

Torque Settings

Suggested Starting Values

The below estimated torque calculations are only offered as a guide. Use of its content by anyone is the sole responsibility of that person and they assume all risk.

The importance of correct bolt tightening cannot be over emphasized. Determining the correct torque can however present problems.

Approximately 90% of the applied torque is employed in overcoming friction, 50% at the bearing face of the nut and 40% between the mating threads. It can therefore be seen that only something in the order of 10% effort is employed inducing axial load in the bolt.

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 using required lubricants and actual parts under actual joint and assembly conditions.

The torque figures quoted are approximate figures and are available to fasteners in the self-colour condition only.

The figures below do not take into account the effect of plated finishes, special lubricants or the effect of hard and smooth mating surfaces such as hardened washers etc.

The torque figures quoted have been based on a theoretical bolt load equal to 85% of the proof load of the bolting material. Where the proof load is not quoted in the specification this has been taken as 95% of the yield stress.

Metric Bolting

Diameter	Tensile Stress Area mm ²	Suggested Bolt Load KN.				Approximate Torque Nm			
		Grade 4.6	Grade 8.8	Grade 10.9	Grade 12.9	Grade 4.6	Grade 8.8	Grade 10.9	Grade 12.9
M5	14.2	2.68	6.9	9.4	11.2	2.68	6.9	9.4	11.2
M6	20.1	3.79	9.8	13.3	15.9	4.55	11.7	15.9	19.1
M8	36.6	6.9	17.8	24.2	29.0	11	28.4	38.7	46.4
M10	58.0	10.9	28.1	38.3	45.9	22	56.3	77	92
M12	84.3	15.9	40.9	55.7	66.8	38	98	134	160
M16	157	29.6	76.2	104	124	95	244	332	397
M20	245	46.2	119	162	194	185	476	647	776
M24	353	66.6	171	233	280	320	822	1119	1342
M30	561	106	272	370	444	635	1634	2223	2667
M36	817	154	397	540	647	1110	2855	3885	4660

Recommended Tightening Torques Zinc Plated Finish

Select Grade as required below 12.9 / 10.9 / 8.8

Maximum Recommended Tightening Torques								
Metric Course Pitch	Grade 12.9 Plated		Metric Course Pitch	Grade 10.9 Plated		Metric Course Pitch	Grade 8.8 Plated	
	Ncm	in-lb		Ncm	in-lb		Ncm	in-lb
M1.6	24	2.11	M1.6	20	1.76	M1.6	14	1.25
M2	49	4.30	M2	41	3.59	M2	29	2.55
M2.5	100	8.81	M2.5	83	7.34	M2.5	59	5.22
M3	177	15.69	M3	148	13.07	M3	105	9.30
M4	412	36.51	M4	344	30.42	M4	244	21.63
M5	834	73.81	M5	695	61.51	M5	494	43.73
Metric Course Pitch	Grade 12.9 Plated		Metric Course Pitch	Grade 10.9 Plated		Metric Course Pitch	Grade 8.8 Plated	
	Nm	ft-lb		Nm	ft-lb		Nm	ft-lb
M6	14	10	M6	12	9	M6	8	6
M8	34	25	M8	29	21	M8	20	15
M10	68	50	M10	57	42	M10	40	30
M12	119	88	M12	99	73	M12	70	52
(M14)	189	139	(M14)	158	116	(M14)	112	83
M16	295	218	M16	246	181	M16	175	129
(M18)	406	299	(M18)	338	249	(M18)	241	177
M20	576	424	M20	480	354	M20	341	252
(M22)	783	577	(M22)	652	481	(M22)	464	342
M24	995	734	M24	829	612	M24	590	435
(M27)	1456	1074	(M27)	1213	895	(M27)	863	636
M30	1977	1458	M30	1647	1215	M30	1171	864
(M33)	2690	1984	(M33)	2242	1653	(M33)	1594	1176
M36	3454	2548	M36	2879	2123	M36	2047	1510
(M39)	4471	3298	(M39)	3726	2748	(M39)	2649	1954
M42	5525	4075	M42	4604	3396	M42	3274	2415
(M45)	6871	5068	(M45)	5726	4223	(M45)	4072	3003
M48	8287	6113	M48	6906	5094	M48	4911	3622
M52	10749	7928	M52	8958	6607	M52	6370	4698



NOTES:

() Non-Preferred

Zinc Plated co-efficient of friction = 125 (zinc at 8 microns thick).

All torque values are for general guidance.

Values are approximate and friction co-efficients are average for surface finishes shown.

WARNING:

Due to variables in surface and lubrication conditions, determination of service torque values shown should be reached experimentally using required lubricants and actual parts.