FASTENAL®

Torque-Tension Relationship for ASTM A193/A193M B7 & A320/A320M L7 Bolts and Studs

Clamp Load Specified per API 17D (70% of yield)

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.

Nom Dia. (in)	Threads per Inch	Clamp Load (lbs)	Tightening Torque			Threads per Inch	Clamp Load (lbs)	Tightening Torque		
			K = 0.12 Typical Xylan or other PTFE	K = 0.15 Typical Plain with Anti-Seize	K = 0.20 Typical Plain & Dry			K = 0.12 Typical Xylan or other PTFE	K = 0.15 Typical Plain with Anti-Seize	K = 0.20 Typical Plain & Dry
Coarse Thread Series						**Fine Thread Series**				
1/4	20	2339	70 in-lbs	88 in-lbs	117 in-lbs	28	2673	80 in-lbs	100 in-lbs	134 in-lbs
5/16	18	3854	145	181	241	24	4268	160	200	267
3/8	16	5695	21 ft-lbs	27 ft-lbs	36 ft-lbs	24	6455	24 ft-lbs	30 ft-lbs	40 ft-lbs
7/16	14	7814	34	43	57	20	8726	38	48	64
1/2	13	10430	52	65	87	20	11757	59	73	98
9/16	12	13373	75	94	125	18	14919	84	105	140
5/8	11	16611	104	130	173	18	18813	118	147	196
3/4	10	24583	184	230	307	16	27413	206	257	343
7/8	9	33937	297	371	495	14	37446	328	410	546
1	8	44522	445	557	742	14	49972	500	625	833
1 1/4	7	71230	890	1113	1484	12	78861	986	1232	1643
1 3/8	6	84884	1167	1459	1945	12	96631	1329	1661	2214
1 1/2	6	103286	1549	1937	2582	12	116205	1743	2179	2905
UN8 Thread Series										
1 1/4	8	73478	918	1148	1531					
1 3/8	8	90662	1247	1558	2078					
1 1/2	8	109650	1645	2056	2741					
1 5/8	8	130442	2120	2650	3533					
1 3/4	8	153038	2678	3348	4464					
1 7/8	8	177438	3327	4159	5545					
2	8	203642	4073	5091	6788					
2 1/4	8	261462	5883	7354	9805					
2 1/2	8	326497	8162	10203	13604					

The torque values can only be achieved if nut (or tapped hole) has a proof load greater than or equal to the bolt's minimum ultimate tensile strength.

As specified in API 17D, clamp load calculated as 70% of the yield strength for the B7 and L7 specified in ASTM A193/A193M and A320/A320M.

Torque values for 1/4 and 5/16-in series are in inch-pounds. All other torque values are in foot-pounds.

Torque values calculated from formula T=KDF, where

Coatings such as Teflon or Xylan offer extremely low coefficients of friction. Often we will experience K values around 0.12 or lower.

K = 0.15 for "lubricated" conditions and K = 0.20 for "dry" conditions

D = Nominal Diameter

F = Clamp Load