

ASME B18.2.5M-2009

Metric 12-Point Flange Screws

AN AMERICAN NATIONAL STANDARD



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Mechanical Engineers**



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FOREWORD

The B18 Standards Committee for the standardization of bolts, screws, nuts, rivets, and similar fasteners was organized in March 1922 as the B18 Sectional Committee under the aegis of the American Engineering Standards Committee (later the American Standards Association, then the United States of America Standards Institute and, as of October 6, 1969, the American National Standards Institute, Inc.), with the Society of Automotive Engineers and the American Society of Mechanical Engineers as joint sponsors. In subsequent years, the Committee came under the sole sponsorship of the American Society of Mechanical Engineers (ASME).

B18 Subcommittee 2 was established and charged with the responsibility for the technical content of standards covering wrench head bolts and nuts. In the late 1980s, a draft of B18.2.5M was created and revised for approval. However, in April of 1995, efforts to finalize a draft of this Standard were abandoned. At its meeting on November 28, 2006, B18 Subcommittee 2 again took up the development of this Standard. This Standard is the result of those efforts.

This Standard was approved as an American National Standard on April 16, 2009.



ASME B18 COMMITTEE

Standardization of Bolts, Nuts, Rivets, Screws, Washers, and Similar Fasteners

(The following is the roster of the Committee at the time of approval of this Standard.)

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Secretary, B18 Standards Committee
The American Society of Mechanical Engineers
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The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

Proposing a Case. Cases may be issued for the purpose of providing alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee Web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the standard, the paragraph, figure or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the standard to which the proposed Case applies.

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The request for an interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his/her request in the following format:

Subject:	Cite the applicable paragraph number(s) and the topic of the inquiry.
Edition:	Cite the applicable edition of the Standard for which the interpretation is being requested.
Question:	Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in this format may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

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METRIC 12-POINT FLANGE SCREWS

1 SCOPE

This Standard covers the complete dimensional and general data for metric series 12-point flange screws recognized as American National Standard. The inclusion of dimensional data in this Standard is not intended to imply that all products described are stock production items.

2 COMPARISONS WITH ISO STANDARDS

Letter symbols designating dimensional characteristics are in accord with ISO 225, except where capital letters have been used instead of lowercase letters in the ISO standards.

3 REFERENCED STANDARDS

The following is a list of publications referenced in this Standard. Unless otherwise specified, the standard(s) referenced shall be the most recent issue at the time of order placement.

ASME B1.3M, Screw Thread Gaging Systems for Dimensional Acceptability — Inch and Metric Threads (UN, UNR, UNJ, M, and MJ)

ASME B1.13M, Metric Screw Threads — M Profile

ASME B18.2.8, Clearance Holes for Bolts, Screws, and Studs

ASME B18.2.9, Straightness Gage and Gaging for Bolts and Screws

ASME B18.12, Glossary of Terms for Mechanical Fasteners

ASME B18.18.1M, Inspection and Quality Assurance for General Purpose Fasteners

ASME B18.18.2M, Inspection and Quality Assurance for High-Volume Machine Assembly Fasteners

ASME B18.18.4M, Inspection and Quality Assurance for Highly Specialized Engineered Applications for Metric Fasteners

ASME B18.24, Part Identifying Number (PIN) Code System Standard for B18 Externally Threaded Fasteners

ASME Y14.5, Dimensioning and Tolerancing

Publisher: The American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016-5990; Order Department: 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300 (www.asme.org)

ASTM A 574M, Standard Specification for Alloy Steel Socket-Head Cap Screws

ASTM F 468M, Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use

ASTM F 568M, Standard Specification for Carbon and Alloy Steel Externally Threaded Metric Fasteners

ASTM F 738M, Standard Specification for Stainless Steel Metric Bolts, Screws, and Studs

ASTM F 788/F 788M, Standard Specification for Surface Discontinuities of Bolts, Screws and Studs, Inch and Metric Series

Publisher: American Society for Testing and Materials (ASTM International), 100 Barr Harbor Drive, West Conshohocken, PA 19428-2559 (www.astm.org)

ISO 225, Fasteners — Bolts, Screws, Studs, and Nuts — Symbols and Designations of Dimensions

Publisher: International Organization for Standardization (ISO), 1 ch. de la Voie-Creuse, Case Postale 56, CH-1211, Genève 20, Switzerland/Suisse (www.iso.org)

4 TERMINOLOGY

For definitions of terms relating to fasteners or features thereof used in this Standard, refer to ASME B18.12.

5 DIMENSIONS

(a) All dimensions in this Standard are given in millimeters (mm), and apply before any coating, unless stated otherwise.

(b) Symbols specifying geometric characteristics are in accordance with ASME Y14.5.

6 TOP OF HEAD

The top of head shall be chamfered or rounded with diameter of chamfer circle or start of rounding being equal to maximum width across flats within a tolerance of -15% of maximum width across flats.

7 HEAD HEIGHT

The head height, K , is the distance, parallel to the axis of the screw, from the plane of the bearing circle to the top of the head, not including any raised markings (see section 21).



8 WRENCHING HEIGHT

Corners of the 12 points shall be fully formed and reasonably uniform over the wrenching height, K_w . Head drive root radius, R_4 , applies to the entire length of the wrenching height, K_w (see Table 1).

9 GAGING OF 12-POINT FLANGE HEAD

The head shall be gaged using two ring gages, A and B, to demonstrate the coincidental acceptability of wrenching height, corner fill, and width across corners. Gage A shall be placed over the head and shall seat on the flange. Gage B shall be placed on the top of the head normal to the screw axis. The two gages shall not be in contact (see Table 2).

10 POSITION OF HEAD

At maximum material condition, the axis of the 12 points of the head shall be within a positional tolerance zone of the diameter specified in Table 3 with respect to the axis of the shank over a distance under the head equal to the nominal screw diameter, D . The datum shall be as close to the head as practicable, but within $0.5D$ from the head, and shall be either wholly plain body or wholly the thread major diameter, not including the thread runout or the underhead fillet.

11 FLANGE

The top surface of the flange shall be conical or slightly rounded (convex). Radius, R_2 , applies both at the corners and at the flats of the 12 points. The contour of edge at flange periphery, between the maximum flange diameter, D_c maximum, and the minimum bearing circle diameter, D_w minimum, shall be optional provided that the minimum flange edge thickness, C minimum, is maintained at the minimum bearing circle diameter, D_w minimum.

12 BEARING SURFACE

The plane formed by the bearing circle shall be perpendicular to the axis of the shank, over a length under the head equal to the nominal screw diameter, D , within the circular runout as specified in Table 3. The measurement of bearing face runout shall be made at the actual bearing circle (i.e., at the line of highest points on any radial line, e.g., by use of straight edge anvil). The datum shall be as close to the head as practical, but within $0.5D$ from the head, and shall be either wholly plain body or wholly thread major diameter, not including the thread runout or the underhead fillet.

13 FILLET

The fillet configuration at the junction of the head and shank shall conform to either Type F, as shown in Table 4,

which also specifies limits, or Type U, as shown in Table 5, at the option of the manufacturer unless the fillet type is specified by the purchaser. The fillet shall be a smooth and continuous curve fairing smoothly into the bearing surface and the shank within the limits specified. For Type F, no radius in the fillet contour shall be less than R_1 minimum specified in Table 4.

14 BODY DIAMETER

The diameter of the body, D_s , on screws that are not threaded full length shall be within the limits specified in Table 1, unless the purchaser specifies screws with reduced diameter body. For screws threaded full length, the diameter of the unthreaded shank under the head shall neither exceed the maximum body diameter, D_s maximum, specified in Table 1, nor be less than the minimum body diameter, D_s minimum, specified in Table 4 or 5. Screws of nominal lengths equal to or greater than the shortest nominal lengths specified in Table 6 may be obtained with reduced diameter body, if so specified. Where reduced diameter body (or "Type R") is specified, the body diameter, D_2 , shall be within the limits specified in Table 6. The screw shall have a shoulder under the head. The diameter, D_s , and length, L_2 , of the shoulder shall be as specified in Table 6.

15 LENGTH

The length of the screw is the distance, parallel to the axis of the screw, from the plane formed by the underhead bearing circle diameter to the extreme end of the screw. Tolerances for screw lengths are specified in Table 7.

16 POINTS

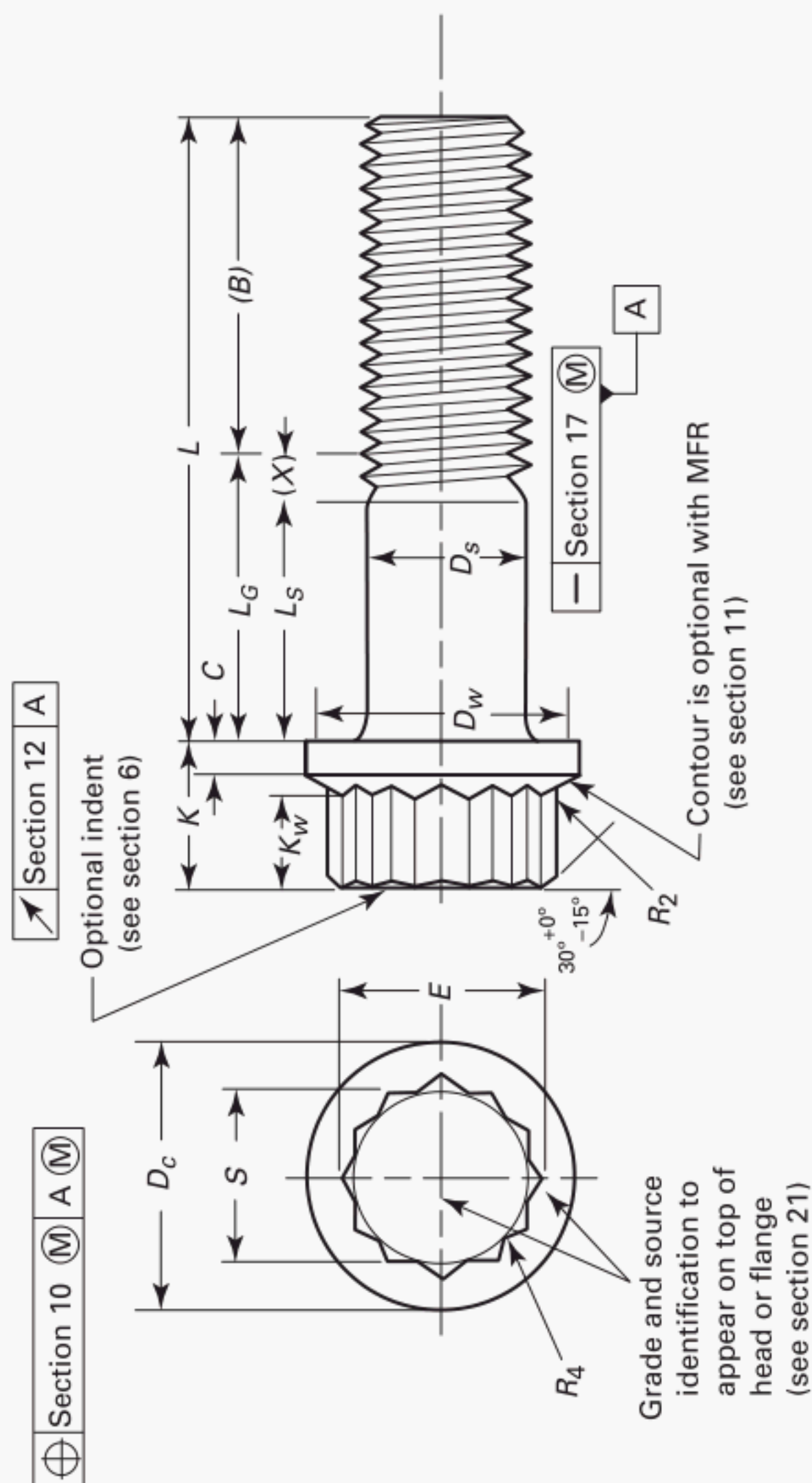
The end of the screw shall be chamfered or rounded at the manufacturer's option from approximately 0.40 mm below the minor diameter of the thread. The length of the point to the first full-formed thread at major diameter, as determined by the distance the point enters into a cylindrical NOT GO major diameter ring gage, shall not exceed U maximum, specified in Table 8. The end of the screw shall be reasonably square with the axis of the screw, and where pointed blanks are used, the slight rim or cup resulting from roll threading shall be permissible. At the manufacturer's option, the end of the screw may have a rounded point of radius, R_e , as specified in Table 8.

17 STRAIGHTNESS

At maximum material condition, the derived median line of the screw body and thread major diameter shall be within a straightness tolerance zone of a diameter

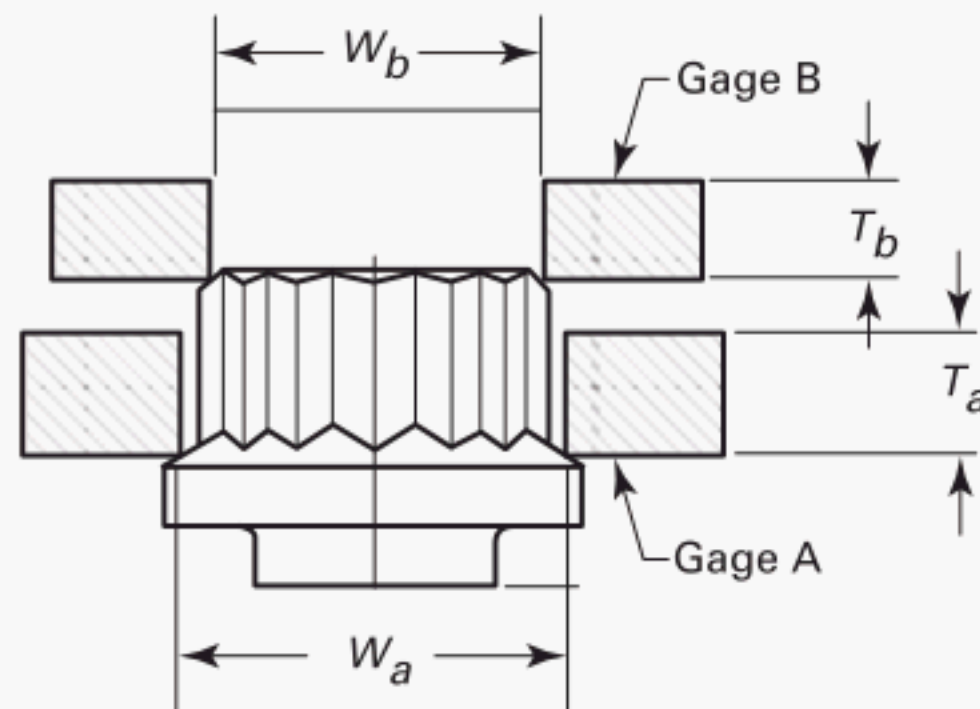


Table 1 Dimensions of 12-Point Flange Screws



Nominal Screw Diameter and Thread Pitch	Body Diameter, D_s		Width Across Flats, S		Minimum Width Across Corners, E		Flange Diameter, D_c		Minimum Bearing Circle Diameter, D_w		Head Height, K		Minimum Wrenching Height Ref, K_w	Maximum Flange Top Fillet Radius, R_2	Maximum Head Drive Root Radius, R_4
	Max.	Min.	Nom.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.			
M5 × 0.8	5	4.82	5	5.00	4.79	5.60	8.72	8.27	8.03	2.25	2.00	5.00	4.88	0.5	0.3
M6 × 1.0	6	5.82	6	6.00	5.79	6.70	10.22	9.77	9.38	2.70	2.45	6.00	5.82	0.5	0.4
M8 × 1.25	8	7.78	8	8.00	7.78	9.00	13.27	12.72	12.33	3.60	3.35	8.00	7.78	0.5	0.4
M10 × 1.5	10	9.78	10	10.00	9.78	11.20	16.27	15.69	15.33	4.50	4.13	10.00	9.78	0.5	0.5
M12 × 1.75	12	11.73	12	12.00	11.79	13.50	18.27	17.67	17.23	5.40	5.03	12.00	11.73	0.5	0.5
M14 × 2	14	13.73	14	14.00	13.79	15.80	21.33	20.67	20.17	6.30	5.93	14.00	13.73	0.5	0.7
M16 × 2	16	15.73	16	16.00	15.81	18.00	24.33	23.62	23.17	7.20	6.83	16.00	15.73	0.5	0.7
M20 × 2.5	20	19.67	20	20.00	19.82	22.50	30.33	29.55	28.87	9.00	8.50	20.00	19.67	0.5	0.8
M24 × 3	24	23.67	24	24.00	23.75	27.00	36.39	35.52	34.81	10.80	10.30	24.00	23.67	0.5	0.8
M30 × 3.5	30	29.67	30	30.00	29.72	33.80	45.39	44.52	43.61	13.50	13.00	30.00	29.67	0.5	1
M36 × 4	36	35.61	36	36.00	35.70	40.50	54.46	52.75	52.54	16.20	15.60	36.00	35.57	0.5	1.3
See sections	14	14	7, 8, 9	11	11	11, 12	11	11	7, 21	7, 21	11	...



Table 2 Gaging of 12-Point Flange Head

Nominal Screw Diameter and Thread Pitch	Gage A				Gage B		
	Inside Diameter, W_a		Thickness, T_a		Inside Diameter, W_b		Minimum Thickness, T_b
	Max.	Min.	Max.	Min.	Max.	Min.	
M5 × 0.8	5.79	5.78	1.86	1.85	5.59	5.58	3.0
M6 × 1	6.94	6.93	2.20	2.19	6.69	6.68	3.0
M8 × 1.25	9.25	9.24	2.96	2.95	8.99	8.98	4.0
M10 × 1.5	11.56	11.55	3.75	3.74	11.19	11.18	4.0
M12 × 1.75	13.87	13.86	4.50	4.49	13.49	13.48	5.0
M14 × 2	16.18	16.17	5.29	5.28	15.79	15.78	5.0
M16 × 2	18.49	18.48	6.09	6.08	17.99	17.98	6.0
M18 × 2	20.80	20.79	6.87	6.86	20.38	20.37	6.0
M20 × 2.5	23.11	23.10	7.62	7.61	22.49	22.48	7.0
M24 × 3	27.73	27.72	9.21	9.20	26.99	26.98	8.0
M30 × 3.5	34.66	34.65	11.59	11.58	34.29	34.28	9.0
M36 × 4	41.59	41.58	13.88	13.87	41.19	41.18	11.0

GENERAL NOTES:

- (a) Dimensions are in millimeters.
 (b) Refer to section 9.

Table 3 Tolerance Zones

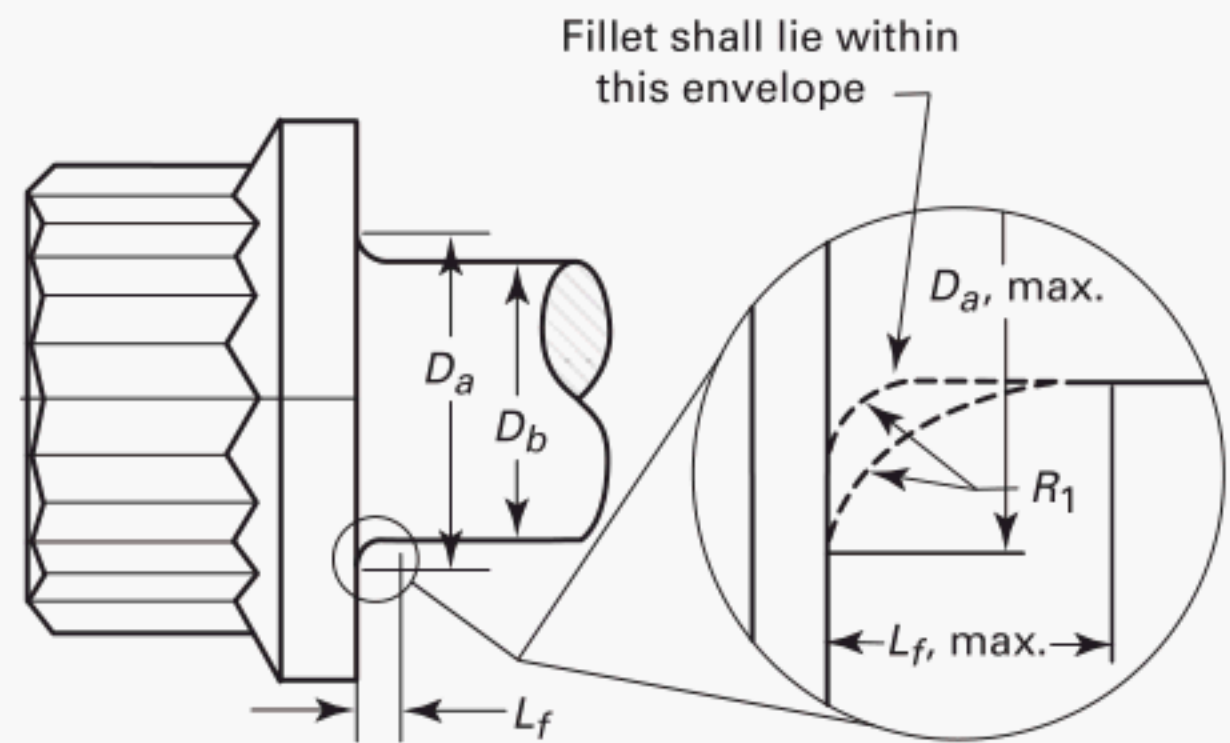
Nominal Screw Diameter and Thread Pitch	Position of Head-to-Shank Tolerance Zone Diameter at MMC	Circular Runout of Bearing Circle to Shank FIM [Note (1)]
M5 × 0.8	0.10	0.14
M6 × 1	0.12	0.16
M8 × 1.25	0.16	0.22
M10 × 1.5	0.20	0.27
M12 × 1.75	0.24	0.30
M14 × 2	0.28	0.35
M16 × 2	0.32	0.40
M20 × 2.5	0.40	0.50
M24 × 3	0.48	0.61
M30 × 3.5	0.60	0.76
M36 × 4	0.72	0.92

GENERAL NOTE: Dimensions are in millimeters.

NOTE:

- (1) Circular runout of bearing circle to shank is based on 1 deg and the minimum bearing circle diameter, D_w min.



Table 4 Dimensions of Type F Underhead Fillets

Nominal Screw Diameter and Thread Pitch	Maximum Fillet Transition Diameter, D_a	Maximum Fillet Length, L_f	Minimum Fillet Radius, R_1	Minimum Wire Diameter, D_s PD-6g
M5 × 0.8	5.7	0.6	0.2	4.36
M6 × 1	6.8	0.68	0.25	5.21
M8 × 1.25	9.2	1.02	0.4	7.04
M10 × 1.5	11.2	1.02	0.4	8.86
M12 × 1.75	13.7	1.87	0.6	10.68
M14 × 2	15.7	1.87	0.6	12.5
M16 × 2	17.7	1.87	0.6	14.5
M20 × 2.5	22.4	2.04	0.8	18.16
M24 × 3	26.4	2.04	0.8	21.8
M30 × 3.5	33.4	2.89	1	27.46
M36 × 4	39.4	2.89	1	33.12

GENERAL NOTE: Dimensions are in millimeters.

equal to 0.006 times length, expressed as a two-place decimal.

A gage and gaging procedure for checking screw straightness are given in ASME B18.2.9.

18 THREADS

18.1 Thread Series and Tolerance Class

Screw threads shall be general-purpose metric screw threads with tolerance Class 6g conforming to ASME B1.13M, unless otherwise specified by the purchaser. For screws with additive finish, size limits for tolerance Class 6g apply before coating, and the thread profile after coating is subject to acceptance using a 6h GO thread gage and tolerance Class 6g thread NOT GO thread gage.

18.2 Thread Gaging

Unless otherwise specified, dimensional acceptability of screw threads shall be determined based on System 21, ASME B1.3M.

19 THREAD LENGTH

The length of thread on screws is controlled by the maximum grip length, L_g maximum, and the minimum body length, L_s minimum, as set forth in paras. 19.1 through 19.4.

19.1 Grip Length, L_g

The grip length, L_g , is the distance, measured parallel to the axis of the screw, from the plane of the bearing circle diameter to the face of a noncounterbored, non-countersunk GO thread ring gage assembled by hand as far as the thread will permit. For standard diameter length combinations of screws, the values for L_g maximum are specified in Table 9. For diameter-length combinations not listed in Table 9, the maximum grip length for long screws that are not threaded full length is equal to the nominal screw length, L , minus the reference thread length, B , as specified in Table 10:

$$L_g \text{ maximum} = L \text{ nominal} - B$$

For short screws of nominal lengths, L , that are shorter than the lengths specified in Table 10 for screws threaded full length,

$$L_g \text{ maximum} = A \text{ maximum}$$

as specified in Table 10.

19.2 Body Length, L_s

Body length, L_s , on long screws that are not threaded full length is the distance, parallel to the axis of the screw, from the plane of the bearing circle to the last scratch of thread or top of the extrusion angle, whichever is closer to the head. For standard diameter-length combinations of screws, the values for L_s minimum are specified in Table 9. For diameter-length combinations not listed in Table 9, the minimum body length on screws that are not threaded full length is equal to the maximum grip length, as determined above, minus the transition thread length, X , as specified in Table 10:

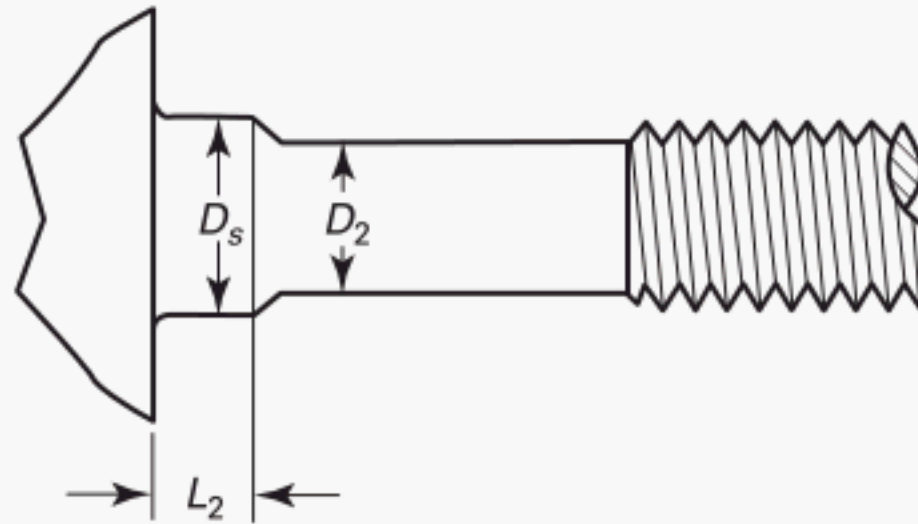
$$L_s \text{ minimum} = L_g \text{ maximum} - X$$

19.3 Thread Length, B

The thread length, B , specified in Table 10, is a reference dimension intended for calculation purposes only, and is the distance, parallel to the axis of the screw, from the extreme end of the screw to the last complete (full-form) thread.

19.4 Transition Thread Length, X

The transition thread length, X , specified in Table 10, is a reference dimension intended for calculation purposes only. It includes the length of incomplete threads and tolerances on grip length and body length. The transition

Table 6 Dimensions of Reduced Body Diameter (Type R)

Nominal Screw Diameter	Shortest Nominal Screw Length, L	Reduced Body Diameter, D_2		Shoulder Diameter, D_s [Note (1)]		Shoulder Length, L_2 [Note (1)]	
		Max.	Min.	Max.	Min.	Max.	Min.
M5	30	4.54	4.36	5	4.82	3.5	2.5
M6	35	5.39	5.21	6	5.82	4.0	3.0
M8	40	7.26	7.04	8	7.78	5.0	4.0
M10	45	9.08	8.86	10	9.78	6.0	5.0
M12	50	10.95	10.68	12	11.73	7.0	6.0
M14	55	12.77	12.50	14	13.73	8.0	7.0
M16	60	14.77	14.50	16	15.73	9.0	8.0
M20	70	18.44	18.16	20	19.67	11.0	10.0
M24	80	22.11	21.80	24	23.67	13.0	12.0
M30	100	27.78	27.46	30	29.67	16.0	15.0
M36	115	33.45	33.12	36	35.61	19.0	18.0

GENERAL NOTE: Dimensions are in millimeters.

NOTE:

(1) Shoulder is mandatory (see section 14).

Table 7 Length Tolerances, L , mm

Nominal Lengths, L , mm	Length Tolerances	
	Nominal Size, D	
	M5 Through M8	M10 Through M36
Over 6 through 10	±0.29	...
Over 10 through 18	±0.35	±0.35
Over 18 through 30	±0.42	±0.42
Over 30 through 50	±0.50	±0.50
Over 50 through 80	±0.60	±0.60
Over 80 through 120	±0.70	±0.70
Over 120 through 180	±0.80	±0.80
Over 180 through 250	±0.92	±0.92
Over 250 through 315	±1.05	±1.05
Over 315 through 400	±1.15	±1.15
Over 401 through 500	±1.25	±1.25

Table 8 Dimensions of Points

Nominal Screw Diameter	Approximate Point Radius, Reference	Maximum Point Length, U
M5	7	1.6
M6	8.4	2
M8	11.2	2.5
M10	14	3
M12	16.8	3.5
M14	19.6	4
M16	22.4	4
M20	28	5
M24	33.6	6
M30	42	7
M36	50.4	9

GENERAL NOTE: Dimensions are in millimeters.



Nominal Screw Diameter and Thread Pitch

GENERAL NOTES:

(b) Diameter-length combinations between the solid stepped lines are recommended.

(c) Screws with lengths above the dashed stepped lines are threaded full length.

Table 10 Thread Lengths

Nominal Screw Diameter and Thread Pitch	Thread Length, Basic, <i>B</i> (Reference)				Screws Threaded Full Length				
	Screw Length, <i>L</i> ≤ 125	Screw Length, <i>L</i> > 125 and ≤ 200	Screw Length, <i>L</i> > 200	Transition Thread Length, <i>X</i> (Reference)	Screw Length, <i>L</i> Under	Maximum Unthreaded Length Under Head, <i>A</i>	Screw Length, <i>L</i>		Maximum Unthreaded Length Under Head, <i>A</i>
							At Least	Under	
M5 × 0.8	16.00	22.00	35.00	4.00	10.00	1.20	10.00	25.00	2.40
M6 × 1	18.00	24.00	37.00	5.00	12.00	1.50	12.00	30.00	3.00
M8 × 1.25	22.00	28.00	41.00	6.25	16.00	1.90	16.00	40.00	4.00
M10 × 1.5	26.00	32.00	45.00	7.50	20.00	2.20	20.00	45.00	4.50
M12 × 1.75	30.00	36.00	49.00	8.75	24.00	2.60	24.00	55.00	5.30
M14 × 2	34.00	40.00	53.00	10.00	28.00	3.00	28.00	60.00	6.00
M16 × 2	38.00	44.00	57.00	10.00	32.00	3.30	32.00	65.00	6.00
M20 × 2.5	46.00	52.00	65.00	12.50	40.00	3.90	40.00	80.00	7.50
M24 × 3	54.00	60.00	73.00	15.00	48.00	4.50	48.00	90.00	9.00
M30 × 3.5	66.00	72.00	85.00	17.50	60.00	5.40	60.00	110.00	10.50
M36 × 4	...	84.00	97.00	20.00	72.00	6.30	72.00	140.00	12.00

from full-form thread to incomplete thread shall be smooth and uniform. The major diameter of the incomplete threads shall not exceed the actual major diameter of the complete (full-form) threads. The transition threads shall have a rounded root contour.

20 MATERIALS AND MECHANICAL PROPERTIES

20.1 Steel

Unless otherwise specified, steel screws shall conform to the requirements of ASTM F 568M, Property Class 12.9 or ASTM A 574M.

20.2 Corrosion-Resistant Steels

Unless otherwise specified, corrosion-resistant steel screws shall conform to the requirements of ASTM F 738M.

20.3 Nonferrous Metals

Unless otherwise specified, nonferrous screws shall conform to the requirements of ASTM F 468M.

21 IDENTIFICATION SYMBOLS

Markings shall be raised or recessed on the top of the head or raised on the top of the flange unless otherwise specified by the purchaser. Markings shall be legible to the unaided eye with the exception of corrective lenses. When raised, markings shall project not less than 0.1 mm for M14 and smaller screws, and 0.3 mm for M16 screws, above the top surface of the head or flange; and total head height (head plus markings) shall not exceed the specified maximum head height, *K* maximum, plus 0.1 mm for M5 and M6 screws, 0.2 mm for M8 and M10 screws, 0.3 mm for M12 and M14 screws, and 0.4 mm for M16 screws.

21.1 Property Class Symbols

Each screw shall be marked in accordance with the requirements of the applicable specification for its material and mechanical properties.

21.2 Source Symbols

Each screw shall be marked to identify its source (manufacturer or private label distributor).

22 FINISH

Unless otherwise specified, screws shall be furnished with one of the following "standard surfaces as manufactured," at the option of the manufacturer:

- (a) bright uncoated
- (b) thermal black oxide
- (c) chemical black oxide

Hydrogen embrittlement tests shall not be required for screws furnished in these conditions.

For other protective finishes specified with an applicable finish specification, precautions to minimize embrittlement shall be exercised.

23 WORKMANSHIP

Screws shall be free from surface imperfections such as burrs, seams, laps, loose scale, and other surface irregularities that could affect serviceability and shall conform to ASTM F 788/F 788M unless otherwise stated.

24 INSPECTION AND QUALITY ASSURANCE

Unless otherwise specified, acceptability of screws shall be determined in accordance with ASME B18.18.4M except as required in section 25.



25 DIMENSIONAL CONFORMANCE

Products shall conform to the specified dimensions. Unless otherwise specified, the following provisions shall apply for inspection of dimensional characteristics:

(a) Unless otherwise specified, the following designated characteristics shall be inspected to the inspection levels shown according to ASME B18.18.2M, and shall be within specified limits.

Characteristic Inspection	Level
Thread acceptability	C
Body diameter, D_s	C
Gaging of 12-point flange head	C
Grip length, L_g	C
Screw length, L	C
Visual inspection [Note (1)]	C

NOTE:

(1) Visual inspection shall include property class marking, source marking, fillet, and workmanship.

(b) If a documented, verifiable, statistically based in-process inspection system is used by the fastener manufacturer, inspections may be conducted at any point after which that characteristic will not be altered. Inspection sample sizes and reporting shall be in accordance with recognized quality systems such as ASME, ASTM, and ISO.

(c) For nondesignated characteristics, the provisions of ASME B18.18.1M shall apply.

26 CLEARANCE HOLES

The recommended sizes of clearance holes in material to be assembled using 12-point flange screws are the normal series given in ASME B18.2.8.

27 DESIGNATION

(a) Twelve-point flange screws shall be designated by the following data, preferably in the sequence shown: product name and designation of the standard, nominal diameter and thread pitch, nominal length, steel property class or material identification, and protective coating, if required.

EXAMPLES:

- (1) 12-point flange screw ASME B18.2.5M, M10 × 1.5 × 50, Property Class 12.9, ASTM A 574M.
- (2) 12-point flange screw ASME B18.2.5M, M16 × 1 × 30, Property Class A1-70, ASTM F 738M.

NOTE: It is common practice in ISO standards to omit thread pitch from the nominal size designation when screw threads are the metric coarse thread series; e.g., M10 is M10 × 1.5.

(b) For a recommended part identifying number (PIN) system for B18 fasteners, see ASME B18.24, when defined.

B18 AMERICAN NATIONAL STANDARDS FOR BOLTS, NUTS, RIVETS, SCREWS, WASHERS, AND SIMILAR FASTENERS

Small Solid Rivets	B18.1.1-1972 (R2006)
Large Rivets	B18.1.2-1972 (R2006)
Metric Small Solid Rivets	B18.1.3M-1983 (R2006)
Square and Hex Bolts and Screws (Inch Series)	B18.2.1-1996 (R2005)
Square and Hex Nuts (Inch Series)	B18.2.2-1987 (R2005)
Metric Hex Cap Screws	B18.2.3.1M-1999 (R2005)
Metric Formed Hex Screws	B18.2.3.2M-2005
Metric Heavy Hex Screws	B18.2.3.3M-1979 (R2001)
Metric Hex Flange Screws	B18.2.3.4M-2001 (R2006)
Metric Hex Bolts	B18.2.3.5M-1979 (R2006)
Metric Heavy Hex Bolts	B18.2.3.6M-1979 (R2006)
Metric Heavy Hex Structural Bolts	B18.2.3.7M-1979 (R2006)
Metric Hex Lag Screws	B18.2.3.8M-1981 (R2005)
Metric Heavy Hex Flange Screws	B18.2.3.9M-2001 (R2006)
Square Head Bolts (Metric Series)	B18.2.3.10M-1996 (R2003)
Metric Hex Nuts, Style 1	B18.2.4.1M-2002 (R2007)
Metric Hex Nuts, Style 2	B18.2.4.2M-2005
Metric Slotted Hex Nuts	B18.2.4.3M-1979 (R2006)
Metric Hex Flange Nuts	B18.2.4.4M-1982 (R2005)
Metric Hex Jam Nuts	B18.2.4.5M-2008
Metric Heavy Hex Nuts	B18.2.4.6M-1979 (R2003)
Metric 12-Point Flange Screws	B18.2.5M-2009
Fasteners for Use in Structural Applications	B18.2.6-2006
Metric 12-Spline Flange Screws	B18.2.7.1M-2002 (R2007)
Clearance Holes for Bolt, Screws, and Studs	B18.2.8-1999 (R2005)
Straightness Gage and Gaging for Bolts and Screws	B18.2.9-2007
Socket Cap, Shoulder, and Set Screws, Hex and Spline Keys (Inch Series)	B18.3-2003 (R2008)
Socket Head Cap Screws (Metric Series)	B18.3.1M-1986 (R2008)
Metric Series Hexagon Keys and Bits	B18.3.2M-1979 (R2008)
Hexagon Socket Head Shoulder Screws (Metric Series)	B18.3.3M-1986 (R2008)
Hexagon Socket Button Head Cap Screws (Metric Series)	B18.3.4M-1986 (R2008)
Hexagon Socket Flat Countersunk Head Cap Screws (Metric Series)	B18.3.5M-1986 (R2008)
Metric Series Socket Set Screws	B18.3.6M-1986 (R2008)
Round Head Bolts (Inch Series)	B18.5-1990 (R2003)
Metric Round Head Short Square Neck Bolts	B18.5.2.1M-2006
Metric Round Head Square Neck Bolts	B18.5.2.2M-1982 (R2005)
Wood Screws (Inch Series)	B18.6.1-1981 (R2008)
Slotted Head Cap Screws, Square Head Set Screws, and Slotted Headless Set Screws (Inch Series)	B18.6.2-1998 (R2005)
Machine Screws and Machine Screw Nuts	B18.6.3-2003 (R2008)
Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws (Inch Series)	B18.6.4-1998 (R2005)
Metric Thread-Forming and Thread-Cutting Tapping Screws	B18.6.5M-2000 (R2005)
Metric Machine Screws	B18.6.7M-1999 (R2005)
General Purpose Semi-Tubular Rivets, Full Tubular Rivets, Split Rivets and Rivet Caps	B18.7-2007
Metric General Purpose Semi-Tubular Rivets	B18.7.1M-2007
Clevis Pins and Cotter Pins (Inch Series)	B18.8.1-1994 (R2000)
Taper Pins, Dowel Pins, Straight Pins, Grooved Pins, and Spring Pins (Inch Series)	B18.8.2-2000
Spring Pins: Coiled Type, Spring Pins: Slotted, Machine Dowel Pins: Hardened Ground, and Grooved Pins (Metric Series)	B18.8.100M-2000 (R2005)
Cotter Pins, Headless Clevis Pins, and Headed Clevis Pins (Metric Series)	B18.8.200M-2000 (R2005)
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Inspection and Quality Assurance for General Purpose Fasteners	B18.18.1-2007
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Plain Washers	B18.22.1-1965 (R2008)
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Square and Rectangular Keys and Keyways.....	B18.25.1M-1996 (R2008)
Woodruff Keys and Keyways	B18.25.2M-1996 (R2008)
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Helical Coil Screw Thread Inserts — Free Running and Screw Locking (Inch Series).....	B18.29.1-1993 (R2007)
Helical Coil Screw Thread Inserts: Free Running and Screw Locking (Metric Series)	B18.29.2M-2005
Open-End Blind Rivets With Break Mandrels (Metric Series)	B18.30.1M-2000 (R2005)
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