

Specification for

# Screw thread metric series measuring cylinders

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| Department of Industry (National Physical Laboratory) | Gauge and Tool Makers' Association |
| Department of Industry (British Calibration Service)  | Individual experts                 |

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 May 1978

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The following BSI references relate to the work on this standard:  
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## Amendments issued since publication

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## Foreword

This British Standard for cylinders used in the determination of the pitch diameter of external screw threads has been prepared under the direction of the Mechanical Engineering Standards Committee.

BS 3777 covering screw thread measuring cylinders was first issued in 1964. At that time, it was appropriate to give priority to cylinders for Unified and Whitworth thread forms and to use primarily imperial units. In addition, the longstanding practice of using diameters of cylinders permitting measurements on a group of thread forms was continued although a more recent postwar facility of using cylinders restricted closely to pitch line contact in a single thread form was introduced as an alternative.

Until metrication is complete, provision has to be continued for the measurement of pitch diameter of Unified, Whitworth and B.A. threads. Relevant information concerning measuring cylinders suitable for this purpose is given in Appendix C. With the issue of this standard, BS 3777:1964 is to be regarded as obsolete.

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### Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8, 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

This standard relates to measuring cylinders for standard pitches of ISO metric threads given in BS 3643. The cylinders described are intended for use on threads of small helix angle, i.e. less than  $5^\circ$ .

Cylinders for measuring the pitch diameter of Unified, Whitworth form and B.A. threads are specified in Appendix C. (See BS 84, BS 93 and BS 1580 for details of these threads.)

## 2 References

The titles of the publications referred to in this standard are listed on the inside back cover.

## 3 Definitions

For the purposes of this British Standard, the following definitions apply.

### 3.1

#### screw thread measuring cylinders

precise cylinders of known diameter used when determining the pitch diameter of an external screw thread of known nominal thread form and pitch

NOTE 1 The terms pitch, pitch diameter and pitch line, which are features of screw threads, are defined in Appendix A.

NOTE 2 The way in which the  $P$  value relates measurement over cylinders to the pitch diameter of a screw thread is explained in Appendix B.

NOTE 3 A full description of the method of determining pitch diameter, established by the National Physical Laboratory, is given in *Notes on Applied Science No. 1* "Gauging and measuring screw threads", published by Her Majesty's Stationery Office.

### 3.2

#### designated metric cylinders

screw thread measuring cylinders for ISO metric threads specified in BS 3643. The designation herein is the nominal pitch of the thread in mm with the symbol "p" signifying the pitch of a metric screw thread

### 3.3

#### pairs and sets

two cylinders used for measuring the effective diameter of a screw thread are referred to as a pair and three cylinders used together for this purpose are referred to as a set

NOTE A pair of cylinders can be used only when the measurement is constrained to be at right angles to the axis of the screw thread, as is the case with the NPL type of "floating carriage" diameter measuring machine. It is necessary to use a set of three cylinders with a hand micrometer.

### 3.4

#### working length (see Figure 1)

the working length,  $l$ , is defined as that part of the overall length beginning at a distance of not more than 5 mm below the part of the cylinder having a cap or fixed tag and ending at a distance of not more than 5 mm from the other end of the cylinder

## 4 Material and finish

4.1 Thread-measuring cylinders shall be made of steel and shall be hardened and tempered to avoid brittleness and breakages in use.

NOTE A hardness value of approximately 700 HV<sup>1)</sup> is recommended over the working length (see Figure 1).

4.2 The working surface shall have a lapped finish, free from any blemishes such as scratches, pits and rust stains.

## 5 Form and general dimensions

5.1 Form. The general form of the cylinders shall be as shown in Figure 1.

5.2 Overall length. Recommended approximate overall lengths,  $L$ , of screw thread measuring cylinders are given in Table 1.

Table 1 — Recommended overall lengths

| Diameter of cylinder |                     | Overall length $L$<br>(approx.) |
|----------------------|---------------------|---------------------------------|
| Over                 | Up to and including |                                 |
| mm                   | mm                  | mm                              |
| —                    | 0.25                | 22                              |
| 0.25                 | 0.5                 | 25                              |
| 0.5                  | 1                   | 28                              |
| 1                    | 1.5                 | 32                              |
| 1.5                  | 2                   | 35                              |
| 2                    | —                   | 38                              |

<sup>1)</sup> BS 427-1.