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Geometrical product specifications (GPS) — Guidelines for the evaluation of coordinate measuring machine (CMM) test uncertainty for CMMs using single and multiple stylus contacting probing systems

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National foreword

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Geometrical product specifications (GPS) — Guidelines for the evaluation of coordinate measuring machine (CMM) test uncertainty for CMMs using single and multiple stylus contacting probing systems

Spécification géométrique des produits (GPS) — Lignes directrices pour l'estimation de l'incertitude d'essai des machines à mesurer tridimensionnelles (MMT) pour MMT utilisant des systèmes de palpage à stylet simple et à stylets multiples

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

Introduction

This Technical Specification is a geometrical product specification (GPS) document and is to be regarded as a general GPS document (see ISO 14638). It influences chain links F of the chain of standards in the general GPS matrix model.

For more detailed information of the relation of this Technical Specification to the GPS matrix model, see Annex B.

The ISO GPS Matrix Model given in ISO 14638 gives an overview of the ISO GPS system of which this Technical Specification is a part. The fundamental rules of ISO GPS given in ISO 8015 apply to this Technical Specification. The default decision rules given in ISO 14253-1 apply to specifications made in accordance with this Technical Specification, unless otherwise stated.

This Technical Specification gives guidance for the evaluation of the test value uncertainty as required by the application of ISO 10360-5.

Before starting any test value uncertainty evaluation, it is recommended that

— the distinction between the *test value uncertainty* and the *measurement uncertainty* is fully understood (the former is used to reduce the acceptance zone in a test, the latter to quantify the reliability of a measurement value) and

— the principle of the tester's responsibility in deciding whether or not to include an uncertainty component in the budget is also understood.

Some details of the above issues are given in ISO/TS 23165, the careful reading of which is recommended.

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1 Scope

This Technical Specification describes how to evaluate the test value uncertainty when testing is performed according to ISO 10360-5.

2 Normative references

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

ISO 10360-1, *Geometrical Product Specifications (GPS) — Acceptance and reverification tests for coordinate measuring machines (CMM) — Part 1: Vocabulary*

ISO 10360-5:2010, *Geometrical product specifications (GPS) — Acceptance and reverification tests for coordinate measuring machines (CMM) — Part 5: CMMs using single and multiple stylus contacting probing systems*

ISO 14253-1:—[1)], *Geometrical product specifications (GPS) — Inspection by measurement of workpieces and measuring equipment — Part 1: Decision rules for proving conformity or nonconformity with specifications*

ISO 17450-2, *Geometrical product specifications (GPS) — General concepts — Part 2: Basic tenets, specifications, operators, uncertainties and ambiguities*

ISO/TS 23165, *Geometrical product specifications (GPS) — Guidelines for the evaluation of coordinate measuring machine (CMM) test uncertainty*

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

ISO/IEC Guide 99, *International vocabulary of metrology — Basic and general concepts and associated terms (VIM)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10360-1, ISO 10360-5, ISO 14253-1, ISO 17450-2, ISO/TS 23165, ISO/IEC Guide 98-3 and ISO/IEC Guide 99 apply.

1) To be published. (Revision of ISO 14253-1:2013)