

TIGHTENING TORQUE FOR METRIC FASTENERS

Important Notice : The tables below lists the maximum permissible tightening torques and the resulting maximum pre-load for standard hex head bolts and socket head cap screws based on 90% utilisation of the bolt's yield strength. They do not include any safety factor and should be used with caution because the coefficient of friction μ is subject to many application variables and as a result an entirely different pre-load figure would result

TIGHTENING TORQUE FOR CLASS 4.6 BOLTS (METRIC COARSE)

THREAD		*when $\mu = 0.10$		*when $\mu = 0.14$	
		results in		results in	
BOLT DIAMETER X PITCH	STRESS AREA mm ²	TIGHTENING TORQUE Nm	PRE LOAD Kn	TIGHTENING TORQUE Nm	PRE LOAD Kn
M5 x 0.8	14.2	1.9	2.74	2.59	2.4
M6 x 1	20.1	3.3	3.87	3.65	4.1
M8 x 1.25	36.6	8	7.1	6.7	10.1
M10 x 1.5	58	16.1	11.3	10.7	20.3
M12 x 1.75	84.3	27	16.4	15.5	34
M14 x 2	115	44	22.5	21.3	55
M16 x 2	157	67	30.9	29.3	85
M18 x 2.5	192	93	37.7	35.7	118
M20 x 2.5	245	131	48.3	45.8	167
M22 x 2.5	302	176	60.1	57.1	225
M24 x 3	353	226	69.5	65.9	287
M27 x 3	459	331	91.2	86.7	424
M30 x 3.5	561	450	111	105.3	575

TIGHTENING TORQUE FOR CLASS 8.8 BOLTS (METRIC COARSE)

		*when $\mu = 0.10$		*when $\mu = 0.14$	
		results in		results in	
THREAD					
BOLT DIAMETER	STRESS AREA	TIGHTENING	PRE LOAD	TIGHTENING	PRE LOAD
X PITCH	mm ²	TORQUE Nm	Kn	TORQUE Nm	Kn
M5 x 0.8	14.2	7.4	5.2	7	6.5
M6 x 1	20.1	10.4	9	9.9	11.3
M8 x 1.25	36.6	19.1	21.6	18.1	27.3
M10 x 1.5	58	30.3	43	28.8	54
M12 x 1.75	84.3	44.1	73	41.9	93
M14 x 2	115	60.6	117	57.5	148
M16 x 2	157	82.9	180	78.8	230
M18 x 2.5	102	104	259	99	329
M20 x 2.5	245	134	363	127	464
M22 x 2.5	302	166	495	158	634
M24 x 3	353	192	625	183	798
M27 x 3	459	252	915	240	1176
M30 x 3.5	561	307	1246	292	1597

TIGHTENING TORQUE FOR CLASS 10.9 BOLTS (METRIC COARSE)

		*when $\mu = 0.10$		*when $\mu = 0.14$	
		results in		results in	
THREAD					
BOLT DIAMETER	STRESS AREA	TIGHTENING	PRE LOAD	TIGHTENING	PRE LOAD
X PITCH	mm ²	TORQUE Nm	Kn	TORQUE Nm	Kn
M5 x 0.8	14.2	10.8	7.6	10.3	9.5
M6 x 1	20.1	15.3	13.2	14.5	16.5
M8 x 1.25	36.6	28	31.8	26.6	40.1
M10 x 1.5	58	44.5	63	42.2	79
M12 x 1.75	84.3	64.8	108	61.5	137
M14 x 2	115	88.9	172	84.4	218
M16 x 2	157	121.7	264	115.7	338
M18 x 2.5	192	149	369	141	469
M20 x 2.5	245	190	517	181	661
M22 x 2.5	302	237	704	225	904
M24 x 3	353	274	890	260	1136
M27 x 3	459	359	1304	342	1674
M30 x 3.5	561	437	1775	416	2274
M33 x 3.5	694	543	2392	517	3078
M36 x 4	817	638	3082	308	3957
M39 x 4	976	765	3975	729	5123

TIGHTENING TORQUE FOR CLASS 12.9 BOLTS (METRIC COARSE)

BOLT DIAMETER X PITCH	THREAD STRESS AREA mm ²	*when $\mu = 0.10$		*when $\mu = 0.14$	
		TIGHTENING TORQUE Nm	PRE LOAD Kn	TIGHTENING TORQUE Nm	PRE LOAD Kn
M5 x 0.8	14.2	12.7	8.9	12	11.2
M6 x 1	20.1	17.9	15.4	17	19.3
M8 x 1.25	36.6	32.8	37.2	31.1	46.9
M10 x 1.5	58	52.1	73	49.4	93
M12 x 1.75	84.3	75.9	126	72	160
M14 x 2	115	104.1	201	98.9	255
M16 x 2	157	142.4	309	135.4	395
M18 x 2.5	192	174	432	165	549
M20 x 2.5	245	223	605	212	773
M22 x 2.5	302	277	824	264	1057
M24 x 3	353	320	1041	305	1329
M27 x 3	459	420	1526	400	1959
M30 x 3.5	561	511	2077	487	2662
M33 x 3.5	694	635	2799	605	3601
M36 x 4	817	747	3607	711	4631
M39 x 4	976	895	4652	853	5994

