

Centre for Basic, Thermal and Length Metrology
National Physical Laboratory

MOY/SCMI/55

**SPECIFICATION OF ACCURACY FOR A
SET OF HOFFMANN ROLLER GAUGES**

A set of 16 Hoffmann commercial rollers intended for use as auxiliary standards of size.

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/55 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

A set of 16 Hoffmann commercial rollers intended for use as auxiliary standards of size.



Figure 1 A set of Hoffmann rollers

CONTENTS

	Page
1 GENERAL	3
2 HARDNESS	3
3 LENGTH	3
4 DIAMETER	3
5 CERTIFICATION	4
6 UNCERTAINTIES	4
7 REPORTING OF COMPLIANCE	4

1 GENERAL

- 1.1 Each set of roller gauges shall be securely housed in a box.
- 1.2 A serial number shall be allocated to each set and shall be legibly marked on the box.
- 1.3 A set shall comprise one roller of each of the following sizes:
 $\frac{3}{16}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{9}{16}$, $\frac{5}{8}$, $\frac{11}{16}$, $\frac{3}{4}$, $\frac{13}{16}$, $\frac{7}{8}$, $\frac{15}{16}$, 1, $1\frac{1}{8}$ and $1\frac{1}{4}$ in
- 1.4 The roller gauges shall have a good quality finish.

2 HARDNESS

- 2.1 The roller gauges 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.

3 LENGTH

- 3.1 The end faces of each roller gauge shall be flat to within **0.002 5 mm**. Any departure from flatness should be such that the faces are of convex form.
- 3.2 The central length of each roller gauge shall agree with its nominal size to within \pm **0.002 5 mm**.

4 DIAMETER

For the purpose of this specification, the requirements on diameter relate to the central 3/5th of the length.

- 4.1 Each roller gauge shall be uniform in diameter to within **0.001 3 mm**.
- 4.2 The mean diameter of each roller gauge shall agree with its nominal size to within **0.002 5 mm**.
- 4.3 Each roller gauge shall be free from lobes. When rotated in a 90° vee block under a sensitive indicator, any variation in reading shall not exceed **0.002 5 mm**. Alternatively, this test may be performed with a roundness measuring instrument.

5 CERTIFICATION

- 5.1 NPL is prepared to issue a Certificate of Calibration for a set of roller gauges complying with this specification. This certificate will state the mean diameter and the measured length of each gauge.

6 UNCERTAINTIES

- 6.1 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 further guidance in Appendix J.

7 REPORTING OF COMPLIANCE

- 7.1 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.
- 7.2 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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