



SLOVENSKI STANDARD

SIST-TS CEN ISO/TS 15530-3:2008

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Geometrical product specifications (GPS) - Coordinate measuring machines (CMM):
Technique for determining the uncertainty of measurement - Part 3: Use of calibrated
workpieces or standards (ISO/TS 15530-3:2004)

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Geometrische Produktspezifikation (GPS) - Verfahren zur Ermittlung der
Messunsicherheit von Koordinatenmessgeräten (KMG) - Teil 3: Anwendung von
kalibrierten Werkstücken oder Normalen (ISO/TS 15530-3:2004)

Spécification géométrique des produits (GPS) - Machines a mesurer tridimensionnelles
(MMT): Technique pour la détermination de l'incertitude de mesure - Partie 3: Utilisation
de pieces étalonnées ou des normes (ISO/TS 15530-3:2004)

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ICS:

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TECHNICAL SPECIFICATION
SPÉCIFICATION TECHNIQUE
TECHNISCHE SPEZIFIKATION

CEN ISO/TS 15530-3

December 2007

ICS 17.040.30

English Version

Geometrical product specifications (GPS) - Coordinate measuring machines (CMM): Technique for determining the uncertainty of measurement - Part 3: Use of calibrated workpieces or standards (ISO/TS 15530-3:2004)

Spécification géométrique des produits (GPS) - Machines à mesurer tridimensionnelles (MMT): Technique pour la détermination de l'incertitude de mesure - Partie 3: Utilisation de pièces étalonnées ou des normes (ISO/TS 15530-3:2004)

Geometrische Produktspezifikation (GPS) - Verfahren zur Ermittlung der Messunsicherheit von Koordinatenmessgeräten (KMG) - Teil 3: Anwendung von kalibrierten Werkstücken oder Normalen (ISO/TS 15530-3:2004)

This Technical Specification (CEN/TS) was approved by CEN on 8 October 2007 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

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Contents

Page

Foreword.....3

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[SIST-TS CEN ISO/TS 15530-3:2008](https://standards.iteh.ai/catalog/standards/sist/d32b6c20-cabf-4a9b-9b06-a2579ba67120/sist-ts-cen-iso-ts-15530-3-2008)

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Foreword

The text of ISO/TS 15530-3:2004 has been prepared by Technical Committee ISO/TC 213 “Dimensional and geometrical product specifications and verification” of the International Organization for Standardization (ISO) and has been taken over as CEN ISO/TS 15530-3:2007 by Technical Committee CEN/TC 290 “Dimensional and geometrical product specification and verification” the secretariat of which is held by AFNOR.

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Endorsement notice

The text of ISO/TS 15530-3:2004 has been approved by CEN as a CEN ISO/TS 15530-3:2007 without any modification.

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TECHNICAL SPECIFICATION

ISO/TS 15530-3

First edition
2004-03-01

Geometrical Product Specifications (GPS) — Coordinate measuring machines (CMM): Technique for determining the uncertainty of measurement —

Part 3:

**Use of calibrated workpieces or
standards**

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*Spécification géométrique des produits (GPS) — Machines à mesurer
tridimensionnelles (MMT): Technique pour la détermination de
l'incertitude de mesure —*

Partie 3: Utilisation de pièces étalonnées ou des normes



Reference number
ISO/TS 15530-3:2004(E)

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Contents

Page

Foreword	iv
Introduction	v
1 Scope.....	1
2 Normative references	1
3 Terms and definitions	1
4 Symbols	2
5 Requirements	2
5.1 Operating conditions	2
5.2 Similarity conditions	3
6 Principle of the uncertainty evaluation using calibrated workpieces	4
7 Procedure.....	4
7.1 Measuring equipment	4
7.2 Execution	4
7.3 Calculation of the uncertainty.....	5
7.4 Applying the substitution method: special considerations	8
8 Reverification of the measurement uncertainty.....	9
9 Interim check of the measurement uncertainty	9
Annex A (informative) Examples of application.....	10
Annex B (informative) Relation to the GPS matrix model	15
Bibliography	16

ISO/TS 15530-3:2004(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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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.

ISO/TS 15530 was prepared by the Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification* and consists of the following parts under the general title *Geometrical Product Specification (GPS) — Coordinate measuring machines (CMM) — Techniques for determining the uncertainty of measurement*:

- *Part 1: Overview and general issues*
- *Part 2: Use of multiple measurement strategies*
- *Part 3: Use of calibrated workpieces or standards*
- *Part 4: Use of computer simulation*
- *Part 5: Use of expert judgement*

Introduction

This part of ISO 15530 is a Geometrical Product Specification (GPS) Technical Specification and is to be regarded as a general GPS document (see ISO/TR 14638). It influences chain link 6 of the chain of standards on size, distance, radius, angle, form, orientation, location, run-out and datums.

For more detailed information on the relation of this standard to the GPS matrix model, see Annex B.

Coordinate measuring machines (CMMs) have become essential for the verification of geometry in industry. According to the ISO 9000 series of standards, in a quality management system the relevant measuring equipment is required to be calibrated against certified equipment having a known and valid relationship to internationally or nationally recognized standards in order to establish traceability. According to the *International Vocabulary of Basic and General Terms in Metrology* (VIM), a calibration comprises — besides the establishment of the relationship between the measured and the correct values of a quantity — the uncertainty evaluation in the final results (measurands) of the measurement task. However, uncertainty evaluation methods covering the errors arising in the innumerable measurement tasks a CMM can actually perform are often very complex. In these cases the risk of an unrealistic estimation of task-related uncertainty is likely to arise.

The aim of this part of ISO 15530 is to provide an experimental technique for simplifying the uncertainty evaluation of CMM-measurements. In this experimental approach measurements are carried out in the same way as actual measurements, but with calibrated workpieces or standards of similar dimension and geometry instead of the unknown objects to be measured. The description of this experimental technique to evaluate measurement uncertainty is the key element of this part of ISO 15530. The standardization of such procedures for the uncertainty evaluation serves the world-wide mutual recognition of calibrations and other measurement results.

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This part of ISO 15530 is applicable for non-substitution measurement of workpieces or standards, where the measurement result is given by the indication of the CMM. Furthermore, this part of ISO 15530 is applicable for substitution measurement, where, in opposition to the non-substitution measurement, a check standard is used to correct for the systematic errors of the CMM. The latter will generally decrease the measurement uncertainty and is often used, especially in the field of gauge calibration.

This part of ISO 15530 describes one of several methods of uncertainty evaluation, which will be outlined in later ISO documents. Because of the experimental approach, it is simple to perform, and it provides realistic statements of measurement uncertainties.

The limitations of this method can be summarised as: the availability of artefacts with sufficiently defined geometrical characteristics, stability, reasonable costs, and the possibility of being calibrated with sufficiently small uncertainty.