ASME B18.25.2M 96 0759670 0574052 986

ASME B18.25.2M-1996

WOODRUFF KEYS AND KEYWAYS

AN AMERICAN NATIONAL STANDARD

GOVERNMENT KEY WORDS
KEY, WOODRUFF

The American Society of Mechanical Engineers

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale



The American Society of Mechanical Engineers

AN AMERICAN NATIONAL STANDARD

WOODRUFF KEYS AND KEYWAYS

ASME B18.25.2M-1996

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

Date of Issuance: July 31, 1996

This Standard will be revised when the Society approves the issuance of a new edition. There will be no addenda or written interpretations of the requirements of this Standard issued to this edition.

ASME is the registered trademark of The American Society of Mechanical Engineers.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The Consensus committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment which provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not "approve," "rate," or "endorse" any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable Letters Patent, nor assume any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations issued in accordance with governing ASME procedures and policies which preclude the issuance of interpretations by individual volunteers.

No part of this document may be reproduced in any form,
in an electronic retrieval system or otherwise,
without the prior written permission of the publisher.

The American Society of Mechanical Engineers
345 E. 47th Street New York, NY 10017

Copyright © 1996 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All Rights Reserved
Printed in U.S.A.

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS

Not for Resale

FOREWORD

(This Foreword is not part of ASME B18.25.2M-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 square and rectangular 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.

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

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.)

OFFICERS

K. E. McCullough, *Chair*
D. A. Clever, *Vice Chair*
E. Schwartz, *Vice Chair*
A. M. Nickles, *Secretary*

COMMITTEE PERSONNEL

J. C. Akins, Safety Socket Screw Corp.
J. B. Belford, Lawson Products, Inc.
D. J. Broomfield, ITW Shakeproof
J. A. Buda, SPS Technologies
R. M. Byrne, Trade Association Management, Inc.
D. A. Clever, Deere & Co.
A. P. Cookman, Ford Motor Co.
T. Collier, Cam-Tech Industries, Inc.
A. C. DiCola, Wrought Washer Manufacturer, Inc.
B. A. Dusina, Federal Screw Works
G. A. Gobb, Consultant
R. J. Harrington, Spirol International Corp.
A. Herskovitz, U. S. Army ARDEC
A. C. Hood, ACH Technologies
F. W. Kern, Society of Automotive Engineers
W. H. Kopke, ITW Shakeproof Industrial Products
P. D. Korsmo, Consultant
J. G. Langenstein, Caterpillar, Inc.
M. Levinson, ITW Shakeproof
J. B. Levy, Consultant
A. D. McCrindle, Stelco Fasteners, Ltd.
K. E. McCullough, Consultant
D. J. Miley, Caterpillar, Inc.
M. D. Prasad, General Motors Corp.
W. Schevey, BGM Fastener Co.
E. Schwartz, Consultant
R. M. Serabin, Bowman Distribution
R. D. Strong, General Motors Corp.
J. F. Sullivan, National Fasteners Distribution Assoc.
R. L. Tennis, Caterpillar, Inc.
S. W. Vass, Lake Erie Screw Corp.
R. G. Weber, BEI School of Engineering
C. J. Wilson, Industrial Fasteners Institute
R. B. Wright, Wright Tool Co.
J. G. Zeratsky, National Rivet & Mfg. Co.

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

SUBCOMMITTEE 25 — KEYS AND KEYWAYS

J. G. Langenstein, *Chair,* Caterpillar, Inc.
D. A. Clever, Deere & Co.
A. Herskovitz, U. S. Army ARDEC
W. H. Kopke, ITW Shakeproof Industrial Products
K. E. McCullough, Consultant
R. S. Merrick, Jr., Standard Horse Nail Corp.
J. F. Sullivan, National Fasteners Distribution Assoc.
D. J. Trinko, Medalist Inc.
C. J. Wilson, Industrial Fasteners Institute

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

CONTENTS

Foreword iii
Standards Committee Roster v

1 Introductory Notes 1
1.1 Scope 1
1.2 Comparison With ISO 3912-1977 1
1.3 Dimensions 1
1.4 Tolerances 1
1.5 Terminology 1
1.6 Referenced Standards 1
1.7 Designation 1

2 Requirements 2
2.1 Material 2
2.2 Dimensions and Tolerances 2

Tables
1 Dimensions for Woodruff Keys 3
2 Dimensions for Woodruff Keyways 4

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

WOODRUFF KEYS AND KEYWAYS

1 INTRODUCTORY NOTES

1.1 Scope

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

1.1.2 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 3912-1977

This Standard is based on ISO 3912-1977, Woodruff Keys and Keyways. However, to improve manufacturability, tolerances are decreased for the keyway width. The resulting fit is approximately the same. Keys manufactured to this Standard are functionally interchangeable with keys manufactured to the ISO standard. Because of tighter width tolerances in this Standard, products manufactured to the ISO standard may not meet the requirements of this Standard.

This Standard also differs from ISO 3912 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;

(c) specifies h12 rather than h11 for the tolerance of the height of the keys.

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, Preferred Metric Limits and Fits (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 relating to fasteners or component features used in this Standard, refer to ANSI B18.12, Glossary of Terms for 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, NJ 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), height (h_1), diameter (D)];

(d) form;

(e) hardness (if other than non-hardened).

EXAMPLES:

(1) ASME B18.25.2M, Woodruff Key 6 x 10 x 25 normal hardened;

(2) ASME B18.25.2M, Woodruff Key 3 x 5 x 13 Whitney.

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

2 REQUIREMENTS

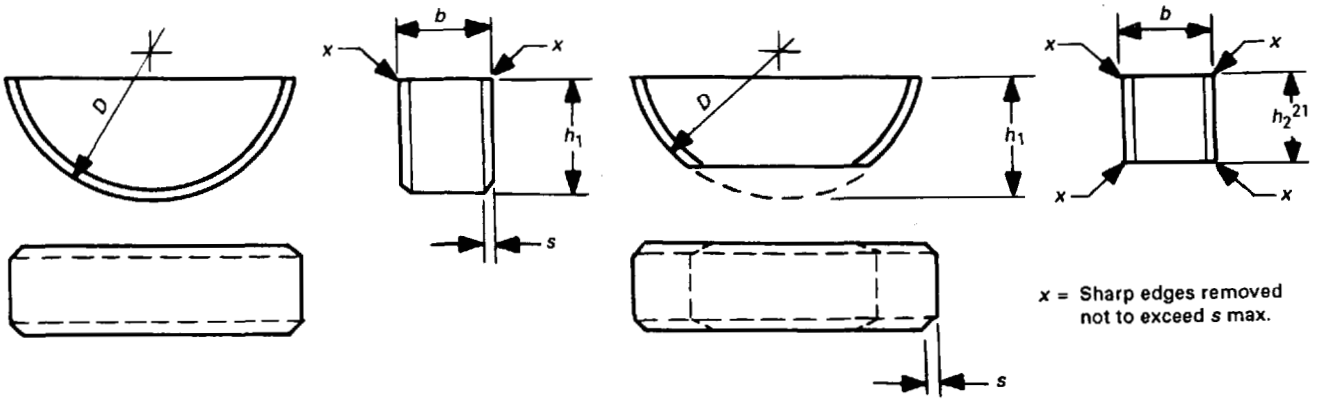
2.1 *Material*

Standard steel keys shall have a hardness of 183 HV min. 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 Woodruff keys are shown in Table 1. Recommended dimensions and tolerances for keyways are shown in Table 2.

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS Not for Resale



Normal Form (Full Radius Type)

Whitney Form[1] (Flat Bottom Type)

TABLE 1 DIMENSIONS FOR WOODRUFF KEYS

Key Size $b \times h_1 \times D$	Width		Height				Diameter, D		Chamfer or Radius, s	
	b	Tolerance	h_1	Tolerance h12	h_2 [Notes (1), (2)]	Tolerance h12	D	Tolerance h12	Min.	Max.
1×1.4×4	1		1.4		1.1		4			
				0				0 −0.120		
				−0.10		0				
1.5×2.6×7	1.5		2.6		2.1	−0.10	7			
2×2.6×7	2		2.6		2.1		7			
2×3.7×10	2		3.7		3.0		10		0.16	0.25
				0				0		
2.5×3.7×10	2.5		3.7	−0.12	3.0		10	−0.150		
3×5×13	3		5.0		4.0		13			
3×6.5×16	3		6.5		5.2		16	0		
4×6.5×16	4		6.5		5.2		16	−0.180		
4×7.5×19	4		7.5		6.0		19			
		0				0				
		−0.025				−0.12		0 −0.210		
5×6.5×16	5		6.5	0	5.2		16			
				−0.15				0 −0.180		
5×7.5×19	5		7.5		6.0		19		0.25	0.40
5×9×22	5		9.0		7.2		22			
6×9×22	6		9.0		7.2		22			
						0		0		
6×10×25	6		10.0		8.0	−0.15	25	−0.210		
8×11×28	8		11.0	0	8.8		28			
10×13×32	10		13.0	−0.18	10.4	0 −0.18	32	0 −0.250	0.40	0.60

NOTES:
(1) This form shall only be used by agreement between the supplier and customer.
(2) Height h_2 is based on 0.8 times height h_1.

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS Not for Resale

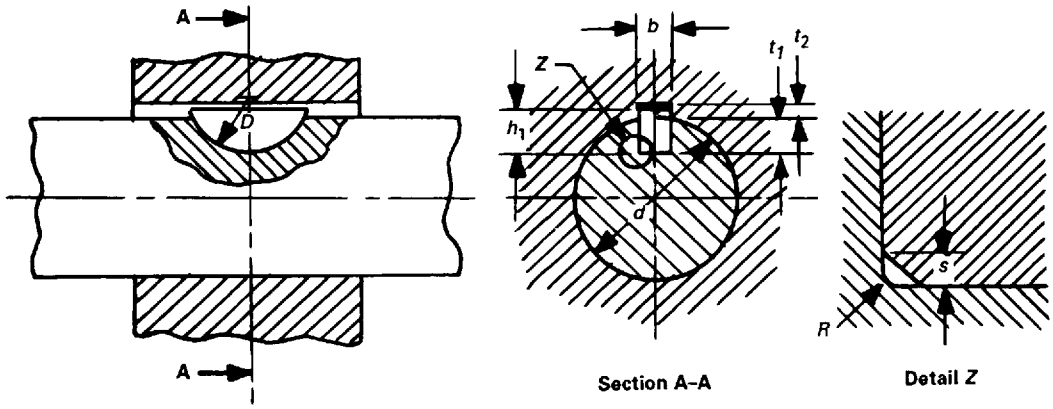


TABLE 2 DIMENSIONS FOR WOODRUFF KEYWAYS

	Keyway											
	Width						Depth				Radius, *R*	
		Tolerance [Note (1)]					Shaft, t_1		Hub, t_2			
		Normal Fit		Close Fit	Free Fit							
Key Size $b \times h_1 \times D^2$	Basic Size	Shaft N9	Hub JS9	Shaft and Hub P9	Shaft H9	Hub D10	Basic Size	Tolerance	Basic Size	Tolerance	Max.	Min.
1×1.4×4	1						1.0		0.6			
1.5×2.6×7	1.5						2.0		0.8			
								+0.1				
2×2.6×7	2	−0.004	+0.0125	−0.006	+0.025	+0.60	1.8	0	1.0			
2×3.7×10	2	−0.029	−0.0125	−0.031	0	+0.20	2.9		1.0		0.16	0.08
2.5×3.7×10	2.5						2.7		1.2			
3×5×13	3						3.8		1.4	+0.1		
3×6.5×16	3						5.3		1.4	0		
4×6.5×16	4						5.0	+0.2	1.8			
4×7.5×19	4						6.0	0	1.8			
5×6.5×16	5	−0.030	+0.015	−0.012	+0.030	+0.078	4.5		2.3			
		0	−0.015	−0.042	0	+0.030	5.5		2.3		0.25	0.16
5×7.5×19	5											
5×9×22	5						7.0		2.3			
6×9×22	6						6.5		2.8			
								+0.3				
6×10×25	6						7.5	0	2.8			
8×11×28	8	0	+0.018	−0.015	+0.036	+0.098	8.0		3.3	+0.2		
		−0.036	−0.018	−0.051	0	+0.040				0	0.4	0.25
10×13×32	10						10.0		3.3			

NOTES:
(1) Note that some of the tolerances are expressed as plus-plus or minus-minus. See para. 1.4 for more information.
(2) The nominal key diameter is the minimum keyway diameter.

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

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 ..... B18.2.1-1981(R1992)
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)
Metric Hex Nuts, Style 1 ..... B18.2.4.1M-1979(R1995)
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)
Socket Cap, Shoulder and Set Screws — Inch Series ..... B18.3-1986(R1995)
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-1981(R1995)
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
Plow Bolts ..... B18.9-1958(R1995)
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) ..... B18.13-1987(R1993)
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)

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale

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)
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)
Square and Rectangular Keys and Keyways B18.25.1M-1996
Woodruff Keys and Keyways B18.25.2M-1996
Helical Coil Screw Thread Inserts (Inch Series) B18.29.1-1993

The ASME Publications Catalog shows a complete list of all the Standards published by the Society. For a complimentary catalog, or the latest information about our publications, call 1-800-THE-ASME (1-800-843-2763).

Copyright ASME International
Provided by IHS under license with ASME
No reproduction or networking permitted without license from IHS
Not for Resale