

Metric Bolt Torque Estimates

Class 8.8, 10.9, 12.9 coarse-thread bolts, M4 to M30 - Newton-meters (Nm)

CALCULATED ESTIMATES - NOT INSTALLATION SPECIFICATIONS

Size	Pitch (mm)	Wrench	Stress area (mm ²)	Class 8.8 (Nm)	Class 10.9 (Nm)	Class 12.9 (Nm)
M4	0.7	7 mm	8.8	3.1	4.4	5.1
M5	0.8	8 mm	14.2	6.2	8.8	10.3
M6	1	10 mm	20.1	10.5	15	17.6
M8	1.25	13 mm	36.6	25.5	36.5	42.6
M10	1.5	16 / 17 mm	58.0	50.5	72.2	84.4
M12	1.75	18 / 19 mm	84.3	88	125.9	147.1
M14	2	21 / 22 mm	115.4	140.6	201.2	235.1
M16	2	24 mm	156.7	218.1	312.1	364.7
M18	2.5	27 mm	192.5	311.8	431.3	504.1
M20	2.5	30 mm	244.8	440.6	609.5	712.4
M22	2.5	34 / 32 mm	303.4	600.7	831	971.2
M24	3	36 mm	352.5	761.4	1053.3	1230.9
M27	3	41 mm	459.4	1116.4	1544.3	1804.8
M30	3.5	46 mm	560.6	1513.6	2093.8	2447

Wrench sizes are the current ISO 4014/4017 hex head. Where the older DIN 931/933 head is a different size (M10, M12, M14, M22), it follows the slash - both are still sold. For JIS reduced heads and hex nuts, see [whatsizebolt.com/bolt-size-chart](https://www.whatsizebolt.com/bolt-size-chart).

Method

Calculated reference estimates, not installation specifications. $T = K \times F \times d$; $K = 0.20$ (assumed plain, unplated steel); $F = 75\%$ of proof stress $\times$ tensile stress area; d is in meters. Approximate stress area $A = \pi/4 \times (\text{diameter} - 0.9382 \times \text{pitch})^2$ in mm^2 . Actual friction and joint design can change preload substantially. ISO 898-1 specifies fastener properties, not a universal tightening torque.

Limitations

Use the equipment or fastener manufacturer's specified torque and assembly condition. These examples do not cover aluminum threads, fine threads, stainless steel, flange bolts, torque-to-yield fasteners, or safety-critical joints. Do not apply a universal oil, anti-seize, coating or thread-locker reduction.

Sources

- Portland Bolt: $T = KDP$, $K = 0.20$ for plain unplated bolts and 75% proof-load assumption
<https://www.portlandbolt.com/technical/bolt-torque-chart/>
- AmesWeb: ISO 898-1:2013 property-class proof stresses (secondary reference)
<https://amesweb.info/Screws/metric-bolt-grades.aspx>
- AmesWeb: metric stress-area definition and strength limitations
<https://amesweb.info/Screws/metric-bolt-grades-strength-calculator.aspx>

Metric Bolt Torque Estimates

Class 8.8, 10.9, 12.9 coarse-thread bolts, M4 to M30 - foot-pounds (ft-lb)

CALCULATED ESTIMATES - NOT INSTALLATION SPECIFICATIONS

Size	Pitch (mm)	Wrench	Stress area (mm ²)	Class 8.8 (ft-lb)	Class 10.9 (ft-lb)	Class 12.9 (ft-lb)
M4	0.7	7 mm	8.8	2.3	3.2	3.8
M5	0.8	8 mm	14.2	4.6	6.5	7.6
M6	1	10 mm	20.1	7.7	11.1	13
M8	1.25	13 mm	36.6	18.8	26.9	31.4
M10	1.5	16 / 17 mm	58.0	37.2	53.2	62.2
M12	1.75	18 / 19 mm	84.3	64.9	92.9	108.5
M14	2	21 / 22 mm	115.4	103.7	148.4	173.4
M16	2	24 mm	156.7	160.8	230.2	269
M18	2.5	27 mm	192.5	230	318.1	371.8
M20	2.5	30 mm	244.8	325	449.6	525.4
M22	2.5	34 / 32 mm	303.4	443.1	612.9	716.3
M24	3	36 mm	352.5	561.6	776.9	907.9
M27	3	41 mm	459.4	823.4	1139	1331.1
M30	3.5	46 mm	560.6	1116.4	1544.3	1804.8

Wrench sizes are the current ISO 4014/4017 hex head. Where the older DIN 931/933 head is a different size (M10, M12, M14, M22), it follows the slash - both are still sold. For JIS reduced heads and hex nuts, see [whatsizebolt.com/bolt-size-chart](https://www.whatsizebolt.com/bolt-size-chart).

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