Recommended Assembly Torques

This resource contains tables of recommended assembly torques for bolts of different dimensions. These values are important to prevent over tightening and damaging bolts. Different bolt sizes and threads will require different torques to tighten the bolts. The resource contains values for metric and imperial bolts.

Bolts and Set Screws
Metric 4.6 Coarse Pitch

Diameter	Pitch (mm)	Recommended Assembly Torque, Nm
M1.6	0.35	0.06
M2	0.40	0.12
M2.5	0.45	0.25
M3	0.50	0.44
M4	0.70	1
M5	0.80	2.1
M6	1.00	3.5
M8	1.25	8.5
M10	1.50	17
M12	1.75	30
M14	2.00	47
M16	2.00	73
M18	2.50	101
M20	2.50	143
M22	2.50	195
M24	3.00	248
M27	3.00	362
M30	3.50	491
M33	3.50	669
M36	4.00	864
M39	4.00	1115
M42	4.50	1378
M48	5.00	2064
M56	5.50	3338
M64	6.00	5030

Value given represent the torque required to induce bolt tension corresponding to approximately 65% of Proof Load.

Surface Condition Torque Adjustment Factors

Plain Steel, as supplied	x 1.0
Plain Steel, degreased	x 2.0
Zinc Plated, as supplied	x 1.0
Zinc Plated, lightly oiled	x 0.9
Galvanised, degreased	x 2.1
Galvanised, lightly oiled	x 1.1
Heavily greased	x 0.7

To convert kN to lbf:
Multiply kN by 224.809

To convert lbft to Nm:
Multiply lbft by 1.35582

Bolts and Set Screws
Metric 8.8 Coarse Pitch

Diameter	Pitch (mm)	Recommended Assembly Torque, Nm
M1.6	0.35	0.15
M2	0.40	0.31
M2.5	0.45	0.64
M3	0.50	1.1
M4	0.70	2.7
M5	0.80	5
M6	1.00	9
M8	1.25	22
M10	1.50	44
M12	1.75	77
M14	2.00	122
M16	2.00	190
M18	2.50	269
M20	2.50	372
M22	2.50	519
M24	3.00	640
M27	3.00	967
M30	3.50	1314
M33	3.50	1782
M36	4.00	2297
M39	4.00	2970
M42	4.50	3671
M48	5.00	5500
M56	5.50	8870
M64	6.00	13376

Value given represent the torque required to induce bolt tension corresponding to approximately 65% of Proof Load.

Surface Condition Torque Adjustment Factors

Plain Steel, as supplied	x 1.0
Plain Steel, degreased	x 2.0
Zinc Plated, as supplied	x 1.0
Zinc Plated, lightly oiled	x 0.9
Galvanised, degreased	x 2.1
Galvanised, lightly oiled	x 1.1
Heavily greased	x 0.7

To convert kN to lbf:
Multiply kN by 224.809

To convert Nm to lbft:
Multiply Nm by 0.737562

Bolts and Set Screws
Metric 10.9 Coarse Pitch

Diameter	Pitch, mm	Recommended Assembly Torque, Nm
M5	0.80	8
M6	1.00	13
M8	1.25	32
M10	1.50	63
M12	1.75	109
M14	2.00	174
M16	2.00	270
M18	2.50	371
M20	2.50	528
M22	2.50	722
M24	3.00	914
M27	3.00	1339
M30	3.50	1817
M33	3.50	2449
M36	4.00	3173
M39	4.00	4110

Surface Condition Torque Adjustment Factors

Plain Steel, as supplied	x 1.0
Plain Steel, degreased	x 2.0
Zinc Plated, as supplied	x 1.0
Zinc Plated, lightly oiled	x 0.9
Galvanised, degreased	x 2.1
Galvanised, lightly oiled	x 1.1
Heavily greased	x 0.7

Bolts and Set Screws
Metric 12.9 Coarse Pitch

Diameter	Pitch, mm	Recommended Assembly Torque, Nm
M3	0.50	1.9
M4	0.70	4.4
M5	0.80	8.9
M6	1.00	15
M8	1.25	37
M10	1.50	73
M12	1.75	128
M14	2.00	203
M16	2.00	316
M18	2.50	436
M20	2.50	620
M22	2.50	840
M24	3.00	1066
M27	3.00	1561
M30	3.50	2124
M33	3.50	2884
M36	4.00	3708

To convert kN to lbf:
Multiply kN by 224.809

To convert Nm to lbft::
Multiply Nm by 0.737562

Value given represent the torque required to induce bolt tension corresponding to approximately 65% of Proof Load.

Bolts and Set Screws Imperial Grade 5 UNF

Diameter	Threads Per Inch (TPI)	Recommended Assembly Torque, lbft
1/4	28	8
5/16	24	17
3/8	24	30
7/16	20	48
1/2	20	74
9/16	18	105
5/8	18	148
3/4	16	258
7/8	14	410
1	12	610
1.1/8	12	771
1.1/4	12	1075
1.3/8	12	1448
1.1/2	12	1900
1" SAE	14	625

Surface Condition Torque Adjustment Factors

Plain Steel, as supplied	x 1.0
Plain Steel, degreased	x 2.0
Zinc Plated, as supplied	x 1.0
Zinc Plated, lightly oiled	x 0.9
Galvanised, degreased	x 2.1
Galvanised, lightly oiled	x 1.1
Heavily greased	x 0.7

Bolts and Set Screws Imperial Grade 8 UNF

Diameter, mm	Threads Per Inch (TPI)	Recommended Assembly Torque, lbft
1/4	28	12
5/16	24	23
3/8	24	43
7/16	20	67
1/2	20	104
9/16	18	149
5/8	18	208
3/4	16	364
7/8	14	579
1	12	862
1-1/8	12	1251
1-1/4	12	1744
1-3/8	12	2349
1-1/2	12	3083
1" SAE	14	883

To convert kN to lbf:
Multiply kN by 224.809

To convert Nm to lbft::
Multiply Nm by 0.737562

Value given represent the torque required to induce bolt tension corresponding to approximately 65% of Proof Load.

Bolts and Set Screws
Imperial Grade 5 UNC

Diameter, mm	Threads Per Inch (TPI)	Recommended Assemly Torque, lbft
1/4	20	7
5/16	18	15
3/8	16	27
7/16	14	43
1/2	13	66
9/16	12	94
5/8	11	130
3/4	10	231
7/8	9	373
1	8	558
1-1/8	7	688
1-1/4	7	971
1-3/8	6	1272
1-1/2	6	1690
1-3/4	5	2663
2	4.5	4007
2-1/4	4.5	5861
2-1/2	4	8017
2-3/4	4	10867
3	4	14355
3-1/4	4	18498
3-1/2	4	23368
3-3/4	4	29038
4	4	35527

Value given represent the torque required to induce bolt tension corresponding to approximately 65% of Proof Load.

Surface Condition Torque Adjustment Factors

Plain Steel, as supplied	x 1.0
Plain Steel, degreased	x 2.0
Zinc Plated, as supplied	x 1.0
Zinc Plated, lightly oiled	x 0.9
Galvanised, degreased	x 2.1
Galvanised, lightly oiled	x 1.1
Heavily greased	x 0.7

To convert kN to lbf:
Multiply kN by 224.809

To convert Nm to lbft::
Multiply Nm by 0.737562

Bolts and Set Screws Imperial Grade 8 UNC

Diameter, mm	TPI	Recommended Assembly Torque, lbft
1/4	20	10
5/16	18	21
3/8	16	38
7/16	14	61
1/2	13	92
9/16	12	133
5/8	11	183
3/4	10	326
7/8	9	525
1	8	787
1-1/8	7	1116
1-1/4	7	1573
1-3/8	6	2063
1-1/2	6	2738
1-3/4	5	4323
2	4.5	6500
2-1/4	4.5	9506
2-1/2	4	13000
2-3/4	4	17623
3	4	23280
3-1/4	4	29998
3-1/2	4	37899
3-3/4	4	47088
4	4	57613

Value given represent the torque required to induce bolt tension corresponding to approximately 65% of Proof Load.

Surface Condition Torque Adjustment Factors

Plain Steel, as supplied	x 1.0
Plain Steel, degreased	x 2.0
Zinc Plated, as supplied	x 1.0
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To convert Nm to lbft::
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