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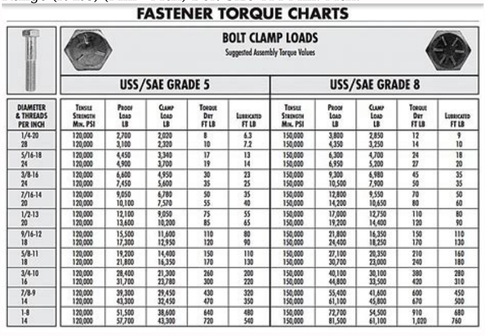
# Bolt torque spec chart

## Torque spec chart for standard bolts. U bolt torque spec chart. Bolt torque spec chart metric. Torque spec on 1.5 bolt. Arp bolt torque spec chart. 5/8 u bolt torque spec. Torque spec chart for stainless steel bolts.

| Bolt Size | Metric Hex Cap, Plated - Recommended Torque In Ft/Lbs unless Noted | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Grade 4.8 | | Grade 8.8 or 9.8 | | Grade 10.9 | | Grade 12.9 | |
| | Lube | Dry | Lube | Dry | Lube | Dry | Lube | Dry |
| M4 (In/Lbs) | 8.5 | 10.0 | 20.4 | 27.6 | 28.8 | 38.4 | 33.6 | 45.6 |
| M5 (In/Lbs) | 15.6 | 21.6 | 40.8 | 54 | 58.8 | 78 | 68.4 | 91.2 |
| M6 (In/Lbs) | 42 | 54 | 78 | 102 | 114 | 144 | 138 | 150 |
| M8 | 8.5 | 11.5 | 16 | 20 | 24 | 30 | 28 | 35 |
| M10 | 17 | 21 | 32 | 40 | 47 | 60 | 55 | 70 |
| M12 | 29 | 39 | 55 | 70 | 80 | 140 | 95 | 120 |
| M14 | 47 | 60 | 88 | 110 | 130 | 165 | 150 | 190 |
| M16 | 73 | 92 | 140 | 175 | 200 | 225 | 240 | 300 |
| M18 | 100 | 125 | 195 | 250 | 275 | 350 | 325 | 410 |
| M20 | 140 | 180 | 275 | 350 | 400 | 500 | 460 | 580 |

## Mil spec bolt torque chart. Torque spec chart for grade 8 bolts. Sae bolt torque spec chart. Large bolt torque spec chart. What is the torque spec on a 8mm bolt.

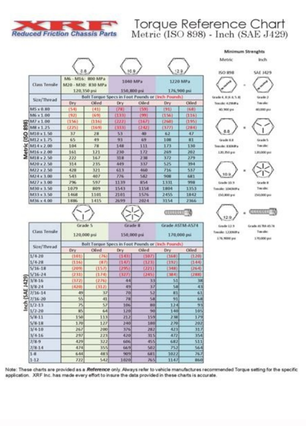
Suggested Starting Torque Values Tightening Torque (ft lbs) Bolt Size TPI Proof Load (lbs) Clamp Load (lbs) Galv + Waxed Galv Plain 1/4" 20 1.750 1.313 3 7 5 5/16" 18 2,900 2,175 6 14 11 3/8" 16 4,250 3,188 10 25 20 7/16" 14 5,850 4,388 16 40 32 1/2" 13 7,800 5,850 24 61 49 9/16" 12 10,000 7,500 35 8 70 5/8" 11 12,400 9,300 48 121 97 3/4" 10 18,400 13,800 86 216 173 7/8" 9 15,200 11,400 83 208 166 1" 8 20,000 15,000 135 313 250 1-1/8" 7 25,200 18,900 177 443 354 1-1/4" 7 32,000 24,000 250 625 500 1-3/8" 6 38,100 28,575 327 819 655 1-1/2" 6 46,400 34,800 435 1,088 870 Tightening Torque (ft lbs) Bolt Size TPI Proof Load (lbs) Clamp Load (lbs) Galv + Waxed Galv Plain 1/4" 20 3,350 2,513 5 13 10 5/16" 18 5,500 4,125 11 27 21 3/8" 16 8,150 6,113 19 48 38 7/16" 14 11,150 8,363 30 76 61 1/2" 13 14,900 11,175 47 116 93 9/16" 12 19,100 14,325 67 168 134 5/8" 11 23,750 17,813 93 232 186 3/4" 10 35,050 26,288 164 411 329 7/8" 9 48,500 36,375 265 663 530 1" 8 63,650 47,738 398 995 796 1-1/8" 7 80,100 60,075 463 1,408 1,125 1-1/4" 7 101,750 76,313 795 1,987 1,590 1-3/8" 6 121,300 90,975 1,042 2,606 2,085 1-1/2" 6 147,550 110,663 1,383 3,458 2,767 1-3/4" 5 199,500 149,625 2,182 5,455 4,364 2" 4-1/2 262,500 196,875 3,281 8,203 6,563 2-1/4" 4-1/2 341,250 255,938 4,799 11,997 9,598 2-1/2" 4 420,000 315,000 6,563 16,406 13,125 2-3/4" 4 468,500 351,263 8,050 20,124 16,100 3" 4 567,150 425,363 10,634 26,585 21,268 3-1/4" 4 674,500 505,875 13,701 34,252 27,402 3-1/2" 4 791,350 593,513 17,311 43,277 34,622 3-3/4" 4 917,700 688,275 21,509 53,771 43,017 4" 4 1,052,600 789,450 26,315 65,788 52,630 1-1/8" 8 82,934 62,201 583 1,458 1,166 1-1/4" 8 105,006 78,754 820 2,051 1,641 1-3/8" 8 129,492 97,119 1,113 2,782 2,226 1-1/2" 8 156,687 117,515 1,469 3,672 2,938 1-3/4" 8 218,400 163,800 -- -- 4,778 2" 8 290,850 218,138 -- -- 7,271 2-1/4" 8 373,801 280,351 -- -- 10,513 2-1/2" 8 466,200 349,650 -- -- 14,569 2-3/4" 8 515,851 386,888 -- -- 17,732 3" 8 618,451 463,838 -- -- 23,192 3-1/4" 8 730,550 547,913 -- -- 29,679 3-1/2" 8 851,201 638,401 -- -- 37,240 3-3/4" 8 982,300 736,725 -- -- 46,045 4" 8 1,121,950 841,463 -- -- 56,098 Tightening Torque (ft lbs) Bolt Size TPI Proof Load (lbs) Clamp Load (lbs) Galv + Waxed Galv Plain 1/4" 20 1,145 859 2 4 4 5/16" 18 1,886 1,415 4 9 7 3/8" 16 2,790 2,093 7 16 13 7/16" 14 3,827 2,870 10 26 21 1/2" 13 5,108 3,831 16 40 32 9/16" 12 6,552 4,914 23 58 46 5/8" 11 8,136 6,102 32 79 61 3/4" 10 12,024 9,018 56 141 113 7/8" 9 15,200 11,400 83 208 166 1" 8 20,000 15,000 125 313 250 1-1/8" 7 25,200 18,900 177 443 354 1-1/4" 7 32,000 24,000 250 625 500 1-3/8" 6 38,100 28,575 327 819 655 1-1/2" 6 46,400 34,800 435 1,088 870 1-3/4" 5 68,400 51,300 748 1,870 1,496 2" 1-4/2 90,000 67,500 1,125 2,813 2,250 2-1/4" 4-1/2 117,000 87,750 1,645 4,113 3,291 2-1/2" 4 144,000 108,000 2,250 5,625 4,500 2-3/4" 4 177,480 133,110 3,050 7,626 6,101 3" 4 214,920 161,190 4,030 10,074 8,060 3-1/4" 4 255,600 191,700 5,191 12,980 10,384 3-1/2" 4 299,880 224,910 6,560 16,400 13,120 3-3/4" 4 347,760 260,820 8,151 20,377 16,301 4" 4 398,880 299,160 9,972 24,930 19,944 Tension (lbs) Tightening Torque Range (ft lbs) (Min - Max) Bolt Size TPI Min. Max.




Galv + Waxed Plain 1/2" 13 12,000 14,000 50 - 58 100 - 117 5/8" 11 19,000 23,000 990 - 120 198 - 240 3/4" 10 28,000 34,000 175 - 213 350 - 425 7/8" 9 39,000 47,000 284 - 343 569 - 685 1" 8 51,000 61,000 425 - 508 850 - 1,017 1-1/8" 7 56,000 67,000 525 - 625 1,050 - 1,256 1-1/4" 7 71,000 85,000 740 - 885 1,479 - 1,771 1-3/8" 6 85,000 102,000 974 -1,169 1,948 - 2,338 1-1/2" 6 103,000 124,000 1,288 - 1,550 2,575 - 3,100 Tension (lbs) Tightening Torque Range (ft lbs) (Min - Max) Bolt Size TPI Min.

| Stud Diameter | Tension | PTFE Coated Bolt coefficient of Friction | | Plain Bolt coefficient of Friction | |
|---|---|---|---|---|---|
| Size | lbf | Torque | Torque | Torque | Torque |
| Inch | | Nm | Ft. lbs | Nm | Ft. lbs |
| | | $f$=0.07 | $f$=0.07 | $f$=0.13 | $f$=0.13 |
| 1/2" | 7450 | 48 | 35 | 80 | 59 |
| 5/8" | 11865 | 92 | 68 | 155 | 115 |
| 3/4" | 17559 | 160 | 118 | 270 | 200 |
| 7/8" | 24241 | 253 | 188 | 429 | 319 |
| 1" | 31802 | 376 | 279 | 639 | 474 |
| 1 1/8" | 41499 | 540 | 401 | 925 | 686 |
| 1 1/4" | 52484 | 745 | 553 | 1285 | 953 |
| 1 3/8" | 64759 | 996 | 739 | 1727 | 1281 |
| 1 1/2" | 78322 | 1297 | 962 | 2261 | 1677 |
| 1 5/8" | 93173 | 1653 | 1226 | 2894 | 2146 |
| 1 3/4" | 109313 | 2069 | 1534 | 3636 | 2696 |
| 1 7/8" | 126741 | 2549 | 1890 | 4493 | 3332 |
| 2" | 145458 | 3097 | 2297 | 5476 | 4061 |
| 2 1/4" | 186758 | 4418 | 3276 | 7851 | 5822 |
| 2 1/2" | 233212 | 6068 | 4500 | 10828 | 8030 |
| 2 5/8" | 233765 | 6394 | 4716 | 11429 | 8430 |
| 2 3/4" | 257694 | 7354 | 5424 | 13168 | 9712 |
| 3" | 309050 | 9555 | 7047 | 17156 | 12654 |
| 3 1/4" | 365070 | 12154 | 8965 | 21878 | 16136 |
| 3 3/4" | 491099 | 18685 | 13782 | 33766 | 24905 |
| 3 7/8" | 525521 | 20620 | 15208 | 37293 | 27506 |
| 4" | 561108 | 22683 | 16730 | 41057 | 30282 |

Max. Lubricated Plain 1/4" 20 3,800 2,850 6 12 5/16" 18 6,300 4,725 12 25 3/8" 16 9,300 6,975 22 44 4/16" 14 12,750 9,563 35 70 1/2" 13 17,050 12,788 53 107 6/16" 12 21,850 16,388 77 154 5/8" 11 27,100 20,325 106 212 3/4" 10 40,100 30,075 188 376 7/8" 9 55,450 41,577 303 606 1" 8 72,700 54,525 454 909 1-1/8" 7 91,550 68,663 644 1,287 1-1/4" 7 120,000 90,000 938 1,875 1-3/8" 6 138,600 103,950 1,191 2,382 1-1/2" 6 168,600 126,450 1,581 3,161 1-3/4" 5 228,000 171,000 2,494 4,988 2" 4-1/2 300,000 225,000 3,750 7,500 2-1/4" 4-1/2 390,000 292,500 5,484 10,969 2-1/2" 4 480,000 360,000 7,500 15,000 2-3/4" 4 517,650 388,238 8,897 17,794 3" 4 626,850 470,138 11,753 23,507 3-1/4" 4 745,500 559,125 15,143 30,286 3-1/2" 4 874,650 655,988 19,133 38,266 3-3/4" 4 1,014,300 760,725 23,773 47,545 4" 4 1,163,400 872,550 29,085 58,100 Tension (lbs) Tightening Torque Range (ft bls)(Min - Max) Bolt Size TPI Min. Max. Lubricated Plain 1/2" 13 15,000 18,000 63 - 75 125 - 150 5/8" 11 24,000 29,000 125 - 151 250 - 302 3/4" 10 35,000 42,000 219 - 263 438 - 525 7/8" 9 49,000 59,000 357 - 430 715 - 860 1" 8 64,000 77,000 533 - 642 1,067 - 1,283 1-1/8" 7 80,000 96,000 750 - 900 1,500 - 1,800 1-1/4" 7 102,000 122,000 1,063 - 1,271 2,125 - 2,542 1-3/8" 6 121,000 145,000 1,386 - 1,661 2,773 - 3,323 1-1/2" 6 148,000 178,000 1,850 - 2,225 3,700 - 4,450 Tightening Torque (ft lbs) Bolt Size TPI Proof Load (lbs) Clamp Load (lbs) Galv + Waxed Galv Plain 1/4" 20 2,700 2,025 4 11 8 5/16" 18 4,450 3,338 9 22 17 3/8" 16 6,600 4,950 15 39 31 7/16" 14 9,050 6,788 25 62 49 1/2" 13 12,050 9,038 38 94 75 9/16" 12 15,450 11,588 54 136 109 5/8" 11 19,200 14,400 75 188 150 3/4" 10 28,400 21,300 133 333 266 7/8" 9 39,250 29,438 215 537 429 1" 8 51,500 38,625 322 805 644 1-1/8" 7 56,450 42,338 397 992 794 1-1/4" 7 71,700 53,772 560 1,400 1,120 1-3/8" 6 85,450 34,088 734 1,836 1,469 1-1/2" 6 104,000 78,000 975 2,438 1,950 1-3/4" 5 104,500 78,375 1,143 2,857 2,286 2" 4-1/2 137,500 105,125 1,719 4,297 3,438 2-1/4" 4-1/2 178,750 134,063 2,514 6,284 5,027 2-1/2" 4 220,000 165,000 3,438 8,594 6,875 2-3/4" 4 271,150 203,363 4,660 11,651 9,321 3" 4 328,350 246,263 6,157 15,391 12,313 Notes: Values calculated using industry accepted formula T = KDP where T = torque, K = torque coefficient (dimensionless), D = nominal diameter (inches), P = bolt clamp load (lbs). K values: waxed (e.g. pressure wax as supplied on high strength nuts) = .10, hot dip galvanized = .25, and plain non-plated bolts (as received) = .20 Torque has been converted into ft/lbs by dividing the result of the formula by 12. All calculations are for Coarse Thread Series (UNC). Grade 2 calculations only cover fasteners 1/4" - 3/4" in diameter up to 6" long. For longer fasteners, the torque is reduced significantly. Clamp loads are based on 75% of the minimum proof loads for each grade and size. Proof load, stress area, yield strength, and other data is based on IFI 7th Edition (2003) Technical Data N-68, SAE J429, ASTM A307, A325, A354, A449, and A490.




These torque calculations are estimates and are only offered as a guide. Because there are many variables that affect the torque-tension relationship, the only way to determine the correct torque is through experimentation under actual joint and assembly conditions. Property classes (grades) are defined by ISO 898 (Mechanical properties of fasteners made of carbon steel and alloy steel). This table shows values for threads that have been lightly oiled and the tension is 85% of the proof load. Size (mm) Recommended Maximum Tightening Torque (Nm) Grade 8.8 Grade 9.8 Grade 10.9 Grade 12.9 M5 7.0 7.8 10.0 11.7 M6 11.8 13.3 17.0 19.9 M8 28.8 32.3 41.3 48.3 M10 57.3 64.1 81.8 95.7 M12 99.8 112 143 167 M16 248 277 354 413 M20 500 690 809 M24 865 1195 1395 M30 1719 2377 2774 These values should only be used when the machine manufacturer has not provided their own. Fine pitch bolts also have different torque levels generally specified in the manufacturer’s documentation.
US imperial bolt torque chart