

SVENSK STANDARD

SS-EN ISO 10360-13:2021

Geometrisk produktspecifikation (GPS) – Leveranskontroll och periodisk översyn av koordinatmätsystem (CMS) – Del 13: Optiska 3D CMS (ISO 10360-13:2021)

Geometrical product specifications (GPS) – Acceptance and reverification tests for coordinate measuring systems (CMS) – Part 13: Optical 3D CMS (ISO 10360-13:2021)



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Europastandarden EN ISO 10360-13:2021 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 10360-13:2021.

The European Standard EN ISO 10360-13:2021 has the status of a Swedish Standard. This document contains the official version of EN ISO 10360-13:2021.

LÄSANVISNINGAR FÖR STANDARDER

I dessa anvisningar behandlas huvudprinciperna för hur regler och yttre begränsningar anges i standardiseringsprodukter.

Krav

Ett krav är ett uttryck i ett dokumentets innehåll som anger objektivet verifierbara kriterier som ska uppfyllas och från vilka ingen avvikelse tillåts om efterlevnad av dokumentet ska kunna åberopas. Krav uttrycks med hjälpverbet **ska** (eller **ska inte** för förbud).

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En rekommendation är ett uttryck i ett dokumentets innehåll som anger en valmöjlighet eller ett tillvägagångssätt som bedöms vara särskilt lämpligt utan att nödvändigtvis nämna eller utesluta andra. Rekommendationer uttrycks med hjälpverbet **bör** (eller **bör inte** för avrådanden).

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Instruktioner anges i imperativ form och används för att ange hur något görs eller utförs. De kan underordnas en annan regel, såsom ett krav eller en rekommendation. De kan även användas självständigt, och är då att betrakta som krav.

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En förklaring är ett uttryck i ett dokumentets innehåll som förmedlar information. En förklaring kan uttrycka tillåtelse, möjlighet eller förmåga. Tillåtelse uttrycks med hjälpverbet **får**. Inom standardiseringen saknas rekommenderad nekande motsats till hjälpverbet får, förbud uttrycks med **ska inte** enligt reglerna för krav. Möjlighet och förmåga uttrycks med hjälpverbet **kan** (eller motsatsen **kan inte**).

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These instructions cover the main principles for the use of provisions and external constraints in standardization deliverables.

Requirement

A requirement is an expression, in the content of a document, that conveys objectively verifiable criteria to be fulfilled, and from which no deviation is permitted if conformance with the document is to be claimed. Requirements are expressed by the auxiliary **shall** (or **shall not** for prohibition).

Recommendation

A recommendation is an expression, in the content of a document, that conveys a suggested possible choice or course of action deemed to be particularly suitable, without necessarily mentioning or excluding others. Recommendations are expressed by the auxiliary **should** (or **should not** for dissuasion).

Instruction

An instruction is expressed in the imperative mood and is used in order to convey an action to be performed. It can be subordinated to another provision, such as a requirement or a recommendation. It can also be used independently and is then to be regarded as a requirement.

Statement

A statement is an expression, in the content of a document, that conveys information. A statement can express permission, possibility or capability. Permission is expressed by the auxiliary **may**. There is no recommended opposite expression for the auxiliary may in standardization, prohibition is expressed by the use of **shall not** in accordance with the rules for requirements. Possibility and capability are expressed by the auxiliary **can** (its opposite being **cannot**).

EUROPEAN STANDARD

EN ISO 10360-13

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2021

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English Version

Geometrical product specifications (GPS) -
Acceptance and reverification tests for coordinate
measuring systems (CMS) - Part 13: Optical 3D CMS
(ISO 10360-13:2021)

Spécification géométrique des produits (GPS) -
Essais de réception et de vérification périodique
des systèmes à mesurer tridimensionnels (SMT)
- Partie 13: SMT optique 3D (ISO 10360-13:2021)

Geometrische Produktspezifikation (GPS) -
Annahmeprüfung und Bestätigungsprüfung
für Koordinatenmessgeräte (KMG) - Teil 13:
Optische 3D KMG (ISO 10360-13:2021)

This European Standard was approved by CEN on 5 September 2021.

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.

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

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

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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 of the voluntary nature of standards, 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 290, *Dimensional and geometrical product specification and verification*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 10360 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

European foreword

This document (EN ISO 10360-13:2021) 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 March 2022, and conflicting national standards shall be withdrawn at the latest by March 2022.

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Endorsement notice

The text of ISO 10360-13:2021 has been approved by CEN as EN ISO 10360-13:2021 without any modification.

Introduction

This document is a geometrical product specification (GPS) standard and is to be regarded as a general GPS standard (see ISO 14638). It influences chain link F of the chain of standards on size, distance, form, orientation, location and run-out in the general GPS matrix (see [Annex H](#)).

The ISO GPS matrix model given in ISO 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.

This document has two technical objectives:

- 1) to test the error of indication when measuring a calibrated test length across the global measuring volume of the CMS;
- 2) to test the errors of indication within a locally intended measuring volume.

These two objectives correspond to:

- a) the test performed for a probing system and a moving carrier of the probing system in combination as described in ISO 10360-2, ISO 10360-7, ISO 10360-8, ISO 10360-10, ISO 10360-11¹⁾ and ISO 10360-12;
- b) the test performed dominantly for the probing system as described in ISO 10360-5, ISO 10360-7, ISO 10360-8, ISO 10360-9, ISO 10360-10, ISO 10360-11 and ISO 10360-12.

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

An optical 3D CMS as specified by this document is a contactless area measuring sensor delivering 3D data in several individual single views by an optical measuring principle and transforming it into a common coordinate system. Typical optical measuring principles are pattern projection, fringe projection and projecting-and-sweeping a scanned line, or similar, delivering single views without assistance of external information related to position and orientation of the objects to be scanned relative to the CMS. Typical registration principles are based on a best fitting of commonly captured position information across at least two different single views by using either or both reference features attached or surface features of the objects to be scanned.

This document is not intended to apply to other types of CMSs, for example:

- tactile CMMs (Cartesian metrological moving carrier), see ISO 10360-2;
- imaging CMMs (Cartesian metrological moving carrier), see ISO 10360-7;
- CMMs equipped with optical distance sensors (Cartesian metrological moving carrier), see ISO 10360-8;
- laser trackers, see ISO 10360-10;
- X-ray CTs, see ISO 10360-11;
- articulated arm CMMs, see ISO 10360-12;
- measuring instruments intended to measure surface characteristics, see the ISO 25178 series;
- optical microscopes;
- hand-held laser-line type scanners.

1) Under preparation. Stage at the time of publication: ISO/DIS 10360-11:2021.

Parties can apply this document to the above or other types of CMSs by mutual agreement.

This document specifies:

- performance requirements that can be assigned by the manufacturer or the user of the CMS;
- the manner of execution of the acceptance and reverification tests to demonstrate the stated requirements;
- rules for verifying conformance;
- applications for which the acceptance and reverification tests can be used.

NOTE 1 [Annex E](#) describes possible limitations with regard to less cooperative surface characteristics, such as colour, glossiness and roughness, and provides a suggested test that can give CMS users an idea of how representative the maximum permissible error would be when measuring their specific industrial part.

NOTE 2 The optical 3D CMS can be moved and positioned by a manually or automated moving unit. The position, orientation or both can be used as additional information for the registration.

NOTE 3 The acceptance and reverification tests are designed to mimic real but simple measurements occurring in practice, subject to the rated operating conditions and the testing procedures. The user is advised to consider the influence of additional or omitted conditions, procedural steps or both when applying the test results according to this document to predict the performance of an actual CMS.

For more detailed information of the relation of this document to other standards and the GPS matrix model, see [Annex H](#).