



**NSAI**  
Standards

Irish Standard  
I.S. EN 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  
10360-8:2013)

**I.S. EN ISO 10360-8:2013**

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

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I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

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

Spécification géométrique des produits (GPS) - Essais de  
réception et de vérification périodique des systèmes de  
mesure tridimensionnels (SMT) - Partie 8: MMT avec  
détecteurs optiques sans contact (ISO 10360-8:2013)

Geometrische Produktspezifikation und -prüfung (GPS) -  
Annahme- und Bestätigungsprüfung für  
Koordinatenmessgeräte (KMG) - Teil 8: KMG mit optischen  
Abstandssensoren (ISO 10360-8:2013)

This European Standard was approved by CEN on 16 November 2013.

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**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## **Foreword**

This document (EN ISO 10360-8:2013) 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of an identical text or by endorsement, at the latest by June 2014, and conflicting national standards shall be withdrawn at the latest by June 2014.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.

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 10360-8:2013 has been approved by CEN as EN ISO 10360-8:2013 without any modification.

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# INTERNATIONAL STANDARD

**ISO  
10360-8**

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

### **Part 8: CMMs with optical distance sensors**

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

*Partie 8: MMT avec détecteurs optiques sans contact*



Reference number  
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**ISO 10360-8:2013(E)**



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## ISO 10360-8:2013(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. [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. [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 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*.

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.

## 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 link 5 of the chains of standards on size, distance, radius, angle, form, orientation, location, run-out and datums. For more detailed information of the relation of this part of ISO 10360 to other standards and the GPS matrix model, see [Annex E](#).

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.

The tests of this part of ISO 10360 have two technical objectives:

- a) to test the error of indication of a calibrated test length using an optical distance sensor and
- b) to test the errors of the optical distance sensor.

Optical distance sensors treated in this standard are classified into two types,

- point measuring sensors, and
- area measuring sensors (e.g. laser point scan, laser line scan, fringe projection)

The benefits of these tests are that the measured result has a direct traceability to the unit length, the metre, and that it gives information on how the CMM (coordinate measuring machine) will perform on similar length measurements.

This part of ISO 10360 parallels that of ISO 10360-2 and ISO 10360-5, which is for CMMs equipped with contact probing systems. The testing methodology between these three parts of ISO 10360 is designed to be intentionally similar. The differences that exist may be eliminated in future revisions of this part or in ISO 10360-2.



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

## Part 8: CMMs with optical distance sensors

### 1 Scope

This part of ISO 10360 specifies the acceptance tests for verifying the performance of a CMM (coordinate measuring machine) when measuring lengths as stated by the manufacturer. It also specifies the reverification tests that enable the user to periodically reverify the performance of the CMM. The acceptance and reverification tests given in this part of ISO 10360 are applicable only to Cartesian CMMs with optical distance sensors. This standard does not explicitly apply to non-Cartesian CMMs, however, the parties may apply this part of 10360 to non-Cartesian CMMs by mutual agreement.

**NOTE** This part of ISO 10360 is not intended to apply for CMMs whose measuring volume is significantly smaller than the size of the test sphere, however, the principle, artefacts, and procedure of the test described in this part of ISO 10360 are useful for the acceptance and reverification tests of those CMMs either as it is or with modifying the parameters such as the size of the test artefacts and the number of the measurements.

This part of ISO 10360 specifies:

- performance requirements that can be assigned by the manufacturer or the user of the CMM,
- the manner of execution of the acceptance and reverification tests to demonstrate the stated requirements,
- rules for verifying 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 10360-1:2000, *Geometrical Product Specifications (GPS) — Acceptance and reverification tests for coordinate measuring machines (CMM) — Part 1: Vocabulary*

ISO 10360-2:2009, *Geometrical product specifications (GPS) — Acceptance and reverification tests for coordinate measuring machines (CMM) — Part 2: CMMs used for measuring linear dimensions*

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

ISO/TS 23165:2006, *Geometrical product specifications (GPS) — Guidelines for the evaluation of coordinate measuring machine (CMM) test uncertainty*

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