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Fastener Size Tables

This page provides tables listing sizes of inch and metric bolts, nuts, and washers. For information on bolted joints, see our bolted joint analysis reference.

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Related Pages:
• Bolted Joint Analysis
• Bolt Pattern Force Distribution
• Bolted Joint Calculator

Hardware Sizes: Unified Inch Screw Thread

This section contains tables of sizes for inch thread hardware.

Bolt Thread Sizes

The following table of thread sizes for coarse and fine thread was adapted from ASME B1.1:

Size	Nominal (Major) Diameter [in]	Coarse Thread (UNC)			Fine Thread (UNF)		
		Threads Per Inch	Tensile Stress Area [in^2]	Minor Area [in^2]	Threads Per Inch	Tensile Stress Area [in^2]	Minor Area [in^2]
#0	0.0600	---	---	---	80	0.00180	0.00151
#2	0.0860	56	0.00370	0.00310	64	0.00394	0.00339
#4	0.1120	40	0.00604	0.00496	48	0.00661	0.00566
#5	0.1250	40	0.00796	0.00672	44	0.00830	0.00716
#6	0.1380	32	0.00909	0.00745	40	0.01015	0.00874
#8	0.1640	32	0.0140	0.01196	36	0.01474	0.01285
#10	0.1900	24	0.0175	0.01450	32	0.0200	0.0175
1/4"	0.2500	20	0.0318	0.0269	28	0.0364	0.0326
5/16"	0.3125	18	0.0524	0.0454	24	0.0580	0.0524
3/8"	0.3750	16	0.0775	0.0678	24	0.0878	0.0809
7/16"	0.4375	14	0.1063	0.0933	20	0.1187	0.1090
1/2"	0.5000	13	0.1419	0.1257	20	0.1599	0.1486
9/16"	0.5625	12	0.182	0.162	18	0.203	0.189
5/8"	0.6250	11	0.226	0.202	18	0.256	0.240
3/4"	0.7500	10	0.334	0.302	16	0.373	0.351

1-1/8"	1.1250	7	0.763	0.693	12	0.856	0.812
1-1/4"	1.2500	7	0.969	0.890	12	1.073	1.024
1-3/8"	1.3750	6	1.155	1.054	12	1.315	1.260
1-1/2"	1.5000	6	1.405	1.294	12	1.581	1.521
1-3/4"	1.7500	5	1.90	1.74	---	---	---
2"	2.0000	4.5	2.50	2.30	---	---	---

Bolt Thread Dimensions

The following equations can be used to calculate dimensions for Unified Inch threads:

	Equation, US Units [in]	Source
Minor Diameter	$d_{m.ext} = d_{nom} - 1.299038/TPI$	Machinery's Handbook
Pitch Diameter	$d_{p.ext} = d_{nom} - 0.64951905/TPI$	ASME B1.1, Section 10.1p
Nominal Area	$A_{nom} = \frac{\pi}{4} d_{nom}^2$	
Tensile Stress Area	$A_t = \frac{\pi}{4}\left(d_{nom} - \frac{0.9743}{TPI}\right)^2$	ASME B1.1, Appendix B
Minor Area (Shear Area)	$A_m = \frac{\pi}{4} d_{m.ext}^2$	

In the table above, d_{nom} is nominal diameter in inches and TPI is threads per inch.

Minimum Clearance Hole Diameters

The following table of clearance holes was adapted from ASME B18.2.8. The *minimum* hole diameters are given.

Bolt Size	Bolt Dia. [in]	Normal Fit [in]	Close Fit [in]	Loose Fit [in]
#0	0.0600	0.076	0.067	0.094
#2	0.0860	0.102	0.094	0.116
#4	0.1120	0.128	0.120	0.144
#5	0.1250	0.156	0.141	0.172
#6	0.1380	0.170	0.154	0.185
#8	0.1640	0.196	0.180	0.213
#10	0.1900	0.221	0.206	0.238
1/4"	0.2500	0.281	0.266	0.297
5/16"	0.3125	0.344	0.328	0.359
3/8"	0.3750	0.406	0.391	0.422
7/16"	0.4375	0.469	0.453	0.484

3/4"	0.7500	0.812	0.781	0.906
7/8"	0.8750	0.938	0.906	1.031
1"	1.0000	1.094	1.031	1.156
1-1/8"	1.1250	1.219	1.156	1.312
1-1/4"	1.2500	1.344	1.281	1.438
1-3/8"	1.3750	1.500	1.438	1.609
1-1/2"	1.5000	1.625	1.562	1.734

Bolt Thread Length

Per ASME B18.2.1, the nominal thread length of inch-series bolts can be found by:

$$L_{thd} = \begin{cases} 2d_{nom} + \frac{1}{4}\text{ in} & L \leq 6\text{ in} \\ 2d_{nom} + \frac{1}{2}\text{ in} & L > 6\text{ in} \end{cases}$$

where L is the total bolt length and d_{nom} is the nominal bolt diameter.

Hex Bolt Head Dimensions

The following table of hex bolt head dimensions was adapted from ASME B18.6.3, Table 29, "Dimensions of Plain (Unslotted) and Slotted Regular and Large Hex Head Screws." This table is used for smaller size hardware.

Size	Nominal (Major) Diameter [in]	Width Across Flats		Head Height	
		Minimum [in]	Maximum [in]	Minimum [in]	Maximum [in]
#2	0.0860	0.120	0.125	0.040	0.050
#4	0.1120	0.181	0.188	0.049	0.060
#6	0.1380	0.244	0.250	0.080	0.093
#8	0.1640	0.244	0.250	0.096	0.110
#10	0.1900	0.305	0.312	0.105	0.120
1/4"	0.2500	0.367	0.375	0.172	0.190
5/16"	0.3125	0.489	0.500	0.208	0.230
3/8"	0.3750	0.551	0.562	0.270	0.295

The following table of hex bolt head dimensions was adapted from ASME B18.2.1, Table 2, "Dimensions of Hex Bolts."

Size	Nominal (Major) Diameter [in]	Width Across Flats			Head Height	
		Nominal [in]		Minimum [in]	Nominal [in]	Minimum [in]
1/4"	0.2500	7/16"	(0.438)	0.425	11/64"	0.150
5/16"	0.3125	1/2"	(0.500)	0.484	7/32"	0.195
3/8"	0.3750	9/16"	(0.562)	0.544	1/4"	0.226
7/16"	0.4375	5/8"	(0.625)	0.603	19/64"	0.272
1/2"	0.5000	3/4"	(0.750)	0.725	11/32"	0.302
5/8"	0.6250	15/16"	(0.938)	0.906	27/64"	0.378

1"	1.0000	1-1/2"	(1.500)	1.450	43/64"	0.591
1-1/8"	1.1250	1-11/16"	(1.688)	1.631	3/4"	0.658
1-1/4"	1.2500	1-7/8"	(1.875)	1.812	27/32"	0.749
1-3/8"	1.3750	2-1/16"	(2.062)	1.994	29/32"	0.810
1-1/2"	1.5000	2-1/4"	(2.250)	2.175	1"	0.902
1-5/8"	1.6250	2-7/16"	(2.438)	2.356	1-3/32"	0.978
1-3/4"	1.7500	2-5/8"	(2.625)	2.538	1-5/32"	1.054
1-7/8"	1.8750	2-13/16"	(2.812)	2.719	1-1/4"	1.130
2"	2.0000	3"	(3.000)	2.900	1-11/32"	1.175

Hex Nut Dimensions

The following table of hex nut dimensions was adapted from ASME B18.2.2, Table 1-1, "Dimensions of Square and Hex Machine Screw Nuts." This table is used for smaller size hardware.

Size	Nominal (Major) Diameter [in]	Width Across Flats		Thickness	
		Nominal [in]	Minimum [in]	Minimum [in]	Maximum [in]
#0	0.060	5/32" (0.156)	0.150	0.043	0.050
#2	0.086	3/16" (0.188)	0.180	0.057	0.066
#4	0.112	1/4" (0.250)	0.241	0.087	0.098
#6	0.138	5/16" (0.312)	0.302	0.102	0.114
#8	0.164	11/32" (0.344)	0.332	0.117	0.130
#10	0.190	3/8" (0.375)	0.362	0.117	0.130
1/4"	0.250	7/16" (0.438)	0.423	0.178	0.193
5/16"	0.312	9/16" (0.562)	0.545	0.208	0.225
3/8"	0.375	5/8" (0.625)	0.607	0.239	0.257

The following table of hex nut dimensions was adapted from ASME B18.2.2, Table 4, "Dimensions of Hex Nuts and Hex Jam Nuts."

Size	Nominal (Major) Diameter [in]	Width Across Flats		Thickness	
		Minimum [in]	Maximum [in]	Minimum [in]	Maximum [in]
1/4"	0.2500	0.428	0.438	0.212	0.226
5/16"	0.3125	0.489	0.500	0.258	0.273
3/8"	0.3750	0.551	0.563	0.320	0.337
7/16"	0.4375	0.675	0.688	0.365	0.385
1/2"	0.5000	0.736	0.750	0.427	0.448
9/16"	0.5625	0.861	0.875	0.473	0.496
5/8"	0.6250	0.922	0.938	0.535	0.559
3/4"	0.7500	1.088	1.125	0.617	0.665
7/8"	0.8750	1.269	1.312	0.724	0.776
1"	1.0000	1.450	1.500	0.831	0.887
1-1/8"	1.1250	1.631	1.688	0.939	0.999
1-1/4"	1.2500	1.812	1.875	1.030	1.094

1-5/8"	1.6250	2.350	2.430	1.364	1.416
1-3/4"	1.7500	2.538	2.625	1.460	1.540
1-7/8"	1.8750	2.722	2.813	1.567	1.651
2"	2.0000	2.900	3.000	1.675	1.763

Internal Thread Dimensions

The following equations can be used to calculate internal thread dimensions for Unified Inch threads:

	Equation, US Units [in]	Source
Minor Diameter	$d_{m.int} = d_{nom} - 1.08253175/TPI$	ASME B1.1, Section 10.1s
Pitch Diameter	$d_{p.int} = d_{nom} - 0.64951905/TPI$	ASME B1.1, Section 8.3

In the table above, d_{nom} is nominal diameter in inches and TPI is threads per inch.

Flat Washer Dimensions

The following table of flat washer dimensions was adapted from ASME B18.21.1, Table 11 for Type A Plain Washers. Type A washers come in 2 series: Narrow and Wide.

Size	Basic Dia. [in]	Series	Inner Dia, Basic [in]	Outer Dia, Basic [in]	Thickness, Basic [in]
#0	0.0600	---	0.078	0.188	0.020
#2	0.0860	---	0.094	0.250	0.020
#4	0.1120	---	0.125	0.312	0.032
#6	0.1380	---	0.156	0.375	0.049
#8	0.1640	---	0.188	0.438	0.049
#10	0.1900	---	0.219	0.500	0.049
1/4"	0.2500	Narrow	0.281	0.625	0.065
1/4"	0.2500	Wide	0.312	0.734	0.065
5/16"	0.3125	Narrow	0.344	0.688	0.065
5/16"	0.3125	Wide	0.375	0.875	0.083
3/8"	0.3750	Narrow	0.406	0.812	0.065
3/8"	0.3750	Wide	0.438	1.000	0.083
7/16"	0.4375	Narrow	0.469	0.922	0.065
7/16"	0.4375	Wide	0.500	1.250	0.083
1/2"	0.5000	Narrow	0.531	1.062	0.095
1/2"	0.5000	Wide	0.562	1.375	0.109
9/16"	0.5625	Narrow	0.594	1.156	0.095
9/16"	0.5625	Wide	0.625	1.469	0.109
5/8"	0.6250	Narrow	0.656	1.312	0.095
5/8"	0.6250	Wide	0.688	1.750	0.134

7/8"	0.8750	Narrow	0.938	1.750	0.134
7/8"	0.8750	Wide	0.938	2.250	0.165
1"	1.0000	Narrow	1.062	2.000	0.134
1"	1.0000	Wide	1.062	2.500	0.165
1-1/8"	1.1250	Narrow	1.250	2.250	0.134
1-1/8"	1.1250	Wide	1.250	2.750	0.165
1-1/4"	1.2500	Narrow	1.375	2.500	0.165
1-1/4"	1.2500	Wide	1.375	3.000	0.165
1-3/8"	1.3750	Narrow	1.500	2.750	0.165
1-3/8"	1.3750	Wide	1.500	3.250	0.180
1-1/2"	1.5000	Narrow	1.625	3.000	0.165
1-1/2"	1.5000	Wide	1.625	3.500	0.180
1-5/8"	1.6250	---	1.750	3.750	0.180
1-3/4"	1.7500	---	1.875	4.000	0.180
1-7/8"	1.8750	---	2.000	4.250	0.180
2"	2.0000	---	2.125	4.500	0.180

Hardware Sizes: Metric Screw Thread

This section contains tables of sizes for metric thread hardware.

Bolt Thread Sizes

The following table of thread sizes for coarse and fine pitch thread was created using the standard sizes from ASME B1.13M. Coarse pitch threads are preferred and should be used whenever possible, as stated in

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The thread size designation for metric thread is given as "M[dia] x [pitch]". For example, a thread with a nominal diameter of 6 mm and a pitch of 1 mm is designated as "M6 x 1."

Nominal (Major) Diameter [mm]	Coarse Pitch			Fine Pitch		
	Pitch [mm]	Tensile Stress Area [mm^2]	Minor Area [mm^2]	Pitch [mm]	Tensile Stress Area [mm^2]	Minor Area [mm^2]
1.6	0.35	1.270	1.076	---	---	---
2	0.4	2.073	1.789	---	---	---
2.5	0.45	3.391	2.980	---	---	---
3	0.5	5.031	4.473	---	---	---
3.5	0.6	6.775	6.000	---	---	---
4	0.7	8.779	7.750	---	---	---
5	0.8	14.18	12.68	---	---	---
6	1	20.12	17.89	---	---	---
8	1.25	36.61	32.84	1	39.17	36.03
10	1.5	57.99	52.29	1.25	61.20	56.30
12	1.75	84.27	76.25	1.25	92.07	86.04
14	2	115.4	104.7	1.5	124.5	116.1
16	2	156.7	144.1	1.5	167.2	157.5
20	2.5	244.8	225.2	1.5	271.5	259.0
24	3	352.5	324.3	2	384.4	364.6
30	3.5	560.6	519.0	2	621.2	596.0
36	4	816.7	759.3	2	914.5	883.8
42	4.5	1121	1045	2	1264	1228
48	5	1473	1377	2	1671	1629
56	5.5	2030	1905	2	2301	2252
64	6	2676	2520	2	3031	2975
72	6	3460	3282	2	3862	3799
80	6	4344	4144	1.5	4851	4798
90	6	5591	5364	2	6099	6020
100	6	6995	6740	2	7562	7473
110	---	---	---	2	9182	9084

Bolt Thread Dimensions

The following equations can be used to calculate dimensions for ISO metric threads. The thread profile is based on a parameter H, the height of the fundamental triangle. The value of H is related to the thread pitch, P by:

$$H = \frac{\sqrt{3}}{2} P$$

	Equation, Metric Units [mm]	Source

Pitch Diameter	$d_{p.ext} = d_{nom} - 0.75 \cdot H = d_{nom} - 0.64951905 \cdot P$	Machinery's Handbook

Nominal Area	$A_{nom} = \frac{\pi}{4} d_{nom}^2$	
Tensile Stress Area	$A_t = \frac{\pi}{4} (d_{nom} - 0.9382P)^2$	ASME B1.13M, Appendix B
Minor Area (Shear Area)	$A_m = \frac{\pi}{4} d_{m.ext}^2$	

In the table above, d_{nom} is nominal diameter in millimeters and P is the thread pitch in millimeters.

Minimum Clearance Hole Diameters

The following table of clearance holes was adapted from ASME B18.2.8. The *minimum* hole diameters are given. This table also matches the table of recommended clearance holes from ASME B18.2.3.1M.

Bolt Size	Normal Fit [mm]	Close Fit [mm]	Loose Fit [mm]
M1.6	1.8	1.7	2
M2	2.4	2.2	2.6
M2.5	2.9	2.7	3.1
M3	3.4	3.2	3.6
M4	4.5	4.3	4.8
M5	5.5	5.3	5.8
M6	6.6	6.4	7
M8	9	8.4	10
M10	11	10.5	12
M12	13.5	13	14.5
M14	15.5	15	16.5
M16	17.5	17	18.5
M20	22	21	24
M24	26	25	28
M30	33	31	35
M36	39	37	42
M42	45	43	48
M48	52	50	56
M56	62	58	66
M64	70	66	74
M72	78	74	82
M80	86	82	91
M90	96	93	101
M100	107	104	112

Bolt Thread Length

$$L_{thd} = \begin{cases} 2d_{nom} + 6\ \text{mm} & L \leq 125\ \text{mm}, & d_{nom} \leq 30\ \text{mm} \\ 2d_{nom} + 12\ \text{mm} & 125 < L \leq 200\ \text{mm}, & d_{nom} \leq 48\ \text{mm} \\ 2d_{nom} + 25\ \text{mm} & L > 200\ \text{mm} & \end{cases}$$

where L is the total bolt length and d_{nom} is the nominal bolt diameter.

Hex Bolt Head Dimensions

The following table of hex bolt head dimensions was adapted from ASME B18.6.7M, Table 14, "Dimensions of Hex Head Machine Screws." This table is used for smaller size hardware.

Nominal Diameter and Thread Pitch	Width Across Flats		Head Height	
	Minimum [mm]	Maximum [mm]	Minimum [mm]	Maximum [mm]
M2 x 0.4	3.02	3.20	1.3	1.6
M2.5 x 0.45	3.82	4.00	1.8	2.1
M3 x 0.5	4.82	5.00	2.0	2.3
M3.5 x 0.6	5.32	5.50	2.3	2.6
M4 x 0.7	6.78	7.00	2.6	3.0
M5 x 0.8	7.78	8.00	3.3	3.8
M6 x 1	9.78	10.00	4.1	4.7
M8 x 1.25	12.73	13.00	5.2	6.0
M10 x 1.5	15.73	16.00	6.5	7.5
M12 x 1.75	17.73	18.00	7.8	9.0

The following table of hex bolt head dimensions was adapted from ASME B18.2.3.1M, Table 3, "Dimensions of Hex Cap Screws."

Nominal Diameter and Thread Pitch	Width Across Flats		Head Height	
	Minimum [mm]	Maximum [mm]	Minimum [mm]	Maximum [mm]
M5 x 0.8	7.78	8.00	3.35	3.65
M6 x 1	9.78	10	3.85	4.15
M8 x 1.25	12.73	13.00	5.10	5.50
M10 x 1.5	15.73	16.00	6.17	6.63
M12 x 1.75	17.73	18.00	7.24	7.76
M14 x 2	20.67	21.00	8.51	9.09
M16 x 2	23.67	24.00	9.68	10.32
M20 x 2.5	29.16	30.00	12.12	12.88
M24 x 3	35.00	36.00	14.46	15.44
M30 x 3.5	45.00	46.00	17.92	19.48
M36 x 4	53.80	55.00	21.62	23.38
M42 x 4.5	62.90	65.00	25.03	26.97
M48 x 5	72.60	75.00	28.93	31.07
M56 x 5.5	82.20	85.00	33.80	36.20
M64 x 6	91.80	95.00	38.68	41.32

M90 x 6	125.50	130.00	54.26	57.75
M100 x 6	140.00	145.00	60.10	63.90

Hex Nut Dimensions

The following table of hex nut dimensions was adapted from ASME B18.2.4.1M, Table 1, "Dimensions of Hex Nuts, Style 1." For further reference, also see ASME B18.2.4.2M, Table 1, "Dimensions of Hex Nuts, Style 2.".

Nominal Diameter and Thread Pitch	Width Across Flats		Thickness	
	Minimum [mm]	Maximum [mm]	Minimum [mm]	Maximum [mm]
M1.6 x 0.35	3.02	3.20	1.05	1.30
M2 x 0.4	3.82	4.00	1.35	1.60
M2.5 x 0.45	4.82	5.00	1.75	2.00
M3 x 0.5	5.32	5.50	2.15	2.40
M3.5 x 0.6	5.82	6.00	2.55	2.80
M4 x 0.7	6.78	7.00	2.90	3.20
M5 x 0.8	7.78	8.00	4.40	4.70
M6 x 1	9.78	10.00	4.90	5.20
M8 x 1.25	12.73	13.00	6.44	6.80
M10 x 1.5	15.73	16.00	8.04	8.40
M12 x 1.75	17.73	18.00	10.37	10.80
M14 x 2	20.67	21.00	12.10	12.80
M16 x 2	23.67	24.00	14.10	14.80
M20 x 2.5	29.16	30.00	16.90	18.00
M24 x 3	35.00	36.00	20.20	21.50
M30 x 3.5	45.00	46.00	24.30	25.60
M36 x 4	53.80	55.00	29.40	31.00

Internal Thread Dimensions

The following equations can be used to calculate internal thread dimensions for ISO metric threads:

	Equation, Metric Units [mm]	Source
Minor Diameter	$d_{m.int} = d_{nom} - 1.25 \cdot H = d_{nom} - 1.08253175 \cdot P$	Machinery's Handbook
Pitch Diameter	$d_{p.int} = d_{nom} - 0.75 \cdot H = d_{nom} - 0.64951905 \cdot P$	Machinery's Handbook

In the table above, d_{nom} is nominal diameter in millimeters and P is the thread pitch in millimeters.

Flat Washer Dimensions

The following table of flat washer dimensions was adapted from ASME B18.22M, Table 1, "Dimensions of Metric Plain Washers (General Purpose)." Plain washers come in 3 series: Regular, Narrow, and Wide.

M1.6	Narrow	1.95	2.09	3.70	4.00	0.50	0.70
M1.6	Regular	1.95	2.09	4.70	5.00	0.50	0.70
M1.6	Wide	1.95	2.09	5.70	6.00	0.60	0.90
M2	Narrow	2.50	2.64	4.70	5.00	0.60	0.90
M2	Regular	2.50	2.64	5.70	6.00	0.60	0.90
M2	Wide	2.50	2.64	7.64	8.00	0.60	0.90
M2.5	Narrow	3.00	3.14	5.70	6.00	0.60	0.90
M2.5	Regular	3.00	3.14	7.64	8.00	0.60	0.90
M2.5	Wide	3.00	3.14	9.64	10.00	0.80	1.20
M3	Narrow	3.50	3.68	6.64	7.00	0.60	0.90
M3	Regular	3.50	3.68	9.64	10.00	0.80	1.20
M3	Wide	3.50	3.68	11.57	12.00	1.00	1.40
M3.5	Narrow	4.00	4.18	8.64	9.00	0.80	1.20
M3.5	Regular	4.00	4.18	9.64	10.00	1.00	1.40
M3.5	Wide	4.00	4.18	14.57	15.00	1.20	1.75
M4	Narrow	4.70	4.88	9.64	10.00	0.80	1.20
M4	Regular	4.70	4.88	11.57	12.00	1.00	1.40
M4	Wide	4.70	4.88	15.57	16.00	1.60	2.30
M5	Narrow	5.60	5.78	10.57	11.00	1.00	1.40
M5	Regular	5.60	5.78	14.57	15.00	1.20	1.75
M5	Wide	5.60	5.78	19.48	20.00	1.60	2.30
M6	Narrow	6.65	6.87	12.57	13.00	1.20	1.75
M6	Regular	6.65	6.87	18.28	18.80	1.20	1.75
M6	Wide	6.65	6.87	24.88	25.40	1.60	2.30
M8	Narrow	8.90	9.12	18.28	18.80	1.60	2.30
M8	Regular	8.90	9.12	24.88	25.40	1.60	2.30
M8	Wide	8.90	9.12	31.38	32.00	2.00	2.80
M10	Narrow	10.85	11.12	19.48	20.00	1.60	2.30
M10	Regular	10.85	11.12	27.48	28.00	2.00	2.80
M10	Wide	10.85	11.12	38.38	39.00	2.50	3.50
M12	Narrow	13.30	13.57	24.88	25.40	2.00	2.80
M12	Regular	13.30	13.57	33.38	34.00	2.50	3.50
M12	Wide	13.30	13.57	43.38	44.00	2.50	3.50
M14	Narrow	15.25	15.52	27.48	28.00	2.00	2.80
M14	Regular	15.25	15.52	38.38	39.00	2.50	3.50
M14	Wide	15.25	15.52	49.38	50.00	3.00	4.00
M16	Narrow	17.25	17.52	31.38	32.00	2.50	3.50
M16	Regular	17.25	17.52	43.38	44.00	3.00	4.00
M16	Wide	17.25	17.68	54.80	56.00	3.50	4.60
M20	Narrow	21.80	22.13	38.38	39.00	3.00	4.00
M20	Regular	21.80	22.32	49.00	50.00	3.50	4.60
M20	Wide	21.80	22.32	64.80	66.00	4.00	5.10

M24	Wide	25.60	26.12	70.80	72.00	4.50	5.60
M30	Narrow	32.40	33.02	54.80	56.00	4.00	5.10
M30	Regular	32.40	33.02	70.80	72.00	4.50	5.60
M30	Wide	32.40	33.02	88.60	90.00	5.00	6.40
M36	Narrow	38.30	38.92	64.80	66.00	4.50	5.60
M36	Regular	38.30	38.92	88.60	90.00	5.00	6.40
M36	Wide	38.30	38.92	108.60	110.00	7.00	8.50

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- stress analysis of a bolted joint
- accounts for preload, applied axial load, and applied shear load

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