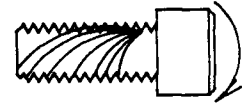


NON-FERROUS TORQUE GUIDE

WHAT IS TORQUE



TORQUE IS A TWISTING FORCE. TORQUE IS APPLIED TO YOUR WATCH STEM WHEN YOU WIND YOUR WATCH. YOU APPLY TORQUE TO UNSCREW THE TOP OF A MASON JAR. TORQUE CAUSES ROTATION OF A SHAFT, OR IT WILL SET UP A TWIST IN A STATIONARY SHAFT. IT IS GENERALLY EXPRESSED IN FOOT POUNDS OR IN INCH POUNDS.

HOW IS TORQUE DETERMINED?

A WRENCH ON A SHAFT--OR A STRING WRAPPED AROUND A WHEEL OR PULLEY--WILL GIVE AN ACCURATE TORQUE READING. USE A SCALE TO DETERMINE THE POUNDS OF PULL AND A RULE TO MEASURE THE RADIUS. COMPUTE THE INCH OR FOOT POUNDS OR FORCE BY USING THE FORMULA.

THE FORMULA FOR TORQUE IS: $T = R \times S$
 WHERE R = RADIUS OR LENGTH OF LEVER
 S = POUNDS PULL ON SCALE

IF A SHAFT CONNECTED TO A 2 FT. LEVER OR ARM REQUIRES 2 LBS. OF FORCE TO CAUSE IT TO RATE. THE TORQUE WOULD BE 4 FT. LBS.

PROPERLY FASTENED THREADED PRODUCTS ACHIEVE THEIR HOLDING POWER FROM THE TORSION (OR TORQUE) THAT IS DERIVED FROM THE MATING OF THE EXTERNAL AND INTERNAL THREADS SUBJECT TO THE ELASTIC LIMIT OF THE MATERIAL.

WHAT TORQUE TO APPLY IS A GENERALLY ASKED QUESTION, BUT THE ANSWER DEPENDS ON THE VARIABLES OF MATERIAL, THREADS' CLASS OF FIT, METHOD OF THREAD MANUFACTURE, AND THREAD LUBRICATION--IF ANY.

THE TABLE ON THE LEFT IS OFFERED AS THE SUGGESTED MAXIMUM TORQUING VALUES FOR THREADED PRODUCTS MADE FROM CORROSION-RESISTANT METALS.

ALL VALUES SHOWN ON CHART EXCEPT FOR NYLON REPRESENT A SAFE WORKING TORQUE: IN THE CASE OF NYLON ONLY, THE FIGURES REPRESENT BREAKING TORQUE.

Bolt Size	18-8 Stainless Steel	Brass	Silicon Bronze	Aluminum 2024-T4	316 Stainless Steel	Monel ~	Nylon *
	In.-Lbs.	In.-Lbs.	In.-Lbs.	In.-Lbs.	In.-Lbs.	In.-Lbs.	In.-Lbs.
2-56 2-64	2.5 3.0	2.0 2.5	2.3 2.8	1.4 1.7	2.6 3.2	2.5 3.1	.44
3-48 3-56	3.9 4.4	3.2 3.6	3.6 4.1	2.1 2.4	4.0 4.6	4.0 4.5	
4-40 4-48	5.2 6.6	4.3 5.4	4.8 6.1	2.9 3.6	5.5 6.9	5.3 6.7	1.19
5-40 5-44	7.7 9.4	6.3 7.7	7.1 8.7	4.2 5.1	8.1 9.8	7.8 9.6	
6-32 6-40	9.6 12.1	7.9 9.9	8.9 11.2	5.3 6.6	10.1 12.7	9.8 12.3	2.14
8-32 8-36	19.8 22.0	16.2 18.0	18.4 20.4	10.8 12.0	20.7 23.0	20.2 22.4	4.3
10-24 10-32	22.8 31.7	18.6 25.9	21.2 29.3	13.8 19.2	23.8 33.1	25.9 34.9	6.61 8.2
1/4"-20 1/4"-28	75.2 94.0	61.5 77.0	68.8 87.0	45.6 57.0	78.8 99.0	85.3 106.0	16.0 20.8
5/16"-18 5/16"-24	132 142	107 116	123 131	80 86	138 147	149 160	34.9
3/8"-16 3/8"-24	236 259	192 212	219 240	143 157	247 271	266 294	
7/16"-14 7/16"-20	376 400	317 327	349 371	228 242	393 418	427 451	
1/2"-13 1/2"-20	517 541	422 443	480 502	313 328	542 565	584 613	
9/16"-12 9/16"-18	682 752	558 615	632 697	413 456	713 787	774 855	
5/8"-11 5/8"-18	1110 1244	907 1016	1030 1154	715 798	1160 1301	1330 1482	
3/4"-10 3/4"-16	1530 1490	1249 1220	1416 1382	980 958	1582 1558	1832 1790	
7/8"-9 7/8"-14	2328 2318	1905 1895	2140 2130	1495 1490	2430 2420	2775 2755	
1"-8 1"-14	3440 3110	2815 2545	3185 2885	2205 1995	3595 3250	4130 3730	
	Ft.-Lbs.	Ft.-Lbs.	Ft.-Lbs.	Ft.-Lbs.	Ft.-Lbs.	Ft.-Lbs.	
1 1/8"-7 1 1/8"-12	413 390	337 318	383 361	265 251	432 408	499 470	
1 1/4"-7 1 1/4"-12	523 480	428 394	485 447	336 308	546 504	627 575	
1 1/2"-6 1 1/2"-12	888 703	727 575	822 651	570 450	930 732	1064 840	

*NYLON FIGURES ONLY ARE BREAKING TORQUE: RATHER THAN SAFE WORKING TORQUE.