



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:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

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

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revices/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN ISO 10360-8:2013

Published:

2013-12-04

*This document was published
under the authority of the NSAI
and comes into effect on:*

2013-12-14

ICS number:

17.040.30

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD

EN ISO 10360-8

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2013

ICS 17.040.30

English Version

**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.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

Contents	Page
Foreword.....	3

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.

This page is intentionally left blank

INTERNATIONAL STANDARD

ISO
10360-8

First edition
2013-12-01

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
ISO 10360-8:2013(E)

© ISO 2013

ISO 10360-8:2013(E)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2013

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Symbols	9
5 Requirements for metrological characteristics	10
5.1 Environmental conditions.....	10
5.2 Operating conditions.....	10
5.3 Probing form error.....	11
5.4 Probing dispersion value.....	11
5.5 Probing size error.....	11
5.6 Probing size error All.....	11
5.7 Length measurement error.....	12
5.8 Flat form measurement error.....	12
5.9 Workpiece loading effects.....	12
6 Acceptance tests and reverification tests	13
6.1 General.....	13
6.2 Probing characteristics.....	13
6.3 Length measurement error.....	20
6.4 Flat form measurement error.....	23
7 Compliance with specifications	26
7.1 Acceptance test.....	26
7.2 Reverification test.....	27
8 Applications	28
8.1 Acceptance test.....	28
8.2 Reverification test.....	28
8.3 Interim check.....	28
9 Indication in product documentation and data sheets	28
Annex A (informative) Structural resolution test	29
Annex B (normative) Artefacts that represent a calibrated test length	34
Annex C (informative) Alignment of artefacts	44
Annex D (normative) Articulated location value of CMMs with articulating probing system for optical distance sensors	46
Annex E (informative) Relation to the GPS matrix model	49
Bibliography	51

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

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

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*

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- Looking for additional Standards? Visit Intertek Inform Infostore
 - Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-