3/32	.103	.083	.0635	1/16
8	7/64	.119	.099	.0791	5/64
10	1/8	.135	.115	.0947	3/32
1/4	1/8	.135	.115	.1270	1/8
5/16	5/32	.166	.146	.1582	5/32
3/8	3/16	.197	.177	.1895	3/16
7/16	7/32	.228	.208	.2207	7/32
1/2	1/4	.260	.240	.2520	1/4
5/8	5/16	.322	.302	.3155	5/16
3/4	3/8	.385	.365	.3780	3/8
7/8	7/16	.447	.427	.5030	1/2
1	1/2	.510	.490	.5655	9/16

# Dimensions of Flat Countersunk Socket Head Cap Screws

**CLASS FIT 3A  
HARDNESS RC 36-43**

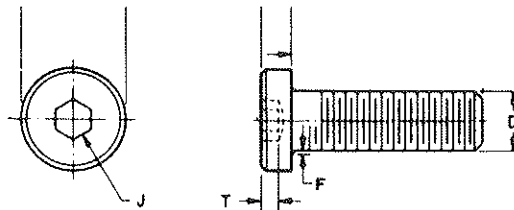


Nominal Size or Basic Screw Diameter	D		A		H		J		T	F
	Body Diameter		Head Diameter		Head Height		Hexagon Socket Size	Key Engagement	Fillet Extension Above D Max.	
			Theoretical Sharp Max.	Abs. Min.	Reference	Flushness Tolerance				
	Max.	Min.	Max.	Min.	Reference	Flushness Tolerance	Nom.	Min.	Max.	
10	0.0600	0.0600	0.0568	0.138	0.117	0.044	0.006	0.035	0.025	0.006
11	0.0730	0.0730	0.0695	0.168	0.143	0.054	0.007	0.050	0.031	0.008
12	0.0860	0.0860	0.0822	0.197	0.168	0.064	0.008	0.050	0.038	0.010
13	0.0990	0.0990	0.0949	0.226	0.193	0.073	0.010	1/16 0.062	0.044	0.010
4	0.1120	0.1120	0.1075	0.255	0.218	0.083	0.011	1/16 0.062	0.055	0.012
5	0.1250	0.1250	0.1202	0.281	0.240	0.090	0.012	5/64 0.078	0.061	0.014
6	0.1380	0.1380	0.1329	0.307	0.263	0.097	0.013	5/64 0.078	0.066	0.015
8	0.1640	0.1640	0.1585	0.359	0.311	0.112	0.014	3/32 0.094	0.076	0.015
10	0.1900	0.1900	0.1840	0.411	0.359	0.127	0.015	1/8 0.125	0.087	0.015
1/4	0.2500	0.2500	0.2435	0.531	0.480	0.161	0.016	5/32 0.156	0.111	0.015
5/16	0.3125	0.3125	0.3053	0.656	0.600	0.198	0.017	3/16 0.188	0.135	0.015
3/8	0.3750	0.3750	0.3678	0.781	0.720	0.234	0.018	7/32 0.219	0.159	0.015
7/16	0.4375	0.4375	0.4294	0.844	0.781	0.234	0.018	1/4 0.250	0.159	0.015
1/2	0.5000	0.5000	0.4919	0.938	0.872	0.251	0.018	5/16 0.312	0.172	0.015
5/8	0.6250	0.6250	0.6163	1.188	1.112	0.324	0.022	3/8 0.375	0.220	0.015
3/4	0.7500	0.7500	0.7406	1.438	1.355	0.396	0.024	1/2 0.500	0.220	0.015
7/8	0.8750	0.8750	0.8647	1.688	1.604	0.468	0.025	9/16 0.562	0.248	0.015
1	1.0000	1.0000	0.9886	1.938	1.841	0.540	0.028	5/8 0.625	0.297	0.015
1-1/8	1.1250	1.1250	1.1086	2.188	2.079	0.611	0.031	3/4 0.750	0.325	0.031
1-1/4	1.2500	1.2500	1.2336	2.438	2.316	0.683	0.035	7/8 0.875	0.358	0.031
1-3/8	1.3750	1.3750	1.3568	2.688	2.553	0.755	0.038	7/8 0.875	0.402	0.031
1-1/2	1.5000	1.5000	1.4848	2.938	2.791	0.827	0.042	1 1.000	0.435	0.031

For Additional information refer to ASME/ANSI B18.3 1986 & ASTM F835

# Dimensions of Low-Head Socket Cap Screws

**CLASS FIT 3A  
HARDNESS RC 38-43**

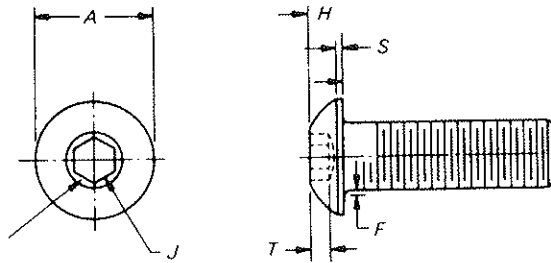


Nominal Size	Basic Screw Diam. D	A-Head Diameter		H-Head Height		J Hex Socket Size	T Key Engagement	F Fillet Above D	
		Max.	Min.	Max.	Min.	Min.	Min.	Max.	Min.
4	0.1120	.183	.178	.056	.053	.0500	.038	.009	.005
5	0.1250	.205	.200	.062	.059	.0625	.044	.010	.006
6	0.1380	.226	.221	.069	.066	.0625	.050	.010	.006
8	0.1640	.270	.265	.082	.079	.0781	.060	.012	.007
10	0.1900	.312	.307	.095	.092	.093	.072	.014	.009
1/4	0.2500	.375	.369	.125	.121	.1250	.094	.014	.009
5/16	0.3125	.437	.431	.156	.152	.1562	.120	.017	.012
3/8	0.3750	.562	.556	.187	.182	.1875	.145	.020	.015
7/16	0.4375	.625	.618	.218	.213	.2188	.166	.023	.018
1/2	0.5000	.750	.743	.250	.244	.2500	.184	.026	.020
5/8	0.6250	.875	.867	.312	.306	.3125	.250	.032	.024

# Dimensions of Button Socket Head Cap Screws

CLASS FIT 3A  
HARDNESS RC 36-43

Slight flat and/or  
countersink  
permissible

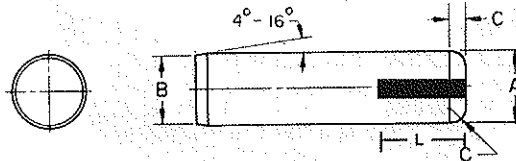


Nominal Size or Basic Screw Diameter	A		H		S	J	T	F	
	Head Diameter		Head Height		Head Side Height	Hexagon Socket Size	Key Engagement	Fillet Extension	
	Max.	Min.	Max.	Min.	Ref.	Nom.	Min.	Max.	Min.
0 0.0600	0.114	0.104	0.032	0.026	0.010	0.035	0.020	0.010	0.005
1 0.0730	0.139	0.129	0.039	0.033	0.010	0.050	0.028	0.010	0.050
2 0.0860	0.164	0.154	0.046	0.038	0.010	0.050	0.028	0.010	0.050
3 0.0990	0.188	0.176	0.052	0.044	0.010	1/16 0.062	0.035	0.010	0.005
4 0.1120	0.213	0.201	0.059	0.051	0.015	1/16 0.062	0.035	0.010	0.005
5 0.1250	0.238	0.226	0.066	0.058	0.015	5/64 0.078	0.044	0.010	0.005
6 0.1380	0.262	0.250	0.073	0.063	0.015	5/64 0.078	0.044	0.010	0.005
8 0.1640	0.312	0.298	0.087	0.077	0.015	3/32 0.094	0.052	0.015	0.010
10 0.1900	0.361	0.347	0.101	0.091	0.020	1/8 0.125	0.070	0.015	0.010
1/4 0.2500	0.437	0.419	0.132	0.122	0.031	5/32 0.156	0.087	0.020	0.015
5/16 0.3125	0.547	0.527	0.166	0.152	0.031	3/16 0.188	0.105	0.020	0.015
3/8 0.3750	0.656	0.636	0.199	0.185	0.031	7/32 0.219	0.122	0.020	0.015
1/2 0.5000	0.875	0.851	0.265	0.245	0.046	5/16 0.312	0.175	0.030	0.020
5/8 0.6250	1.000	0.970	0.331	0.311	0.062	3/8 0.375	0.210	0.030	0.020

For Additional information refer to ASME/ANSI B18.3 1986 & ASTM F835

# Dimensions of Dowel Pins & Pull Dowel Pins

SURFACE HARDNESS RC 60 min.  
CORE HARDNESS RD 50-58  
SURFACE FINISH 8 MU max



For additional information refer to ANSI B18.8.2 1978

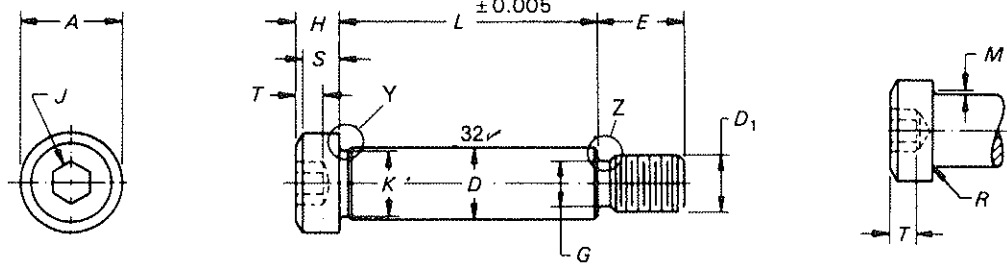
All dimensions in inches

Nominal Size or Nominal Pin Diameter	A						B		C		Double Shear Load Min. lb	L	Tap Size
	Pin Diameter						Point Diameter	Crown Height or Radius	Material Carbon or Alloy Steel				
	Standard Series Pins			Oversize Series Pins						Max	Min	Max	Min
	Basic	Max	Min	Basic	Max	Min							
1/16 0.0625	0.0627	0.0628	0.0626	0.0635	0.0636	0.0634	0.058	0.048	0.020	0.008	800		
5/64 0.0781	0.0783	0.0784	0.0782	0.0791	0.0792	0.0790	0.074	0.064	0.026	0.010	1,240		
3/32 0.0938	0.0940	0.0941	0.0939	0.0948	0.0949	0.0947	0.089	0.079	0.031	0.012	1,800		
1/8 0.1250	0.1252	0.1253	0.1251	0.1260	0.1261	0.1259	0.120	0.110	0.041	0.016	3,200		
5/32 0.1562	0.1564	0.1565	0.1563	0.1572	0.1573	0.1571	0.150	0.140	0.052	0.020	5,000		
3/16 0.1875	0.1877	0.1878	0.1876	0.1885	0.1886	0.1884	0.180	0.170	0.062	0.023	7,200		
1/4 0.2500	0.2502	0.2503	0.2501	0.2510	0.2511	0.2509	0.240	0.230	0.083	0.031	12,800	21/64	6-32
5/16 0.3125	0.3127	0.3128	0.3126	0.3135	0.3136	0.3134	0.302	0.290	0.104	0.039	20,000	21/64	10-32
3/8 0.3750	0.3752	0.3753	0.3751	0.3760	0.3761	0.3759	0.365	0.350	0.125	0.047	28,700	3/8	10-32
7/16 0.4375	0.4377	0.4378	0.4376	0.4385	0.4386	0.4384	0.424	0.409	0.146	0.055	39,100	1/2	1/4-20
1/2 0.5000	0.5002	0.5003	0.5001	0.5010	0.5011	0.5009	0.486	0.471	0.167	0.063	51,000	1/2	1/4-20
5/8 0.6250	0.6252	0.6253	0.6251	0.6260	0.6261	0.6259	0.611	0.595	0.208	0.078	79,800	1/2	1/4-20
3/4 0.7500	0.7502	0.7503	0.7501	0.7510	0.7511	0.7509	0.735	0.715	0.250	0.094	114,000	5/8	5/16-18
7/8 0.8750	0.8752	0.8753	0.8751	0.8760	0.8761	0.8769	0.860	0.840	0.293	0.109	156,000	N/A	N/A
1 1.0000	1.0002	1.0003	1.0001	1.0010	1.0011	1.0009	0.980	0.960	0.333	0.125	204,000	3/4	5/16-18

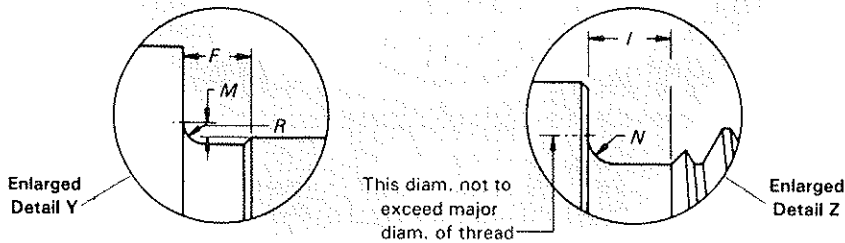


# Dimensions of Hexagon Socket Head Shoulder Screws

CLASS FIT 3A  
HARDNESS RC 36-43



Nominal Size or Basic Shoulder Diameter	D		A		H		S	J		T	M	R	
	Shoulder Diameter		Head Diameter		head Height		Head Side Height	Hexagon Socket Size		Key Engagement	Head Fillet Extension Above D	Head Fillet Radius	
	Max.	Min.	Max.	Min.	Max.	Min.	Min.	Nom.	Min.	Max.	Min.		
1/4	0.250	0.2480	0.2460	0.375	0.357	0.188	0.177	0.157	1/8	0.125	0.094	0.014	0.009
5/16	0.312	0.3105	0.3085	0.438	0.419	0.219	0.209	0.183	5/32	0.156	0.117	0.017	0.012
3/8	0.375	0.3730	0.3710	0.562	0.543	0.250	0.240	0.209	3/16	0.188	0.141	0.020	0.015
1/2	0.500	0.4980	0.4960	0.750	0.729	0.312	0.302	0.262	1/4	0.250	0.188	0.026	0.020
5/8	0.625	0.6230	0.6210	0.875	0.853	0.375	0.365	0.315	5/16	0.312	0.234	0.032	0.024
3/4	0.750	0.7480	0.7460	1.000	0.977	0.500	0.490	0.421	3/8	0.375	0.281	0.039	0.030
1	1.000	0.9980	0.9960	1.312	1.287	0.625	0.610	0.527	1/2	0.500	0.375	0.050	0.040
1-1/4	1.250	1.2480	1.2460	1.750	1.723	0.750	0.735	0.633	5/8	0.625	0.469	0.060	0.050
1-1/2	1.500	1.4980	1.4960	2.125	2.095	1.000	0.980	0.842	7/8	0.875	0.656	0.070	0.060
1-3/4	1.750	1.7480	1.7460	2.375	2.345	1.125	1.105	0.948	1	1.000	0.750	0.080	0.070
2	2.000	1.9980	1.9960	2.750	2.720	1.250	1.230	1.054	1-1/4	1.250	0.937	0.090	0.080

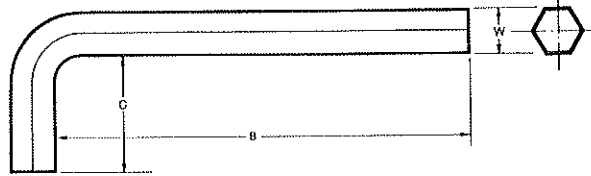


Nominal Size or Basic Shoulder Diameter	K	F	D <sub>1</sub>		Threads/In.	G		I	N		E	
			Shoulder Neck Diameter	Shoulder Neck Width		Nominal Thread Size or Basic Thread Diameter	Thread Neck Diameter		Thread Neck Width	Thread Neck Fillet		Thread Length
							Max.	Min.	Max.	Max.	Min.	Basic
1/4	0.250	0.227	0.093	10	0.1900	24	0.142	0.133	0.083	0.023	0.017	0.375
005/16	0.312	0.289	0.093	1/4	0.2500	20	0.193	0.182	0.100	0.028	0.022	0.438
3/8	0.375	0.352	0.093	5/16	0.3125	18	0.249	0.237	0.111	0.031	0.025	0.500
1/2	0.500	0.477	0.093	3/8	0.3750	16	0.304	0.291	0.125	0.035	0.029	0.625
5/8	0.625	0.602	0.093	1/2	0.5000	13	0.414	0.397	0.154	0.042	0.036	0.750
3/4	0.750	0.727	0.093	5/8	0.6250	11	0.521	0.502	0.182	0.051	0.045	0.875
1	1.000	0.977	0.125	3/4	0.7500	10	0.638	0.616	0.200	0.055	0.049	1.000
1-1/4	1.250	1.227	0.125	7/8	0.8750	9	0.750	0.726	0.222	0.062	0.056	1.125
01-1/2	1.500	1.478	0.125	1-1/8	1.1250	7	0.964	0.934	0.286	0.072	0.066	1.500
1-3/4	1.750	1.728	0.125	1-1/4	1.2500	7	1.089	1.059	0.286	0.072	0.066	1.750
2	2.000	1.978	0.125	1-1/2	1.5000	6	1.307	1.277	0.333	0.102	0.096	2.000

For additional information refer to ASME/ANSI B18.3 & ASTM A574  
All dimensions in inches

# Dimensions of USS Hexagon Keys

**MATERIAL - HIGH GRADE ALLOY STEEL**  
**HARDNESS - RC 48 < 3/8**  
**45 ≥ 3/8**



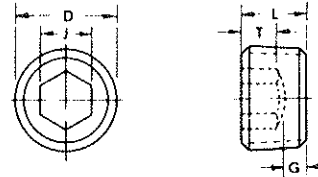
W Wrench Size A/F		B Nominal		C Nominal	Minimum Torsional Shear Strength	Minimum Torsional Yield	Minimum Torque
Max.	Min.	short arm	long arm		lb. in.	lb. in.	in. lb.
.028	.0275	1.219	2.594	.219	1.2	1.1	.86
.035	.0345	1.219	2.672	.344	2.4	2.1	1.80
.050	.0490	1.656	2.844	.531	7	6	5.00
1/16	.0615	1.750	3.000	.562	12	11	9.50
5/64	.0771	1.875	3.188	.609	26	23	19.40
3/32	.0927	2.000	3.375	.656	46	40	33.50
7/64	.1077	2.125	3.562	.703	73	63	52.90
1/8	.1235	2.250	3.750	.750	108	94	77.90
9/64	.1391	2.375	3.937	.796	154	134	117.00
5/32	.1547	2.500	4.125	.844	210	183	156.00
3/16	.1860	2.750	4.500	.938	364	317	273.00
7/32	.2172	3.000	4.875	1.031	580	502	428.00
1/4	.2480	3.250	5.250	1.125	860	750	615.00
5/16	.3110	3.750	6.000	1.250	1685	1465	1315.00
3/8	.3730	4.250	6.750	1.375	2900	2520	2150.00
7/16	.4355	4.750	7.500	1.500	4400	3860	3665.00
1/2	.4975	5.250	8.250	1.625	6600	5750	5130.00
9/16	.5600	5.750	9.000	1.750	9200	8000	7010.00
5/8	.6225	6.250	9.750	1.875	12650	11000	9810.00
3/4	.7470	7.250	11.250	2.125	20800	18100	15,570.00
7/8	.8720	8.250	12.750	2.375	29200	25400	23,400.00
1	.9970	9.250	14.250	2.625	43700	38000	35,100.00
1-1/4	1.243	11.250	—	3.000	71900	62500	—
1-1/2	1.493	13.250	—	3.500	124000	108000	—
1-3/4	1.743	15.250	—	4.000	198000	172000	—
2	1.993	17.250	—	4.500	276000	240000	—

For additional information refer to ASME/ANSI B 18.3 1986

## Key Application Chart

Key Size W		1960 Series Socket Head Cap Screw	Button Head Screw	Flat Head Screws	Shoulder Screws	Low Heads and Socket Set Screws	Pressure Plugs
Max.	Min.						
.028	.0275	—	—	—	—	#0	—
.035	.0345	—	#0	#0	—	#1, #2	—
.050	.049	#0	#1, #2	#1, #2	—	#3, #4	—
1/16	.0615	#1	#3, #4	#3, #4	—	#5, #6	—
5/64	.0771	#2, #3	#5, #6	#5, #6	—	#8	—
3/32	.0927	#4, #5	#8	#8	—	#10	—
7/64	.1079	#6	—	—	—	—	—
1/8	.1235	—	#10	#10	1/4	1/4	—
9/64	.1391	#8	—	—	—	—	—
5/32	.1547	#10	1/4	1/4	5/16	5/16	1/16
3/16	.1860	1/4	5/16	5/16	3/8	3/8	1/8
7/32	.2172	—	3/8	3/8	—	7/16	—
1/4	.2485	5/16	—	7/16	1/2	1/2	1/4
5/16	.3110	3/8	1/2	1/2, 9/16	5/8	5/8	3/8
3/8	.3735	7/16, 1/2	5/8	5/8	3/4	3/4	1/2
7/16	.4355	9/16	—	—	—	—	—
1/2	.4975	5/8	—	3/4	7/8, 1	7/8	—
9/16	.5600	—	—	7/8	—	1, 1-1/8	3/4
5/8	.6225	3/8	—	1	1-1/4	1-1/4, 1-3/8	1
3/4	.7470	7/8, 1	—	—	—	1-1/2	1-1/4, 1-1/2
7/8	.8720	1-1/8, 1-1/4	—	—	1-1/2	—	—
1	.9970	1-3/8, 1-1/2	—	—	1-3/4	1-3/4, 2	1-1/2, 2
1-1/4	1.243	1-3/4	—	—	2	—	—
1-1/2	1.493	2	—	—	—	—	—
1-3/4	1.743	2-1/4, 2-1/2	—	—	—	—	—
2	1.993	2-3/4	—	—	—	—	—

## Dimensions of Hexagon Socket Dry-Seal Pressure Plugs 3/4" Taper

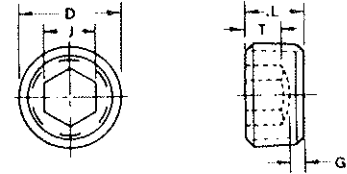


**MATERIAL- ALLOY**  
**HARDNESS RC 36-43**

Nominal Size	D Nominal O.D.	Threads Per Inch	J Hexagon Socket Size Nominal	T Key Engagement Minimum	G Wall Thickness Minimum	L Overall Length			Tightening Torque (Inch-Lbs.)
						Nominal	Maximum	Minimum	
1/16	.312	27	5/32	.140	.062	5/16	.324	.300	150
1/8	.405	27	3/16	.140	.062	5/16	.324	.300	250
1/4	.540	18	1/4	.218	.073	7/16	.457	.417	600
3/8	.675	18	5/16	.250	.084	1/2	.520	.480	1200
1/2	.840	14	3/8	.312	.095	9/16	.583	.542	1800
3/4	1.050	14	9/16	.312	.125	5/8	.645	.605	3000
1	1.315	11-1/2	5/8	.375	.125	3/4	.770	.730	4200
1-1/4	1.660	11-1/2	3/4	.437	.156	13/16	.832	.792	5400
1-1/2	1.900	11-1/2	1	.437	.156	13/16	.843	.780	6900
2	2.375	11-1/2	1	.437	.156	7/8	.906	.844	8500

For additional information refer to ANSI B1.20.3-1976

## Dimensions of Hexagon Socket Flush-Seal Pressure Plugs 7/8" Taper

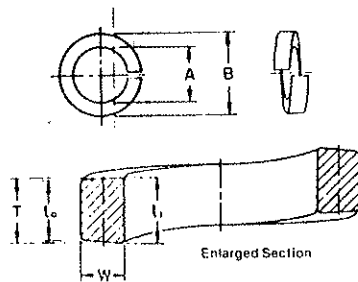


**MATERIAL- ALLOY**  
**HARDNESS RC 36-43**

Nominal Size	D Nominal O.D.	Threads Per Inch	J Hexagon Socket Size Nominal	T Key Engagement Minimum	G Wall Thickness Minimum	L Overall Length		Basic Pitch Diameter at Socket Face	Tightening Torque (Inch-Lbs.)
						Maximum	Minimum		
1/16	.307	27	5/32	.140	.052	.250	.235	.28253	150
1/8	.401	27	3/16	.140	.049	.250	.235	.37495	250
1/4	.529	18	1/4	.218	.045	.406	.391	.49366	600
3/8	.667	18	5/16	.250	.040	.406	.391	.62904	1200
1/2	.830	14	3/8	.312	.067	.531	.516	.78103	1800
3/4	1.041	14	9/16	.312	.154	.531	.516	.99147	3000
1	1.302	11-1/2	5/8	.360	.112	.656	.641	1.24180	4200
1-1/4	1.647	11-1/2	3/4	.360	.102	.656	.641	1.58655	5400
1-1/2	1.885	11-1/2	3/4	.360	.102	.656	.641	1.82551	—

For additional information refer to ANSI B1.20.3-1976

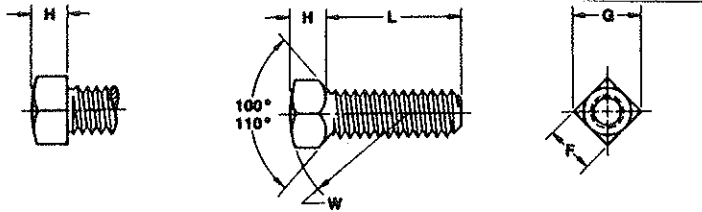
## Dimensions of Hi-Collar Lock Washers



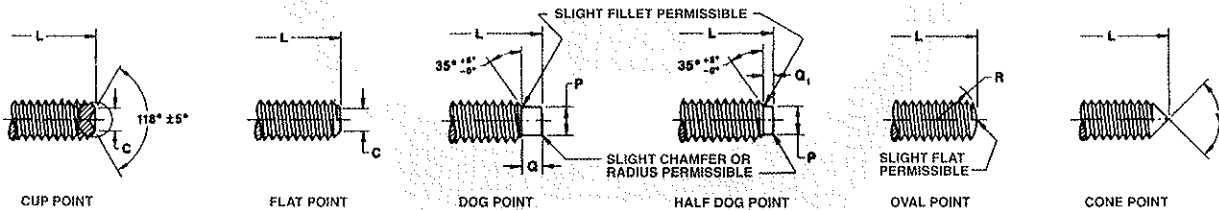
For additional information refer to  
ASME/ANSI B18.21.1 1990  
All dimensions in inches

Nominal Washer Sizes		A		B	T	W
		Inside Diameter		Outside Diameter	Mean Section Thickness $(t+t_0)/2$	Section Width
		Max.	Min.	Max <sup>2</sup>	Min.	Min.
No. 4	0.112	0.120	0.114	0.173	0.022	0.022
No. 5	0.125	0.133	0.127	0.202	0.030	0.030
No. 6	0.138	0.148	0.141	0.216	0.030	0.030
No. 8	0.164	0.174	0.167	0.267	0.047	0.042
No. 10	0.190	0.200	0.193	0.294	0.047	0.042
1/4	0.250	0.260	0.252	0.363	0.078	0.047
5/16	0.312	0.322	0.314	0.457	0.093	0.062
3/8	0.375	0.385	0.377	0.550	0.125	0.076
7/16	0.438	0.450	0.440	0.664	0.140	0.090
1/2	0.500	0.512	0.502	0.733	0.172	0.103
5/8	0.625	0.640	0.628	0.916	0.203	0.125
3/4	0.750	0.765	0.753	1.104	0.218	0.154
7/8	0.875	0.890	0.878	1.287	0.234	0.182
1	1.000	1.015	1.003	1.469	0.250	0.208
1-1/8	1.125	1.144	1.129	1.654	0.313	0.236
1-1/4	1.250	1.272	1.254	1.782	0.313	0.236
1-3/8	1.375	1.399	1.379	2.022	0.375	0.292
1-1/2	1.500	1.524	1.504	2.149	0.375	0.292
1-3/4	1.750	1.778	1.758	2.585	0.469	0.383
2	2.000	2.028	2.008	2.835	0.469	0.383

# Dimensions of Square Head Set Screws



Nominal Size or Basic Screw Diameter	F		G		H		K		S	U	W	
	Width Across Flats		Width Across Corners		Head Height		Neck Relief Diameter		Neck Relief Fillet Radius	Relief Relief Width	Head Radius	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Min	
10	0.1900	0.188	0.180	0.265	0.247	0.148	0.134	0.145	0.140	0.027	0.083	0.48
1/4	0.2500	0.250	0.241	0.354	0.331	0.196	0.178	0.185	0.170	0.032	0.100	0.62
5/16	0.3125	0.312	0.302	0.442	0.415	0.245	0.224	0.240	0.225	0.036	0.111	0.78
3/8	0.3750	0.375	0.362	0.530	0.497	0.293	0.270	0.294	0.279	0.041	0.125	0.94
7/16	0.4365	0.438	0.423	0.619	0.581	0.341	0.315	0.345	0.330	0.046	0.153	1.09
1/2	0.5000	0.500	0.484	0.707	0.665	0.389	0.361	0.500	0.385	0.050	0.154	1.25
9/16	0.5625	0.562	0.545	0.795	0.748	0.437	0.407	0.454	0.439	0.054	0.167	1.41
5/8	0.6250	0.625	0.606	0.884	0.833	0.485	0.452	0.507	0.492	0.059	0.182	1.56
3/4	0.7500	0.750	0.729	1.060	1.001	0.582	0.544	0.620	0.605	0.065	0.200	1.88
7/8	0.8750	0.875	0.852	1.237	1.170	0.678	0.635	0.731	0.716	0.072	0.222	2.19
1	1.0000	1.000	0.974	1.414	1.337	0.774	0.726	0.838	0.823	0.081	0.250	2.50
1-1/8	1.1250	1.125	1.096	1.591	1.505	0.870	0.817	0.939	0.914	0.092	0.283	2.81
1-1/4	1.2500	1.250	1.219	1.768	1.674	0.966	0.908	1.064	1.039	0.092	0.283	2.12
1-3/8	1.3750	1.375	1.342	1.945	1.843	1.063	1.000	1.159	1.134	0.109	0.333	3.44
1-1/2	1.5000	1.500	1.464	2.121	2.010	1.159	1.091	1.284	1.259	0.109	0.333	3.75

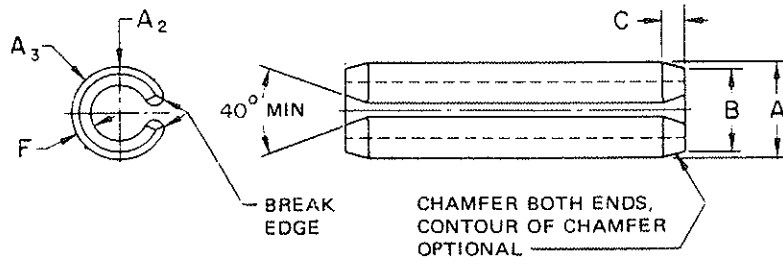


Nominal Size or Basic Screw Diameter	C		P		Q		Q <sub>1</sub>		R	Y	
	Cup and Flat Point Diameters		Dog and Half Dog Point Diameters		Point Length				Oval Point Radius	Cone Point Angle 90° ± 2° For These Nominal Lengths or Longer; 118° ± 2° For Shorter Screws	
	Max	Min	Max	Min	Dog		Half Dog				
10	0.1900	0.102	0.068	0.127	0.120	0.095	0.085	0.050	0.040	0.142	1/4
1/4	0.2500	0.132	0.118	0.156	0.149	0.130	0.120	0.068	0.058	0.188	5/16
5/16	0.3125	0.172	0.156	0.203	0.195	0.161	0.151	0.083	0.073	0.234	3/8
3/8	0.3750	0.212	0.194	0.250	0.241	0.193	0.183	0.099	0.089	0.281	7/16
7/16	0.4365	0.252	0.232	0.297	0.287	0.224	0.214	0.114	0.104	0.328	1/2
1/2	0.5000	0.291	0.270	0.344	0.334	0.255	0.245	0.130	0.120	0.375	9/16
9/16	0.5625	0.332	0.309	0.391	0.379	0.287	0.275	0.146	0.134	0.422	5/8
5/8	0.6250	0.371	0.347	0.469	0.456	0.321	0.305	0.164	0.148	0.469	3/4
3/4	0.7500	0.450	0.425	0.562	0.549	0.383	0.367	0.196	0.180	0.562	7/8
7/8	0.8750	0.530	0.502	0.656	0.642	0.446	0.430	0.227	0.211	0.656	1
1	1.0000	0.609	0.579	0.750	0.734	0.510	0.490	0.260	0.240	0.750	1-1/8
1-1/8	1.1250	0.689	0.655	0.844	0.826	0.572	0.552	0.291	0.271	0.844	1-1/4
1-1/4	1.2500	0.767	0.733	0.938	0.920	0.635	0.615	0.323	0.303	0.938	1-1/2
1-3/8	1.3750	0.848	0.808	1.031	1.011	0.698	0.678	0.354	0.334	1.031	1-5/8
1-1/2	1.5000	0.926	0.886	1.125	1.105	0.760	0.740	0.385	0.365	1.125	1-3/4

For additional information refer to ANSI/ASME B 18.6.2 1972 (1983)

All Dimensions in inches

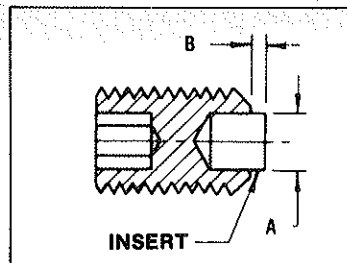
# Dimensions of Spring Pins



Nominal Size or Basic Pin Diameter	A		B	C		F	Recommended Hole Size		Double Shear Load, Min, lb			
	Pin Diameter		Chamfer Diameter	Chamfer Length		Stock Thickness	Hole Size		Material			
	Max <sup>2</sup>	Min <sup>3</sup>	Max	Max	Min	Basic	Max	Min	AISI 1070-1095 and AISI 420	AISI 302	Beryllium Copper	
1/16	0.062	0.069	0.066	0.059	0.028	0.007	0.012	0.065	0.062	425	350	270
5/64	0.078	0.086	0.083	0.075	0.032	0.008	0.018	0.081	0.078	650	550	400
3/32	0.094	0.103	0.099	0.091	0.038	0.008	0.022	0.097	0.094	1,000	800	660
1/8	0.125	0.135	0.131	0.122	0.044	0.008	0.028	0.129	0.125	2,100	1,500	1,200
9/64	0.141	0.149	0.145	0.137	0.044	0.008	0.028	0.144	0.140	2,200	1,600	1,400
5/32	0.156	0.167	0.162	0.151	0.048	0.010	0.032	0.160	0.156	3,000	2,000	1,800
3/16	0.188	0.199	0.194	0.182	0.055	0.011	0.040	0.192	0.187	4,400	2,800	2,600
7/32	0.219	0.232	0.226	0.214	0.065	0.011	0.048	0.224	0.219	5,700	3,550	3,700
1/4	0.250	0.264	0.258	0.245	0.065	0.012	0.048	0.256	0.250	7,700	4,600	4,500
5/16	0.312	0.328	0.321	0.306	0.080	0.014	0.062	0.318	0.312	11,500	7,095	6,800
3/8	0.375	0.392	0.385	0.368	0.095	0.016	0.077	0.382	0.375	17,600	10,000	10,100
7/16	0.438	0.456	0.448	0.430	0.095	0.017	0.077	0.445	0.437	20,000	12,000	12,200
1/2	0.500	0.521	0.513	0.485	0.110	0.025	0.094	0.510	0.500	25,800	15,500	16,800
5/8	0.625	0.650	0.640	0.608	0.125	0.030	0.125	0.636	0.625	46,000 <sup>4</sup>	18,800	...
3/4	0.750	0.780	0.769	0.730	0.150	0.030	0.150	0.764	0.750	66,000 <sup>4</sup>	23,200	...

For additional information refer to ANSI B18.8.2 1978

# Dimensions of Nylon & Brass Tip Set Screw



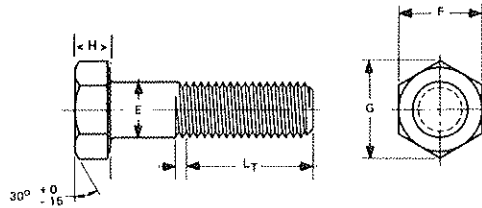
THREAD SIZE	TIP DIAMETER A	TIP PROTRUSION B	THREAD SIZE	TIP DIAMETER A	TIP PROTRUSION B
2-56	1/32	1/32	1/4-28	1/8	1/16
4-40	1/16	1/32	5/16-18	3/16	3/32
6-32	1/16	1/32	5/16-24	3/16	3/32
8-32	3/32	3/64	3/8-16	3/16	3/32
10-24	3/32	3/64	3/8-24	3/16	3/32
10-32	3/32	3/64	1/2-13	1/4	1/8
1/4-20	1/8	1/16	1/2-20	1/4	1/8

All dimensions in inches



# Dimensions of Hexagon Cap Screws USS

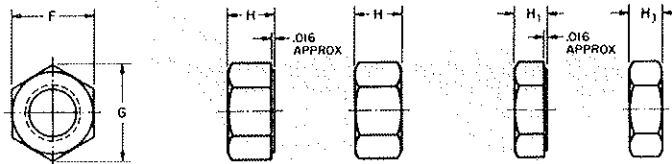
CLASS FIT 2A  
HARDNESS RC 33-39



Nominal Size or Basic Product Dia.	E		F			G		H			LT		Y	
	Body Dia.		Width Across Flats			Width Across Corners		Height			Thread Length For Screw Lengths		Thread Length	
	Max	Min	Basic	Max	Min	Max	Min	Basic	Max	Min	6in. and Shorter	Over 6in.	Max	
1/4	0.2500	0.2500	0.2450	7/16	0.438	0.428	0.505	0.488	5/32	0.163	0.150	0.750	1.000	0.250
5/16	0.3125	0.3152	0.3065	1/2	0.500	0.489	0.577	0.577	13/16	0.211	0.195	0.875	1.125	0.278
3/8	0.3750	0.3750	0.3690	9/16	0.562	0.551	0.650	0.628	15/64	0.243	0.226	1.000	1.250	0.312
7/16	0.4375	0.4375	0.4305	5/8	0.625	0.612	0.722	0.698	9/32	0.291	0.272	1.125	1.375	0.357
1/2	0.5000	0.5000	0.4930	3/4	0.750	0.736	0.866	0.840	5/16	0.323	0.302	1.250	1.500	0.385
9/16	0.5625	0.5625	0.5545	13/16	0.812	0.798	0.938	0.910	23/64	0.371	0.348	1.375	1.625	0.417
5/8	0.6250	0.6250	0.6170	15/16	0.938	0.922	1.083	1.051	25/64	0.403	0.378	1.500	1.750	0.455
3/4	0.7500	0.7500	0.7410	1-1/8	1.125	1.100	1.299	1.254	15/32	0.483	0.455	1.750	2.000	0.500
7/8	0.8750	0.8750	0.8660	1-5/16	1.312	1.285	1.516	1.465	35/64	0.563	0.531	2.000	2.250	0.556
1	1.0000	1.0000	0.9900	1-1/2	1.500	1.469	1.732	1.675	39/64	0.627	0.591	2.250	2.500	0.625
1-1/8	1.1250	1.1250	1.1140	1-11/16	1.688	1.631	1.949	1.859	11/16	0.718	0.658	2.500	2.750	0.714
1-1/4	1.2500	1.2500	1.2390	1-7/8	1.875	1.812	2.165	2.066	25/32	0.813	0.749	2.750	3.000	0.714
1-3/8	1.3750	1.3750	1.3630	2-1/16	2.062	1.994	2.382	2.273	27/32	0.878	0.810	3.000	3.250	0.833
1-1/2	1.5000	1.5000	1.4880	2-1/4	2.230	2.175	2.598	2.480	1-5/16	0.974	0.902	3.250	3.500	0.833
1-3/4	1.7500	1.7500	1.7380	2-5/8	2.625	2.538	3.031	2.893	1-3/32	1.134	1.054	3.750	4.000	1.000
2	2.0000	2.0000	1.9880	3	3.000	2.900	3.464	3.306	1-7/32	1.263	1.175	4.250	4.500	1.111

For additional information refer to SAE J429 AST M354 Grade BD

# Dimensions of Hexagon Nuts USS



Nominal Size or Basic Major Dia of Thread	F			G		H			H1			Hex Nuts Specified Proof Load		Jam Nuts All Strength Levels	
	Width Across Flats			Width Across Corners		Thickness Hex Nuts			Thickness Hex Jam Nuts			Up to 150,000 psi	150,000 psi and Greater		
	Basic	Max.	Min.	Max.	Min.	Basic	Max.	Min.	Basic	Max.	Min.	Runout of Bearing Face, FIR Max			
1/4	0.2500	7/16	0.438	0.428	0.505	0.488	7/32	0.226	0.212	5/32	0.163	0.150	0.015	0.010	0.015
5/16	0.3125	1/2	0.500	0.489	0.577	0.577	17/64	0.273	0.258	3/16	0.195	0.180	0.016	0.011	0.016
3/8	0.3750	9/16	0.562	0.551	0.650	0.628	21/64	0.377	0.320	7/32	0.227	0.210	0.017	0.012	0.017
7/16	0.4375	11/16	0.688	0.675	0.794	0.768	3/8	0.385	0.365	1/4	0.260	0.240	0.018	0.013	0.018
1/2	0.5000	3/4	0.750	0.736	0.866	0.840	7/16	0.448	0.427	5/16	0.323	0.302	0.019	0.014	0.019
9/16	0.5625	7/8	0.875	0.861	1.010	0.982	31/64	0.496	0.473	5/16	0.324	0.301	0.020	0.015	0.020
5/8	0.6250	15/16	0.938	0.922	1.083	1.051	35/64	0.559	0.535	3/8	0.387	0.363	0.021	0.016	0.021
3/4	0.7500	1-1/8	1.125	1.088	1.299	1.240	41/64	0.665	0.617	27/64	0.446	0.398	0.023	0.018	0.023
7/8	0.8750	1-5/16	1.312	1.269	1.516	1.447	3/4	0.776	0.724	31/64	0.510	0.458	0.025	0.020	0.025
1	1.0000	1-1/2	1.500	1.450	1.732	1.653	55/64	0.887	0.831	35/64	0.575	0.519	0.027	0.022	0.027
1-1/8	1.1250	1-11/16	1.688	1.631	1.949	1.859	31/32	0.999	0.939	39/64	0.639	0.579	0.030	0.025	0.030
1-1/4	1.2500	1-7/8	1.875	1.812	2.165	2.066	1-1/16	1.094	1.030	23/32	0.751	0.667	0.033	0.028	0.033
1-3/8	1.3750	2-1/16	2.062	1.994	2.382	2.273	1-11/64	1.206	1.138	25/32	0.815	0.747	0.036	0.031	0.036
1-1/2	1.5000	2-1/4	2.250	2.175	2.598	2.480	1-9/32	1.317	1.245	27/32	0.880	0.808	0.039	0.034	0.039

For additional information refer to ANSI B18.2.2 1983 & SAE J995 All dimensions in inches

## Dimensions of Thru Hardened USS Washers

HARDNESS RC 38-45

NOMINAL WASHER SIZE	OUTSIDE DIA. IN.	INSIDE DIA. IN.	THICKNESS	
			MIN.	MAX.
1/4	3/4	5/16	.055	.072
5/16	7/8	3/8	.064	.080
3/8	1	7/16	.064	.080
7/16	1-1/4	1/2	.064	.080
1/2	1-3/8	9/16	.097	.121
9/16	1-1/2	5/8	.097	.121
5/8	1-3/4	21/32	.122	.146
3/4	2	13/16	.122	.146
7/8	2-1/4	15/16	.136	.160
1	2-1/2	1-1/16	.136	.160
1-1/8	2-3/4	1-1/4	.136	.160
1-1/4	3	1-3/8	.136	.160
1-3/8	3-1/4	1-1/2	.136	.160
1-1/2	3-1/2	1-5/8	.136	.160

For additional information refer to ANSI B18.22.1 1993

## Dimensions of Thru Hardened SAE Washers

HARDNESS RC 38-45

NOMINAL WASHER SIZE	OUTSIDE DIA. IN.	INSIDE DIA. IN.	THICKNESS	
			MIN.	MAX.
1/4	5/8	9/32	.055	.072
5/16	11/16	11/32	.055	.072
3/8	13/16	13/32	.055	.072
7/16	59/64	15/32	.055	.072
1/2	1-1/16	17/32	.097	.121
9/16	1-3/16	19/32	.097	.121
5/8	1-5/16	21/32	.122	.146
3/4	1-15/32	13/16	.122	.146
7/8	1-3/4	15/16	.136	.160
1 1/8	2	1-1/16	.136	.160
1-1/8	2-1/4	1-1/4	.136	.160
1-1/4	2-1/2	1-3/8	.136	.160
1-3/8	2-3/4	1-1/2	.136	.160
1-1/2	3	1-5/8	.136	.160

For additional information refer to ANSI B18.22.1 1983

## Dimensions of Heat-Treated Steel Lock Washers

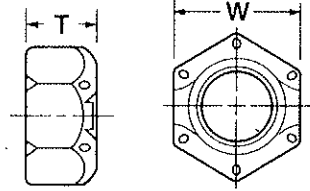
HARDNESS RC 38-46

NOMINAL WASHER SIZE	OUTSIDE DIAMETER	INSIDE DIA. MAX.
1/4	.487	.260
5/16	.583	.322
3/8	.680	.385
7/16	.776	.450
1/2	.869	.512
9/16	.965	.574
5/8	1.072	.640

NOMINAL WASHER SIZE	OUTSIDE DIAMETER	INSIDE DIA. MAX.
3/4	1.264	.765
7/8	1.455	.890
1	1.647	1.015
1-1/8	1.838	1.144
1-1/4	2.028	1.272
1-3/8	2.210	1.399
1-1/2	2.409	1.524

For additional information refer to ANSI B18.21.1 1990

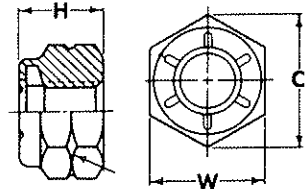
## Dimensions of Prevailing-Torque Type C Nuts



Rockwell C24-32 • AISI C1037 • IFI 100/101-107 • Class 2B Thread

SIZE	W WIDTH ACROSS FLATS		T THICKNESS		CLAMP LOAD LB. (1)	NUT TIGHTENING TORQUE (2)		WEIGHT LBS. 1,000 PCS.
	MAX	MIN	MAX	MIN		MAX	MIN	
1/4-20	.438	.428	.226	.212	2,850	125	85	6.7
1/4-28	.438	.428	.226	.212	3,250	125	85	
5/16-18	.500	.489	.273	.258	4,700	190	130	9.8
5/16-24	.500	.489	.273	.258	5,200	200	140	
3/8-16	.562	.551	.337	.320	6,950	28	20	14.5
3/8-24	.562	.551	.337	.320	7,900	29	21	
7/16-14	.688	.675	.385	.365	9,600	43	31	25.0
7/16-20	.688	.675	.385	.365	10,700	43	31	
1/2-13	.750	.736	.448	.427	12,800	62.5	45	34.8
1/2-20	.750	.736	.448	.427	14,400	70	50	
9/16-12	.875	.861	.496	.473	16,400	95	70	53.7
9/16-18	.875	.861	.496	.473	18,300	95	70	
5/8-11	.938	.922	.559	.535	20,300	122.5	90	70.2
5/8-18	.938	.922	.559	.535	23,000	125	90	
3/4-10	1.125	1.088	.665	.617	30,100	210	155	115.0
3/4-16	1.125	1.088	.665	.617	33,600	210	155	
7/8-9	1.312	1.269	.776	.724	41,600	312.5	225	207.0
7/8-14	1.312	1.269	.776	.724	45,800	312.5	225	
1-8	1.500	1.450	.887	.831	54,600	462.5	360	260.0
1-14	1.500	1.450	.887	.831	61,100	500.0	362.5	

## Dimensions of High Tensile Nylon Insert Lock-Nut

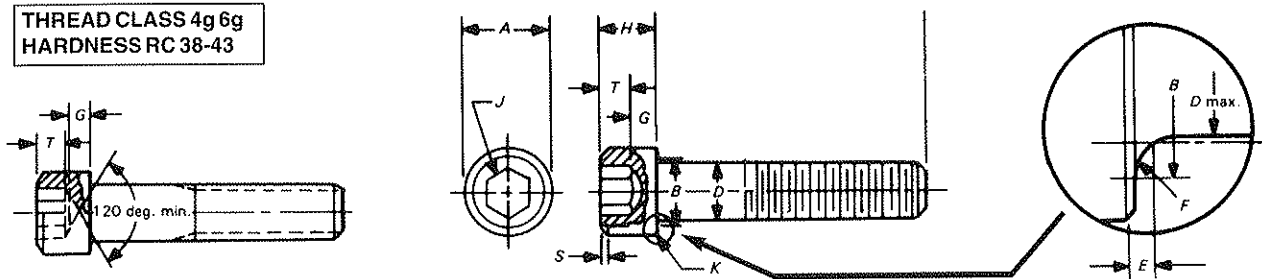


Rockwell C25-34 • AISI C1137 • NYLON 250° MAX • Class 2B Thread

SIZE	W WIDTH ACROSS FLATS		H THICKNESS		C WIDTH ACROSS CORNERS (Min)	AXIAL TENSILE STRENGTH LBS.(Min.)	APPROX.WT. LBS./1000
	MAX	MIN	MAX	MIN			
1/4-20	.440	.428	.328	.298	.482	5,700	8.80
1/4-28	.440	.428	.328	.298		6,000	
5/16-18	.502	.492	.359	.329	.552	9,000	11.80
5/16-24	.502	.492	.359	.329		9,500	
3/8-16	.564	.553	.468	.438	.622	14,000	18.20
3/8-24	.564	.553	.468	.438		15,500	
7/16-14	.690	.679	.468	.438	.766	18,000	22.00
7/16-20	.690	.679	.468	.438		19,600	
1/2-13	.752	.741	.609	.579	.837	25,000	43.50
1/2-20	.752	.741	.609	.579		26,700	
9/16-12	.877	.865	.656	.626	.978	32,000	71.00
9/16-18	.877	.865	.656	.626		34,000	
5/8-11	.940	.928	.765	.735	1.051	42,000	86.00
5/8-18	.940	.928	.765	.735		45,700	
3/4-10	1.064	1.053	.890	.860	1.191	50,500	121.00
3/4-16	1.064	1.053	.890	.860		56,000	
7/8-9	1.252	1.240	.999	.969	1.403	69,300	194.00
7/8-14	1.252	1.240	.999	.969		76,400	
1-8	1.440	1.428	1.078	1.016	1.615	90,900	285.00
1-14	1.440	1.428	1.078	1.016		100,000	

# Dimensions of Metric Socket Head Cap Screws

THREAD CLASS 4g 6g  
HARDNESS RC 38-43



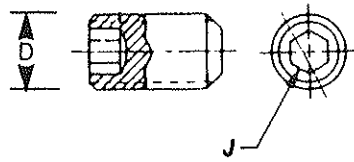
Nominal Size and Thread Pitch	D		A		H		S	J	T	G	Underhead Fillet			E	F	K
	Body Diameter		Head Diameter		Head Height		Chamfer or Radius	Hexagon Socket Size	Key Engagement	Wall Thickness	Transition Diam.		Transition Length	Juncture Radius	Chamfer or Radius	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Nom.	Min.	Min.	Max.	Min.	Max.	Min.	Max.	
M1.6 x 0.35	1.60	1.46	3.00	2.87	1.60	1.52	0.16	1.5	0.80	0.54	2.0	1.8	0.34	0.10	0.08	
M2 x 0.4	2.00	1.86	3.80	3.65	2.00	1.91	0.20	1.5	1.00	0.68	2.6	2.2	0.51	0.10	0.08	
M2.5 x 0.45	2.50	2.36	4.50	4.33	2.50	2.40	0.25	2.0	1.25	0.85	3.1	2.7	0.51	0.10	0.08	
M3 x 0.5	3.00	2.86	5.50	5.32	3.00	2.89	0.30	2.5	1.50	1.02	3.6	3.2	0.51	0.10	0.13	
M4 x 0.7	4.00	3.82	7.00	6.80	4.00	3.88	0.40	3.0	2.00	1.52	4.7	4.4	0.60	0.20	0.13	
M5 x 0.8	5.00	4.82	8.50	8.27	5.00	4.86	0.50	4.0	2.50	1.90	5.7	5.4	0.60	0.20	0.13	
M6 x 1	6.00	5.82	10.00	9.74	6.00	5.85	0.60	5.0	3.00	2.28	6.8	6.5	0.68	0.25	0.20	
M8 x 1.25	8.00	7.78	13.00	12.70	8.00	7.83	0.80	6.0	4.00	3.20	9.2	8.8	1.02	0.40	0.20	
M10 x 1.5	10.00	9.78	16.00	15.67	10.00	9.81	1.00	8.0	5.00	4.00	11.2	10.8	1.02	0.40	0.20	
M12 x 1.75	12.00	11.73	18.00	17.63	12.00	11.79	1.20	10.0	6.00	4.80	14.2	13.2	1.87	0.60	0.25	
M14 x 2	14.00	13.73	21.00	20.60	14.00	13.77	1.40	12.0	7.00	5.60	16.2	15.2	1.87	0.60	0.25	
M16 x 2	16.00	15.73	24.00	23.58	16.00	15.76	1.60	14.0	8.00	6.40	18.2	17.2	1.87	0.60	0.25	
M20 x 2.5	20.00	19.67	30.00	29.53	20.00	19.73	2.00	17.0	10.00	8.00	22.4	21.6	2.04	0.80	0.40	
M24 x 3	24.00	23.67	36.00	35.48	24.00	23.70	2.40	19.0	12.00	9.60	26.4	25.6	2.04	0.80	0.40	
M30 x 3.5	30.00	29.67	45.00	44.42	30.00	29.67	3.00	22.0	15.00	12.00	33.4	32.0	2.89	1.00	0.40	
M36 x 4	36.00	35.61	54.00	53.37	36.00	35.64	3.60	27.0	18.00	14.40	39.4	38.0	2.89	1.00	0.40	
M42 x 4.5	42.00	41.61	63.00	62.31	42.00	41.61	4.20	32.0	21.00	16.80	45.6	44.4	3.06	1.20	0.40	
M48 x 5	48.00	47.61	72.00	71.27	48.00	47.58	4.80	36.0	24.00	19.20	52.6	51.2	3.91	1.60	0.40	

For additional information refer to ASME/ANSI B18.3.1M 1986  
All dimensions in millimeters ASTM A574M-93

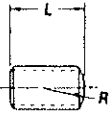
Minimum Ultimate Tensile Loads			
Note — all values are rounded to 3 significant digits.			
Thread Size	Stress Area, mm <sup>2</sup>	Tensile Load min, kN	Proof Load, kN
M1.6x0.35	01.27	01.55	01.23
M2x0.4	02.07	02.53	02.01
M2.5x0.45	03.39	04.14	00 3.29
M3x0.5	05.03	06.14	04.88
M4x0.7	08.78	10.70	08.52
M5x0.8	14.20	17.30	13.8
M6x1	20.10	24.50	19.5
M8x1.25	36.60	44.60	35.5
M10x1.5	58.00	70.80	56.3
M12x1.75	84.30	103	81.8
M14x2	115	140	112
M16x2	157	192	152
M20x2.5	245	299	238
M24x3	353	431	342
M30x3.5	561	684	544
M36x4	817	997	792
M42x4.5	1120	1370	1090
M48x5	1470	1790	1430

# Dimensions of Metric Socket Set Screws

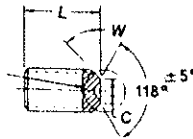
THREAD CLASS 4g 6g  
HARDNESS RC 45-53



OVAL POINT

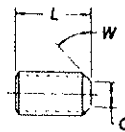


CUP POINT  
(KNURL)



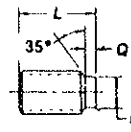
ISO 4029  
DIN 916

FLAT POINT



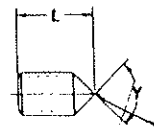
ISO 4026  
DIN 913

DOG POINT



ISO 4028  
DIN 915

CONE POINT



ISO 4027  
DIN 914

D	J	C	C <sub>2</sub>	R	Y	P	Q						
Nominal Size or Basic Screw	Thread Pitch	Hexagon Socket Size	Cup Point Diameter		Flat Point Diameter		Oval Point Radius		Cone Point Angle 90 deg. for These Lengths and Over; 118 deg. for Shorter Lengths	Dog Point			
			Max.	Min.	Max.	Min.	Max.	Min.		Diameter		Length	
Diameter		Nom.	Max.	Min.	Max.	Min.	Max.	Min.		Max.	Min.	Max.	Min.
1.6	0.35	0.7	0.80	0.55	0.80	0.55	1.60	1.20	3	0.80	0.55	0.53	0.40
2	0.4	0.9	1.00	0.75	1.00	0.75	1.90	1.50	3	1.00	0.75	0.64	0.50
2.5	0.45	1.3	1.20	0.95	1.50	1.25	2.28	1.88	4	1.50	1.25	0.78	0.63
3	0.5	1.5	1.40	1.15	2.00	1.75	2.65	2.25	4	2.00	1.75	0.92	0.75
4	0.7	2	2.00	1.75	2.50	2.25	3.80	3.00	5	2.50	2.25	1.20	1.00
5	0.8	2.5	2.50	2.25	3.50	3.20	4.55	3.75	6	3.50	3.20	1.37	1.25
6	1	3	3.00	2.75	4.00	3.70	5.30	4.50	8	4.00	3.70	1.74	1.50
8	1.25	4	5.00	4.70	5.50	5.20	6.80	6.00	10	5.50	5.20	2.28	2.00
10	1.5	5	6.00	5.70	7.00	6.64	8.30	7.50	12	7.00	6.64	2.82	2.50
12	1.75	6	8.00	7.64	8.50	8.14	9.80	9.00	16	8.50	8.14	3.35	3.00
16	2	8	10.00	9.64	12.00	11.57	12.80	12.00	20	12.00	11.57	4.40	4.00
20	2.5	10	14.00	13.57	15.00	14.57	15.80	15.00	25	15.00	14.57	5.45	5.00
24	3	12	16.00	15.57	18.00	17.57	18.80	18.00	30	18.00	17.57	6.49	6.00

For additional information refer to ANSI B18.3.6 M 1986 ISO 4029  
All dimensions in millimeters

## Torsional Strength Requirements For Socket Set Screws

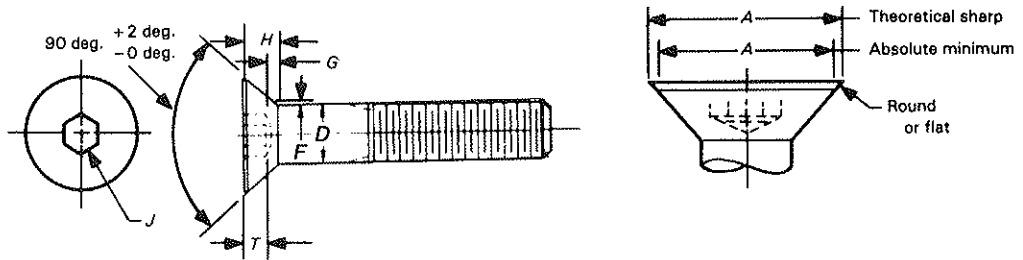
Nominal Screw Size	Shortest Nominal Screw Lengths Subject to Torque Testing For			Test Torque N-m
	Cup and Flat Points	Cone and Oval Points	Half Dog Points	
	Min			
1.6	3	3	3	00.1
2	4	4	4	00.2
2.5	4	4	4	00.6
3	4	5	5	01.0
4	5	6	6	02.1
5	5	8	8	04.7
6	6	8	8	07.7
8	8	10	10	17.8
10	10	12	12	35
12	12	16	16	57
16	16	20	20	126
20	25	25	25	252
24	25	30	30	420

Tightening torques are only recommended for proper applications. Refer to your engineering stats.



# Dimensions of Metric Countersunk Flat Socket Head Cap Screws

THREAD CLASS 4g 6g  
HARDNESS RC 38-43

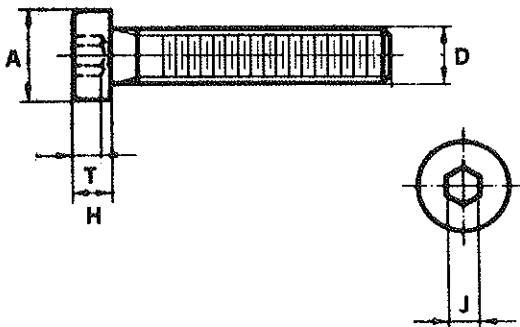


Nominal Size or Basic Screw Diameter	Thread Pitch	D		A		H		J	T	G	F				
		Body Diameter		Head Diameter		Head Height									
		Max.	Min.	Theoretical Sharp Max.	Absolute Min.	Reference	Flushness Tolerance					Hexagon Socket Size	Key Engagement	Socket Wall	Fillet Extension Above D
												Nom.	Min.	Min.	Max.
3	0.5	3.0	2.86	6.72	5.35	1.86	0.30	2.0	1.1	0.25	0.25				
4	0.7	4.0	3.82	8.96	7.80	2.48	0.30	2.5	1.5	0.45	0.35				
5	0.8	5.0	4.82	11.20	9.75	3.10	0.35	3.0	1.9	0.66	0.40				
6	1	6.0	5.82	13.44	11.70	3.72	0.35	4.0	2.2	0.70	0.50				
8	1.25	8.0	7.78	17.92	15.60	4.96	0.40	5.0	3.0	1.16	0.60				
10	1.5	10.0	9.78	22.40	19.50	6.20	0.50	6.0	3.6	1.62	0.80				
12	1.75	12.0	11.73	26.88	23.40	7.44	0.60	8.0	4.3	1.80	0.90				
14	2	14.0	13.73	30.24	26.18	8.12	0.70	10.0	4.7	1.62	1.00				
16	2	16.0	15.73	33.60	28.96	8.80	0.80	10.0	4.8	2.20	1.00				
20	2.5	20.0	19.67	40.32	34.60	10.16	1.00	12.0	5.6	2.20	1.20				

For additional information refer to ASME/ANSI B 18.3.5 M 1986 DIN 7991  
All dimensions in millimeters

# Dimensions of Metric Low-Head Socket Cap Screws

THREAD 4g 6g  
HARDNESS RC 33-39

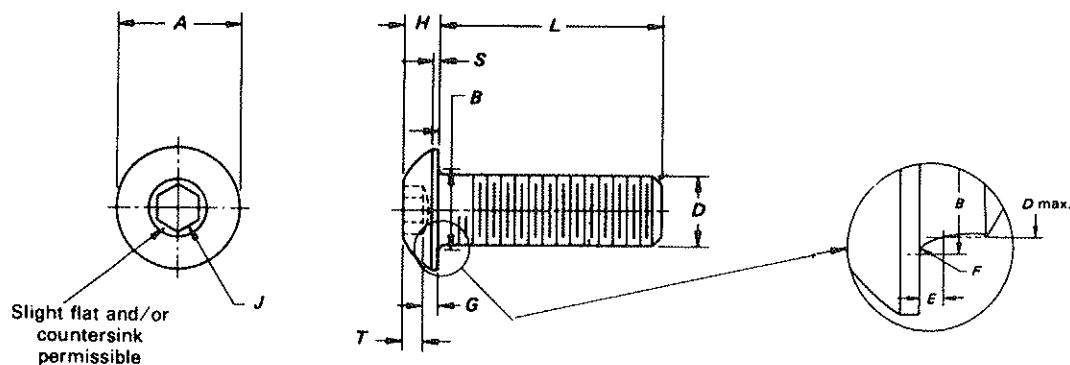


Nominal Size and Thread Pitch	D		A		H	J	T
	Body Diameter		Head Diameter				
	Max.	Min.	Max.	Min.			
M4x0.7	4.00	3.82	7.00	6.80	2.8	3.0	1.48
M5x0.7	5.00	4.82	8.50	8.27	3.5	4.0	1.85
M6x1.0	6.00	5.80	10.00	9.74	4.0	5.0	2.09
M8x1.25	8.00	7.78	13.00	12.70	5.0	6.0	2.48
M10x1.50	10.00	9.78	16.00	15.67	6.5	8.0	3.36

For additional information refer to DIN 7984

# Dimensions of Metric Button Socket Head Cap Screws

THREAD CLASS 4g 6g  
HARDNESS RC 38-43

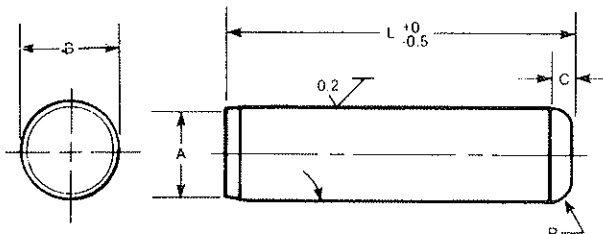


Nominal Size or Basic Screw Diameter	Thread Pitch	A		H		S	J	T	G	Under Head Fillet			Maximum Standard Length	
		Head Diameter		Head Height		Head Side Height	Hexagon Socket Size	Key Engagement	Wall Thickness	Transition Diameter		Transi-tion Length		Junc-ture Radius
		max.	min.	max.	min.	ref.	nom.	min.	min.	max.	min.	max.		min.
3	0.5	5.70	5.40	1.65	1.43	0.38	2	1.04	0.20	3.6	3.2	0.51	0.10	12
4	0.7	7.60	7.24	2.20	1.95	0.38	2.5	1.30	0.30	4.7	4.4	0.60	0.20	20
5	0.8	9.50	9.14	2.75	2.50	0.50	3	1.56	0.38	5.7	5.4	0.60	0.20	30
6	1	10.50	10.07	3.30	3.00	0.80	4	2.08	0.74	6.8	6.5	0.68	0.25	30
8	1.25	14.00	13.57	4.40	4.05	0.80	5	2.60	1.05	9.2	8.8	1.02	0.40	40
10	1.5	17.50	17.07	5.50	5.20	0.80	6	3.12	1.45	11.2	10.8	1.02	0.40	40
12	1.75	21.00	20.48	6.60	6.24	0.80	8	4.16	1.63	14.2	13.2	1.87	0.60	60
16	2	28.00	27.48	8.80	8.44	1.50	10	5.20	2.25	18.2	17.2	1.87	0.60	60

For additional information refer to ASME/ANSI B18.3.4M 1986 ISO 7380 DIN 9427

# Dimensions of Metric Dowel Pins

HARDNESS RC 60 SURFACE  
RC 50-58 CORE

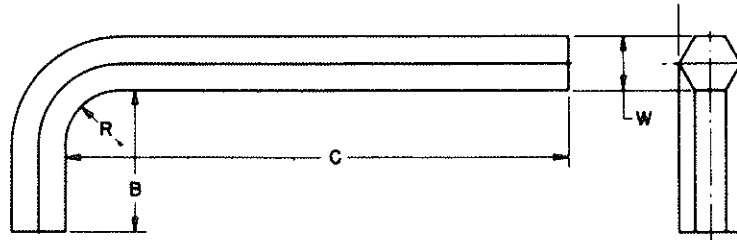


Nominal Size	DIMENSIONS				
	B		A		C
	Pin Diameter		Point Diameter		Crown Height
	Max.	Min.	Max.	Min.	Max.
3	3.008	3.003	2.9	2.6	0.8
4	4.008	4.003	3.9	3.6	0.9
5	5.008	5.003	4.9	4.6	1.0
6	6.009	6.003	5.8	5.4	1.1
8	8.009	8.003	7.8	7.4	1.3
10	10.009	10.003	9.8	9.4	1.4
12	12.009	12.003	11.8	11.4	1.6
16	16.009	16.003	15.8	15.3	1.8
20	20.009	20.003	19.8	19.3	2.0
25	25.009	25.003	24.8	24.3	2.3

For additional information refer to ASME/ANSI B18.8.5M ISO 8734 DIN 6325  
All dimensions in millimeters

# Dimensions of Metric Hexagon Keys

MATERIAL- HIGH GRADE ALLOY STEEL  
HARDNESS - 48RC < M10  
45RC ≥ M10



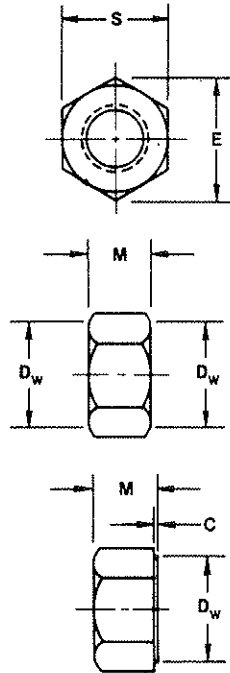
Nominal Key or Bit and Socket Size	W		Y		B		C				R
	Hexagon Width Across Flats		Hexagon Width Across Corners		Length of Short Arm		Length of Long Arm				
	Max	Min	Max	Min	Max	Min	Short Series		Long Series		
0.7	0.711	0.698	0.798	0.762	8	3	34	28	69	63	1.5
0.9	0.899	0.876	0.998	0.960	11	6	34	28	71	65	1.5
1.3	1.270	1.244	1.422	1.372	16	11	44	39	75	69	1.5
1.5	1.500	1.470	1.690	1.640	14	13	45	43	78	76	1.5
2	2.000	1.970	2.250	2.200	16	15	50	48	83	81	2.0
2.5	2.500	2.470	2.820	2.770	18	17	56	53	90	87	2.5
3	3.000	2.960	3.399	3.340	20	18	63	60	100	97	3.0
4	4.000	3.960	4.532	4.470	25	23	70	66	106	102	4.0
5	5.000	4.960	5.690	5.630	28	26	80	76	118	114	5.0
6	6.000	5.950	6.828	6.760	32	30	90	86	140	136	6.0
8	8.000	7.950	9.136	9.030	36	34	100	95	160	155	8.0
10	10.000	9.950	11.470	11.340	40	38	112	106	170	164	10.0
12	12.000	11.950	13.764	13.590	45	43	125	119	212	206	12.0
14	14.000	13.930	16.058	15.880	56	53	140	133	236	229	14.0
17	17.000	16.930	19.499	19.300	63	60	160	152	250	242	17.0
19	19.000	18.930	21.793	21.580	70	67	180	171	280	271	19.0
22	22.000	21.930	25.234	25.000	80	76	200	190	335	325	22.0
24	24.000	23.930	27.525	27.240	90	86	224	213	375	364	24.0
27	27.000	26.870	30.969	30.710	100	95	250	238	-	-	27.0
32	32.000	31.840	36.704	36.430	125	119	315	300	-	-	32.0
36	36.000	35.840	41.292	40.900	140	133	355	338	-	-	36.0

For additional information refer to ASME/ANSI B18.3.2M 1979 ISO 2936 DIN911  
All dimensions in millimeters

MECHANICAL PROPERTIES				
Key Size	Torsional Shear Strength Minimum		Torsional Yield Strength Minimum	
	N·m	In·lbs.	N·m	In·lbs.
A-F				
0.7	0.13	1.2	0.12	1.1
0.9	0.27	2.4	0.24	2.1
1.3	0.79	7.0	0.68	6.0
1.5	1.20	10.5	1.02	9.0
2.0	3.0	26.5	2.7	24.0
2.5	6.2	55	5.4	48
3.0	10.5	93	9.1	80
4.0	24.9	220	21.7	190
5.0	48.8	430	42.5	375
6.0	83.5	740	72.8	645
8.0	199	1,760	173	1,530
10.0	386	3,420	336	2,970
12.0	634	5,610	551	4,880
14.0	995	8,800	867	7,700
17.0	1710	15,100	1490	13,200
19.0	2380	21,000	2070	18,300

METRIC

# Dimensions of Metric Hexagon Nuts

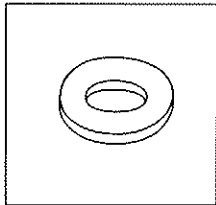


Nominal Nut Dia and Thread Pitch	S		E		M		D <sub>w</sub>	C		Total Runout of Bearing Surface FIM
	Width Across Flats		Width Across Corners		Thickness		Bearing Face Dia	Washer Face Thickness		
	Max	Min	Max	Min	Max	Min	Min	Max	Min	
M1.6 × 0.35	3.20	3.02	3.70	3.41	1.30	1.05	2.4	—	—	—
M2 × 0.4	4.00	3.82	4.62	4.32	1.60	1.35	3.1	—	—	—
M2.5 × 0.45	5.00	4.82	5.77	5.45	2.00	1.75	4.1	—	—	—
M3 × 0.5	5.50	5.32	6.35	6.01	2.40	2.15	4.6	—	—	—
M3.5 × 0.6	6.00	5.82	6.93	6.58	2.80	2.55	5.1	—	—	—
M4 × 0.7	7.00	6.78	8.08	7.66	3.20	2.90	5.9	—	—	—
M5 × 0.8	8.00	7.78	9.24	8.79	4.70	4.40	6.9	—	—	0.30
M6 × 1	10.00	9.78	11.55	11.05	5.20	4.90	8.9	—	—	0.33
M8 × 1.25	13.00	12.73	15.01	14.38	6.80	6.44	11.6	—	—	0.36
M10 × 1.5	16.00	15.73	18.48	17.77	8.40	8.04	14.6	—	—	0.39
M12 × 1.75	18.00	17.73	20.78	20.03	10.80	10.37	16.6	—	—	0.42
M14 × 2	21.00	20.67	24.25	23.35	12.80	12.10	19.6	—	—	0.45
M16 × 2	24.00	23.67	27.71	26.75	14.80	14.10	22.5	—	—	0.48
M20 × 2.5	30.00	29.16	34.64	32.95	18.00	16.90	27.7	0.8	0.4	0.56
M24 × 3	36.00	35.00	41.57	39.55	21.50	20.20	33.2	0.8	0.4	0.64
M30 × 3.5	46.00	45.00	53.12	50.85	25.60	24.30	42.7	0.8	0.4	0.76
M36 × 4	55.00	53.80	63.51	60.79	31.00	29.40	51.1	0.8	0.4	0.89

HARDNESS RC 26-36

For additional information refer to ANSI B18.2.4.1M 1979  
All dimensions in millimeters

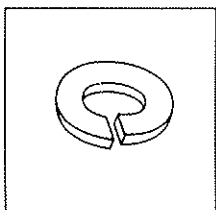
# Dimensions of Metric Hardened Washers



HARDNESS RC 38-45

NON. WASHER SIZE	INSIDE DIAMETER		OUTSIDE DIAMETER		THICKNESS	
	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
M-5	5.78	5.50	11.00	10.57	1.75	1.20
M-6	6.87	6.65	13.00	12.57	1.75	1.20
M-8	9.12	8.90	18.80	18.37	2.30	1.60
M-10	11.12	10.85	20.00	19.48	2.30	1.60
M-12	13.57	13.30	25.40	24.88	2.80	2.00
M-14	15.52	15.25	28.00	27.48	3.50	2.50
M-16	17.52	17.25	32.00	31.38	3.50	2.50
M-20	22.32	21.80	39.00	38.38	4.00	3.00
M-24	26.12	25.60	44.00	43.38	4.60	3.50

# Dimensions of Metric Lockwashers



HARDNESS RC 38-46

NOM. WASHER SIZE	INSIDE DIAMETER		OUTSIDE DIAMETER	THICKNESS
	MAX.	MIN.	MAX.	MIN.
M-5	5.25	5.05	9.33	1.20
M-6	6.25	6.05	11.45	1.50
M-8	8.25	8.05	14.47	1.91
M-10	10.25	10.05	17.53	2.06
M-12	12.30	12.05	21.13	2.36
M-14	14.70	14.22	24.10	2.80
M-16	16.38	16.08	28.52	3.30
M-20	20.38	20.08	34.50	3.81
M-24	24.38	24.08	41.96	4.80

# Suggested Tightening Torques For **Alloy** 1960 Inch Series Socket Head Cap Screws

NOMINAL SIZE	BASIC SCREW DIAMETER INCHES	TORQUE TO TIGHTEN SCREWS TO YIELD (In-lb)		TIGHTENING TORQUE* (In-lb)	
		UNRC	UNRF	UNRC	UNRF
0	0.0600	—	3.5	—	2.6
1	0.0730	6	6.5	4.5	4.8
2	0.0860	10	11	7.5	8
3	0.0990	15	16	11	12
4	0.1120	22	24	16	18
5	0.1250	32	33	24	24
6	0.1380	40	45	30	34
8	0.1640	74	78	55	58
10	0.1900	105	120	79	90
		(ft-lb)		(ft-lb)	
1/4	0.2500	22	25	17	19
5/16	0.3125	46	51	35	38
3/8	0.3750	83	93	62	70
7/16	0.4375	132	146	100	109
1/2	0.5000	203	230	150	172
5/8	0.6250	380	430	283	317
3/4	0.7500	667	750	500	562
7/8	0.8750	917	1020	688	767
1	1.0000	1390	1520	1040	1080
1-1/4	1.2500	2780	3080	2080	2310
1-1/2	1.5000	4850	5450	3625	4080

Nominal Sizes	Tensile Strength P.S.I. Min.	Yield Strength P.S.I. Min.	Elongation* In 2 Inches Per Cent Min.	Reduction of Area* Per Cent Min.	Minimum Hardness Rockwell C
0 to 1/2	180,000	162,000	12	35	39
Over 1/2	170,000	153,000	14	40	38

\* Listed tightening torques are 75 percent of the torque to yield based on ASTM574. Specification listing tensile strength of 180,000 PSI for screw size 0.500 and smaller and 170,000 PSI for screw size 0.625 and larger. Values based on plated and non-lubricated fasteners.

Tightening torques are only recommended for proper applications. Refer to your engineering stats.

# Suggested Tightening Torques For Other **Alloy** Socket Screw Products (INCH-POUND)

Nom. size	Basic Screw Diameter	Button Head Flat Head Hex Key Size	Flat Head		Button Head		Nominal Size	Hex Key Size	Shoulder Screw	Low Head
			Tightening Torque	Tightening Torque	Tightening Torque	Tightening Torque				
0	.060	.035	—	1.5	—	1.5	—	—	—	—
1	.073	.050	2.5	2.5	2.5	2.5	—	—	—	—
2	.086	.050	4.5	4.5	4.5	4.5	—	—	—	—
3	.099	1/16	7	7	7	7	—	—	—	—
4	.112	1/16	8	8	8	9	4	.050	—	5.0
5	.125	5/64	12	13	12	12	5	.062	—	9.5
6	.138	5/64	15	17	16	16	6	.062	—	9.5
8	.164	3/32	30	31	30	30	8	5/64	—	19.4
10	.190	1/8	40	45	40	45	10	3/32	—	33.5
1/4	.250	5/32	100	110	100	110	1/4	1/8	50	77.9
5/16	.312	3/16	200	220	200	220	5/16	5/32	125	156.0
3/8	.375	7/32	350	400	350	400	3/8	3/16	265	273.0
7/16	.437	1/4	560	625	—	—	7/16	7/32	—	428.0
1/2	.500	5/16	850	1,000	850	1,000	1/2	1/4	470	615.0
9/16	.562	5/16	1,200	1,360	—	—	—	—	—	—
5/8	.625	3/8	1,700	1,900	1,700	1,800	5/8	5/16	1,150	1,315.0
3/4	.750	1/2	3,000	3,200	—	—	3/4	3/8	2,000	—
7/8	.875	9/16	5,000	5,400	—	—	—	—	—	—
1	1.000	5/8	8,000	7,600	—	—	1	1/2	4,000	—

\* Listed tightening torques are 75 percent of the torque to yield based on ASTM574. Specification listing tensile strength of 180,000 PSI for screw size 0.500 and smaller and 170,000 PSI for screw size 0.625 and larger. Values based on plated and non-lubricated fasteners.

Tightening torques are only recommended for proper applications. Refer to your engineering stats.



# Suggested Tightening Torques For Other Socket Screw Metals

Size	18-8 Stainless Steel	Brass	Silicon Bronze	Aluminum 2024-T4	316 Stainless Steel	NiCu	Nylon
VALUE IN INCH - POUNDS							
2-56	2.5	2.0	2.3	1.4	2.6	2.5	0.44
2-64	3.0	2.5	2.8	1.7	3.2	3.1	
3-48	3.0	3.2	3.6	2.1	4.0	4.0	
3-56	4.4	3.6	4.1	2.4	4.6	4.5	
4-40	5.2	4.3	4.8	2.9	5.5	5.3	1.99
4-48	6.6	5.4	6.1	3.6	6.9	6.7	
5-40	7.7	6.3	7.1	4.2	8.1	7.8	
5-44	9.4	7.7	8.7	5.1	9.8	9.8	
6-32	9.6	7.9	8.9	5.3	10.1	9.8	2.14
6-40	12.1	9.9	11.2	6.6	12.7	12.3	4.3
8-32	22.0	18.0	20.4	12.0	23.0	20.2	
8-36	22.0	18.0	20.4	12.0	23.0	22.4	
10-24	22.8	18.6	21.2	13.8	23.8	25.9	6.61
10-32	31.7	25.9	29.3	19.2	33.1	34.9	8.2
1/4"-20	75.2	61.5	68.8	45.6	78.8	85.3	16.0
1/4"-28	94.0	77.0	87.0	57.0	99.0	106.0	20.8
5/16"-18	122	107	123	80	138	149	34.9
5/16"-24	142	116	131	86	147	160	
3/8"-16	236	192	219	143	247	266	
3/8"-24	259	212	240	157	271	294	
7/16"-14	376	317	349	228	393	427	
7/16"-20	400	327	371	242	418	451	
1/2"-13	517	422	480	313	542	584	
1/2"-20	541	443	502	328	565	613	
9/16"-12	682	558	632	413	713	774	
9/16"-18	752	615	697	456	787	855	
5/8"-11	1110	907	1030	715	1160	1330	
5/8"-18	1244	1060	1154	798	1301	1482	
3/4"-10	1490	1220	1382	958	1558	1790	
3/4"-16	1530	1249	1416	980	1582	1832	
7/8"-9	2318	1895	2130	1490	2420	2755	
7/8"-14	2328	1905	2140	1495	2430	2775	
1"-8	3110	2545	2885	1995	3250	3730	
1"-14	3440	2815	3185	2205	3595	4130	

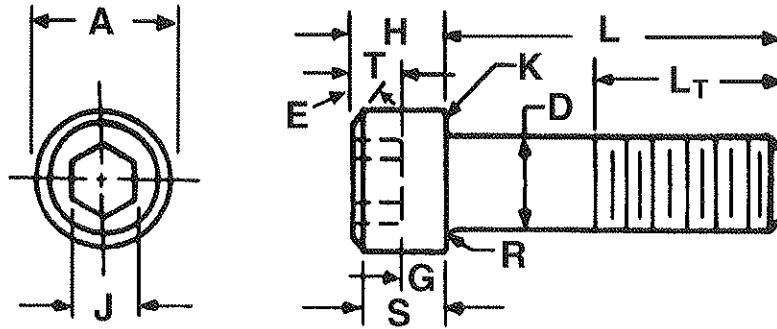
Tightening torques are only recommended for proper applications. Refer to your engineering stats.

## METRIC KEY APPLICATION CHART

Size A/F	Socket Cap Screws		Flat Head	Button	Shoulder Screws	Socket Set Screws
	Std. Head Height	Low Head				
0.7						M1.6
0.9						M2
1.3						M2.5
1.5	M1.6/M2					M3
2.0	M.25		M3	M3		M4
2.5	M3		M4	M4		M5
3.0	M4	M4	M5	M5	M6	M6
4.0	M5	M5	M6	M6	M8	M8
5.0	M6	M6	M8	M8	M10	M10
6.0	M8	M8	M10	M10	M12	M12
8.0	M10	M10	M12	M12	M16	M16
10.0	M12	M12	M16	M16	M20	M20
12.0	M14	M16	M20		M24	M24
14.0	M16	M20	M24			
17.0	M20	M24				
19.0	M24					
22.0	M30					
27.0	M36					
32.0	M42					
36.0	M48					

# Comparison Chart

## 1960 and 1936 Series Socket Head Cap Screw



Size Nom.	D Body Diam		1960 A Head Diam. 1960 Series		1936 A Head Diam. 1936 Series		H Head Height		S Head Side Hgt.	1960 J Sock. 1960 Series	1936 J Sock. 1936 Series	T Key Eng.	G Wall Thkns	R Radius		K Chamf. or Radius	LT Basic Thrd. Lght 1960 Series
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.	Nom.	Nom.	Min.	Min.	Max.	Min.	Max.	Min.
0	.060	.0568	.096	.091	.0960	.0926	.060	.057	.054	.050	.050	.025	.019	.007	.003	.003	.500
1	.073	.0695	.118	.112	.118	.1142	.073	.070	.066	1/16	.050	.031	.023	.007	.003	.003	.625
2	.086	.0822	.140	.134	.140	.136	.086	.083	.077	5/64	1/46	.038	.028	.008	.004	.003	.625
3	.099	.0949	.161	.154	.161	.157	.099	.095	.089	5/64	5/64	.044	.032	.008	.004	.003	.625
4	.112	.1075	.183	.176	.183	.178	.112	.108	.101	3/32	5/64	.051	.036	.009	.005	.005	.750
5	.125	.1202	.205	.198	.205	.200	.125	.121	.112	3/32	3/32	.057	.040	.010	.006	.005	.750
6	.138	.1329	.226	.218	.226	.221	.138	.134	.124	7/64	3/32	.064	.044	.010	.006	.005	.750
8	.164	.1585	.270	.262	.270	.265	.164	.159	.148	9/64	1/8	.077	.052	.012	.007	.005	.875
10	.190	.1840	5/16	.303	5/16	.306	.190	.185	.171	5/32	5/32	.090	.016	.014	.009	.005	.875
1/4	.250	.2435	3/8	.365	3/8	.367	1/4	.233	.225	3/16	3/16	.120	.080	.014	.009	.008	1.000
5/16	.3125	.3053	15/32	.457	7/16	.429	5/16	.306	.281	1/4	7/32	.151	.100	.017	.012	.008	1.125
3/8	.375	.3678	9/16	.550	9/16	.553	3/8	.368	.337	5/16	5/16	.182	.120	.020	.015	.008	1.250
7/16	.4375	.4294	21/32	.642	5/8	.615	7/16	.430	.394	3/8	5/16	.213	.140	.023	.018	.010	1.375
1/2	.500	.4919	3/4	.735	3/4	.739	1/2	.492	.450	3/8	3/8	.245	.160	.026	.020	.010	1.500
5/8	.625	.6163	15/16	.921	7/8	.863	5/8	.616	.562	1/2	1/2	.307	.200	.032	.024	.010	1.750
3/4	.750	.7406	1-1/8	1.107	1.000	.987	3/4	.740	.675	5/8	9/16	.370	.240	.039	.030	.010	2.000
7/8	.875	.8647	15/16	1.293	1-1/8	1.111	7/8	.864	.787	3/4	9/16	.432	.280	.044	.034	.015	2.250
1	1.000	.9886	1-1/2	1.479	1-5/16	1.297	1.000	.988	.900	3/4	5/8	.495	.320	.050	.040	.015	2.500

BOXED AREA SHOWS DIMENSIONAL CHANGES.

Specifications per BS2470

# Inches into Millimeters

Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters
1/64	0.3969	13/16	20.6375	27/32	56.3564	37/64	96.8397	51/32	137.319
1/32	0.7937	5/16	21.0344	2 1/4	57.1501	37/32	97.6314	5 1/6	138.113
3/64	1.1906	27/32	21.4312	27/32	57.9439	37/8	98.4252	5 15/32	138.907
1/16	1.5875	5/8	21.8281	2 1/8	58.7376	329/32	99.2189	5 1/2	139.700
5/64	1.9844	3/8	22.2250	2 1/32	59.5314	3 15/64	100.013	5 17/32	140.494
3/32	2.3812	5/16	22.6219	2 1/8	60.3251	3 31/32	100.806	5 1/6	141.288
7/64	2.7781	29/32	23.0187	2 13/32	61.1189	4	101.600	5 13/32	142.082
1/8	3.1750	59/64	23.4156	2 1/4	61.9126	4 1/32	102.394	5 5/8	142.875
9/64	3.5719	1 1/16	23.8125	2 5/32	62.7064	4 1/6	103.188	5 21/32	143.699
5/32	3.9687	61/64	24.2094	2 1/2	63.5001	4 3/32	103.981	5 11/16	144.463
11/64	4.3656	31/32	24.6062	2 17/32	64.2939	4 1/8	104.775	5 23/32	145.257
3/16	4.7625	63/64	25.0031	2 1/8	65.0876	4 5/32	105.569	5 3/4	146.050
13/64	5.1594	1	25.4001	2 19/32	65.8814	4 3/6	106.363	5 25/32	146.844
7/32	5.5562	1 1/32	26.1938	2 5/8	66.6751	4 7/32	107.156	5 13/6	147.638
15/64	5.9531	1 1/16	26.9876	2 11/32	67.4689	4 1/4	107.950	5 27/32	148.432
1/4	6.3500	1 3/32	27.7813	2 1 1/16	68.2626	4 3/32	108.744	5 7/8	149.225
17/64	6.7469	1 1/8	28.5751	2 23/32	69.0564	5 1/6	109.538	5 29/32	150.019
9/32	7.1437	1 1/32	29.3688	2 3/4	69.8501	4 1 1/32	110.331	5 1/6	150.813
19/64	7.5406	1 3/16	30.1626	2 25/32	70.6439	4 1/8	111.125	5 31/32	151.607
5/16	7.9375	1 7/32	30.9563	2 1 1/16	71.4376	4 1 3/32	111.919	6	152.400
21/64	8.3344	1 1/4	31.7501	2 27/32	72.2314	4 1/6	112.713	6 1/6	153.988
1 1/32	8.7312	1 1/2	32.5438	2 7/8	73.0251	4 1 3/32	113.506	6 1/8	155.575
23/64	9.1281	1 3/8	33.3376	2 29/32	73.8189	4 1/2	114.300	6 3/6	157.163
3/8	9.5250	1 11/32	34.1313	2 1 1/16	74.6126	4 1 7/32	115.094	6 1/4	158.750
25/64	9.9219	1 3/8	34.9251	2 31/32	75.4064	4 1/6	115.888	6 3/6	160.338
13/32	10.3187	1 13/32	35.7188	3	76.2002	4 1 1/32	116.681	6 3/8	161.925
27/64	10.7156	1 1/6	36.5126	3 1/32	76.9939	4 1/8	117.475	6 3/6	163.513
7/16	11.1125	1 15/32	37.3063	3 1/16	77.7877	4 21/32	118.269	6 1/2	165.100
29/64	11.5094	1 1/2	38.1001	3 3/32	78.5814	4 1 1/16	119.063	6 3/6	166.688
15/32	11.9062	1 17/32	38.8938	3 1/8	79.3752	4 23/32	119.856	6 5/8	168.275
31/64	12.3031	1 1/8	39.6876	3 3/32	80.1689	4 3/4	120.650	6 1 1/6	169.863
1/2	12.7000	1 9/32	40.4813	3 5/16	80.9627	4 25/32	121.444	6 3/4	171.450
33/64	13.0969	1 5/8	41.2751	3 3/8	81.7564	4 1 3/16	122.238	6 3 3/6	173.038
17/32	13.4937	1 21/32	42.0688	3 1/4	82.5502	4 27/32	123.031	6 7/8	174.625
35/64	13.8906	1 11/16	42.8626	3 3/32	83.3439	4 7/8	123.825	6 15/6	176.213
9 1/64	14.2875	1 23/32	43.6563	3 5/16	84.1377	4 29/32	124.619	7	177.800
37/64	14.6844	1 3/4	44.4501	3 11/32	84.9314	4 1 1/6	125.413	7 1/6	179.388
19/32	15.0812	1 25/32	45.2438	3 3/8	85.7252	4 31/32	126.206	7 1/8	180.975
39/64	15.4781	1 13/16	46.0376	3 13/32	86.5189	5	127.000	7 3/6	182.563
5/8	15.8750	1 27/32	46.8313	3 7/16	87.3127	5 1/32	127.794	7 1/4	184.150
41/64	16.2719	1 7/8	47.6251	3 15/32	88.1064	5 1/6	128.588	7 3/6	185.738
21/32	16.6687	1 29/32	48.4188	3 1/2	88.9002	5 3/32	129.382	7 5/8	187.325
43/64	17.0656	1 15/16	49.2126	3 17/32	89.6939	5 1/8	130.175	7 7/6	188.913
1 1/16	17.4625	1 31/32	50.0063	3 3/6	90.4877	5 3/32	130.969	7 1/2	190.500
45/64	17.8594	2	50.8001	3 19/32	91.2814	5 1/6	131.763	7 3/6	192.088
23/32	18.2562	2 1/32	51.5939	3 5/8	92.0752	5 3/32	132.557	7 5/8	193.675
47/64	18.6531	2 1/16	52.3876	3 21/32	92.8689	5 1/4	133.350	7 1 1/6	195.263
3/4	19.0500	2 3/32	53.1814	3 1 1/16	93.6627	5 3/32	134.144	7 3/4	196.850
49/64	19.4469	2 1/8	53.9751	3 23/32	94.4564	5 5/6	134.938	7 5/6	198.438
25/32	19.8437	2 3/32	54.7688	3 3/4	95.2502	5 1 1/32	135.732	7 7/8	200.025
51/64	20.2406	2 1/6	55.5626	3 25/32	96.0439	5 1/8	136.525	8	203.200

# Thread Size Comparison

METRIC PRODUCTS					UNIFIED INCH PRODUCTS				B.S. INCH PRODUCTS				
Size	Major Dia.		Thread Pitch mm	T.P.I.	Size	T.P.I.		Major Dia. Inch	Size	T.P.I.		Major Dia. Inch	T.P.I. BA
	mm	Inch				UNC	UNF			BSW	BSF		
<b>M1.6</b>	1.60	.063	.35	79	<b>#0</b>	–	80	.060					
<b>M2.0</b>	2.00	.079	.4	64	<b>#1</b>	–	72	.073					
<b>M2.5</b>	2.50	.098	.45	56	<b>#2</b>	56	64	.086	<b>8BA</b>			.087	59.1
					<b>#3</b>	48	56	.099					
<b>M3</b>	3.00	.118	.5	51	<b>#4</b>	40	48	.112	<b>6BA</b>	40		.110	47.9
					<b>#5</b>	40	44	.125					
					<b>#6</b>	32	36	.164	<b>5BA</b>			.126	43.1
												<b>4BA</b>	
<b>M4</b>	4.00	.157	.7	36	<b>#8</b>	32	36	.164	<b>3BA</b>			.161	34.8
<b>M5</b>	5.00	.197	.8	32	<b>#10</b>	24	32	.190	<b>3/16</b>	24	32	.187	
									<b>2BA</b>			.185	31.3
									<b>1BA</b>			.209	28.2
<b>M6</b>	6.00	.236	1.0	25	<b>1/4</b>	20	28	.250	<b>1/4</b>	20	26	.250	
									<b>OBA</b>			.236	25.4
<b>M8</b>	8.00	.315	1.25	20	<b>5/16</b>	18	24	.313	<b>5/16</b>	18	22	.313	
<b>M10</b>	10.00	.394	1.5	17	<b>3/8</b>	16	24	.375	<b>3/8</b>	16	20	.375	
<b>M12</b>	12.00	.472	1.75	14.5	<b>7/16</b>	14	20	.438	<b>7/16</b>	14	18	.438	
					<b>1/2</b>	13	20	.500	<b>1/2</b>	12	16	.500	
<b>M14</b>	14.00	.551	2.0	12.5	<b>5/8</b>	11	18	.625	<b>5/8</b>	11	14	.625	
<b>M16</b>	16.00	.630	2.0	12.5									
<b>M20</b>	20.00	.78	2.5	10	<b>3/4</b>	10	16	.750	<b>3/4</b>	10	12	.750	
					<b>7/8</b>	9	14	.875	<b>7/8</b>	9	11	.875	
<b>M24</b>	24.00	9.45	3.0	8.5	<b>1</b>	8	14	1.000	<b>1</b>	8	10	1.000	
					<b>1-1/8</b>	7	12	1.125	<b>1-1/8</b>	7	9	1.125	
<b>M30</b>	30.00	1.181	3.5	7.3	<b>1-1/4</b>	7	12	1-1/4	<b>1-1/4</b>	7	9	1.250	
<b>M36</b>	36.00	1.417	4.0	6.4	<b>1-1/2</b>	6	12	1.500	<b>1-1/2</b>	6	8	1.500	
<b>M42</b>	42.00	1.654	4.5	5.6									

# SI Units Applicable To Metric Mechanical Fasteners

Quantity	Unit	Symbol	Conversions From Customary Units			Approximate Equivalencies Between SI and U.S. Customary Units
			To Convert From	To	Multiply By	
length	meter	m	inch	mm	2.540000* E + 01	25 mm = 1 in. 300 mm = 1 ft 25 μm = .001 in.
	millimeter	mm	foot	mm	3.048000* E + 02	
	micrometer	μm	foot	m	3.048000* E - 01	
mass	kilogram	kg	ounce	g	2.834952 E + 01	28 g = 1 oz 1 kg = 35 oz 1 kg = 2.2 lbs 1 Mg = 2200 lbs
	gram	g	pound	kg	4.535924 E - 01	
	megagram	Mg	ton (2000 lb)	kg	9.071847 E + 02	
			ton (2000 lb)	Mg	9.071847 E - 01	
density	kilogram per cubic meter	kg/m <sup>3</sup>	pounds per cubic foot	kg/m <sup>3</sup>	1.601846 E + 01	16 kg/m <sup>3</sup> = 1 lb/ft <sup>3</sup>
temperature	degree Celsius	°C	degrees Fahrenheit	°C	°C = 5/9 (°F - 32)*	0°C = 32°F (exact) 20°C = 68°F (exact) 100°C = 212°F (exact) 480°C = 900°F
area	square millimeter	mm <sup>2</sup>	square inch	mm <sup>2</sup>	6.451600* E + 02	645 mm <sup>2</sup> = 1 in. <sup>2</sup> 1 m <sup>2</sup> = 11 ft <sup>2</sup>
	square meter	m <sup>2</sup>	square foot	m <sup>2</sup>	9.290304* E - 02	
volume	cubic meter cubic millimeter	m <sup>3</sup> mm <sup>3</sup>	cubic inch	mm <sup>3</sup>	1.638706 E + 04	16400 mm <sup>3</sup> = 1 in. <sup>3</sup> 1 m <sup>3</sup> = 35 ft <sup>3</sup> 1 m <sup>3</sup> = 1.3 yd <sup>3</sup>
			cubic foot	m <sup>3</sup>	2.831685 E - 02	
			cubic yard	m <sup>3</sup>	7.645549 E - 01	
force	newton kilonewton meganewton	N kN MN	ounce-force	N	2.780139 E - 01	1 N = 3.6 oz 4.4 N = 1 lbf 1 kN = 225 lbf 1MN = 225 kips
			pound-force	N	4.448222 E + 00	
			pound-force	kN	4.448222 E - 03	
			kip (1000-lbf)	kN	4.448222 E + 00	
			kip	MN	4.448222 E - 03	
stress	megapascal	MPa	pound-force/inch <sup>2</sup> (psi)	MPa	6.894757 E - 03	1MPa = 145 psi 7 MPa = 1000 psi 7 MPa = 1 ksi
			kips/inch <sup>2</sup> (ksl)	MPa	6.894757 E + 00	
torque	newton-meter	N·m	inch ounce	N·m	7.061552 E - 03	1 N·m = 140 in. oz 1 N·m = 9 in. lb 1.4 N·m = 1 ft. lb 1 N·m = .75 ft. lb
			inch pound	N·m	1.129848 E - 01	
			foot pound	N·m	1.355818 E + 00	

**WARNING:** The data in this book should only be used as a reference guide. The proper torque can only be determined by analyzing the design parameters which include temperature, plating, lubrication, etc. Short time tensile, creep and stress relaxation should be considered for applications where the temperature exceeds 400° (204°C). Lower ductility, impact strength and fatigue life must be considered for screws subject to temperatures below -20°F (-29°C). All socket screw products are Class 3A Fit except sizes 1 - 1/4" and larger which are Class 2A Fit.

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014 316 Stainless  
015 Alloy Nylon Patch  
271 Alloy Nylon Pellet  
016 Stainless Nylon Pellet  
017 Silicon-Bronze  
018 Monel  
019 Lo-Head Alloy  
307 936 Alloy  
532 Metric Alloy  
538 Metric Stainless  
581 Semi-Standard Stainless  
813 Alloy (BSW)  
820 Alloy (BA)  
837 Alloy Zinc Plated

## SOCKET SET SCREWS

101 Alloy Cup Pl.  
102 Stainless Cup Pl.  
104 316 Stainless Cup Pt.  
105 Alloy Cup Pt Nylon Patch  
281 Alloy Cup Pt. Nylon Pellet  
106 Stainless Cup Pt. Nylon Patch  
107 Brass Cup Pl.  
108 Monel Cup Pl.  
111 Alloy Knurled Pl.  
121 Alloy Cone Pl.  
125 Alloy Cone Pl. Nylon Patch  
131 Alloy Oval Pt.  
135 Alloy Oval Pt. Nylon Patch  
141 Alloy 1/2 Dog Pt.  
145 Alloy 1/2 Dog Pt. Nylon Patch  
151 Alloy Flat Pl.  
155 Alloy Flat Pt. Nylon Patch  
533 Alloy Metric Cup Pt.  
539 Stainless Metric Cup Pt.  
601 Semi-Standard Alloy Cup pt.  
602 Semi-Standard Stainless Cup Pt.  
603 Semi-Standard Alloy Cone Pl.  
605 Semi-Standard Alloy Oval Pt.  
606 Semi-Standard Alloy 1/2 Dog Pt.  
607 Semi-Standard Alloy Full Dog Pt.

## SOCKET SET SCREWS

703 Semi-Standard Stainless Flat Pt.  
704 Semi-Standard Stainless Cone Pt.  
705 Semi-Standard Stainless Oval Pt.  
706 Semi-Standard Stainless 1/2 Dog Pt.  
707 Semi-Standard Stainless Full Dog Pt.  
816 Alloy Jam Screw  
821 Metric Knurl Pt.  
831 Alloy Metric Cone Pt.  
832 Alloy Metric Flat Pt.  
833 Alloy Metric Dog Pt.  
838 Alloy Zinc Plated Cup Pt.

## BUTTON SOCKET CAP SCREWS

201 Alloy  
202 Stainless  
205 Alloy Nylon Patch  
291 Alloy Nylon Pellet  
535 Alloy Metric  
701 Semi-Standard Alloy  
702 Semi-Standard Stainless  
817 Alloy (BSW)  
819 Alloy (BA)  
824 Stainless Metric  
839 Alloy Zinc Plated

## FLAT SOCKET CAP SCREW

211 Alloy  
212 Stainless  
215 Alloy Nylon Patch  
293 Alloy Nylon Pellet  
534 Alloy Metric  
712 Semi-Standard Stainless  
721 Semi-Standard Alloy  
814 Alloy (BSW)  
818 Alloy (BA)  
823 Stainless Metric  
840 Alloy Zinc Plated

## SHOULDER (STRIPPER) BOLTS

221 Alloy  
225 Alloy Nylon Patch  
295 Alloy Nylon Pellet  
537 Alloy Metric  
710 Semi-Standard Stainless  
711 Semi-Standard Alloy

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230 Brass  
231 Alloy Dry Seal (3/4")  
232 Stainless Dry Seal (3/4")  
233 Alloy Flush Seal (7/8")  
822 Alloy (BSPT)

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241 Alloy  
242 Stainless  
251 Alloy Oversize  
261 Pull Out Alloy  
536 Alloy Metric

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305 Nylon Insert  
306 Grade 8 Hex (Zinc-Yel) & Unplated  
308 Grade 8 Black  
310 Nylon-Insert Stainless  
315 Metric Class 10 Hex (Zinc-Blue)  
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812 Metric Nylon Insert Locknut (Z&B)  
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828 Grade 8 Locknut PHOS/Oil  
834 Metric Stainless Hex Nuts

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371 Grade 8 Metric Flat (Zinc-Blue)  
381 Grade 8 "SAE" Flat (Zinc-Yel)  
448 L9@ Tension Washer  
835 Metric Stainless Flatwasher  
836 Metric Stainless Lockwasher

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407 Brass Cup Pl.  
408 Stainless Cup Pt.  
409 Steel Cup Pt.  
410 Steel Dog Pt.  
411 Larger-Longer  
412 Fine Thread  
413 Steel Flat Pt.  
414 Steel Cone Pt.  
415 Steel Oval Pt.  
805 Alloy Cup Pt.

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410 L9@ Cap Screw Alloy  
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451 Giant Black Grade 8 Alloy  
460 Metric Grade 10.9 (Zinc-Blue) Alloy  
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528 Metric Long Arm  
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529 Metric Assortments  
529 T-Handle Assortments  
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801 Steel  
803 Stainless

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807 Button Socket Cap Stainless  
808 Flat Socket Cap Alloy  
809 Flat Socket Cap Stainless  
810 Socket Head Cap Alloy  
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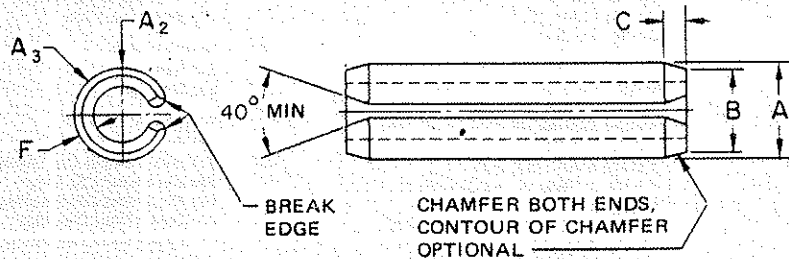
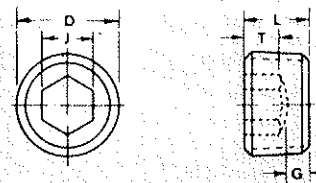
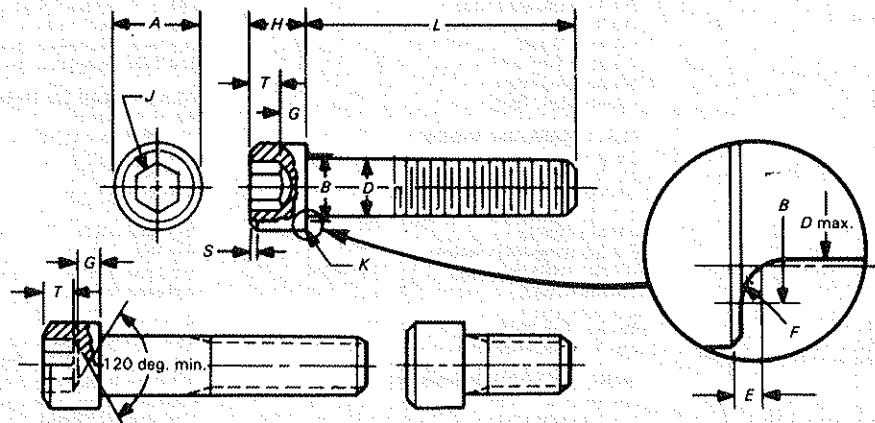
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