

CONFIRMED
DECEMBER 2007

Specification for

Spindle noses and adjustable adaptors for multi-spindle heads

Co-operating organizations

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

Associated Offices Technical Committee	Engineering Equipment Users' Association
Association of Consulting Engineers	Gas Council
Association of Hydraulic Equipment Manufacturers Ltd.	Institution of Civil Engineers
Association of Mining Electrical and Mechanical Engineers	Institution of Gas Engineers
British Chemical Plant Manufacturers' Association	Institution of Heating and Ventilating Engineers
British Compressed Air Society	Institution of Mechanical Engineers*
British Electrical and Allied Manufacturers' Association*	Institution of Mechanical Engineers (Automobile Division)
British Gear Manufacturers' Association	Institution of Plant Engineers
British Internal Combustion Engine Manufacturers' Association	Institution of Production Engineers*
British Mechanical Engineering Confederation	Locomotive and Allied Manufacturers' Association of Great Britain
British Pump Manufacturers' Association	London Transport Executive
British Steel Industry*	Machine Tool Trades Association*
Crown Agents for Oversea Governments and Administrations	Ministry of Defence
Department of Employment and Productivity (H.M. Factory Inspectorate)	Ministry of Defence, Army Department*
Department of the Environment*	National Coal Board
Department of Trade and Industry*	National Physical Laboratory (Department of Trade and Industry)
Department of Trade and Industry — National Engineering Laboratory	Royal Institute of British Architects
Electricity Council, the Central Electricity Generating Board and the Area Boards in England and Wales	Telecommunications Engineering Manufacturing Association
	Water-tube Boilermakers Association

The Government departments and scientific and industrial 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:

Association of Scientific, Technical & Managerial Staffs	Society of Motor Manufacturers and Traders Ltd.
Gauge and Toolmakers' Association	Standards Associates
Machine Tool Industry Research Association	Trades Union Congress
Ministry of Aviation Supply	University of Aston in Birmingham
Ministry of Defence, Air Force Department	University of Manchester Institute of Science and Technology
Ministry of Defence, Navy Department	Individual experts
National Federation of Engineers Tool Manufacturers	

This British Standard, having been approved by the Mechanical Engineering Industry Standards Committee, was published under the authority of the Executive Board on 28 April 1972

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First published January 1953
First revision April 1972

The following BSI references relate to the work on this standard:
Committee references MEE/6 and MEE/6/14
Drafts for comment 69/28955 and 69/28956

ISBN 0 580 06509 X

Amendments issued since publication

Amd. No.	Date of issue	Comments
1969	May 1976	
2454	February 1978	
4990	February 1986	Indicated by a sideline in the margin

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Foreword

This standard makes reference to the following British Standards:

BS 1660, *Machine tapers*.

BS 1759, *Knurling wheels*.

BS 3643, *ISO metric screw threads — Part 2: Limits and tolerances for coarse pitch series threads*.

BS 4168, *Hexagon socket screws and wrench keys — metric series*.

BS, *Trapezoidal threads*¹⁾.

This British Standard has been prepared under the authority of the Mechanical Engineering Industry Standards Committee and is based on proposals submitted by the Machine Tool Trades Association (M.T.T.A.). In preparing this standard account has been taken of related International Organization for Standardization (ISO) work currently in hand. Oil sealing is not covered by ISO work.

The spindle nose dimensions specified in this standard are similar to those in German Standard DIN 55058 “*Drilling spindle heads*”, and permit the use of adjustable adaptors produced to DIN 6327 “*Adaptors*”.

Three types of adaptor are included in this standard as well as a single type of lock nut. All three types of adaptor produced to this standard are interchangeable with but not identical to those produced to DIN 6327.

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 8 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⁾ In course of preparation.

1 Scope

This British Standard specifies dimensional and accuracy requirements for spindle noses for the receipt of adjustable and quick change adaptors for use in multi-spindle heads.

The standard specifies requirements for three types of adjustable adaptors for the receipt of taper shank drills, reamers and spot facing cutters, for use in multi-spindle machines or heads.

NOTE The titles of the British Standards referred to in this standard are listed on page ii.

2 Spindle noses

2.1 Nominal sizes

The nominal size of the spindle nose shall be its nominal bore, which shall be identical with the nominal diameter of the adaptor with which it is to be used. The range of nominal sizes is:

16, 20, 25, 28, 36 and 48 mm.

The 25 mm size is non-preferred.

2.2 Interchangeability

Spindle noses shall be capable of accepting adjustable adaptors produced in accordance with 3.

2.3 Dimensions

Dimensions shall comply with the details given in Table 1.

2.4 Material

2.4.1 The spindles shall be manufactured from alloy steel which when suitably heat treated shall have a tensile strength of from 685 N/mm² to 785 N/mm² ²⁾.

2.4.2 The bearing and oil seal diameters and thrust faces and at least the first 25 mm length of the nose shall be heat treated to give a hardness within the range of 45 to 50 HRC (440 to 505 HV 30).

2.5 Drift slots

Drift slots may be provided either for the purpose of removing tools with the adjustable adaptor still in the spindle nose or for removing the adjustable adaptor itself. Where drift slots are provided they shall be as shown in the tables, and at 90° from the keyway. Slots to these dimensions are suitable for adaptor removal.

2.6 Surface texture

The spindle nose bore, bearing and oil seal surfaces shall not be rougher than 0.4 µm R_a. Other surfaces shall not be rougher than 0.8 µm R_a.

2.7 Chamfers

Chamfers shall be produced on the inside and outside diameters of the spindle nose as indicated, as well as on the edges of the drift slots, where applicable.

2.8 Locking screw

A grub screw conforming to BS 4168 tolerance class 6g external for locking the adaptor into the spindle nose shall be provided at 180° from the keyway as indicated. A second grub screw 13 mm in from the first is optional. For details of corresponding thread in spindle nose see Table 1.

Grub screws shall be reduced in length if necessary so that they do not protrude when an adaptor is gripped.

2.9 Length of nose

Basic lengths of nose are specified in Table 1. Where longer noses are required preferred increments of 10 mm shall be used. If external oil seals are not required the basic minimum nose lengths may be reduced by 10 mm.

2.10 Keyway

A keyway to accept the Woodruff key of the appropriate adjustable adaptor shall be provided as shown in the tables.

2.11 Accuracy

2.11.1 A suggested method of mounting the spindles for accuracy tests is with the bearing diameter resting in V-blocks as shown in Figure 2 and Figure 3.

2.11.2 Bore concentricity and axial alignment may be determined by inserting into the spindle bore a suitable close fitting test bar and taking readings at positions shown in Figure 2 at distances Z and Z_1 . Deviation shall not exceed the values given in Table 2.

2.11.3 Oil seal diameter concentricity may be determined by direct readings on the diameter as shown in Figure 3. The deviation shall not exceed the values given in Table 2.

²⁾ 1 N/mm² = 1 MN/m².