

ASME B18.25.1M-1996

SQUARE AND RECTANGULAR KEYS AND KEYWAYS

AN AMERICAN NATIONAL STANDARD

GOVERNMENT KEY WORDS

KEY, MACHINE, SQUARE

KEY, MACHINE, RECTANGULAR



The American Society of
Mechanical Engineers



The American Society of
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

ASME B18.25.1M-1996

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FOREWORD

(This Foreword is not part of ASME B18.25.1M-1996)

In 1994 ASME Subcommittee B18.25 was created. 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 Woodruff and square and rectangular keys. This Standard covering Woodruff keys is based on the ISO standard with modifications to reflect U.S. manufacturing and user needs. The final document was balloted June 29, 1995.

Following approval by ASME, the document was submitted to the American National Standards Institute. This Standard was approved by ANSI on February 5, 1996.

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

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SQUARE AND RECTANGULAR KEYS AND KEYWAYS

1 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 tight width tolerance. The deviations are less than the basic size. Keys with greater width tolerance and with deviations greater than the basic size are covered by ASME B18.25.3M.

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 is based on ISO Standards R773-1969, Rectangular or Square Parallel Keys and Their Corresponding Keyways and 2491-1974, Thin Parallel Keys and Their Corresponding Keyways (Dimensions in millimeters). Product manufactured to this Standard will meet the ISO standards. Because of tighter width tolerances in this Standard, products manufactured to the ISO standard may not meet the requirements of this Standard.

This Standard differs from ISO in that it:

- (a) does not restrict the corners of a key to be chamfered but allows either a chamfer or a radius on the key;
- (b) specifies a key material hardness rather than a tensile property.

1.3 Dimensions

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

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 or minus-minus 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 relating to fasteners or component features used in this Standard, refer to ANSI B18.12, Glossary of Terms of Mechanical Fasteners.

1.6 Referenced Standards

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

Referenced ISO standards may be obtained from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036-8002.

1.7 Designation

Keys conforming to this Standard shall be designated 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) form;
- (e) hardness (if other than non-hardened).

EXAMPLES:

- (1) ASME B18.25.1M Square Key 3 x 3 x 15 form B.
- (2) ASME B18.25.1M Rectangular Key 10 x 6 x 20 form C hardened.

1.8 Preferred Lengths and Tolerances

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

Length	±Tolerances
6	0.38
8, 10	0.45
12, 14, 16, 18	0.56
20, 22, 25, 28	0.65
32, 36, 40, 45, 50	0.8
56, 63, 70, 80	0.95
90, 100, 110	1.1
125, 140, 150, 180	1.25
200, 220, 250	1.45
280	1.6
320, 360, 400	1.8

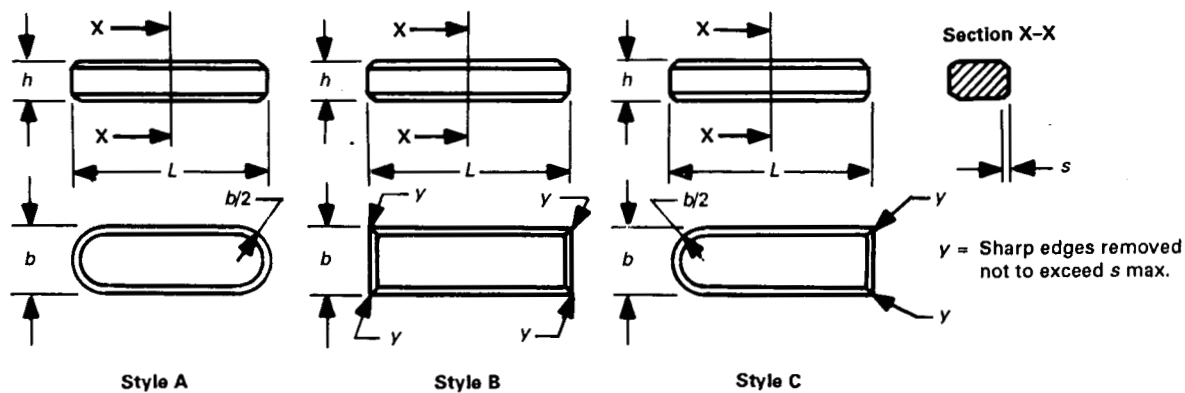
2 REQUIREMENTS

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.

**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 h8	Basic Size	Tolerance Sq. h8; Rect. h11	Min.	Max.	From	To
Square Keys							
2	0 −0.014	2	0 −0.014	0.16	0.25	6	20 [Note (1)]
3		3				6	36 [Note (1)]
4		4				8	45 [Note (1)]
5	0 −0.018	5		0.25	0.40	10	56 [Note (1)]
6		6	0 −0.018			14	70 [Note (1)]
Rectangular Keys							
5	0 −0.018	3	0 −0.060	0.25	0.40	10	56 [Note (1)]
6		4	0			14	70 [Note (1)]
8	0 −0.022	5	−0.075			18	90 [Note (1)]
8		7	0 −0.090				
10		6	0 −0.075	0.40	0.60	22	110 [Note (1)]
10		8	0 −0.090				
12	0 −0.027	6	0 −0.075	0.40	0.60	28	140 [Note (1)]
12		8	0 −0.090				
14		6	0 −0.075			36	160 [Note (1)]
14		9	0 −0.090				
16		7				45	180 [Note (1)]
16		10					
18		7	50			200 [Note (1)]	
18		11					0 −0.110

(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 h8	Basic Size	Tolerance Sq. h8; Rect. h11	Min.	Max.	From	To
Rectangular Keys (Cont'd)							
20	0 -0.033	8	0 -0.090	0.60	0.80	56	220 [Note (1)]
20		12	0 -0.110			63	260 [Note (1)]
22		6	0 -0.075			70	280 [Note (1)]
22		14	0 -0.110			80	320 [Note (1)]
25		9	0 -0.090			90	360 [Note (1)]
25		14	0 -0.110			100	400 [Note (1)]
28		10	0 -0.090				
28	0 -0.039	16	0 -0.110	1.00	1.20		
32		11					
32		18					
36		12					
36		20	0				
40		22	0.130				
45	25	0 -0.160	1.60	2.00			
50	28						
56	32						
63	32						
70	36		2.50	3.00			
80	40						
90	45						
100	50						

NOTE:

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

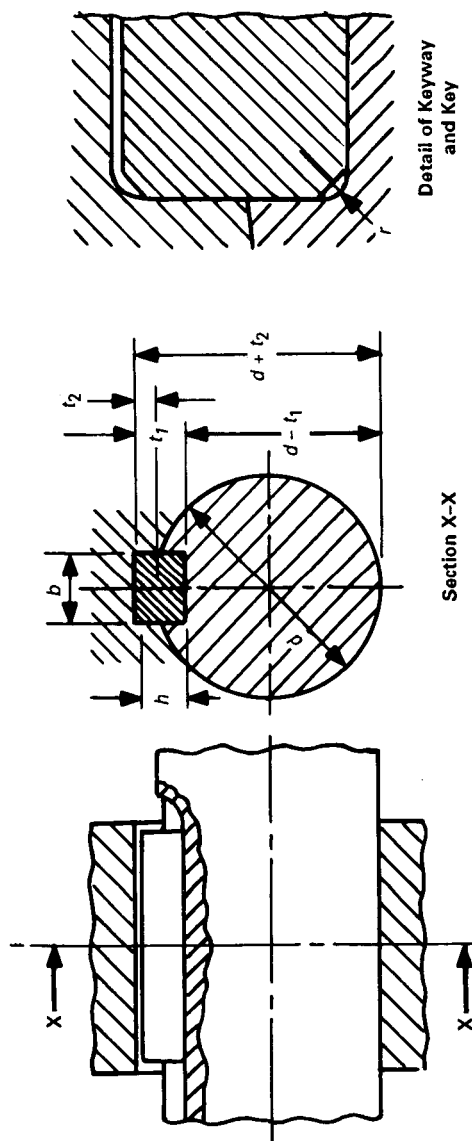


TABLE 2 DIMENSIONS AND TOLERANCES FOR KEYWAYS

Key size <i>b</i> × <i>h</i>	Keyway																					
	Width														Depth						Radius, <i>r</i>	
	Tolerance [Note (1)] and Resulting Fits [Note (2)]																					
	Normal Fit						Close Fit				Free Fit				Shaft, <i>t</i> ₁		Hub, <i>t</i> ₂					
	Shaft		Hub		Shaft and Hub		Shaft		Hub		Shaft		Hub									
Basic Size	N9	Fit	JS9	Fit	P9	Fit	Fit	H9	Fit	D10	Fit	Hub	Basic Size	Toler- ance	Basic Size	Toler- ance	Min.	Max.				
2×2	2	−0.004 −0.029	0.010L 0.029T	+0.0125 −0.0125	0.0265L 0.0125T	−0.006 −0.031	0.008L 0.031T	+0.025 0	0.039L 0T	+0.060 +0.020	0.074L 0.020L		1.2 1.8 2.5 1.8		1 1.4 1.8 1.4		0.08	0.16				
3×3	3																					
4×4	4																					
5×3	5													+0.1 0								
5×5	5	0 −0.030	0.018L 0.030T	+0.0150 −0.0150	0.033L 0.015T	−0.012 −0.042	0.006L 0.042T	+0.030 0	0.048L 0T	+0.078 +0.030	0.096L 0.030L		3 2.5 3.5 3		2.8 1.8 2.8 2.8		0.16	0.25				
6×4	6																					
6×6	6													+0.2 0								
8×5	8																					
8×7	8																					
10×6	10	0 −0.036	0.022L 0.036T	+0.0180 −0.0180	0.040L 0.018T	−0.015 −0.051	0.007L 0.051T	+0.036 0	0.058L 0T	+0.098 +0.040	0.120L 0.040L		3.5 5		2.8 3.3		0.25	0.4				
10×8	10													+0.2 0								

(Table 2 continues on next page)

TABLE 2 DIMENSIONS AND TOLERANCES FOR KEYWAYS (CONT'D)

Keyway																
Key size <i>b</i> × <i>h</i>	Width										Depth		Radius, <i>r</i>			
	Tolerance [Note (1)] and Resulting Fits [Note (2)]										Shaft, <i>t</i> ₁		Hub, <i>t</i> ₂		Min.	Max.
	Normal Fit			Close Fit			Free Fit				Basic Size	Toler- ance	Basic Size	Toler- ance		
	Shaft		Hub	Shaft and Hub		Shaft		Hub								
	N9	Fit	JS9	Fit	P9	Fit	H9	Fit	D10	Fit						
12×6	12										3.5	+0.1 0	2.8	+0.1 0	0.25	0.4
12×8	12										5	+0.2 0	3.3	+0.2 0		
14×6	14	0 -0.043	0.027L 0.043T	+0.0215 -0.0215	-0.018 -0.061	0.009L 0.061T	+0.043 0	0.070L 0T	+0.120 +0.050	0.147L 0.050L	3.5	+0.1 0	2.8	+0.1 0		
14×9	14										5.5		3.8			
16×7	16										4		3.3		0.4	0.06
16×10	16										6		4.3			
18×7	18										4		3.3			
18×11	18										7		4.4			
20×8	20										5	+0.2 0	3.3	+0.2 0	0.4	0.06
20×12	20										7.5		4.9			
22×9	22										5.5		3.8			
22×14	22	0 -0.052	0.033L 0.052T	+0.026 -0.026	-0.022 -0.074	0.011L 0.074T	+0.052 0	0.085L 0T	+0.149 +0.065	0.182L 0.065L	9		5.4			
25×9	25										5.5		3.8		0.4	0.06
25×14	25										9		5.4			
28×10	28										6		4.3			
28×16	28										10		6.4			
32×11	32										11		4.4		0.4	0.06
32×18	32										18		7.4			
36×12	36	0	0.039L	+0.031	-0.026	0.013L	+0.062	0.101L	+0.180	0.219L	12		4.9			
36×20	36	-0.062	0.062T	-0.031	-0.088	0.088T	0	0T	+0.080	0.080L	12	+0.3 0	8.4	+0.3 0		
40×22	40										13		9.4		0.4	0.06
45×25	45										15		10.4			
50×28	50										17		11.4			

(Table 2 continues on next page)

TABLE 2 DIMENSIONS AND TOLERANCES FOR KEYWAYS (CONT'D)

Key size <i>b</i> x <i>h</i>	Keyway															
	Width										Depth				Radius, <i>r</i>	
	Tolerance [Note (1)] and Resulting Fits [Note (2)]										Shaft, <i>t</i> ₁		Hub, <i>t</i> ₂			
	Normal Fit				Close Fit				Free Fit				Basic Size	Toler- ance	Basic Size	Toler- ance
	Shaft		Hub		Shaft and Hub		Shaft		Hub		D10	Fit				
	N9	Fit	JS9	Fit	P9	Fit	H9	Fit	H9	Fit			Fit	Fit		
56×32	0	0.046L	+0.037	0.083L	-0.032	0.014L	+0.074	0.120L	+0.220	0.266L	20	12.4	12.4	1.2	1.6	
63×32	-0.074	0.074T	-0.037	0.037T	-0.106	0.106T	0	0T	+0.100	0.100L	20	12.4	12.4			
70×36											22	+0.3	14.4	+0.3		
80×40											25	0	15.4	0		
90×45	0	0.054L	+0.0435	0.0975L	-0.037	0.017L	+0.087	0.139L	+0.260	0.314L	28	17.4	17.4	2	2.5	
100×50	-0.087	0.87T	-0.0435	0.0435T	-0.1254	0.1254T	0	0T	+0.120	0.120L	31	19.5	19.5			

NOTES:

- (1) Note that some of the tolerances are expressed as plus-plus. See para. 1.4 for more information.
 (2) Resulting fits: L indicates a clearance between the key and keyway; T indicates an interference between the key and the keyway.

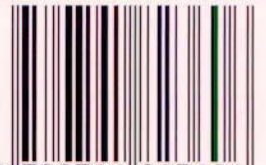
AMERICAN NATIONAL STANDARDS FOR BOLTS, NUTS, RIVETS, SCREWS, WASHERS, AND SIMILAR FASTENERS

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