

TIGHTENING TORQUE REFERENCE CHART FOR SAE AND METRIC BOLTS

NL = Not Lubricated
L = Lubricated
1 lbs ft = 1.356 N·m



HEX KEY INTERCHANGE	
SAE	Metric

TIGHTENING TORQUE FOR SAE BOLTS (30% of yield strength S_y) in lbs ft														
MATERIAL	UNC	1/4"-20	5/16"-18	3/8"-16	7/16"-14	1/2"-13	9/16"-12	5/8"-11	3/4"-10	7/8"-9	1"-8	1 1/8"-7	1 3/8"-6	1 1/2"-6
GRADE 1	NL	4	8	14	22	34	49	68	100	194	291	492	581	1012
	L	3	6	10	17	26	37	51	90	145	218	309	436	759
GRADE 2	NL	6	12	22	35	54	78	107	191	194	291	492	581	1012
	L	5	9	17	27	40	58	81	143	145	218	309	436	759
GRADE 5/5.2	NL	10	20	36	57	87	126	173	308	496	743	1053	1486	2589
	L	7	15	27	43	65	94	130	239	372	557	790	1114	1939
GRADE 8	NL	14	28	50	81	123	177	246	435	700	1050	1488	2100	3654
	L	10	21	38	60	92	133	184	326	525	787	1116	1575	2740

TIGHTENING TORQUE FOR METRIC BOLTS (30% of yield strength S_y) in lbs ft														
MATERIAL	ST. PITCH	M6-1	M8-1.25	M10-1.5	M12-1.75	M14-2	M16-2	M18-2.5	M20-2.5	M22-2.5	M24-3	M27-3	M30-3.5	M36-4
CLASS 4.6	NL	3	8	16	29	46	71	98	139	199	240	351	477	833
	L	3	6	12	21	34	53	74	104	142	180	263	357	629
CLASS 8.8	NL	8	22	44	76	122	190	262	370	509	640	896	1271	2221
	L	7	17	33	57	91	142	197	278	378	480	702	953	1666
CLASS 10.9	NL	15	32	64	112	179	279	385	544	739	940	1375	1867	3363
	L	10	24	48	84	134	209	289	408	555	705	1031	1400	2447
CLASS 12.9	NL	16	38	75	131	209	326	451	636	865	1100	1609	2195	3878
	L	12	29	56	98	157	245	338	477	649	825	1207	1639	2893
MATERIAL	FINE PITCH	M6-0.75	M8-1	M10-1	M12-1.25	M14-1.5	M16-1.5	M18-1.5	M20-1.5	M22-1.5	M24-1.5	M27-1.5	M30-1.5	M36-1.5
CLASS 4.6	NL	4	9	18	31	50	76	110	154	207	273	393	545	958
	L	3	7	14	25	37	57	83	116	156	204	295	409	719
CLASS 8.8	NL	10	24	49	83	132	202	294	411	553	727	1048	1455	2556
	L	7	16	37	63	99	151	220	308	415	545	799	1091	1897
CLASS 10.9	NL	15	35	72	123	194	296	431	603	813	1068	1539	2136	3754
	L	11	26	54	92	146	222	323	453	610	801	1155	1602	2815
CLASS 12.9	NL	17	41	84	143	227	347	505	706	951	1249	1822	2500	4393
	L	12	31	63	108	170	260	379	530	719	937	1351	1875	3295

5/64	→	2
3/32	→	2.5
7/64	→	3
1/8	→	3.5
5/32	→	4
3/16	→	5
7/32	→	6
1/4	→	7
5/16	→	8
3/8	→	10

Bolt Torque Chart Metric 316

John H. Bickford, Michael Oliver



Bolt Torque Chart Metric 316:

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