

Toote geomeetrilised spetsifikatsioonid (GPS). Üldised käsitusviisid. Osa 1: Geomeetriliste spetsifikatsioonide ja nõuetele vastavuse hindamise mudel

Geometrical product specifications (GPS) - General concepts - Part 1: Model for geometrical specification and verification (ISO 17450-1:2011)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 17450-1:2011 sisaldab Euroopa standardi EN ISO 17450-1:2011 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 17450-1:2011 consists of the English text of the European standard EN ISO 17450-1:2011.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 15.12.2011.	Date of Availability of the European standard is 15.12.2011.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 17.040.01

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Aru 10, 10317 Tallinn, Eesti; www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:
Aru 10, 10317 Tallinn, Estonia; www.evs.ee; phone 605 5050; e-mail info@evs.ee

English Version

**Geometrical product specifications (GPS) - General concepts -
Part 1: Model for geometrical specification and verification (ISO
17450-1:2011)**

Spécification géométrique des produits (GPS) - Concepts
généraux - Partie 1: Modèle pour la spécification et la
vérification géométriques (ISO 17450-1:2011)

Geometrische Produktspezifikation (GPS) - Grundlagen -
Teil 1: Modell für die geometrische Spezifikation und
Prüfung (ISO 17450-1:2011)

This European Standard was approved by CEN on 10 December 2011.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Foreword

This document (EN ISO 17450-1:2011) 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 2012, and conflicting national standards shall be withdrawn at the latest by June 2012.

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.

This document supersedes CEN ISO/TS 17450-1:2007.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 17450-1:2011 has been approved by CEN as a EN ISO 17450-1:2011 without any modification.

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Application and future prospects	11
5 General	11
6 Features	12
6.1 General	12
6.2 Ideal features	13
6.3 Non-ideal features	15
6.4 Relationships between geometrical feature terms	16
7 Characteristics	18
7.1 General	18
7.2 Intrinsic characteristics of ideal features	18
7.3 Situation characteristics between ideal features	19
7.4 Situation characteristics between non-ideal and ideal features	20
8 Operations	21
8.1 Feature operations	21
8.2 Evaluation	25
8.3 Transformation	26
9 Specification	26
9.1 General	26
9.2 Specification by dimension	26
9.3 Specification by zone	27
9.4 Deviation	27
10 Verification	28
Annex A (informative) Examples of applications to ISO 1101	29
Annex B (informative) Mathematical symbols and definitions	43
Annex C (informative) Comparison between tolerancing and metrology	55
Annex D (informative) Concept diagram for characteristics	57
Annex E (informative) Invariance classes	58
Annex F (informative) Relationship to the GPS matrix model	60
Bibliography	62
Alphabetical index	63

Introduction

This part of ISO 17450 is a geometrical product specification (GPS) document and is to be regarded as a global GPS document (see ISO/TR 14638). It influences all chain links of the chains of standards.

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. For more detailed information on the relationship of this part of ISO 17450 to other standards and to the GPS matrix model, see Annex F.

In a market environment of increased globalization, the exchange of technical product information is of high importance and the need to express unambiguously the geometry of mechanical workpieces of vital urgency. Consequently, codification associated with the macro- and micro-geometry of workpiece specifications needs to be unambiguous and complete if the functional geometrical variation of parts is to be limited; in addition, the language ought to be applicable to CAx systems.

The aim of ISO/TC 213 is to provide the tools for a global and “top-down” approach to GPS. These tools form the basis of new standards specifying a common language for geometrical definition. This language can be used by design (assemblies and individual workpieces), manufacturing and inspection, to describe the measurement procedure, regardless of the media (e.g. a paper drawing, numerical drawing or exchange file) used. The tools are based on the characteristics of features, as well as on the constraints between the features and on feature operations, used for the creation of different geometrical features.

Geometrical product specifications (GPS) — General concepts —

Part 1: Model for geometrical specification and verification

1 Scope

This part of ISO 17450 provides a model for geometrical specification and verification and defines the corresponding concepts. It also explains the mathematical basis of the concepts associated with the model and defines general terms for geometrical features of workpieces.

This part of ISO 17450 defines the fundamental concepts for the GPS system in order to:

- provide nonambiguous GPS language to be used in design, manufacturing and verification,
- identify features, characteristics and rules to provide the basis for specifications,
- provide a complete symbology language to indicate GPS specifications,
- provide simplified symbology by defining default rules, and
- provide consistent rules for verification.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC Guide 99, *International vocabulary of metrology — Basic and general concepts and associated terms (VIM)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC Guide 99 and the following apply.

3.1

real surface

⟨of a workpiece⟩ set of features which physically exist and separate the entire workpiece from the surrounding medium