BRITISH STANDARD

BS 4235-2: 1977
ISO 3912:1977

CONFIRMED
OCTOBER 1985

Specification for

Metric keys and keyways —

Part 2: Woodruff keys and keyways

[ISO title: Woodruff keys and keyways]

UDC 621.886.6

Cooperating organizations

The Mechanical Engineering Standards Committee, under whose direction this British Standard was prepared, consists of representatives from the following Government departments and professional and industrial organizations:

Associated Offices Technical Committees
Association of Consulting Engineers
Association of Hydraulic Equipment Manufacturers Ltd.
Association of Mining Electrical and Mechanical Engineers
British Compressed Air Society
British Electrical and Allied Manufacturers' Association
British Gas Corporation
British Gear Manufacturers' Association
British Internal Combustion Engine Manufacturers' Association
British Mechanical Engineering Confederation
British Pump Manufacturers' Association
British Steel Corporation
British Steel Industry
Crown Agents for Oversea Governments and Administration
Department of the Environment
Department of Trade
Electricity Supply Industry in England and Wales
Engineering Equipment Users' Association
Federation of Manufacturers of Construction Equipment and Cranes
Health and Safety Executive — HM Factory Inspectorate
Institution of Civil Engineers
Institution of Gas Engineers
Institution of Heating and Ventilating Engineers
Institution of Mechanical Engineers
Institution of Plant Engineers
Institution of Production Engineers
London Transport Executive
Machine Tool Trades Association
Ministry of Defence*
Ministry of Defence, Army Department
National Coal Board
National Engineering Laboratory — Department of Trade
Process Plan Association
Railway Industry Association of Great Britain*
Royal Institute of British Architects
Society of Motor Manufacturers and Traders
Telecommunication Engineering and Manufacturing Association
The Water-tube Boilermakers' Association

The organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

Department of Industry, National Engineering Laboratory
Institution of Engineers and Shipbuilders in Scotland
Milling Cutter and Reamer Association
Steel Works Plant Association

This British Standard, having been prepared under the direction of the Mechanical Engineering Standards Committee, was published under the authority of the Executive Board on 31 October 1977

The following BSI references relate to the work on this standard:
Committee reference MEE/4
Draft for comment 75/76178 DC

ISBN 0 580 09537 1

Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

Foreword

This Part of this British Standard has been prepared under the direction of the Mechanical Engineering Standards Committee. It is identical with ISO 3912 "*Woodruff keys and keyways*".

Terminology and conventions. The text of the international standard has been accepted as suitable for publication, without deviation, as a British Standard. Certain terminology and conventions are used, however, that are not identical with those used in British Standards. Attention is therefore drawn to the following.

Wherever the words "International Standard", relating to this publication, appear, they should be interpreted as "British Standard".

The comma has been used throughout as a decimal marker. In British Standards it is current practice to use a full point (a full stop on the baseline) as the decimal marker.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 4 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This International Standard specifies the dimensional characteristics of Woodruff keys and of the alternative Whitney key and of the corresponding keyways in shaft and hub. It also gives the relationship to be observed between the diameter of the shaft and the section of the key for both torque transmission and positional applications.

2 Field of application

This International Standard is intended for general application to cylindrical shafts and cylindrical shaft ends.[1)]

3 Dimensions and tolerances of keys

See the figures and Table 1 on page 2.

4 Material

Steel having a tensile strength of not less than 590 N/mm^2 in the finished condition, unless otherwise agreed between the interested parties.

NOTE The mechanical properties of the steel will be specified completely at a later date.

5 Shape, dimensions and tolerances of keyways

See the figure and Table 2 on page 3.

6 Relationship of shaft diameter to key size

Two series of relationships between shaft diameter and key size are given in Table 3, page 4: series 1 for torque applications and series 2 for positional applications (for example where, as in the case of an interference fit, the torque is not transmitted through the key but through the shaft/hub interface).

7 Designation

A woodruff key shall be designated by its width and its height and by reference to this International Standard.

Examples

— For a key of normal form and with a section $b \times h_1 = 5 \times 6{,}5$ mm:

Key ISO 3912 – 5 × 6,5

— For a key of Whitney form and with a section $b \times h_2 = 5 \times 5{,}2$ mm:

Key ISO 3912 – 5 × 5,2

[1)] The relationship between the diameter of a conical shaft end and the key section is given in ISO... (in preparation).

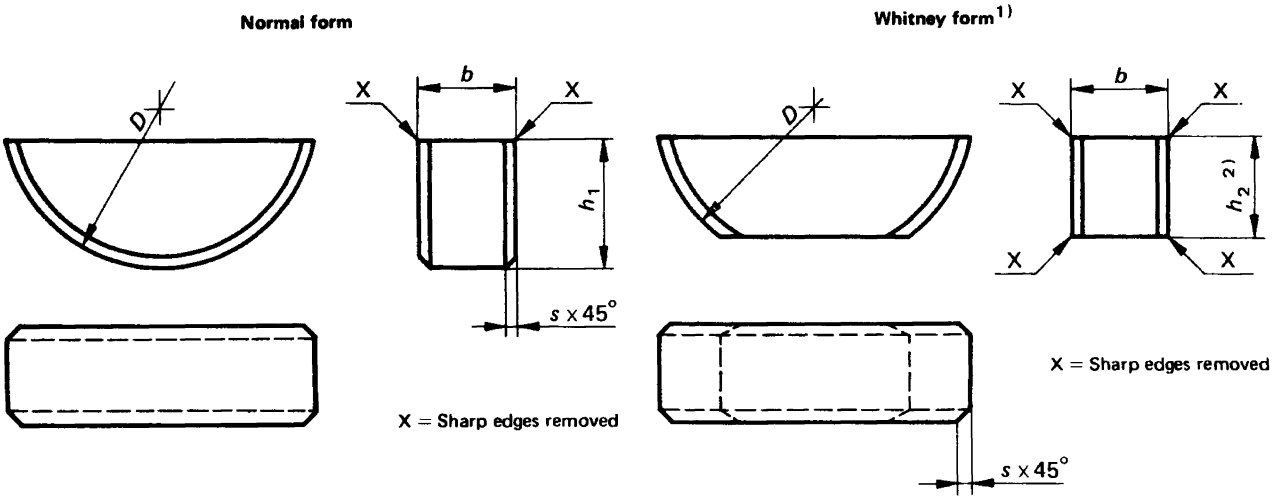

Table 1 — Dimensions and tolerances of keys

Values in millimetres

Width b		Height h_1		Diameter D		Chamfer s	
nominal	tolerance h9[a]	nominal	tolerance h11	nominal	tolerance h12	min.	max.
1,0	0 / − 0,025	1,4	0 / − 0,060	4	0 / − 0,120	0,16	0,25
1,5		2,6		7	0 / − 0,150	0,16	0,25
2,0		2,6		7		0,16	0,25
2,0		3,7	0 / − 0,075	10		0,16	0,25
2,5		3,7		10		0,16	0,25
3,0		5,0		13	0 / − 0,180	0,16	0,25
3,0		6,5	0 / − 0,090	16		0,16	0,25
4,0	0 / − 0,030	6,5		16		0,25	0,40
4,0		7,5		19	0 / − 0,210	0,25	0,40
5,0		6,5		16	0 / − 0,180	0,25	0,40
5,0		7,5		19	0 / − 0,210	0,25	0,40
5,0		9,0		22		0,25	0,40
6,0		9,0		22		0,25	0,40
6,0		10,0		25		0,25	0,40
8,0	0 / − 0,036	11,0	0 / − 0,110	28		0,40	0,60
10,0		13,0		32	0 / − 0,250	0,40	0,60

[a] A closer tolerance may be adopted subject to agreement between the interested parties.
1) This form should only be adopted by agreement between the interested parties.
2) In this case the height h_2 of the key shall be equal to 0,8 times the height of the Woodruff key of normal form, i.e. $h_2 = 0{,}8\ h_1$. The calculated value shall be rounded off to the nearest 0,1 mm.

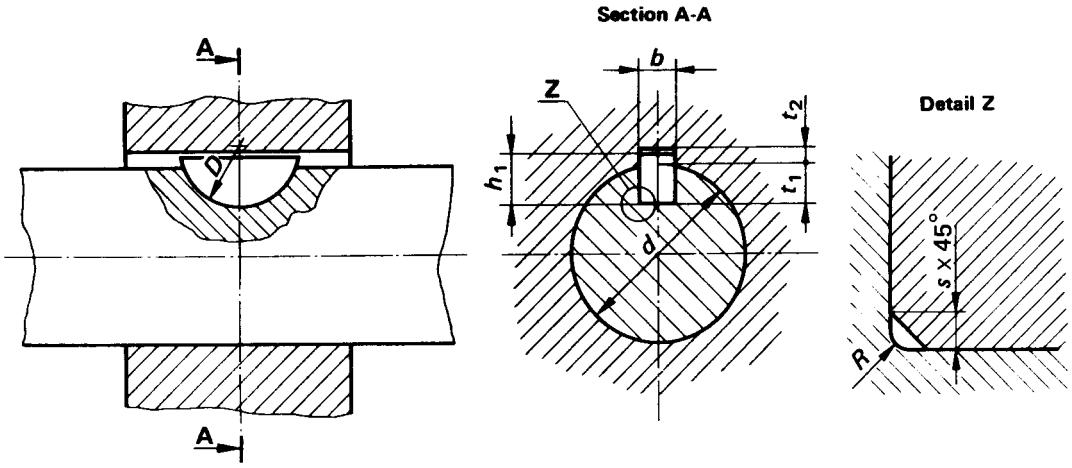

Table 2 — Dimensions and tolerances of keyways

Values in millimetres

Key size of normal form $b \times h_1 \times D$ or equivalent Whitney form	Width b				Depth				Radius R	
	nominal	Tolerance			Shaft t_1		Hub t_2			
		Normal fit		Close fit						
		Shaft N9	Hub J_s9	Shaft and hub P9	nominal	tolerance	nominal	tolerance	max.	min.
1,0 × 1,4 × 4	1,0				1,0		0,6		0,16	0,08
1,5 × 2,6 × 7	1,5				2,0		0,8		0,16	0,08
2,0 × 2,6 × 7	2,0				1,8	+ 0,1 0	1,0		0,16	0,08
2,0 × 3,7 × 10	2,0	− 0,004 − 0,029	+ 0,012 − 0,012	− 0,006 − 0,031	2,9		1,0		0,16	0,08
2,5 × 3,7 × 10	2,5				2,7		1,2		0,16	0,08
3,0 × 5,0 × 13	3,0				3,8		1,4		0,16	0,08
3,0 × 6,5 × 16	3,0				5,3		1,4	+ 0,1 0	0,16	0,08
4,0 × 6,5 × 16	4,0				5,0		1,8		0,25	0,16
4,0 × 7,5 × 19	4,0				6,0	+ 0,2 0	1,8		0,25	0,16
5,0 × 6,5 × 16	5,0				4,5		2,3		0,25	0,16
5,0 × 7,5 × 19	5,0	0 − 0,030	+ 0,015 − 0,015	− 0,012 − 0,042	5,5		2,3		0,25	0,16
5,0 × 9,0 × 22	5,0				7,0		2,3		0,25	0,16
6,0 × 9,0 × 22	6,0				6,5		2,8		0,25	0,16
6,0 × 10,0 × 25	6,0				7,5	+ 0,3 0	2,8		0,25	0,16
8,0 × 11,0 × 28	8,0				8,0		3,3	+ 0,2 0	0,40	0,25
10,0 × 13,0 × 32,0	10,0	0 − 0,036	+ 0,018 − 0,018	− 0,015 − 0,051	10,0		3,3		0,40	0,25

Table 3 — Relationship: shaft diameter — key size

Dimensions in millimetres

Shaft diameter d				Key size of normal form $b \times h_1 \times D$ or equivalent Whitney form
Series 1		Series 2		
Over	Including	Over	Including	
3	4	3	4	1,0 × 1,4 × 4
4	5	4	6	1,5 × 2,6 × 7
5	6	6	8	2,0 × 2,6 × 7
6	7	8	10	2,0 × 3,7 × 10
7	8	10	12	2,5 × 3,7 × 10
8	10	12	15	3,0 × 5,0 × 13
10	12	15	18	3,0 × 6,5 × 16
12	14	18	20	4,0 × 6,5 × 16
14	16	20	22	4,0 × 7,5 × 19
16	18	22	25	5,0 × 6,5 × 16
18	20	25	28	5,0 × 7,5 × 19
20	22	28	32	5,0 × 9,0 × 22
22	25	32	36	6,0 × 9,0 × 22
25	28	36	40	6,0 × 10,0 × 25
28	32	40	—	8,0 × 11,0 × 28
32	38	—	—	10,0 × 13,0 × 32

blank

BS 4235-2: 1977
ISO 3912:1977

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: 020 8996 9000. Fax: 020 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: 020 8996 9001. Fax: 020 8996 7001.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: 020 8996 7111. Fax: 020 8996 7048.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: 020 8996 7002. Fax: 020 8996 7001.

Copyright

BSI
389 Chiswick High Road
London
W4 4AL