

ASME B18.25.3M-1998

SQUARE AND RECTANGULAR KEYS AND KEYWAYS: WIDTH TOLERANCES AND DEVIATIONS GREATER THAN BASIC SIZE

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**



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Mechanical Engineers

A N A M E R I C A N N A T I O N A L S T A N D A R D

SQUARE AND RECTANGULAR KEYS AND KEYWAYS: WIDTH TOLERANCES AND DEVIATIONS GREATER THAN BASIC SIZE

ASME B18.25.3M-1998

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FOREWORD

(This Foreword is not part of ASME B18.25.3M-1998)

The ASME Subcommittee B18.25 was created in 1994. This subcommittee then assumed the responsibilities of ANSI Standards Committee B17.

The first endeavor of this subcommittee was to create U.S. standards for metric square and rectangular and Woodruff keys and keyways. ASME B18.25.1M covers square and rectangular keys and keyways based on the ISO standard with modifications to reflect U.S. manufacturing and user needs. ASME B18.25.2M covers Woodruff keys and keyways based on the ISO standard with modifications to reflect U.S. manufacturing and user needs. This Standard covers what would be referred to as a "commercial" grade of square and rectangular keys and keyways. There is no ISO standard for the keys and keyways covered by this Standard. The following document was balloted on March 6, 1998.

Following approval by ASME, the document was submitted to the American National Standards Institute. This Standard was approved by ANSI on June 17, 1998.

ASME STANDARDS COMMITTEE B18

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 Main Committee
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New York, NY 10016-5990

Proposing Revisions. Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

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.

Interpretations. Upon request, the B18 Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the B18 Main Committee.

The request for 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, which 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.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

Attending Committee Meetings. The B18 Main Committee regularly holds meetings, which are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B18 Main Committee.

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INTRODUCTORY NOTES

1.1 Scope

1.1.1 This Standard covers requirements for square and rectangular parallel keys and keyways intended for both alignment of shafts and hubs, and transmitting torque between shafts and hubs.

1.1.2 Keys covered by this Standard have a relatively loose width tolerance. All width tolerances are positive. Keys with minus width tolerances and a smaller tolerance range are covered by ASME B18.25.1M.

1.1.3 The inclusion of dimensional data in this Standard is not intended to imply that all sizes described are production stock items. Consumers should consult with suppliers concerning lists of stock items.

1.2 Comparison With ISO R773-1969 and 2491-1974

This Standard has greater tolerances than ISO Standards R773-1969 and 2491-1974. Product manufactured to this Standard is not interchangeable dimensionally with product manufactured to the ISO standards nor is product manufactured to the ISO standards dimensionally interchangeable with product manufactured to this Standard. ISO standards do not include hardened keys.

1.3 Dimensions

Unless otherwise specified, all dimensions in this Standard are in millimeters.

1.4 Tolerances

Many of the tolerances shown in Tables 1 and 2 are from ANSI B4.2 (ISO 286-1 and ISO 286-2). As a result, in addition to plus-minus tolerances which are common in the U.S., some are expressed as plus-plus deviations from the basic size. For further interpretation of these tolerances, refer to ANSI B4.2 or ISO 286.

1.5 Terminology

For definitions of terms related to fasteners or component fasteners used in this Standard, refer to ANSI B18.12.

1.6 Referenced Standards

ANSI B18.12, Glossary of Terms for Mechanical Fasteners
ASME B18.25.1M, Square and Rectangular Keys and Keyways
ISO Standard R773-69, Rectangular or Square Parallel Keys and Their Corresponding Keyways
ISO Standard 2491-1974, Thin Parallel Keys and Their Corresponding Keyways (Dimensions in millimeters)
ISO Standard 286-1-1988, ISO System of Limits and Fits — Bases of Tolerances, Deviations and Fits
ISO Standard 286-2-1988, ISO System of Limits and Fits — Tables of Standard Tolerance Grades and Limit Deviations for Holes and Shafts

Referenced ASME standards may be obtained from the American Society of Mechanical Engineers, 22 Law Drive, Box 2300, Fairfield, New Jersey 07007-2300

Referenced ANSI and ISO standards may be obtained from the American National Standards Institute, 11 West 42nd Street, New York, NY

1.7 Designation

Keys conforming to this Standard shall be designed by the following data, preferably in the sequence shown:

- (a) ASME document number,
- (b) product name,
- (c) nominal size (width (b) x height (h) x length),
- (d) style,
- (e) hardness (if other than non-hardened) or optionally by ASME B18.24.1, Part Identification Number (PIN) Code System Standard for B18 Externally Threaded Products.

EXAMPLES:

- (1) K253NAB003020302NNAA1
- (2) K253NBF010040302NNAA1

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1.8 Preferred Lengths and Tolerances

Preferred lengths and tolerances of square and rectangular keys are shown below. Tolerances are JS16 from ANSI B4.2. To minimize problems due to lack of straightness, key length should be less than 10 times the key width.

Length	±Tolerances
6	0.375
8, 10	0.45
12, 14, 16, 18	0.55
20, 22, 25, 28	0.65
32, 36, 45, 50	0.80
56, 63, 70, 80	0.95
90, 100, 110	1.1
125, 140, 160, 180	1.25
200, 220, 250	1.45
280	1.6
320, 360, 400	1.8

2 REQUIREMENTS

2.1 Material

Standard steel keys shall have a hardness of 183 HV minimum. Hardened keys shall be alloy steel through hardened to a Vickers hardness of 390 to 510 HV. When other materials and properties are required, these shall be as agreed upon by the supplier and customer.

2.2 Dimensions and Tolerances

Dimensions and tolerances for square and rectangular keys are shown in Table 1. Recommended dimensions and tolerances for keyways are shown in Table 2.

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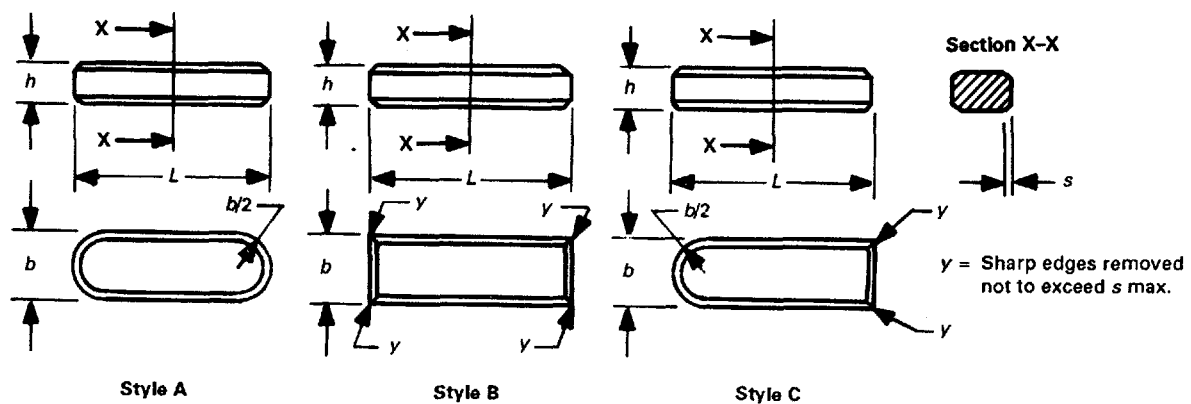


TABLE 1 DIMENSIONS FOR SQUARE AND RECTANGULAR PARALLEL KEYS

Width, <i>b</i>		Thickness, <i>h</i>		Chamfer or Radius, <i>s</i>		Range of Lengths	
Basic Size	Tolerance	Basic Size	Tolerance	Min.	Max.	From	To
Square Keys							
2	+0.040	2	+0.040	0.16	0.25	6	20
3	-0.000	3	-0.000			6	36 [Note (1)]
4	+0.045	4	+0.045			8	45 [Note (1)]
5		5		10	56 [Note (1)]		
6		6		-0.000	0.25	0.40	14
Rectangular Keys							
5	+0.045 -0.000	3	+0.160 -0.000	0.25	0.40	10	56 [Note (1)]
6	+0.050 -0.000	4	+0.175 -0.000			14	70 [Note (1)]
8		5	-0.000			18	90 [Note (1)]
8		7	+0.190 -0.000				
10		6	+0.175 -0.000	0.40	0.60	22	110 [Note (1)]
10		8	+0.190 -0.000				

(Table 1 continues on next page)

TABLE 1 DIMENSIONS FOR SQUARE AND RECTANGULAR PARALLEL KEYS (CONT'D)

Width, <i>b</i>		Thickness, <i>h</i>		Chamfer or Radius, <i>s</i>		Range of Lengths	
Basic Size	Tolerance	Basic Size	Tolerance	Min.	Max.	From	To
Rectangular Keys							
12	+0.075 -0.000	6	+0.175 -0.000	0.40	0.60	28	140 [Note (1)]
12		8	+0.190 -0.000				
14		6	+0.175 -0.000			36	160 [Note (1)]
14		9	+0.190 -0.000			45	180 [Note (1)]
16		7					
16		10					
18		7					
18		11	+0.210 -0.000			50	200 [Note (1)]
20	+0.050 -0.033	8	+0.190 -0.000	0.60	0.80	56	220 [Note (1)]
20		12	+0.210 -0.000			63	260 [Note (1)]
22		6	+0.175 -0.000			70	280 [Note (1)]
22		14	+0.210 -0.000			80	320 [Note (1)]
25		9	+0.210 -0.000			90	360 [Note (1)]
25		14	+0.190 -0.000			100	400 [Note (1)]
28		10	+0.210 -0.000				
28		16	+0.280 -0.000			1.00	1.20
32	11						
32	18						
36	12	+0.280 -0.000					
36	20						
40	22						
45	25						
50	28						
56	+0.125 -0.000	32	+0.310 -0.000	1.60	2.00		
63		32					
70		36					
80		40					
90	+0.135	45		2.50	3.00		
100	-0.000	50					

NOTE:

(1) See 1.8 for preferred maximum length of key.

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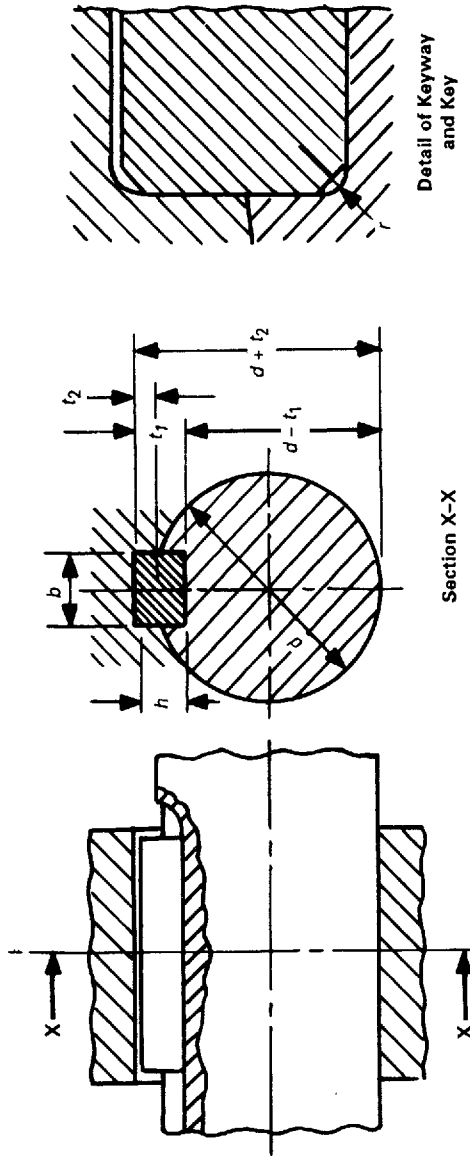


TABLE 2 DIMENSIONS AND TOLERANCES FOR KEYWAYS

Keyway																
Key Size, b x h	Width										Depth			Radius, r		
	Tolerance and Resulting Fit [Note (1)]										Shaft, t ₁		Hub, t ₂			
	Normal Fit				Close Fit		Free Fit		Nom- inal	Tolerance	Nom- inal	Tolerance				
	Shaft		Hub		Shaft		Hub									
	Tolerance	Fit	Tolerance	Fit	Tolerance	Fit	Tolerance	Fit								
2x2	2	+0.040	0.040L	+0.050	0.050L	+0.034	0.034L	+0.066					0.066L	+0.086	0.086L	1.2
3x3	3	+0.010	0.030T	+0.025	0.015T	-0.008	0.032T	+0.040	0T	+0.060	0.020L	1.8	1.4			
4x4	4											2.5	1.8			
5x3	5											1.8	1.4	0.25		
5x5	5	+0.045	0.045L	+0.060	0.060L	+0.035	0.035L	+0.075	0.075L	+0.105	0.105L	3	2.8			
6x4	6	+0.015	0.030T	+0.015	0.015T	-0.005	0.040T	+0.045	0T	+0.075	0.030L	2.5	1.8			
6x6	6											3.5	2.8			
8x5	8											3	2.8			
8x7	8	+0.055	0.055L	+0.075	0.075L	+0.040	0.040L	+0.090	0.090L	+0.130	0.130L	4	+0.2	3.3	+0.2	0.6
10x6	10	+0.015	0.035T	+0.035	0.015T	-0.000	0.050T	+0.050	0T	+0.090	0.040L	3.5	+0.1	2.8	+0.1	
													0		0	
													+0.2	3.3	+0.2	
10x8	10											5	+0.2	0	0	

(Table 2 continues on next page)

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

Small Solid Rivets	B18.1.1-1972(R1995)
Large Rivets	B18.1.2-1972(R1995)
Metric Small Solid Rivets	B18.1.3M-1983(R1995)
Square and Hex Bolts and Screws (Inch Series)	B18.2.1-1996
Square and Hex Nuts (Inch Series)	B18.2.2-1987(R1993)
Metric Hex Cap Screws	B18.2.3.1M-1979(R1995)
Metric Formed Hex Screws	B18.2.3.2M-1979(R1995)
Metric Heavy Hex Screws	B18.2.3.3M-1979(R1995)
Metric Hex Flange Screws	B18.2.3.4M-1984(R1995)
Metric Hex Bolts	B18.2.3.5M-1979(R1995)
Metric Heavy Hex Bolts	B18.2.3.6M-1979(R1995)
Metric Heavy Hex Structural Bolts	B18.2.3.7M-1979(R1995)
Metric Hex Lag Screws	B18.2.3.8M-1981(R1991)
Metric Heavy Hex Flange Screws	B18.2.3.9M-1984(R1995)
Square Head Bolts (Metric Series)	B18.2.3.10M-1996
Metric Hex Nuts, Style 1	B18.2.4.1M-1996
Metric Hex Nuts, Style 2	B18.2.4.2M-1979(R1995)
Metric Slotted Hex Nuts	B18.2.4.3M-1979(R1995)
Metric Hex Flange Nuts	B18.4.4.4M-1982(R1993)
Metric Hex Jam Nuts	B18.2.4.5M-1979(R1990)
Metric Heavy Hex Nuts	B18.2.4.6M-1979(R1990)
Fasteners for Use in Structural Applications	B18.2.6-1996
Socket Cap, Shoulder, and Set Screws, Hex and Spline Keys (Inch Series)	B18.3-1998
Socket Head Cap Screws (Metric Series)	B18.3.1M-1986(R1993)
Metric Series Hexagon Keys and Bits	B18.3.2M-1979(R1990)
Hexagon Socket Head Shoulder Screws (Metric Series)	B18.3.3M-1986(R1993)
Hexagon Socket Button Head Cap Screws (Metric Series)	B18.3.4M-1986(R1993)
Hexagon Socket Flat Countersunk Head Cap Screws (Metric Series)	B18.3.5M-1986(R1993)
Metric Series Socket Set Screws	B18.3.6M-1986(R1993)
Round Head Bolts (Inch Series)	B18.5-1990
Metric Round Head Short Square Neck Bolts	B18.5.2.1M-1996
Metric Round Head Square Neck Bolts	B18.5.2.2M-1982
Round Head Square Neck Bolts With Large Head (Metric Series)	B18.5.2.3M-1990
Wood Screws (Inch Series)	B18.6.1-1981(R1991)
Slotted Head Cap Screws, Square Head Set Screws, and Slotted Headless Set Screws	B18.6.2-1972(R1993)
Machine Screws and Machine Screw Nuts	B18.6.3-1972(R1983)
Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws (Inch Series)	B18.6.4-1981(R1991)
Metric Thread Forming and Thread Cutting Tapping Screws	B18.6.5M-1986(R1993)
Metric Machine Screws	B18.6.7M-1985(R1993)
General Purpose Semi-Tubular Rivets, Full Tubular Rivets, Split Rivets and Rivet Caps	B18.7-1972(R1992)
Metric General Purpose Semi-Tubular Rivets	B18.7.1M-1984(R1992)
Clevis Pins and Cotter Pins (Inch Series)	B18.8.1-1994
Taper Pins, Dowel Pins, Straight Pins, Grooved Pins, and Spring Pins (Inch Series)	B18.8.2-1995
Spring Pins — Coiled Type (Metric Series)	B18.8.3M-1995
Spring Pins — Slotted (Metric Series)	B18.8.4M-1994
Machine Dowel Pins — Hardened Ground (Metric Series)	B18.8.5M-1994
Cotter Pins (Metric Series)	B18.8.6M-1995
Headless Clevis Pins (Metric Series)	B18.8.7M-1994
Headed Clevis Pins (Metric Series)	B18.8.8M-1994
Grooved Pins (Metric Series)	B18.8.9M-1998
Plow Bolts (Inch Series)	B18.9-1996
Track Bolts and Nuts	B18.10-1982(R1992)
Miniature Screws	B18.11-1961(R1992)
Glossary of Terms for Mechanical Fasteners	B18.12-1962(R1991)
Screw and Washer Assemblies — Sems (Inch Series)	B18.13-1996
Screw and Washer Assemblies — Sems (Metric Series)	B18.13.1M-1991
Forged Eyebolts	B18.15-1985(R1995)
Mechanical and Performance Requirements for Prevailing-Torque Type Steel Metric Hex Nuts and Hex Flange Nuts	B18.16.1M-1979(R1995)
Torque-Tension Test Requirements for Prevailing-Torque Type Steel Metric Hex Nuts and Hex Flange Nuts	B18.16.2M-1979(R1995)

Dimensional Requirements for Prevailing-Torque Type Steel

Metric Hex Nuts and Hex Flange Nuts	B18.16.3M-1982(R1993)
Wing Nuts, Thumb Screws, and Wing Screws	B18.17-1968(R1983)
Inspection and Quality Assurance for General Purpose Fasteners	B18.18.1M-1987(R1993)
Inspection and Quality Assurance for High-Volume Machine Assembly Fasteners	B18.18.2M-1987(R1993)
Inspection and Quality Assurance for Special Purpose Fasteners	B18.18.3M-1987(R1993)
Inspection and Quality Assurance for Fasteners for Highly Specialized Engineered Applications	B18.18.4M-1987(R1993)
Inspection and Quality Assurance Plan Requiring In-Process Inspection and Controls	B18.18.5M-1998
Quality Assurance Plan for Fasteners Produced in a Third Party Accreditation System	B18.18.6M-1998
Quality Assurance Plan for Fasteners Produced in a Customer Approved Control Plan	B18.18.7M-1998
Lock Washers (Inch Series)	B18.21.1-1994
Lock Washers (Metric Series)	B18.21.2M-1994
Metric Plain Washers	B18.22M-1981(R1990)
Plain Washers	B18.22.1-1965(R1990)
Part Identifying Number (Pin) Code System Standard for B18 Externally Threaded Products	B18.24.1-1996
Part Identifying Number (PIN) Code System Standard for B18 Nonthreaded Products	B18.24.3-1998
Square and Rectangular Keys and Keyways	B18.25.1M-1996
Woodruff Keys and Keyways	B18.25.2M-1996
Square and Rectangular Keys and Keyways: Width Tolerances and Deviations Greater Than Basic Size	B18.25.3M-1998
Helical Coil Screw Thread Inserts (Inch Series)	B18.29.1-1993

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