BS EN ISO 10360-9:2013

BSI Standards Publication

Geometrical product specifications (GPS) — Acceptance and reverification tests for coordinate measuring systems (CMS)

Part 9: CMMs with multiple probing systems

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee TDW/4, Technical Product Realization.

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

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Foreword

This document (EN ISO 10360-9:2013) has been prepared by Technical Committee ISO/TC 213 “Dimensional and geometrical product specifications and verification” in collaboration with Technical Committee CEN/TC 290 “Dimensional and geometrical product specification and verification” the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2014, and conflicting national standards shall be withdrawn at the latest by June 2014.

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

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Foreword

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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).

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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, *Geometrical product specifications and verification*.

ISO 10360 consists of the following parts, under the general title *Geometrical product specifications (GPS) — Acceptance and reverification tests for coordinate measuring machines (CMM)*:

— *Part 1: Vocabulary*

— *Part 2: CMMs used for measuring linear dimensions*

— *Part 3: CMMs with the axis of a rotary table as the fourth axis*

— *Part 4: CMMs used in scanning measuring mode*

— *Part 5: CMMs using single and multiple stylus contacting probing systems*

— *Part 6: Estimation of errors in computing of Gaussian associated features*

— *Part 7: CMMs equipped with imaging probing systems*

ISO 10360 also consists of the following parts, under the general title *Geometrical product specifications (GPS) — Acceptance and reverification tests for coordinate measuring systems (CMS)*:

— *Part 8: CMMs with optical distance sensors*

— *Part 9: CMMs with multiple probing systems*

— *Part 10: Laser trackers for measuring point-to-point distances*

The following parts are under preparation:

— *Part 12: Articulated-arm CMMs*

Computed tomography is to form the subject of a future part 11.

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Introduction

This part of ISO 10360 is a geometrical product specification (GPS) standard and is to be regarded as a general GPS standard (see ISO/TR 14638). It influences chain link 5 of the chains of standards on size, distance, radius, angle, form, orientation, location, run-out and datums.

The ISO/GPS Masterplan given in ISO/TR 14638 gives an overview of the ISO/GPS system of which this document is a part. The fundamental rules of ISO/GPS given in ISO 8015 apply to this document and the default decision rules given in ISO 14253-1 apply to specifications made in accordance with this document, unless otherwise indicated.

For more detailed information on the relation of this part of ISO 10360 to other standards and to the GPS matrix model, see Annex B.

The acceptance and reverification tests described in this part of ISO 10360 are applicable to CMMs that use multiple probing systems in contacting and non-contacting mode. The scope of this part is to test the performance of a multiple probing system CMM when two or more probing systems are used on one measurement task. Its general approach is analogous to the multi-stylus test in ISO 10360-5, but focusing on the performance test of different probing system types, for example an imaging probe combined with a contacting probe on single ram CMMs or on multiple ram CMMs.

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Geometrical product specifications (GPS) — Acceptance and reverification tests for coordinate measuring systems (CMS) —

Part 9:
CMMs with multiple probing systems

1 Scope

This part of ISO 10360 specifies procedures for testing the performance of coordinate measuring machines of various designs that use multiple probing systems in contacting and non-contacting mode. It applies to

— acceptance tests for verifying the performance of a CMM and its probes as stated by the manufacturer,

— reverification tests performed by the user for periodical checking of the CMM and its probes,

— interim checks performed by the user for monitoring the CMM and its probes in between reverification tests.

It considers CMMs of single ram designs as well as multiple ram designs with small or with large overlapping measuring volume. It applies to multiple probing systems consisting of different types of probes (such as an imaging probe combined with a contacting probe, or two contacting probes of different individual performance).

The tests described are sensitive to many errors attributable to both the CMM and the probing systems; they supplement the length measurement tests and the individual probing error tests of each probing system. The length measurement tests, as well as the individual probing error tests (for example, ISO 10360-5, ISO 10360-7, or ISO 10360-8), should be performed before executing the procedures in this part of ISO 10360.

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 10360-1:2000, *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 10360-7:2011, *Geometrical product specifications (GPS) — Acceptance and reverification tests for coordinate measuring machines (CMM) — Part 7: CMMs equipped with imaging probing systems*

ISO 10360-8:2013, *Geometrical product specifications (GPS) — Acceptance and reverification tests for coordinate measuring machines (CMM) — Part 8: CMMs with optical distance sensors*

ISO 14253-1:2013, *Geometrical product specifications (GPS) — Inspection by measurement of workpieces and measuring equipment — Part 1: Decision rules for proving conformity or nonconformity with specifications*

ISO/IEC Guide 99:2007, *International vocabulary of metrology — Basic and general concepts and associated terms (VIM)*

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