

BRITISH STANDARD SPECIFICATION

EXTERNAL MICROMETERS

B.S. 870 : 1950

**Incorporating amendments issued October 1951 (PD 1281)
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THIS BRITISH STANDARD, having been approved by the Mechanical Engineering Industry Standards Committee, and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 9th June, 1950.

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The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

Other British Standards for engineers' precision tools published or in the course of preparation are as follows :—

B.S. 817. Cast iron surface plates and tables.

B.S. 818. Cast iron straightedges.

B.S. 852. Toolmakers' straightedges.

B.S. 863. Steel straightedges of rectangular section.

B.S. 869. Toolmakers' flats and high precision surface plates.

B.S. 887. Vernier callipers.

B.S. 888. Slip (or block) gauges and their accessories.

B.S. 906. Engineers' parallels (steel).

B.S. 907. Dial gauges for linear measurements.

B.S. 939. Engineers' squares.

B.S. 957. Feeler gauges.

B.S. 958. Precision levels.

B.S. 959. Internal micrometers.

B.S. 1054. Engineers' comparators.

B.S. 1643. Vernier height gauges.

B.S. 1685. Bevel protractors.

B.S. 1790. Length bars and accessories.

B.S. 2795. Dial test indicators (lever type) for linear measurement.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or edition.

CONFIRMATION OF B.S. 870 : 1950

External micrometers

This British Standard has recently been reviewed in accordance with B.S.I. procedure and has been confirmed as satisfying present requirements.

August 1959

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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 :—

Admiralty
Air Ministry
Associated Offices Technical Committee
Association of Consulting Engineers (Incorporated)
British Chemical Plant Manufacturers' Association
British Compressed Air Society
British Electrical and Allied Manufacturers' Association
British Engineers' Association
British Internal Combustion Engine Manufacturers' Association
British Iron and Steel Federation
British Railways
Crown Agents for the Colonies
Department of Scientific and Industrial Research
Engineering Equipment Users' Association
Institute of Marine Engineers
Institute of Petroleum
Institution of Civil Engineers
Institution of Gas Engineers
Institution of Heating and Ventilating Engineers
Institution of Mechanical Engineers
Institution of Mechanical Engineers (Automobile Division)
Institution of Production Engineers
Locomotive Manufacturers' Association
Machine Tool Trades' Association
Ministry of Labour and National Service
Ministry of Supply
Ministry of Transport
Ministry of Works
Office of the High Commissioner for India
War Office

BRITISH STANDARD SPECIFICATION FOR EXTERNAL MICROMETERS

FOREWORD

This British Standard for external micrometers was first issued in 1939, when it was prepared under the authority of the Mechanical Engineering Industry Standards Committee in response to a request received from the Institution of Production Engineers. It forms one of a series of standards for engineers' precision tools, and the present revised edition of the standard has been prepared, as was the 1939 edition, with the co-operation of the manufacturers and in close collaboration with the National Physical Laboratory.

The purpose of the present revision is to incorporate modifications of the 1939 edition which have been found to be desirable, to add provisions for micrometers with measuring ranges of 0 to $\frac{1}{2}$ in. and from 12 in. to 24 in. (with their corresponding metric equivalents), and to include requirements relating to micrometers with interchangeable anvils and various measuring ranges up to 24 in. (600 mm.).

SPECIFICATION

SECTION ONE : GENERAL

SCOPE

1. This British Standard applies to :

a. External micrometers, having a frame holding a micrometer spindle and nut on one side opposite a fixed anvil on the other, with individual measuring ranges of :

- (i) 0 to $\frac{1}{2}$ in.
- (ii) 1 in., e.g., 0 to 1 in., 1 in. to 2 in., etc., up to 23 to 24 in.
- (iii) 0 to 13 mm.
- (iv) 25 mm., e.g., 0 to 25 mm., 25 to 50 mm., etc., up to 575 to 600 mm.

b. External micrometers, having a frame holding a micrometer spindle and nut on one side opposite an anvil on the other, and providing for two or more alternative ranges of measurement effected by means of interchangeable or sliding anvils, with individual measuring ranges of :

- | | |
|------------------|----------------|
| (i) 0 to 2 in. | 12 to 16 in. |
| 0 to 4 in. | 16 to 20 in. |
| 4 to 8 in. | 20 to 24 in. |
| 8 to 12 in. | |
| (ii) 0 to 50 mm. | 300 to 400 mm. |
| 0 to 100 mm. | 400 to 500 mm. |
| 100 to 200 mm. | 500 to 600 mm. |
| 200 to 300 mm. | |

c. Setting gauges for micrometers above 1 in. or 25 mm.

NOMENCLATURE

2. For the purposes of this British Standard the nomenclature given in Fig. 1 has been adopted.

SECTION TWO : MICROMETERS

MATERIAL

3. For sizes up to 4 in. the frame shall be of a suitable quality of steel. For sizes above 4 in. and up to 12 in. the frame may be of a suitable quality of steel or malleable cast iron. For sizes above 12 in. the frame may be of a suitable quality of steel, malleable cast iron, or light alloy. It is recommended that suitable heat-insulating grips should be attached to the frame in convenient positions. It is further recommended that all micrometer frames should be suitably heat-treated to avoid any secular changes that might take place in the material.

*As
altered
Oct.,
1951*

NOTE. Whilst the use of light alloys for the frames of micrometers over 12 in. has the merit of lightness and so facilitates the handling of large micrometers, it should be realized that the coefficient of expansion of light alloys is appreciably greater than that of steel or malleable cast iron and that temperature changes in the frame, due to contact with the hands, may result in appreciable changes in the zero reading. This characteristic need not, however, detract from the accuracy of the readings if, during use, the micrometer is checked frequently against a standard length bar or setting gauge and the appropriate correction made to the reading.

The spindle and anvil shall be of high grade tool steel. The measuring faces of the spindle and anvil shall be hardened to give a diamond pyramid hardness number of not less than 800.* The measuring faces may be tipped with tungsten carbide or other suitable hard material.

GENERAL DESIGN OF FRAME

4. The frame shall be so shaped as to permit of the measurement of a cylinder of diameter equal to the maximum capacity of the micrometer.

NOTE. The design and finish of the frames of micrometers vary and the purchaser should indicate, in his enquiry and order, the design and finish required. (See Appendix B).

The stiffness of the frame shall be such that a force of 2 lb. weight applied between the measuring faces does not alter the distance between them by more than the amounts given in Tables 1 and 2.

MICROMETER SCREW

5. The micrometer screw shall have a pitch of $\frac{1}{40}$ in., or of 0.5 mm.

NOTE. It is recommended that the threads of the screw and nut should be truncated so as to confine contact to the flanks of the thread.

SPINDLE

6. The front parallel portion of the spindle shall be a good free-turning fit in its bush without perceptible shake. In the micrometer as supplied the

* The approximate equivalent hardness number on the Rockwell C scale is 62.