

ASTM A449 / SAE Grade 5

Bolt Size (inches)	TPI	Proof Load (lbs.)	Clamp Load (lbs.)	Tightening Torque (ft. lbs.)		
				Waxed	Galv.	Plain
1/4	20	2,700	2,025	4	11	8
5/16	18	4,450	3,338	9	22	17
3/8	16	6,600	4,950	15	39	31
7/16	14	9,050	6,788	25	62	49
1/2	13	12,050	9,038	38	94	75
9/16	12	15,450	11,588	54	136	109
5/8	11	19,200	14,400	75	188	150
3/4	10	28,400	21,300	133	333	266
7/8	9	39,250	29,438	215	537	429
1	8	51,500	38,625	322	805	644
1-1/8	7	56,450	42,338	397	992	794
1-1/4	7	71,700	53,775	560	1,400	1,120
1-3/8	6	85,450	64,088	734	1,836	1,469
1-1/2	6	104,000	78,000	975	2,438	1,950
1-3/4	5	104,500	78,375	1,143	2,857	2,286
2	4 1/2	137,500	103,125	1,719	4,297	3,438
2-1/4	4 1/2	178,750	134,063	2,514	6,284	5,027
2-1/2	4	220,000	165,000	3,438	8,594	6,875
2-3/4	4	271,150	203,363	4,660	11,651	9,321
3	4	328,350	246,263	6,157	15,391	12,313

ASTM A490

Bolt Size (inches)	TPI	Tension (lbs.)		Tightening Torque Range (ft. lbs.) (Min. - Max.)	
		Min.	Max.	Lubricated	Plain
1/2	13	15,000	18,000	63 - 75	125 - 150
5/8	11	24,000	29,000	125 - 151	250 - 302
3/4	10	35,000	42,000	219 - 263	438 - 525
7/8	9	49,000	59,000	357 - 430	715 - 860
1	8	64,000	77,000	533 - 642	1,067 - 1,283
1-1/8	7	80,000	96,000	750 - 900	1,500 - 1,800
1-1/4	7	102,000	122,000	1,063 - 1,271	2,125 - 2,542
1-3/8	6	121,000	145,000	1,386 - 1,661	2,773 - 3,323
1-1/2	6	148,000	178,000	1,850 - 2,225	3,700 - 4,450

This chart of estimated torque calculations is only offered as a guide. Use of it's content by anyone is the sole responsibility of that person and they assume all risk. Due to many variables that affect the torque-tension relationship like human error, surface texture, and lubrication the only way to determine the correct torque is through experimentation under actual joint and assembly conditions.

