



Torque-Tension Relationship for ASTM A574 Socket Head Cap Screws

Nominal Dia (in.)	Unified Coarse Thread Series						Fine Thread Series					
	threads per inch	Tensile Stress Area (sq. in.)	Clamp Load (lbs)	Tightening Torque			threads per inch	Tensile Stress Area (sq. in.)	Clamp Load (lbs)	Tightening Torque		
				K = 0.15 (ft-lbs)	K = 0.16 (ft-lbs)	K = 0.20 (ft-lbs)				K = 0.15 (ft-lbs)	K = 0.16 (ft-lbs)	K = 0.20 (ft-lbs)
1/4	20	0.0318	3341	10	11	14	28	0.0364	3819	12	13	16
5/16	18	0.0524	5505	22	23	29	24	0.0581	6097	24	25	32
3/8	16	0.0775	8136	38	41	51	24	0.0878	9222	43	46	58
7/16	14	0.1063	11162	61	65	81	20	0.1187	12465	68	73	91
1/2	13	0.1419	14899	93	99	124	20	0.1600	16795	105	112	140
5/8	11	0.2260	22883	179	191	238	18	0.2560	25916	202	216	270
3/4	10	0.3345	33864	317	339	423	16	0.3730	37762	354	378	472
7/8	9	0.4617	46751	511	545	682	14	0.5095	51584	564	602	752
1	8	0.6057	61332	767	818	1022	14	0.6799	68839	860	918	1147
1 1/8	7	0.7633	77282	1087	1159	1449						
1 1/4	7	0.9691	98123	1533	1635	2044	12	1.0729	108636	1697	1811	2263
1 3/8	6	1.1549	116932	2010	2144	2680	12	1.3147	133115	2288	2440	3051
1 1/2	6	1.4053	142282	2668	2846	3557	12	1.5810	160079	3001	3202	4002
1 3/4	5	1.8995	192320	4207	4487	5609						
2	4.5	2.4982	252945	6324	6745	8432						

Clamp load calculated as 75% of the proof load for socket head cap screws as specified in ASTM A574.

Torque values calculated from formula $T=KDF$, where

K = 0.15 for "lubricated" conditions, K = 0.16 "as-received" and K = 0.20 for "dry" conditions

D = Nominal Diameter

F = Clamp Load

Caution: All material included in this chart is advisory only, and its use by anyone is voluntary. In developing this information, Fastenal has made a determined effort to present its contents accurately. Extreme caution should be used when using a formula for torque/tension relationships. Torque is only an indirect indication of tension. Under/over tightening of fasteners can result in costly equipment failure or personal injury.