



THE BOLT SUPPLY HOUSE LTD.

Industrial Products

RECOMMENDED TORQUE VALUES

FOR SAE GRADE 2, GRADE 5 AND GRADE 8 CAP SCREWS & BOLTS

TORQUES LISTED ARE SUGGESTED VALUES FOR PARTS THAT CARRY RESIDUAL OILS FROM MANUFACTURING. THESE DO NOT APPLY TO PLATED OR OTHERWISE LUBRICATED PARTS. CONTACT THE BOLT SUPPLY HOUSE LTD. FOR ASSISTANCE REGARDING YOUR SPECIFIC FASTENING APPLICATIONS.

Bolt Size	S.A.E Grade 2		S.A.E Grade 5		S.A.E Grade 8	
	Load*	Torque	Load*	Torque	Load*	Torque
1/4-20	1,320 lbs.	5 ft. lbs.	2,000 lbs.	8 ft. lbs.	2,850 lbs.	12 ft. lbs.
1/4-28	1,500 lbs.	5 ft. lbs.	2,300 lbs.	10 ft. lbs.	3,250 lbs.	14 ft. lbs.
5/16-18	2,160 lbs.	11 ft. lbs.	3,350 lbs.	17 ft. lbs.	4,700 lbs.	24 ft. lbs.
5/16-24	2,400 lbs.	12 ft. lbs.	3,700 lbs.	19 ft. lbs.	5,200 lbs.	27 ft. lbs.
3/8-16	3,200 lbs.	20 ft. lbs.	4,950 lbs.	30 ft. lbs.	7,000 lbs.	45 ft. lbs.
3/8-24	3,620 lbs.	23 ft. lbs.	5,600 lbs.	35 ft. lbs.	7,900 lbs.	50 ft. lbs.
7/16-14	4,380 lbs.	30 ft. lbs.	6,800 lbs.	50 ft. lbs.	9,550 lbs.	70 ft. lbs.
7/16-20	4,900 lbs.	35 ft. lbs.	7,550 lbs.	55 ft. lbs.	10,700 lbs.	78 ft. lbs.
1/2-13	5,850 lbs.	50 ft. lbs.	9,000 lbs.	75 ft. lbs.	12,750 lbs.	105 ft. lbs.
1/2-20	6,600 lbs.	55 ft. lbs.	10,550 lbs.	90 ft. lbs.	14,370 lbs.	120 ft. lbs.
9/16-12	7,100 lbs.	65 ft. lbs.	11,600 lbs.	110 ft. lbs.	16,400 lbs.	155 ft. lbs.
9/16-18	7,900 lbs.	75 ft. lbs.	12,950 lbs.	120 ft. lbs.	18,250 lbs.	170 ft. lbs.
5/8-11	9,350 lbs.	90 ft. lbs.	14,400 lbs.	150 ft. lbs.	20,350 lbs.	210 ft. lbs.
5/8-18	10,532 lbs.	105 ft. lbs.	16,370 lbs.	180 ft. lbs.	23,000 lbs.	240 ft. lbs.
3/4-10	13,800 lbs.	160 ft. lbs.	21,300 lbs.	270 ft. lbs.	30,100 lbs.	375 ft. lbs.
3/4-16	15,400 lbs.	180 ft. lbs.	23,800 lbs.	300 ft. lbs.	33,500 lbs.	420 ft. lbs.
7/8-9	9,700 lbs.	145 ft. lbs.	27,000 lbs.	395 ft. lbs.	41,600 lbs.	610 ft. lbs.
7/8-14	10,700 lbs.	155 ft. lbs.	29,800 lbs.	435 ft. lbs.	45,800 lbs.	675 ft. lbs.
1"-8	12,700 lbs.	210 ft. lbs.	35,500 lbs.	590 ft. lbs.	54,500 lbs.	910 ft. lbs.
1"-12	13,900 lbs.	230 ft. lbs.	38,800 lbs.	650 ft. lbs.	59,700 lbs.	1,000 ft. lbs.
1"-14	14,300 lbs.	240 ft. lbs.	39,700 lbs.	655 ft. lbs.	61,000 lbs.	1,015 ft. lbs.



NOTE: THESE RECOMMENDED TORQUE VALUES ARE APPROXIMATE ONLY. THE TORQUE TENSION RELATIONSHIP IS AFFECTED BY LUBRICATION, SURFACE FINISH, THREAD FIT, PLATING, LOCK WASHERS, ETC.
***CLAMP LOAD (LBS.) EQUALS 75% OF BOLT PROOF LOAD.**
FOR PLATED FINISH, TORQUE MUST BE REDUCED. USE ONLY 75% OF ABOVE VALUES.

TAP DRILL SIZES

Tap Size	Pitch	Form	Tap Drill 75%	Tap Size	Pitch	Form	Tap Drill 75%	Tap Size	Pitch	Form	Tap Drill 75%
0 -----	80	NF	¾"	⅜ ----	14 20	NC NF	U W	⅜ ---	27	NPT	D
1 -----	64 72	NC NF	53 53	½ ----	13 20	NC NF	27/64 29/64	½ ----	27	NPT	R
2 -----	56 64	NC NF	51 50	⅝ ----	12 18	NC NF	3¼/64 33/64	¾ ----	18	NPT	⅞
3 -----	48 56	NC NF	¾" 46	⅞ ----	11 18	NC NF	17/32 37/64	⅞ ----	18	NPT	7/8
4 -----	40 48	NC NF	43 42	¾ ----	10 16	NC NF	21/32 11/16	1 ----	11½	NPT	1 ½/32
5 -----	40 44	NC NF	39 37	⅞ ----	9 14	NC NF	49/64 13/16	1¼ ----	11½	NPT	1 1/4
6 -----	32 40	NC NF	36 33	1 ----	8 12 14*	NC NF NS	7/8 29/64 15/16	1½ ----	11½	NPT	1 1/2
8 -----	32 36	NC NF	29 29	1 1/8 ----	7 12	NC NF	63/64 13/16	2 ----	11½	NPT	2 1/2
10 -----	24 32	NC NF	25 21	1 1/4 ----	7 12	NC NF	17/64 11 1/8	Self Tapping Screws Size Decimal Drill No.4 .112 5/64 No.6 .138 3/32 No.7 .155 7/64 No.8 .165 1/8 No.10 .191 9/64 No.12 .218 5/32 No.14 .251 3/16			
12 -----	24 28	NC NF	17 15	1 1/2 ----	6 12	NC NF	17/32 1 1/8				
1/4 -----	20 28	NC NF	7 3	1 1/2 ----	6 12	NC NF	1 1/8 1 1/4				
5/16 ---	18 24	NC NF	F 1	1 3/4 ----	5	NC	1 1/2				
3/8 -----	16 24	NC NF	¾" Q	2 ----	4 1/2	NC	1 1/2				

*- Indicates number of threads per inch for Unified Fine (1" – 12 threads is U.N.F Standard, however, 1" – 14 is popular demand and generally stocked). Coarse Thread Series, Class 2A Fit, recommended for general bolt use.

BOLT THREADS

(Number of threads per inch)

Diameter of Bolt (in.)	No. 10	No. 10	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3
Coarse Thread Series	24	24	20	18	16	14	13	12	11	10	9	8	7	7	6	6	5	4 1/2	4 1/2	4	4
Fine Thread Series	32	28	28	24	24	20	20	18	18	16	14	14	12	12	12	12	12	12	12	12	12

*- Indicates number of threads per inch for unified Fine (1" – 12 threads is U.N.F Standard, however, 1" – 14 is popular demand and generally stocked). Coarse thread series, Class 2A Fit, recommended for general bolt use.

THREAD LENGTHS

(All standard bolts except lag screws)

Diameter of Bolt (in.)	Nº 10	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	1 1/2	1 3/4	1 1/2	2
Thread Length (in.)	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4
6" & shorter	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4
Longer than 6"	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2	

Thread Length Formula:

For bolts 6" and shorter – twice the diameter plus ¼" – (2D + ¼") Longer than 6" – twice the diameter plus ½" – (2D + ½")
When bolts are short for formula thread length, thread will extend as close to head or shoulder as practical. In actual production thread lengths may be longer than the formula thread lengths.

WRENCH OPENING FOR NUTS

Nut Size	Wrench Size	Nut Size	Wrench Size	Nut Size	Wrench Size	Nut Size	Wrench Size	Nut Size	Wrench Size	Nut Size	Wrench Size
1/4	7/16	7/16	11/16	5/8	15/16	1	1 1/2	1 3/8	2 1/16	2	3
5/16	1/2	1/2	3/4	3/4	1 1/8	1 1/8	1 1/16	1 1/2	2 1/4	2 1/2	3 3/4
3/8	9/16	9/16	7/8	7/8	1 5/16	1 1/4	1 7/8	1 3/4	2 5/8	3	4 1/2

Grade Marking	Specifications	Material & Treatment	Nominal Size (in.)	Mechanical Properties					Hardness Rockwell		
				Proof Load Min (ksi)	Yield Strength Min (ksi)	Tensile Strength Min (ksi)	Elong % Min	RA %	Min	Max	
	SAE J429		1/4" - 11/2"	33	36	60	18	35	B70	B100	
	A307 Grade A	Low or Medium Carbon Steel	¼" - 4"	-	-	60	18	-	B69	B100	
	A307 Grade B		¼" - 4"	-	-	60 min 100 max	18	-	B69	B95	
	A307 Grade C		¼" - 4"	-	36	58 min 80 max	23	-	-	-	
	F1554 Grade 36		¼" - 4"	-	36	58 min 80 max	23	40	-	-	
	F1554 Grade 55		¼" - 2"	-	55	75 min 95 max	21	30	-	-	
			21/4" - 21/2"					22			
			23/4" - 3"					20			
			31/4" - 4"					18			
	SAE J429 Grade 2		¼" - ¾"	55	57	74	18	35	B80	B100	
		7/8" - 11/2"	33	36	60	18	B70				
	A193/A320 Grade B8 Class 1	AISI SS304 Stainless	No Restrictions	-	30	75	30	50	-	B96	
	A193/A320 Grade B8M	AISI SS316 Stainless Steel									
	A325 Type 1	Medium Carbon Steel, Q&T	½" - 1" 11/8"- 11/2"	85 74	92 81	120 105	14	35	C24 C19	C35 C31	
	A325 Type 3	Atmospheric Corrosion Resistant Steel, Q&T									
	SAE J429 Grade 5	Medium Carbon Steel, Q&T	1/4" - 1"	85	92	120	14	35	C25	C34	
			11/8" - 11/2"	74	81	105			C19	C30	
	A449 Type 1		1/4" - 1"	85	92	120	14	35	C25	C34	
			11/8" - 11/2"	74	81	105			C19	C30	
		15/8" - 3"	55	58	90	B91			B100		
	A449 Type 3	Weathering Steel, Q&T	1/4" - 1"	85	92	120	14	35	C25	C34	
			11/8" - 11/2"	74	81	105			C19	C30	
			15/8" - 3"	55	58	90			B91	B100	
	A193 Grade B7	Medium Carbon Alloy Steel, Q&T	1/4" - 21/2"	-	105	125	16	50	-	C35	
			25/8" - 4"		95	115	16	50		C35	
			41/8" - 7"		75	100	18	50		C35	
	A354 Grade BC		1/4" - 21/2"	105	109	125	16	50	C26	C36	
			25/8" - 4"	95	94	115	16	45	C22	C33	
	F1554 Grade 105			1/4" - 3"	-	105	125 min 150 max	15	45	-	-
	A320 Grade L7		AISI 4140, 4142, or 4145	1/4" - 21/2"	-	105	125	16	50	-	-
	A320 Grade L43	AISI 4340	1/4" - 4"	-	105	125	16	50	-	-	
	A490 Type 1	Medium Carbon Alloy Steel, Q&T	1/2" - 11/2"	120	130	150 min 173 max	14	40	C33	C38	
	A490 Type 3	Atmospheric Corrosion Resistant Steel, Q&T									
	SAE J429 Grade 8	Medium Carbon Alloy Steel, Q&T	1/4" - 11/2"	120	130	150	12	35	C33	C39	
	A354 Grade BD [6]		1/4" - 21/2"	120	130	150	14	40	C33	C39	
			25/8" - 4"	105	115	140			C31	C39	



LIABILITY – Information in this document pertaining to strength or proper working load or performance of materials, tools and equipment has been compiled by the manufacturer for the buyer's convenience. We assume no responsibility for the accuracy of the information and no liability for defective materials beyond the value of the material.

LOCATIONS

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