UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES

SAE Grade and Head Markings	NO MARK	1 or 2 ^b	5 5.1 5.2 \$ 8.	2
SAE Grade and Nut Markings	NO MARK			

	Grade 1				Grade 2 ^b			Grade 5, 5.1, or 5.2				Grade 8 or 8.2				
Lubri	Lubricated ^a		Drya		Lubricated ^a		Drya		Lubricated*		Drya		Lubricateda		Drya	
N·m	lb-ft	N-m	lb-ft	N·m	lb-ft	N-m	lb-ft	N·m	lb-ft	N-m	ib-ft	N·m	lb-ft	N·m	lb-ft	
3.7	2.8	4.7	3.5	6	4.5	7.5	5.5	9.5	7	12	9	13.5	10	17	12.5	
7.7	5.5	10	7	12	9	15	11	20	15	25	18	II.			26	
14	10	17	13	22	16	27	20	35	26	44	33	50	36	63	46	
22	16	28	20	35	26	44	32	55	41	70	52	80	58	100	75	
33	25	42	31	53	39	67				1		1		1	115	
48	36	60	45	75	56	95	70	125	90	155	115	175	130	225	160	
67	50	85	62	105	78	135	100	170	125	215	160	215	160	300	225	
120	87	150	110		140					1					400	
190	140	240	175	190	140	240	175	490	360	625	450	700	500	875	650	
290	210	360	270	290	210	360	270	725	540	925	675	1050	750	1200	975	
1	425	725	530	570	425	725	530	1300	950	1650	1200	2050	1500	2600	1350 1950	
750	550	950	700	750	550	950	700	1700	1250	2150	1550	0700	0000	0400	0550	
		1250	925	990	725	1250	930	2250	1650			ı			2550 3350	
	N·m 3.7 7.7 14 22 33 48 67 120 190 290 470	Lubricated* N·m Ib-ft 3.7 2.8 7.7 5.5 14 10 10 10 10 10 10 10	Lubricated ^a Dr N·m lb-ft N·m 3.7 2.8 4.7 7.7 5.5 10 14 10 17 22 16 28 33 25 42 48 36 60 67 50 85 120 87 150 190 140 240 290 210 360 470 300 510 570 425 725 750 550 950	Lubricateda Drya N·m lb-ft N·m lb-ft 3.7 2.8 4.7 3.5 7.7 5.5 10 7 14 10 17 13 22 16 28 20 33 25 42 31 48 36 60 45 67 50 85 62 120 87 150 110 190 140 240 175 290 210 360 270 470 300 510 375 570 425 725 530 750 550 950 700	Lubricateda Drya Lubricateda N·m lb-ft N·m lb-ft N·m 3.7 2.8 4.7 3.5 6 7.7 12 14 10 17 13 22 22 16 28 20 35 33 25 42 31 53 48 36 60 45 75 67 50 85 62 105 120 87 150 110 190 190 140 240 175 190 290 210 360 270 290 470 300 510 375 470 570 425 725 530 570 750 550 950 700 750	Lubricateda Drya Lubricateda N·m lb-ft N·m lb-ft N·m lb-ft 3.7 2.8 4.7 3.5 6 4.5 7.7 5.5 10 7 12 9 14 10 17 13 22 16 22 16 28 20 35 26 33 25 42 31 53 39 48 36 60 45 75 56 67 50 85 62 105 78 120 87 150 110 190 140 190 140 240 175 190 140 290 210 360 270 290 210 470 300 510 375 470 300 570 425 725 530 570 425 750 550 950 700 <td>Lubricateda Drya Lubricateda Dr N·m lb-ft N·m lb-ft N·m lb-ft N·m 3.7 2.8 4.7 3.5 6 4.5 7.5 7.7 5.5 10 7 12 9 15 14 10 17 13 22 16 27 22 16 28 20 35 26 44 33 25 42 31 53 39 67 48 36 60 45 75 56 95 67 50 85 62 105 78 135 120 87 150 110 190 140 240 190 140 240 175 190 140 240 290 210 360 270 290 210 360 470 300 510 375 470 300</td> <td>Lubricateda Drya Lubricateda Drya N·m lb-ft N·m lb-ft N·m lb-ft N·m lb-ft 3.7 2.8 4.7 3.5 6 4.5 7.5 5.5 7.7 5.5 10 7 12 9 15 11 14 10 17 13 22 16 27 20 22 16 28 20 35 26 44 32 33 25 42 31 53 39 67 50 48 36 60 45 75 56 95 70 67 50 85 62 105 78 135 100 120 87 150 110 190 140 240 175 190 140 240 175 190 140 240 175 290 210 360 270</td> <td>Lubricated^a Dry^a Lubricated^a N·m lib-ft N·m lib-ft</td> <td>Lubricated^a Dry^a Lubricated^a Dry^a Lubricated^a N·m lb-ft N·m</td> <td>Lubricated^a Dry^a Lubricated^a Dry^a Lubricated^a Dry^a Lubricated^a Dry^a N·m lb-ft N·m lb</td> <td>Lubricated^a Dry^a Lubricated^a Dry^a Lubricated^a Dry^a N·m lb-ft N·m lb-ft</td> <td>Lubricated^a Dry^a Lubricated^a Dry^a Dry^a Dry^a Dry^a Dry^a D</td> <td>Lubricated^a Dry^a Lubricated^a Dry^a Lubricated^a Dry^a Lubricated^a Dry^a Lubricated^a N·m lb-ft N·m lb-ft</td> <td>Lubricateda Drya Lubricateda Drya</td>	Lubricateda Drya Lubricateda Dr N·m lb-ft N·m lb-ft N·m lb-ft N·m 3.7 2.8 4.7 3.5 6 4.5 7.5 7.7 5.5 10 7 12 9 15 14 10 17 13 22 16 27 22 16 28 20 35 26 44 33 25 42 31 53 39 67 48 36 60 45 75 56 95 67 50 85 62 105 78 135 120 87 150 110 190 140 240 190 140 240 175 190 140 240 290 210 360 270 290 210 360 470 300 510 375 470 300	Lubricateda Drya Lubricateda Drya N·m lb-ft N·m lb-ft N·m lb-ft N·m lb-ft 3.7 2.8 4.7 3.5 6 4.5 7.5 5.5 7.7 5.5 10 7 12 9 15 11 14 10 17 13 22 16 27 20 22 16 28 20 35 26 44 32 33 25 42 31 53 39 67 50 48 36 60 45 75 56 95 70 67 50 85 62 105 78 135 100 120 87 150 110 190 140 240 175 190 140 240 175 190 140 240 175 290 210 360 270	Lubricated ^a Dry ^a Lubricated ^a N·m lib-ft N·m lib-ft	Lubricated ^a Dry ^a Lubricated ^a Dry ^a Lubricated ^a N·m lb-ft N·m	Lubricated ^a Dry ^a Lubricated ^a Dry ^a Lubricated ^a Dry ^a Lubricated ^a Dry ^a N·m lb-ft N·m lb	Lubricated ^a Dry ^a Lubricated ^a Dry ^a Lubricated ^a Dry ^a N·m lb-ft N·m lb-ft	Lubricated ^a Dry ^a Dry ^a Dry ^a Dry ^a Dry ^a D	Lubricated ^a Dry ^a Lubricated ^a Dry ^a Lubricated ^a Dry ^a Lubricated ^a Dry ^a Lubricated ^a N·m lb-ft N·m lb-ft	Lubricateda Drya Lubricateda Drya	

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed t fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from falling when tightening.

Tighten plastic insert or crimped steel-type lock nuts approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

^a "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

^b Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6-in.) long, and for all other types of bolts and screws of any length.