

Gears — Evaluation of instruments for the measurement of individual gears

ICS 21.200

National foreword

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The UK participation in its preparation was entrusted by Technical Committee MCE/5, Gears, to Subcommittee MCE/5/-/2, Gear Accuracy, which has the responsibility to:

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- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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Summary of pages

This document comprises a front cover, an inside front cover, the ISO title page, pages ii to iv, pages 1 to 19 and a back cover

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Gears — Evaluation of instruments for the measurement of individual gears

*Engrenages — Évaluation des instruments de mesure des engrenages
individuels*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 18653 was prepared by Technical Committee ISO/TC 60, *Gears*.

Gears — Evaluation of instruments for the measurement of individual gears

1 Scope

This International Standard specifies methods for the evaluation of measuring instruments used for gear measurements of involute, helix, pitch and runout. It is applicable both to instruments that measure runout directly and to those that compute it from index measurements. It also gives recommendations for the evaluation of tooth thickness measuring instruments and, of necessity, includes the estimation of measurement uncertainty with the use of calibrated gear artifacts. It does not address the calibration of artifacts by laboratories accredited in accordance with ISO/IEC 17025; nor are its requirements intended as an acceptance specification of product gears (see ISO 1328-1, ISO 1328-2, ISO/TR 10064-1 and ISO/TR 10064-2). The estimation of product gear measurement uncertainty is beyond its scope (see ISO/TR 10064-5 for recommendations).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1328-1, *Cylindrical gears — ISO system of accuracy — Part 1: Definitions and allowable values of deviations relevant to corresponding flanks of gear teeth*

ISO/TR 10064-3, *Cylindrical gears — Code of inspection practice — Part 3: Recommendations relative to gear blanks, shaft centre distance and parallelism of axes*

ISO/TR 10064-5¹⁾, *Cylindrical gears — Code of inspection practice — Part 5: Recommendations relative to evaluation of gear measuring instruments*

ISO 14253-1, *Geometrical Product Specifications (GPS) — Inspection by measurement of workpieces and measuring equipment — Part 1: Decision rules for proving conformance or non-conformance with specifications*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

3 Terms, definitions and symbols

For the purposes of this document, the following terms, definitions and symbols (see Table 1) apply.

NOTE 1 The definitions, when applicable, conform to ISO 122-1, ISO 1328-1, ISO 1328-2 and ISO/TR 10064-1.

NOTE 2 The terms, definitions and symbols used in this document may differ from those used in other International Standards. The user needs to be certain of fully understanding them, as used here.

1) Under preparation.

3.1

accuracy

closeness of agreement between a measured value and an accepted reference (or calibrated) value

3.2

artifact

object of specific shape used to determine the accuracy of measuring devices

See Clause 7.

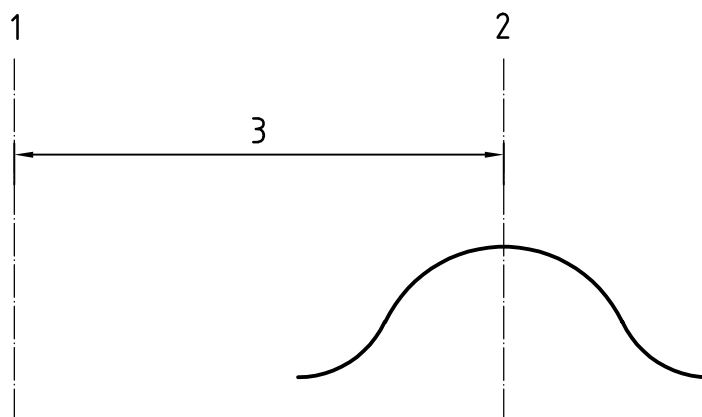
3.3

bias

difference between the observed average of measurements and the calibration value

See Figure 1.

NOTE Bias can be affected by systematic errors such as linearity or gain and can be different throughout the operating range of the measurement system.



Key

- 1 calibration value
- 2 observed average
- 3 bias

Figure 1 — Bias

3.4

calibration

set of operations that establish, under specified conditions, the relationship between values of quantities indicated by a measuring instrument or measuring system and the corresponding values realized by standards

3.5

gain

magnification factor between the input and the output

3.6

helix artifact

artifact having a calibrated helix form

3.7

involute artifact

calibrated artifact having an involute form determined by a specific base circle