Bolt Torque Guide

Starting torque for **Grade 5 and 8** inch bolts and **Class 8.8 and 10.9** metric bolts, dry and oiled.

INCH BOLTS · FOOT POUNDS (FT·LB)

	GRADE 5 (3 LINES)		GRADE 8 (6 LINES)	
SIZE	DRY	OILED	DRY	OILED
¼-20 UNC	8	6	12	9
¼-28 UNF	10	7	14	10
5⁄16-18 UNC	17	13	25	18
5⁄16-24 UNF	19	14	27	20
⅜-16 UNC	31	23	44	33
⅜-24 UNF	35	26	49	37
7⁄16-14 UNC	49	37	70	52
7⁄16-20 UNF	55	41	78	58
½-13 UNC	75	57	106	80
½-20 UNF	85	64	120	90
9⁄16-12 UNC	109	82	154	115
9⁄16-18 UNF	121	91	171	128
⅝-11 UNC	150	113	212	159
⅝-18 UNF	170	127	240	180
¾-10 UNC	267	200	376	282
¾-16 UNF	297	223	420	315
⅞-9 UNC	429	322	606	455
⅞-14 UNF	474	355	669	502
1-8 UNC	644	483	909	681
1-12 UNF	704	528	995	746

METRIC BOLTS, COARSE · NEWTON METERS (N·M)

	CLASS 8.8		CLASS 10.9	
SIZE	DRY	OILED	DRY	OILED
M5 × 0.8	6	5	9	7
M6 × 1	11	8	15	11
M8 × 1.25	25	19	36	27
M10 × 1.5	50	38	72	54
M12 × 1.75	88	66	126	94
M14 × 2	141	105	201	151
M16 × 2	218	164	312	234
M18 × 2.5	312	234	431	323
M20 × 2.5	441	330	610	457
M22 × 2.5	601	451	831	623
M24 × 3	761	571	1053	790

Convert: N·m × 0.7376 = ft·lb. ft·lb × 1.3558 = N·m. ft·lb × 12 = in·lb.

How these were worked out

Clamping force is set to 75% of the bolt's proof load, the usual target for reusable joints. Torque = K × diameter × clamp force, with K = 0.20 for clean dry steel and K = 0.15 for oiled threads.

A guide, not a spec. When an engine, vehicle or equipment maker gives a torque, use theirs. Plated, waxed or anti-seize threads need less torque than dry. Never reuse torque-to-yield bolts.