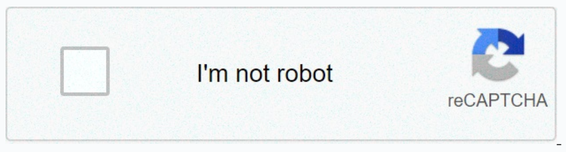

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Stud bolt spanner size chart pdf

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Skip to content piping flange stud bolt and spanner size PDF chart in Inch and MM sizes [illegible] Pining flange stud bolt and spanner size PDF chart A4 150# Class to 600# Class Download Link 900# Class to 2500# Class Download Link Flange classes > 150# 300# 600# 900# 1500#   2500# (1) > Bolt DIA = Stud OD inch Size (2) > Bolt DIA = Stud OD MM Size (3) > Bolt L   = Bolt length MM Size (4) > Sp...r Size = Bolt spanner size in MM   error: Content is protected !! Hardware threading standard This article may be too technical for most readers to understand. Please help improve it to make it understandable to non-experts, without removing the technical details. (December 2020) (Learn how and when to remove this template message) The ISO metric screw thread is the most commonly used type of general-purpose screw thread worldwide.[1] They were one of the first international standards agreed when the International Organization for Standardization (ISO) was set up in 1947.[citation needed] The "M" designation for metric screws indicates the nominal outer diameter of the screw thread, in millimetres. This is also referred to as the "major" diameter in the information below. It indicates the diameter of smooth-walled hole that a male thread (e.g. on a bolt) will pass through easily to connect to an internally threaded component (e.g. a nut) on the other side. That is, an M6 screw has a nominal outer diameter of 6 millimetres and will therefore be a well-located, co-axial fit in a hole drilled to 6 mm diameter. Basic profile Basic profile of all ISO metric screw threads, where the male part has the external thread The design principles of ISO general-purpose metric screw threads ("M" series threads) are defined in international standard ISO 68-1.[2] Each thread is characterized by its major diameter, D (Dmaj in the diagram), and its pitch, P. ISO metric threads consist of a symmetric V-shaped thread. In the plane of the thread axis, the flanks of the V have an angle of 60° to each other. The thread depth is 0.54125 × pitch.

Bolts strength grade			4.8	6.8	8.8	10.9
The minimum broken strength			392Mpa	588Mpa	784Mpa	941Mpa
Bolt	Indent Hex	Hex Socket	Recommend Torque			
mm	mm	mm	Nm	Nm	Nm	Nm
M14	22	12	69	98	137	165
M16	24	14	98	137	206	247
M18	27	14	137	206	284	341
M20	30	17	176	296	402	569
M22	32	17	225	333	539	765
M24	36	19	314	470	686	981
M27	41	19	441	637	1029	1472
M30	46	22	588	882	1225	1962
M33	50	24	735	1127	1470	2060
M36	55	27	980	1470	1764	2453
M39	60	27/30	1176	1764	2156	2943
M42	65	32	1519	2352	2744	3826
M45	70	—	1764	2744	3136	4415
M48	75	36	2254	3430	3920	5592
M52	80	36	2744	4116	4704	6573
M56	85	41	3528	5149	5978	8437
M60	90	46	4018	5978	7742	10791

The outermost 1⁄8 and the innermost 1⁄4 of the height H of the V-shape are cut off from the profile. The relationship between the height H and the pitch P is found using the following equation where θ is half the included angle of the thread, in this case 30°:[3] H = 1 2 tan θ · P = 3 2 · P ≈ 0.866025 · P {\displaystyle H={\frac {1}{2\tan \theta }}\cdot P={\frac {\sqrt {3}}{2}}\cdot P\approx 0.866025\cdot P} or P = 2 tan θ · H = 2 3 · H ≈ 1.154701 · H {\displaystyle P=2\tan \theta \cdot H={\frac {2}{\sqrt {3}}}\cdot H\approx 1.154701\cdot H} In an external (male) thread (e.g. on a bolt), the major diameter Dmaj and the minor diameter Dmin define maximum dimensions of the thread. This means that the external thread must end flat at Dmaj, but can be rounded out below the minor diameter Dmin. Conversely, in an internal (female) thread (e.g. in a nut), the major and minor diameters are minimum dimensions; therefore the thread profile must end flat at Dmin but may be rounded out beyond Dmaj. In practice this means that one can measure the diameter over the threads of a bolt to find the nominal diameter Dmaj, and the inner diameter of a nut is Dmin. The minor diameter Dmin and effective pitch diameter Dp are derived from the major diameter and pitch as D min = D maj − 2 · 5 8 · H = D maj − 5 3 8 · P ≈ D maj − 1.082532 · P D p = D maj − 2 · 3 8 · H = D maj − 3 3 8 · P ≈ D maj − 0.649519 · P {\displaystyle {\begin{aligned}D_{\text{min}}&=D_{\text{maj}}-2\cdot {\frac {5}{8}}\cdot H=D_{\text{maj}}-{\frac {5{\sqrt {3}}}{8}}\cdot P\approx D_{\text{maj}}-1.082532\cdot P\\[3pt]D_{\text{p}}&=D_{\text{maj}}-2\cdot {\frac {3}{8}}\cdot H=D_{\text{maj}}-{\frac {3{\sqrt {3}}}{8}}\cdot P\approx D_{\text{maj}}-0.649519\cdot P\end{aligned}}} Tables of the derived dimensions for screw diameters and pitches defined in ISO 261 are given in ISO 724.

Designation A metric ISO screw thread is designated by the letter M followed by the value of the nominal diameter D (the maximum thread diameter) and the pitch P, both expressed in millimetres and separated by the multiplication sign, × (e.g. M8×1.25). If the pitch is the normally used "coarse" pitch listed in ISO 261 or ISO 262, it can be omitted (e.g. M8).[4]:17 The length of a machine screw or bolt is indicated by an additional × and the length expressed in millimetres (e.g. M8×1.25×30 or M8×30).[citation needed] Tolerance classes defined in ISO 965-1 can be appended to these designations, if required (e.g. M500– 6g in external threads). External threads are designated by lowercase letter, g or h. Internal threads are designated by upper case letters, G or H.[4]:17 Preferred sizes See also: Preferred metric sizes § ISO_261 and 262 fastener diameters ISO 261 specifies a detailed list of preferred combinations of outer diameter D and pitch P for ISO metric screw threads.[5][6] ISO 262 specifies a shorter list of thread dimensions – a subset of ISO 261.[7] ISO 262 selected sizes for screws, bolts and nuts Nominal diameter, D (mm) Series Pitch, P (mm) Nominal diameter, D (mm) Series Pitch, P (mm) Coarse Fine Coarse Fine 1 R10 0.25 0.2 ⋮ 1.2 R10 0.25 0.2 16 R10 2 1.5 1.4 R20 0.3 0.2 18 R20 2.5 2 or 1.5 1.6 R10 0.35 0.2 20 R10 2.5 2 or 1.5 1.8 R20 0.35 0.2 22 R20 2.5 2 or 1.5 2 R10 0.4 0.25 24 R10 3 2 2.5 R10 0.45 0.35 27 R20 3 2 3 R10 0.5 0.35 30 R10 3.5 2 3.5 R20 0.6 0.35 33 R20 3.5 2 4 R10 0.7 0.5 36 R10 4 3 5 R10 0.8 0.5 39 R20 4 3 6 R10 1 0.75 42 R10 4.5 3 7 R20 1 0.75 45 R20 4.5 3 8 R10 1.25 1 or 0.75 48 R10 5 3 10 R10 1.5 1.25 or 1 52 R20 5 4 12 R10 1.75 1.5 or 1.25 56 R10 5.5 4 14 R20 2 1.5 60 R20 5.5 4 ⋮ 64 R10 6 4 The thread values are derived from rounded Renard series. They are defined in ISO 3, with "1st choice" sizes being from the R''10 series and "2nd choice" and "3rd choice" sizes being the remaining values from the R''20 series.[5] The coarse pitch is the commonly used default pitch for a given diameter. In addition, one or two smaller fine pitches are defined, for use in applications where the height of the normal coarse pitch would be unsuitable (e.g. threads in thin-walled pipes). The terms coarse and fine have (in this context) no relation to the manufacturing quality of the thread. In addition to coarse and fine threads, there is another division of extra fine, or superfine threads, with a very fine pitch thread. Superfine pitch metric threads are occasionally used in automotive components, such as suspension struts, and are commonly used in the aviation manufacturing industry. This is because extra fine threads are more resistant to coming loose from vibrations.[8] Fine and superfine threads also have a greater minor diameter than coarse threads, which means the bolt or stud has a greater cross-sectional area (and therefore greater load-carrying capability) for the same nominal diameter. Spanner (wrench) sizes Below are some common spanner (wrench) sizes for metric screw threads. Hexagonal (generally abbreviated to "hex") head widths (width across flats, spanner size) are for DIN 934 hex nuts and hex head bolts. Other (usually smaller) sizes may occur to reduce weight or cost, including the small series flange bolts defined in ISO 4162 which typically have hexagonal head sizes corresponding to the smaller 1st choice thread size (eg. M6 small series flange bolts have 8mm hexagonal heads, as would normally be found on M5 bolts).[9] Thread Spanner (wrench) size (mm) Hex nut, and bolt Socket-head cap screw Button-head cap screwCounter-sunk flat-head cap screw Set, or grub, screw ISO DIN M1 - 2.5 - - - M1.2 - 3 - - - M1.4 - 3 1.25 - 0.7 M1.6 3.2 1.5 0.9 0.7 M2 4 1.5 1.25 0.9 M2.5 5 2 1.5 1.3 M3 5.5 2.5 2 1.5 M3.5 6 - - - M4 7 3 2.5 2 M5 8 4 3 2.5 M6 10 5 4 3 M7 11 - - - M8 13 6 5 4 M10 16 17 8 6 5 M12 18 19 10 8 6 M14 21 22 10 - - M16 24 14 10 8 M18 27 14 12 - M20 30 17 12 10 M22 34 32 17 14 - M24 36 19 14 12 M27 41 19 17 14 M30 46 22 17 14 M33 50 24 - - M36 55 27 - - M39 60 - - - M42 65 32 - - M45 70 - - - M48 75 36 - - M52 80 36 - - M56 85 41 - - M60 90 - - - M64 95 46 - - Standards International ISO 68-1: ISO general purpose screw threads — Basic profile — Metric screw threads.

ISO 261: ISO general purpose metric screw threads — General plan. ISO 262: ISO general purpose metric screw threads — Selected sizes for screws, bolts and nuts.

ISO 965: ISO general purpose metric screw threads — Tolerances[4] ISO 965-1: Principles and basic data ISO 965-2: Limits of sizes for general purpose external and internal screw threads. ISO 965-3: Deviations for constructional screw threads ISO 965-4: Limits of sizes for hot-dip galvanized external screw threads to mate with internal screw threads tapped with tolerance position H or G after galvanizing ISO 965-5: Limits of sizes for internal screw threads to mate with hot-dip galvanized external screw threads with maximum size of tolerance position h before galvanizing National BS 3643: ISO metric screw threads ANSI/ASME B1.13M: Metric Screw Threads: M Profile ANSI/ASME B4.2-1978 (R2009): Preferred Metric Limits and Fits DIN13, page 519 Derived standards Japan has a JIS metric screw thread standard that largely follows the ISO, but with some differences in pitch and head sizes. See also ASTM A325M ASTM F568M British Association screw threads (BA) British Standard Cycle (BSC) British standard fine thread (BSF) British standard pipe thread (BSP) British Standard Whitworth (BSW) – a British thread standard with 55° profile. Buttress thread Engineering tolerance Garden hose thread List of drill and tap sizes National pipe thread (NPT) National thread Nominal size Panzergewinde Photographic Filter thread Preferred metric sizes Screw thread Square thread form Thread angle Trapezoidal thread forms United States Standard thread Unified Thread Standard (UTS, UNC, UNF, UNEF and UNS) – a US/Canadian/British thread standard that uses the same 60° profile as metric threads, but an inch-based set of diameter/pitch combinations. References ^ ISO/TC/ 1 Business Plan, 2007-03-05, Version 1.3. Table 3: The market share of each screw thread, p. 7. ^ ISO 68-1:1998 ISO general purpose screw threads – Basic profile – Part 1: Metric screw threads. International Organization for Standardization. ^ Oberg et al. 2000, p. 1706 ^ a b c ISO 965-1:2013 ISO general purpose metric screw threads — Tolerances — Part 1: Principles and basic data. International Organization for Standardization. 15 September 2013. ^ a b ISO 261:1998 ISO general purpose metric screw threads – General plan.

International Organization for Standardization. 17 December 1998. ^ ISO & DIN13 ^ ISO 262:1998 ISO general purpose metric screw threads – Selected sizes for screws, bolts and nuts. International Organization for Standardization. 17 December 1998. ^ "Final report" (PDF). ntrs.nasa.gov. Archived from the original (PDF) on 14 March 2017. Retrieved 7 July 2017. ^ "ISO 4162:2012".

METRIC SPANNER SIZES AND THREADS

SIZE	THREAD PITCH	SPANNER SIZE
M5 (5mm)	0.80mm	8mm
M6 (6mm)	1.00mm	10mm
M8 (8mm)	1.25mm	13mm
M10 (10mm)	1.50mm	17mm
M12 (12mm)	1.75mm	19mm
M14 (14mm)	2.00mm	22mm
M16 (16mm)	2.00mm	24mm
M18 (18mm)	2.50mm	27mm
M20 (20mm)	2.50mm	30mm
M22 (22mm)	2.50mm	32mm
M24 (24mm)	3.00mm	36mm

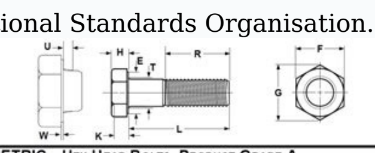
Imperial conversion to nearest metric equivalent

1/8"	3.0mm	5/8"	16.0mm
5/32"	4.0mm	3/4"	20.0mm
3/16"	5.0mm	7/8"	22.0mm
1/4"	6.0mm	1"	25.0mm
5/16"	8.0mm	1 1/4"	30.0mm
3/8"	10.0mm	1 1/2"	40.0mm
7/16"	11.0mm	1 3/4"	45.0mm
1/2"	12.0mm	2"	50.0mm
9/16"	14.0mm		

Screw Gauge conversion to nearest metric equivalent

No. 4	2.9mm
No. 6	3.5mm
No. 8	4.2mm
No. 10	4.8mm
No. 12	5.5mm
No. 14	6.3mm

International Standards Organisation. Retrieved 23 December 2022. Bibliography Oberg, Erik; Jones, Franklin D.; Horton, Holbrook L.; Ryffel, Henry H. (2000), Machinery's Handbook (26th ed.), New York: Industrial Press Inc., ISBN 0-8311-2635-3. External links Diagrams and tables of many screwthread series.



METRIC - HEX HEAD BOLTS, PRODUCT GRADE A ISO 4014

Nominal Size	Thread Pitch	R Threaded Length L <= 125 mm	R Threaded Length L>125mm <=200mm	W Washer Face Thickness Max	W Washer Face Thickness Min	T Fillet Transition Diameter Max	U Under-head Fillet Max	E Washer Face Diameter Min	H Head Height Max	H Head Height Min	F Width Across Flats Max	F Width Across Flats Min	G Width Across Corners Min	K Wrench-ing Height Min
M1.6	0.35	9	-	0.25	0.1	2	0.6	2.27	1.225	0.975	3.2	3.02	3.41	0.68
M2	0.4	10	-	0.25	0.1	2.6	0.8	3.07	1.525	1.275	4	3.82	4.32	0.89
M2.5	0.45	11	-	0.25	0.1	3.1	1	4.07	1.825	1.575	5	4.82	5.45	1.1
M3	0.5	12	-	0.4	0.15	3.6	1	4.57	2.125	1.875	5.5	5.32	6.01	1.31
M4	0.7	14	-	0.4	0.15	4.7	1.2	5.88	2.925	2.675	7	6.78	7.66	1.87
M5	0.8	16	-	0.5	0.15	5.7	1.2	6.88	3.65	3.35	8	7.78	8.79	2.35
M6	1	18	-	0.5	0.15	6.8	1.4	8.88	4.15	3.85	10	9.78	11.05	2.7
M8	1.25	22	-	0.6	0.15	9.2	2	11.63	5.45	5.15	13	12.73	14.38	3.61
M10	1.5	26	-	0.6	0.15	11.2	2	14.63	6.58	6.22	16**	15.73	17.77	4.35
M12	1.75	30	-	0.6	0.15	13.7	3	16.63	7.68	7.32	18**	17.73	20.03	5.12
M14	2	34	40	0.6	0.15	15.7	3	19.37	8.98	8.62	21**	20.67	23.36	6.03
M16	2	38	44	0.8	0.2	17.7	3	22.49	10.18	9.82	24	23.67	26.75	6.87
M20	2.5	46	52	0.8	0.2	22.4	4	28.19	12.715	12.285	30	29.67	33.53	8.6
M24	3	54	60 73*	0.8	0.2	26.4	4	33.61	15.215	14.785	36	35.38	39.98	10.35

Tolerance on Length				
	12-16mm: ±0.35	20-30mm: ±0.42	35-50mm: ±0.5	55-80mm: ±0.6
	90-120: ±0.7		130-150mm: ±0.8	

*For nominal lengths over 200mm.
**DIN 931 spec for maximum width across flats on these three diameters are 17, 19 & 22 mm, respectively.

METRIC - HEX HEAD BOLTS, PRODUCT GRADE B ISO 4014

Nominal Size	Thread Pitch	R Threaded Length L>125mm <=200mm	R Threaded Length L>200 mm	W Washer Face Thickness Max	W Washer Face Thickness Min	T Fillet Transition Diameter Max	U Under-head Fillet Max	E Washer Face Diameter Min	H Head Height Max	H Head Height Min	F Width Across Flats Max	F Width Across Flats Min	G Width Across Corners Min	K Wrench-ing Height Min
M16	2	44	-	0.8	0.2	17.7	3	22	10.29	9.71	24	23.16	26.17	6.8
M20	2.5	52	-	0.8	0.2	22.4	4	27.7	12.85	12.15	30	29.16	32.95	8.51
M24	3	60	73	0.8	0.2	26.4	4	33.25	15.35	14.65	36	35	39.55	10.26
M30	3.5	72	85	0.8	0.2	33.4	6	42.75	19.12	18.28	46	45	50.85	12.8
M36	4	84	97	0.8	0.2	39.4	6	51.11	22.92	22.08	55	53.8	60.79	15.46
M42	4.5	96	109	1	0.3	45.6	8	59.95	26.42	25.58	65	63.1	71.3	17.91
M48	5	108	121	1	0.3	52.6	10	69.45	30.42	29.58	75	73.1	82.6	20.71
M56	5.5	-	137	1	0.3	63	12	78.66	35.5	34.5	85	82.8	93.56	24.15
M64	6	-	153	1	0.3	71	13	88.16	40.5	39.5	95	92.8	104.86	27.65

Tolerance on Length				
	110-120mm: ±1.75	130-180mm: ±2.0	200-240mm: ±2.3	260-300mm: ±2.6
	320-400mm: ±2.85		420-500mm: ±3.15	

In German DIN 931: M1,6 to M39 Hexagon head bolts (Product grades A and B)(1987) IS 9519: Fasteners - Hexagon products - Width across flats, Indian standard (2013) Metric screw thread profile, dimensions and tolerances Retrieved from " You're Reading a Free Preview Page 2 is not shown in this preview.