

Specification for

Straight-sided splines for cylindrical shafts: metric nominal dimensions, tolerances and gauging requirements —

[ISO title: Straight-sided splines for
cylindrical shafts with internal
centering — Dimensions, tolerances and
verification]

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Machinery and Components Standards Committee (MCE/-) to Technical Committee MCE/2, upon which the following bodies were represented:

- British Gear Manufacturers' Association
- British Pump Manufacturers' Association
- Department of Trade and Industry (National Engineering Laboratory)
- Institution of Engineers and Shipbuilders in Scotland
- Institution of Production Engineers
- Lloyds Register of Shipping
- Milling Cutter Association

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- Agricultural Engineers' Association
- Association of Hydraulic Equipment Manufacturers
- British Engine Group of the Society of Motor Manufacturers and Traders Limited
- Gauge and Tool Makers' Association
- Institution of Engineering Designers
- Ministry of Defence
- Society of British Aerospace Companies Limited
- Society of Motor Manufacturers and Traders limited

This British Standard, having been prepared under the direction of the Machinery and Components Standards Committee, was published under the authority of the Board of BSI and comes into effect on 29 August 1986

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National foreword

This British Standard has been prepared under the direction of the Machinery and Components Standards Committee. It is identical with ISO 14-1982 “*Straight-sided splines for cylindrical shafts with internal centering — Dimensions, tolerances and verification*”, which was prepared by Technical Committee ISO/TC 32 of the International Organization for Standardization (ISO) and in the development of which the United Kingdom played an active part. This edition of BS 5686 supersedes the 1979 edition, which is withdrawn. For the first time, BS 5686 includes tolerances and gauging requirements for straight-sided splines.

Terminology and conventions. The text of the international standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

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

Wherever the words “International Standard” appear, referring to this standard, they should be read as “British Standard”.

Cross-references. The Technical Committee has reviewed the provisions of ISO/R 1938 and ISO 3670, to which reference is made in the text, and has decided that they are acceptable for use in conjunction with this standard.

NOTE *Typographical error.* In the title of clause 4, delete “shaft” and substitute “shafts”.

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 14, an inside back cover 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 and field of application

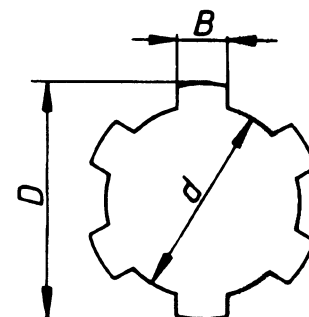
Shaft (or hub) $6 \times 23 \times 26$

This International Standard lays down dimensions, in millimetres, of straight-sided splines for cylindrical shafts with internal centering, light series and medium series.

This International Standard also specifies control methods and corresponding gauges.

2 Dimensions

The nominal dimensions common to shaft and hub, d , D and B are given in Table 1. The tolerances are indicated in Table 2 and Table 3.



3 Designation

The profile of a splined shaft or hub shall be designated by stating, in the following order: the number of splines N , the minor diameter d and the outside diameter D , these three numbers being separated by the sign $\times$; for example:

Table 1 — Nominal dimensions

d mm	Light series				Medium series			
	Designation	N	D mm	B mm	Designation	N	D mm	B mm
11					$6 \times 11 \times 14$	6	14	3
13					$6 \times 13 \times 16$	6	16	3,5
16					$6 \times 16 \times 20$	6	20	4
18					$6 \times 18 \times 22$	6	22	5
21					$6 \times 21 \times 25$	6	25	5
23	$6 \times 23 \times 26$	6	26	6	$6 \times 23 \times 28$	6	28	6
26	$6 \times 26 \times 30$	6	30	6	$6 \times 26 \times 32$	6	32	6
28	$6 \times 28 \times 32$	6	32	7	$6 \times 28 \times 34$	6	34	7
32	$8 \times 32 \times 36$	8	36	6	$8 \times 32 \times 38$	8	38	6
36	$8 \times 36 \times 40$	8	40	7	$8 \times 36 \times 42$	8	42	7
42	$8 \times 42 \times 46$	8	46	8	$8 \times 42 \times 48$	8	48	8
46	$8 \times 46 \times 50$	8	50	9	$8 \times 46 \times 54$	8	54	9
52	$8 \times 52 \times 58$	8	58	10	$8 \times 52 \times 60$	8	60	10
56	$8 \times 56 \times 62$	8	62	10	$8 \times 56 \times 65$	8	65	10
62	$8 \times 62 \times 68$	8	68	12	$8 \times 62 \times 72$	8	72	12
72	$10 \times 72 \times 78$	10	78	12	$10 \times 72 \times 82$	10	82	12
82	$10 \times 82 \times 88$	10	88	12	$10 \times 82 \times 92$	10	92	12
92	$10 \times 92 \times 98$	10	98	14	$10 \times 92 \times 102$	10	102	14
102	$10 \times 102 \times 108$	10	108	16	$10 \times 102 \times 112$	10	112	16
112	$10 \times 112 \times 120$	10	120	18	$10 \times 112 \times 125$	10	125	18

4 Tolerances on holes and shaft

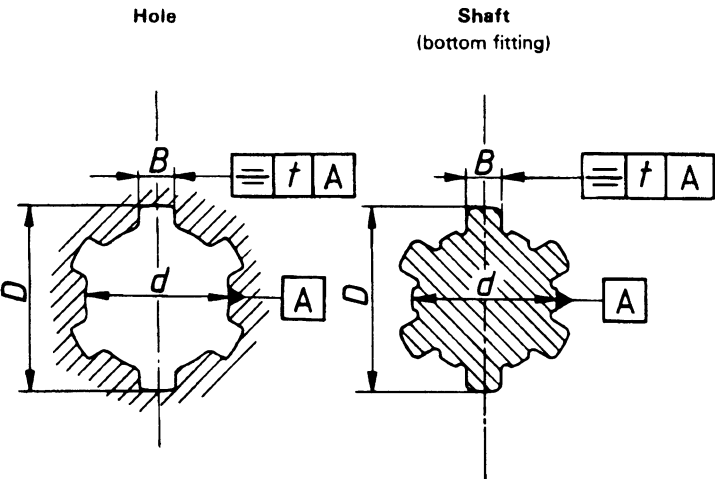


Table 2 — Tolerances on holes and shafts

Tolerances on hole						Tolerances on shaft			Mounting type
Not treated after broaching			Treated after broaching						
<i>B</i>	<i>D</i>	<i>d</i>	<i>B</i>	<i>D</i>	<i>d</i>	<i>B</i>	<i>D</i>	<i>d</i>	
H9	H10	H7	H11	H10	H7	d10	a11	f7	Sliding
						f9	a11	g7	Close sliding
						h10	a11	h7	Fixed

Table 3 — Tolerances on symmetry

Dimensions in millimetres

Spline width	B	3	3,5 4 5 6	7 8 9 10	12 14 16 18
Tolerance of symmetry t		0,010 (IT7)	0,012 (IT7)	0,015 (IT7)	0,018 (IT7)

The dimensional tolerances on holes and shafts are given in Table 2, whilst Table 3 indicates tolerances on symmetry.

With certain milling cutters, it is possible for special applications to produce splines without bottom tool clearance with a very reduced fillet radius between the spline side and the minor diameter d (for example, milling cutters with fixed working positions).

The tolerances in Table 2 above relate to entirely finished workpieces (shafts and hubs). Tooling should therefore be different for untreated workpieces or workpieces treated before machining and for workpieces treated after machining.

The tolerance specified on B includes the index variation (and the symmetry variation).

For alignment errors, see 5.7.

5 Gauging

5.1 General

This clause gives general information concerning gauges and gauge control; all the other requirements concerning gauges are given in clause 6 for the case where limit gauges are used, which is not compulsory. Direct measurement gauging can be permitted by previous agreement between the parties concerned according to rules to be defined to the best of requirements.

5.2 Reference temperature

The standard reference temperature of industrial measurements is 20 °C. The dimensions prescribed for parts and gauges are measured at this temperature and shall normally be checked at this temperature.