



Knoxville Bolt and Screw, Inc.

www.knoxvillebolt.com

614 Sevier Avenue
 P.O. Box 9149
 Knoxville, TN 37920-1738

865-573-1991
 800-231-3309
 800-231-9566
 FAX 865-573-8617

Standard Steel Bolt Torque Specifications							
Standard Dry Torque in Foot-Pounds							
Bolt Size (in.)	Coarse Threads/inch	SAE Grade 0-1-2 74,000 psi Low Carbon Steel	SAE Grade 3 100,000 psi Med. Carbon Steel	SAE Grade 5 120,000 psi Med. Carbon Heat T. Steel	SAE Grade 6 133,000 psi Med. Carbon Temp. Steel	SAE Grade 7 133,000 psi Med. Carbon Alloy Steel	SAE Grade 8 150,000 psi Med. Carbon Alloy Steel
1/4	20	6	9	10	12.5	13	14
5/16	18	12	17	19	24	25	29
3/8	16	20	30	33	43	44	47
7/16	14	32	47	54	69	71	78
1/2	13	47	69	78	106	110	119
9/16	12	69	103	114	150	154	169
5/8	11	96	145	154	209	215	230
3/4	10	155	234	257	350	360	380
7/8	9	206	372	382	550	570	600
1	8	310	551	587	825	840	700
1-1/8	7	480	872	794	1304	1325	1430
1-1/4	7	375	1211	1105	1815	1825	1975
1-3/8	6	900	1624	1500	2434	2500	2650
1-1/2	6	1100	1943	1775	2913	3000	3200
1-5/8	5.5	1470	2660	2425	3985	4000	4400
1-3/4	5	1900	3463	3150	5189	5300	5650
1-7/8	5	2360	4695	4200	6980	7000	7600
2	4.5	2750	5427	4550	7491	7500	8200



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Metric Steel Bolts Torque Specifications					
Bolt Size Millimeters	Coarse Thread Pitch	Standard Dry Torque in Foot-Pounds			
		Standard 5D 71,160 psi Med. Carbon Steel	Standard 8G 113,800 psi Med. Carbon Steel	Standard 10K 142,000 psi Med. Carbon Steel	Standard 12K 170,674 psi Med. Carbon Steel
6mm	1.00	5	6	8	10
8mm	1.00	10	16	22	27
10mm	1.25	31	40	45	49
12mm	1.25	34	54	70	86
14mm	1.25	55	89	117	137
16mm	2.00	83	132	175	208
18mm	2.00	111	182	236	283
22mm	2.50	182	284	394	464
24mm	3.00	261	419	570	689



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SUGGESTED TORQUE VALUES AND CLAMP LOADS GRADES 2, 5, & 8 CAP SCREWS								
Nominal Size	Threads/Inch	Tensile Stress Area (sq. in)	Grade 2		Grade 5		Grade 8	
			Clamp Load (lb)	Tightening Torque (in-lb)	Clamp Load (lb)	Tightening Torque (in-lb)	Clamp Load (lb)	Tightening Torque (in-lb)
.250	28	.0363	1200-1800	47-65	1855-2782	72-100	2619-3928	107-142
	20	.0318	1050-1575	41-57	1622-2432	65-88	2291-3437	93-129
.3125	24	.0580	1914-2871	93-129	2961-4441	144-200	4180-6270	212-294
	18	.0524	1729-2594	84-117	2674-4011	130-180	3775-5662	199-265
.375	24	.0878	2897-4346	169-234	4479-6719	262-363	6324-9486	384-534
	16	.0774	2557-3836	150-207	3952-5928	231-320	5579-8369	339-471
.4375	20	.1187	3917-5876	267-370	6054-9080	413-572	3546-12820	606-841
	14	.1063	3508-5262	239-331	5421-8132	370-512	7654-11480	542-753
.500	20	.1599	5278-7917	412-570	8151-12236	53-73 (ft-lb)	11516-64746	81-103 (ft-lb)
	13	.1419	4683-7024	365-506	7237-10855	47-65 (ft-lb)	10217-15325	72-96 (ft-lb)
Nominal Size	Threads/Inch	Tensile Stress Area (sq. in)	Clamp Load (lb)	Tightening Torque (ft-lb)	Clamp Load (lb)	Tightening Torque (ft-lb)	Clamp Load (lb)	Tightening Torque (ft-lb)
.5625	18	.2029	6698-10048	49-68	10356-15528	76-105	14615-21922	115-154
	12	.1731	5714-8571	42-58	9279-13319	68-90	13100-19651	103-138
.625	18	.2559	8446-12670	63-95	13053-19580	106-147	18428-27643	175-233
	11	.2260	7458-11187	61-84	11526-17289	94-130	16277-24408	143-191
.750	16	.3729	12392-18373	185-257	19021-28531	185-257	26853-40280	284-378
	10	.3344	11037-16555	108-149	17055-25582	166-230	24081-36122	254-338
1.000	12	.6630	13149-19703	164-247	33815-50722	440-609	47739-71608	670-894
	8	.6060	12010-17994	150-225	30892-46339	402-566	43613-65420	619-817
1.125	12	.8562	16948-25423	238-357	38006-57009	534-801	61632-92448	866-1300
	7	.7531	15107-2261	212-318	33877-50816	476-714	54936-82404	772-1158
1.250	12	1.0734	21245-31868	332-498	47641-71462	744-1116	77256-115884	1207-1810
	7	.9646	19186-28719	300-450	43023-64535	672-1008	69768-104652	1090-1635



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18-8 & 316 S/S, Brass, Aluminum, Monel, Silicon Bronze Torque Specifications							
Bolt Size Inches or #	Threads Per Inch	Standard Dry Torque in Inch-Pounds					
		18-8 Stainless Steel	Brass	Silicon Bronze	2024-T4 Aluminum	316 Stainless Steel	Monel
#2	56	2.5	2.0	2.3	1.4	2.6	2.5
	64	3.0	2.5	2.8	1.7	3.2	3.1
#3	48	3.9	3.2	3.6	2.1	4.0	4.0
	56	4.4	3.6	4.1	2.4	4.6	4.5
#4	40	5.2	4.3	4.8	2.9	5.5	5.3
	48	6.6	5.4	6.1	3.6	6.9	6.7
#5	40	7.7	6.3	7.1	4.2	8.1	7.8
	44	9.4	7.7	8.7	5.1	9.8	9.6
#6	32	9.6	7.9	8.9	5.3	10.1	9.8
	40	12.1	9.9	11.2	6.6	12.7	12.3
#8	32	19.8	16.2	18.4	10.8	20.7	20.2
	36	22.0	18.0	20.4	12.0	23.0	22.4
#10	24	22.8	18.6	21.2	13.8	23.8	25.9
	32	31.7	25.9	29.3	19.2	33.1	34.9



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Bolt Size Inches or #	Threads Per Inch	Standard Dry Torque in Inch-Pounds					
		18-8 Stainless Steel	Brass	Silicon Bronze	2024-T4 Aluminum	316 Stainless Steel	Monel
1/4	20	75.2	61.5	68.8	45.6	78.8	85.3
	28	94.0	77.0	87.0	57.0	99.0	106.0
5/16	18	132	107	123	80	138	149
	24	142	116	131	86	147	160
3/8	16	236	192	219	143	247	266
	24	259	212	240	157	271	294
7/16	14	376	317	349	228	393	427
	20	400	327	371	242	418	451
1/2	13	517	422	480	313	542	584
	20	541	443	502	328	565	613
Bolt Size Inches or #	Threads Per Inch	Standard Dry Torque in Inch-Pounds					
		18-8 Stainless Steel	Brass	Silicon Bronze	2024-T4 Aluminum	316 Stainless Steel	Monel
9/16	12	682	558	632	413	713	774
	18	752	615	697	456	787	855
5/8	11	1110	907	1030	715	1160	1330
	18	1244	1016	1154	798	1301	1482
3/4	10	1530	1249	1416	980	1582	1832
	16	1490	1220	1382	958	1558	1790
7/8	9	2328	1905	2140	1495	2430	2775
	14	2318	1895	2130	1490	2420	2755
1	8	3440	2815	3185	2205	3595	4130
	14	3110	2545	2885	1995	3250	3730



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Bolt Size Inches or #	Threads Per Inch	Standard Dry Torque in Foot-Pounds					
		18-8 Stainless Steel	Brass	Silicon Bronze	2024-T4 Aluminum	316 Stainless Steel	Monel
1 1/8	7	413	337	383	265	432	499
	12	390	318	361	251	408	470
1 1/4	7	523	428	485	336	546	627
	12	480	394	447	308	504	575
1 1/2	6	888	727	822	570	930	1064
	12	703	575	651	450	732	840



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Allen Heads, Brass, & Bronze Bolts Torque Specifications				
Bolt Size Inches or #	Coarse Threads Per Inch	Standard Dry Torque in Foot-Pounds		
		Allen Head 160,000 psi High Carbon CaseH Steel	Machine Screw 60,000 psi Yellow Brass	Machine Screw 70,000 psi Silicone Bronze
#2	56	...	2 in lb.	2.3 in lb.
#3	48	...	3.3 in lb.	3.7 in lb.
#4	40	...	4.4 in lb.	4.0 in lb.
#5	40	...	6.4 in lb.	7.2 in lb.
#6	32	21	8 in lb.	10 in lb.
#8	32	46	16 in lb.	19 in lb.
#10	24	60	20 in lb.	22 in lb.
1/4	20	16	65 in lb.	70 in lb.
5/16	18	33	110 in lb.	125 in lb.
3/8	16	54	17	20
7/16	14	84	27	30
1/2	13	125	37	41
9/16	12	180	49	53
5/8	11	250	78	88
3/4	10	400	104	117
7/8	9	640	160	180
1	8	970	215	250
1-1/8	7	1520	325	365
1-1/4	7	2130	400	450
1-3/8	6	2850
1-1/2	6	3450	595	655
1-5/8	6	4700
1-3/4	5	6100
1-7/8	5	8200
2	4-1/2	8800



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Whitworth Steel Bolts Torque Specifications					
Bolt Size Inches	Coarse Threads Per Inch	Standard Dry Torque in Foot-Pounds			
		Grades A & B 62,720 psi Med Carbon Steel	Grade S 112,000 psi Med Carbon Steel	Grade T 123,200 psi Med Carbon Steel	Grade V 145,600 psi Med Carbon Steel
1/4	20	5	7	9	10
5/16	18	9	15	18	21
3/8	16	15	27	31	36
7/16	14	24	43	51	58
1/2	12	36	64	79	89
9/16	12	52	94	111	128
5/8	11	73	128	155	175
3/4	11	118	213	259	287
7/8	9	186	322	407	459
1	8	276	497	611	693