

BS 870:2008

Incorporating Corrigenda Nos. 1 and 2



BSI Standards Publication

Specification for external micrometers

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to ii, pages 1 to 16, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI and came into effect on 30 November 2008. It was prepared by Technical Committee TDW/4, *Technical product realization*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes BS 870:1950, which is withdrawn.

Relationship with other publications

EN ISO 3611, which specifies micrometer callipers for external measurements, is currently under development.

Information about this document

This British Standard has been fully revised to bring it up to date.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

This British Standard applies to the following types of external micrometers.

- 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: 0-13 mm; 25 mm (e.g. 0-25 mm, 25-50 mm, etc., up to 575-600 mm) and 0-½ in; 1 in (e.g., 0-1 in, 1-2 in, etc., up to 23-24 in).
- 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:
 - 0-50 mm, 0-100 mm, 100-200 mm, 200-300 mm, 300-400 mm, 400-500 mm and 500-600 mm; or
 - 0-2 in, 0-4 in, 4-8 in, 8-12 in, 12-16 in, 16-20 in and 20-24 in.
- c) Setting gauges for micrometers above 25 mm or 1 in.

NOTE Attention is drawn to the fact that metric dimensions are not necessarily direct conversions of the imperial dimensions.

2 Material

For sizes up to 100 mm or 4 in the frame shall be of a suitable quality of steel. For sizes above 100 mm or 4 in and up to 300 mm or 12 in the frame may be of a suitable quality of steel or malleable cast iron. For sizes above 300 mm or 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.

NOTE Whilst the use of light alloys for the frames of micrometers over 300 mm or 12 in has the merit of lightness and so facilitates the handling of large micrometers, it should be noted 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, can 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 (62 on the Rockwell C scale). The measuring faces may be tipped with tungsten carbide or other suitable hard material.

3 General design of frame

The frame shall be so shaped as to permit the measurement of a cylinder of diameter equal to the maximum capacity of the micrometer (see Figure 1 for an illustration of the components).

NOTE The design and finish of the frames of micrometers can vary and the design and finish required should be agreed and set out in the purchaser's specification (see Annex B).

The stiffness of the frame shall be such that a load of 1 kg or 2 lb mass applied between the measuring faces does not alter the distance between them by more than the amounts specified in Table 1 and Table 2.

Figure 1 External micrometer components

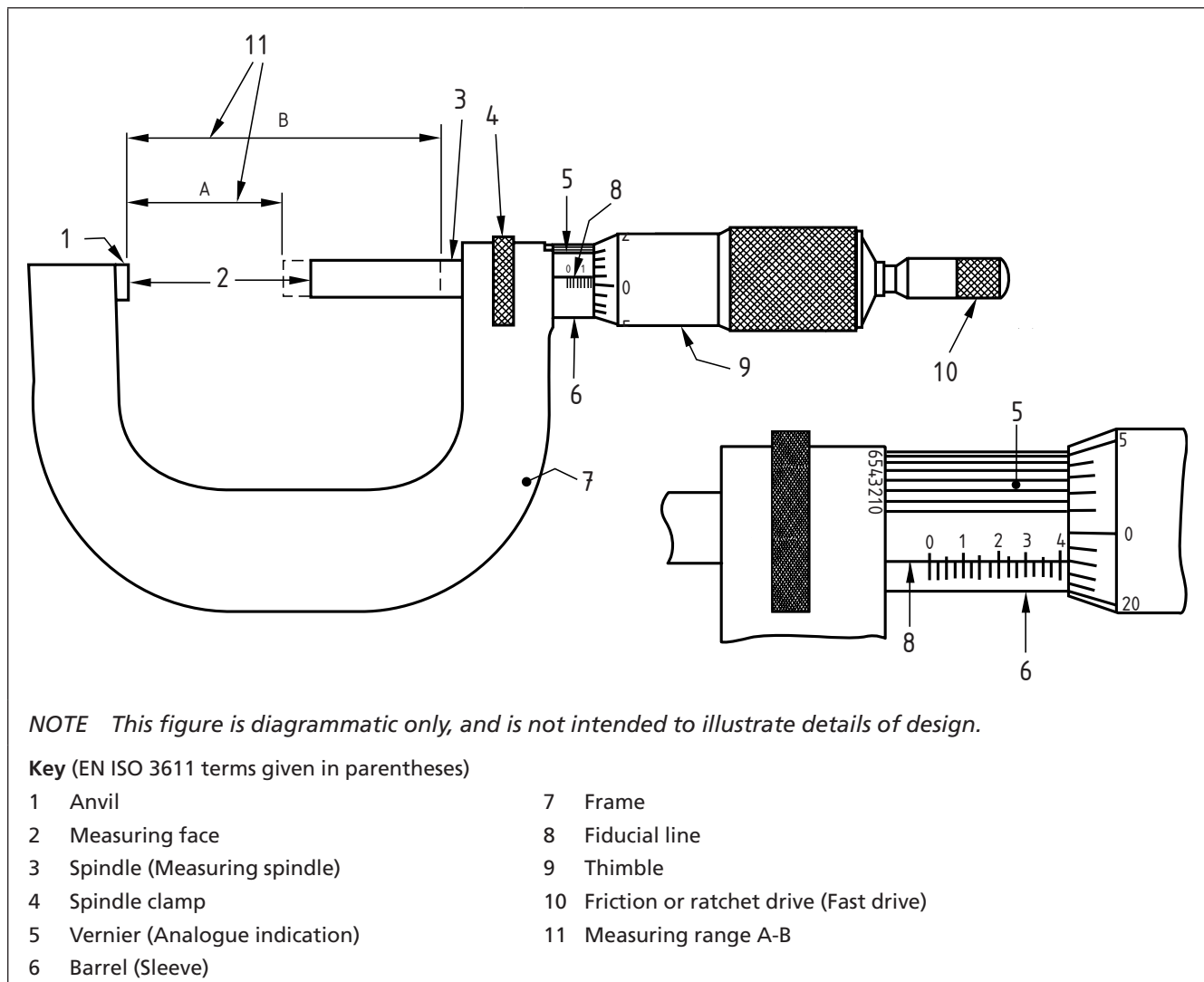


Table 1 Permissible flexure of frame – metric readings

Measuring range of micrometer			Permissible flexure of frame under load of 1kg mass
mm	mm	mm	mm
0-25	25-50	50-75	0.003
75-100	100-125	125-150	0.005
150-175	175-200	200-225	0.005
225-250	250-275	275-300	0.008
300-325	325-350	350-375	0.010
375-400	400-425	425-450	0.013
450-475	475-500	500-525	0.015
525-550	550-575	575-600	0.018

Table 2 Permissible flexure of frame – inch readings

Measuring range of micrometer			Permissible flexure of frame under load of 2 lb mass
in	in	in	in
0-1	1-2	2-3	0.000 1
3-4	4-5	5-6	0.000 2
6-7	7-8	8-9	0.000 2
9-10	10-11	11-12	0.000 3
12-13	13-14	14-15	0.000 4
15-16	16-17	17-18	0.000 5
18-19	19-20	20-21	0.000 6
21-22	22-23	23-24	0.000 7

4 Micrometer screw

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

NOTE The threads of the screw and nut should be truncated so as to confine contact to the flanks of the thread.

5 Spindle

- 5.1 The front parallel portion of the spindle shall turn freely in its bush without perceptible shake. The spindle and screw shall be lubricated with a thin, light, non-corrosive oil and the spindle shall run freely and smoothly throughout the length of its travel. There shall be no perceptible backlash between the spindle screw and nut.
- 5.2 When the micrometer is at its maximum reading, there shall be full engagement of the nut and micrometer screw.
- 5.3 If a spindle clamp is fitted, the design shall be such that it effectively locks the spindle without altering the distance between the measuring faces by more than 0.003 mm or 0.0001 in.