

Centre for Basic, Thermal and Length Metrology
National Physical Laboratory

MOY/SCMI/61

**SPECIFICATION OF ACCURACY FOR
STANDARDS USED FOR SETTING SCREW
DIAMETER MEASURING MACHINES**

Standard discs, plugs or cylindrically ended bars, so designed that they may be supported between centres.

Note: Specifications previously numbered 61 (Issue 2) and 61M (Issue 2) have been reviewed and combined to form this specification.

FOREWORD

In the 1940s and 1950s, NPL was involved in drafting a special series of Specifications of Accuracy that covered a wide range of precision measuring apparatus. This series has been built on first hand experience gained in the design and construction of prototype measuring equipment at NPL and in the design and calibration of measuring equipment of British and foreign manufacture. Each specification in the series originally conformed to a general pattern and was allocated a permanent serial number which, in addition to its title, serves as its identity.

The MOY/SCMI (Metrology/Specification Certification Measuring Instruments) standards are complementary to the Standards issued by the British Standards Institute (BSI). The majority relate to measurement equipment of a proprietary kind designed either at NPL or by British manufacturers which, in the ordinary way, would not fall within BSI's terms of reference. In some cases, in which the equipment is of a more general nature, the Specification has provided a useful basis for formulating a British Standard. The specifications are to enable manufacturers to base their inspection on mutually agreed specifications of accuracy both in workmanship and performance.

MOY/SCMI/61 has been updated as part of a project financed by the DTI (MPU 8/61.3) concerned with Good Practice Guides and Equipment Specifications.

SCOPE

Standard discs, plugs or cylindrically ended bars, so designed that they may be supported between centres.



Figure 1 Disc standards

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1 GENERAL

1.1 The general workmanship and finish shall be in keeping with standards of this class.

1.2 The standards shall normally be supplied in sets securely housed in a suitable box.

1.3 Each standard shall be marked with an identification number.

Note: A common identification number may be used for the individual members of a set.

1.4 The standards shall be accompanied by a declaration from the manufacturer that all the pieces in the set have been subjected to a recognised heat treatment for securing dimensional stability.

1.5 The gauging surfaces and the centres shall be hardened and, when finished, shall have a hardness of not less than **800 HV**, when tested in accordance with BS EN ISO 6507-1:1998.

1.6 The gauging surfaces shall have a fine ground or lapped finish

2 ACCURACY**2.1 IMPERIAL**

The tolerances given in Table 1 below shall apply.

Table 1 Tolerances

Nominal diameter of standard (in.)	Maximum permissible departure of mean diameter from nominal (in.)*	Maximum permissible variation in diameter (in.)*	Maximum permissible concentricity of gauging face and axis of centres (TIR)** (in.)
Up to 2	0.000 5	0.000 03	0.000 1
Above 2 and up to 6	0.000 5	0.000 05	—
Above 6 and up to 12	0.001 0	0.000 10	—

Notes: * In the case of standard discs and plugs the tolerances prescribed in the second and third columns of the Table will apply to measurements made over a central band, 0.5 in. wide.

** TIR = Total Indicator Reading

2.2 METRIC

The tolerances given in Table 2 below shall apply.

Table 2 Tolerances

Nominal diameter of standard (mm)	Maximum permissible departure of mean diameter from nominal (mm)*	Maximum permissible variation in diameter (mm)*	Maximum permissible concentricity of gauging face and axis of centres (TIR)** (mm)
Up to 50	± 0.013	0.000 8	0.002 5
Above 50 and up to 150	± 0.013	0.001 3	—
Above 150 and up to 300	± 0.025	0.002 5	—

Notes: * In the case of standard discs and plugs the tolerances prescribed in the second and third columns of the Table will apply to measurements made over a central band, 12 mm wide.

** TIR = Total Indicator Reading

3 CERTIFICATION

- 3.1 NPL is prepared to issue a Certificate of Calibration for a set of standards complying with this Specification.

4 UNCERTAINTIES

- 4.1 It will normally be necessary to consider the uncertainty of measurement when ascertaining compliance (or non-compliance) with this specification. UKAS document M3003 '*Uncertainty and confidence in measurement*' gives guidance in Appendix J.

5 REPORTING OF COMPLIANCE

- 5.1 Certain clauses in any specifications are necessary to support manufacture and assembly but may be difficult or unnecessary to check in subsequent checks for compliance with this specification. In certain cases checking a feature may require disassembly of the item, which may be undesirable. Although it is not essential that all clauses be checked on subsequent verification, it is important that those clauses omitted do not detract from the metrological value of the test. Where applicable, a performance check should always be carried out as this may allow indirect verification of those parameters that are not easily measured individually without disassembly.
- 5.2 When making statements of compliance or non-compliance, it is recommended that this specification and the relevant clauses within it be unambiguously identified in the calibration certificate or test report.

Example wording for a set of angle gauges follows.

This set of angle gauges has been examined for compliance with the accuracy requirements of clauses 2 and 3 of NPL Specification of Accuracy MOY/SCMI/18 (Issue 5), a copy of which is attached to this certificate.

For free measurement advice and information on other specifications in this series call the NPL Help line on 020 8943 6880

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The standard reference temperature for industrial length measurements is defined in ISO 1:1975 *Standard reference temperature for industrial length measurements*.

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