



**NSAI**  
Standards

Irish Standard  
I.S. EN ISO 10360-12:2016

Geometrical product specifications (GPS) -  
Acceptance and reverification tests for  
coordinate measuring systems (CMS) - Part  
12: Articulated arm coordinate measurement  
machines (CMM) (ISO 10360-12:2016)

## I.S. EN ISO 10360-12:2016

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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## National Foreword

I.S. EN ISO 10360-12:2016 is the adopted Irish version of the European Document EN ISO 10360-12:2016, Geometrical product specifications (GPS) - Acceptance and reverification tests for coordinate measuring systems (CMS) - Part 12: Articulated arm coordinate measurement machines (CMM) (ISO 10360-12:2016)

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EUROPEAN STANDARD

EN ISO 10360-12

NORME EUROPÉENNE

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English Version

Geometrical product specifications (GPS) - Acceptance and  
reverification tests for coordinate measuring systems  
(CMS) - Part 12: Articulated arm coordinate measurement  
machines (CMM) (ISO 10360-12:2016)

Spécification géométrique des produits (GPS) - Essais  
de réception et de vérification périodique des systèmes  
de mesure tridimensionnels (SMT) - Partie 12:  
Machines à mesurer tridimensionnelles à bras articulés  
(MMT) (ISO 10360-12:2016)

Geometrische Produktspezifikation (GPS) - Annahme-  
und Bestätigungsprüfung für Koordinatenmesssysteme  
(KMS) - Teil 12: Koordinatenmessgeräte (KMG) mit  
Gelenkausleger (ISO 10360-12:2016)

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**EN ISO 10360-12:2016 (E)**

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## **European foreword**

This document (EN ISO 10360-12:2016) 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of an identical text or by endorsement, at the latest by May 2017, and conflicting national standards shall be withdrawn at the latest by May 2017.

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.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

### **Endorsement notice**

The text of ISO 10360-12:2016 has been approved by CEN as EN ISO 10360-12:2016 without any modification.

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

**Part 12:  
Articulated arm coordinate  
measurement machines (CMM)**

*Spécification géométrique des produits (GPS) — Essais de  
réception et de vérification périodique des systèmes de mesure  
tridimensionnels (SMT) —*

*Partie 12: Machines à mesurer tridimensionnelles à bras articulés  
(MMT)*



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**ISO 10360-12:2016(E)**



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## ISO 10360-12:2016(E)

### 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](http://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](http://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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

The committee responsible for this document is ISO/TC 213, *Dimensional and 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 systems (CMS)*:

- *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 system*
- *Part 6: Estimation of errors in computing of Gaussian associated features*
- *Part 7: CMMs equipped with imaging probing systems*
- *Part 8: CMMs with optical distance sensors*
- *Part 9: CMMs with multiple probing systems*
- *Part 10: Laser trackers for measuring point-to-point distances*
- *Part 12: Articulated arm coordinate measuring machines (CMM)*

## **Introduction**

This part of ISO 10360 is a general GPS standard (see ISO 14638). For more detailed information about the relation of this part of ISO 10360 to other standards and the GPS matrix model, see [Annex I](#).

This part of ISO 10360 is included in the ISO/GPS Masterplan given in ISO 14638, which gives an overview of the ISO/GPS system. The fundamental rules of ISO/GPS given in ISO 8015 apply to this part of ISO 10360 and the default decision rules given in ISO 14253-1 apply to specifications made in accordance with this part of ISO 10360, unless otherwise indicated.

The objective of this part of ISO 10360 is to provide a well-defined testing procedure to

- enable manufacturers of articulated arm CMMs to provide specification MPEs, and
- enable users to test articulated arm CMMs to manufacturer specifications using calibrated traceable reference artefacts.

The benefits of these tests are that the measured result has a direct traceability to the unit length, the metre, and that they give information on how the articulated arm CMM will perform on similar length measurements.



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

## Part 12: Articulated arm coordinate measurement machines (CMM)

### 1 Scope

This part of ISO 10360 specifies the acceptance tests for verifying the performance of an articulated arm CMM by measuring calibrated test lengths as stated by the manufacturer. It also specifies the reverification tests that enable the user to periodically reverify the performance of the articulated arm CMM. It applies to articulated arm CMMs using tactile probes and optionally optical distance sensors (also referred to as laser line scanners or laser line probes). Details on tests for scanner accessories are given in [Annex E](#).

This part of ISO 10360 does not specify how often or when testing is performed, if at all, nor does it specify which party should bear the cost of testing.

This part of ISO 10360 specifies

- performance requirements that can be assigned by the manufacturer or the user of the articulated arm CMM,
- the manner of execution of the acceptance and reverification tests to demonstrate the stated requirements,
- rules for proving conformance, and
- applications for which the acceptance and reverification tests can be used.

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

ISO 10360-9:2013, *Geometrical product specifications (GPS) — Acceptance and reverification tests for coordinate measuring systems (CMS) — Part 9: CMMs with multiple probing systems*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions given in ISO 10360-1 and the following apply.

NOTE The definitions in this section are intended to concisely state the meaning of terms. For metrological characteristics that have numerical values, the complete description of the procedure and derivation of test results in [Clause 6](#) and [Annex E](#) are to be followed in determining values.

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