



Torque-Tension Relationship ASTM A307 Grade A, SAE J429 Grade 5 & 8, Holo-Krome Grade 9 and ASTM A574 Fine Thread

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.

	Nominal Dia (in)	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
	threads per inch	28	24	24	20	20	18	18	16	14	14	12	12	12	12
ASTM A307 Grade A 	Min Tensile (lbs)	2182	3484	5270	7123	9597	12179	15357	22378	30568	40793	51343	64377	78883	94861
	Clamp Load (lbs)	982	1568	2371	3205	4319	5480	6911	10070	13756	18357	23104	28970	35497	42688
	Torque (ft-lbs)														
	Lubricated	3.1	6.1	11.1	17.5	27.0	38.5	54.0	94	150	229	325	453	610	800
	Dry	4.1	8.2	14.8	23.4	36.0	51.4	72.0	126	201	306	433	604	813	1067
SAE J429 Grade 5 	Min Tensile (lbs)	4365	6968	10539	14246	19194	24358	30715	44755	61137	81586	89851	112659	138045	166007
	Min Proof Strength (lbs)	3092	4936	7465	10091	13596	17253	21756	31702	43305	57790	63323	79398	97289	116996
	Clamp Load (lbs)	2319	3702	5599	7568	10197	12940	16317	23776	32479	43343	47493	59548	72967	87747
	Torque (ft-lbs)														
	Ecoguard	6.3	12.5	22.7	35.9	55.2	78.9	110.5	193	308	470	579	806	1087	1426
	Lubricated	7.2	14.5	26.2	41.4	63.7	91.0	127.5	223	355	542	668	930	1254	1645
SAE J429 Grade 8 	Dry	9.7	19.3	35.0	55.2	85.0	121.3	170.0	297	474	722	890	1241	1672	2194
	Min Tensile (lbs)	5456	8710	13174	17807	23993	30447	38394	55944	76421	101983	128358	160942	197207	237154
	Min Proof Strength (lbs)	4365	6968	10539	14246	19194	24358	30715	44755	61137	81586	102687	128753	157765	189723
	Clamp Load (lbs)	3274	5226	7905	10684	14396	18268	23036	33566	45853	61190	77015	96565	118324	142292
	Torque (ft-lbs)														
	Ecoguard	8.9	17.7	32.1	50.6	78.0	111.3	156.0	273	435	663	939	1308	1763	2312
Holo-Krome Grade 9 	Lubricated	10.2	20.4	37.1	58.4	90.0	128.4	180.0	315	502	765	1083	1509	2034	2668
	Dry	13.6	27.2	49.4	77.9	120.0	171.3	240.0	420	669	1020	1444	2012	2712	3557
	Min Tensile (lbs)	6547	10452	15809	21369	28792	36537	46072	67133	91705	122380				
	Min Proof Strength (lbs)	5116	8167	12353	16697	22497	28549	36000	52457	71657	95626				
	Clamp Load (lbs)	3837	6125	9265	12523	16873	21412	27000	39343	53743	71720				
	Torque (ft-lbs)														
ASTM A574 	Ecoguard	10.4	20.7	37.6	59.4	91.4	130.5	182.8	320	509	777	145473	182401	223501	268774
	Min Tensile (lbs)	6547	10452	15809	21369	28792	34507	43513	63403	86611	115581	145473	182401	223501	268774
	Min Proof Strength (lbs)	5092	8129	12296	16620	22393	27402	34554	50350	68779	91785	115522	144848	177486	213438
	Clamp Load (lbs)	3819	6097	9222	12465	16795	20552	25916	37762	51584	68839	86642	108636	133115	160079
	Torque (ft-lbs)														
	Ecoguard	10.3	20.6	37.5	59.1	91.0	125.2	175.5	307	489	746	1056	1471	1983	2601
	Lubricated	11.9	23.8	43.2	68.2	105.0	144.5	202.5	354	564	860	1218	1697	2288	3001
	Dry	15.9	31.8	57.6	90.9	140.0	192.7	270.0	472	752	1147	1625	2263	3051	4002

Minimum tensile and proof strengths per ASTM A307, SAE J429, ASTM A574 and H-K Gr 9 where applicable.

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.

Clamp load calculated as 75% of the proof load when specified by the standard. ASTM A307 utilized 75% of 36,000 PSI.

Torque values calculated from formula T=KDF, where

K estimated at 0.13 for Ecoguard, 0.15 used for "lubricated" conditions and 0.20 for "dry" conditions.

D = Nominal Diameter

F = Clamp Load

Note: When using Zinc Plated (lubricated with wax) Top Lock Nuts, the K value can vary between 0.12-0.16.