



SLOVENSKI STANDARD SIST EN ISO 14978:2006

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Specifikacija geometrijskih veličin izdelka (GPS) - Osnove in zahteve za merilno opremo GPS (ISO 14978:2006)

Geometrical Product Specifications (GPS) - General concepts and requirements for GPS measuring equipment (ISO 14978:2006)

Geometrische Produktspezifikation (GPS) - Allgemeine Begriffe und Anforderungen für GPS Messeinrichtungen (ISO 14978:2006)

Spécification géométrique des produits (GPS) - Concepts et exigences généraux pour les équipements de mesure GPS (ISO 14978:2006)

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NORME EUROPÉENNE
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EN ISO 14978

July 2006

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English Version

**Geometrical Product Specifications (GPS) - General concepts
and requirements for GPS measuring equipment (ISO
14978:2006)**

Spécification géométrique des produits (GPS) - Concepts
et exigences généraux pour les équipements de mesure
GPS (ISO 14978:2006)

Geometrische Produktspezifikation (GPS) - Allgemeine
Begriffe und Anforderungen für GPS Messeinrichtungen
(ISO 14978:2006)

This European Standard was approved by CEN on 19 June 2006.

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EN ISO 14978:2006 (E)**Foreword**

This document (EN ISO 14978:2006) 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of an identical text or by endorsement, at the latest by January 2007, and conflicting national standards shall be withdrawn at the latest by January 2007.

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First edition
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Geometrical product specifications (GPS) — General concepts and requirements for GPS measuring equipment

*Spécification géométrique des produits (GPS) — Concepts et
exigences généraux pour les équipements de mesure GPS*

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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
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ISO 14978:2006(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.

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 14978 was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

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Introduction

This International Standard is a geometrical product specification (GPS) standard and is to be regarded as a global GPS standard (see ISO/TR 14638). It influences chain links 5 and 6 of all chains of standards in the general GPS matrix.

For more detailed information of the relation of this International Standard to other standards and the GPS matrix model, see Annex C.

This International Standard contains guidance for writing the standards for specific measuring equipment.

This International Standard is intended to give the user a basic understanding of the use of ISO standards for GPS measuring equipment. This International Standard presents and defines general concepts to be used in connection with GPS measuring equipment to avoid multiple repetitions in the ISO standards for specific GPS measuring equipment. This International Standard is also intended as guidance for the manufacturer to evaluate and present specifications for characteristics for GPS measurement equipment.

This International Standard should be close at hand when reading and using ISO standards for a specific GPS measuring equipment.

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Geometrical product specifications (GPS) — General concepts and requirements for GPS measuring equipment

1 Scope

This International Standard specifies the general requirements, terms and definitions of characteristics of simple GPS measuring equipment, e.g. micrometers, dial gauges, callipers, surface plates, height gauges, gauge blocks, but not necessarily excluding more complicated equipment. It forms the basis for standards defining and describing the design characteristics and metrological characteristics for measuring equipment. It also gives guidance for the development and content of standards for GPS measuring equipment.

This International Standard is intended to ease the communication between manufacturer/supplier and customer/user and to make the specification phase of GPS measuring equipment more accurate. This International Standard is also intended as a tool to be used in companies in the process of defining and selecting relevant characteristics for measuring equipment to be used in the quality assurance of measuring processes, i.e. in calibration and in workpiece measurements.

This International Standard also includes terms which are frequently used in connection with the characterization of specific measuring equipment.

2 Normative references

[SIST EN ISO 14978:2006](https://standards.iteh.ai/catalog/standards/sist/db57a2f1-1faf-41ca-820a-c70811b89a35/sist-en-iso-14978-2006)

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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 1:2002, *Geometrical Product Specifications (GPS) — Standard reference temperature for geometrical product specification and verification*

ISO 1101:2004, *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

ISO 5459:—¹), *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Datums and datum systems*

ISO 14253-1:1998, *Geometrical Product Specifications (GPS) — Inspection by measurement of workpieces and measuring equipment — Part 1: Decision rules for proving conformance or non-conformance with specifications*

ISO/TS 14253-2:1999, *Geometrical Product Specifications (GPS) — Inspection by measurement of workpieces and measuring equipment — Part 2: Guide to the estimation of uncertainty in GPS measurement, in calibration of measuring equipment and product verification*

ISO/TS 17450-2, *Geometrical product specifications (GPS) — General concepts — Part 2: Basic tenets, specifications, operators and uncertainties*

International vocabulary of basic and general terms in metrology (VIM), BIPM, IEC, IFCC, ISO, IUPAC, IUPAP, 1987

1) To be published. (Revision of ISO 5459:1981.)

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International vocabulary of basic and general terms in metrology (VIM), BIPM, IEC, IFCC, ISO, IUPAC, IUPAP, 1993

Guide to the expression of uncertainty in measurement (GUM), BIPM, IEC, IFCC, ISO, IUPAC, IUPAP, OIML, 1993²⁾

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14253-1, ISO/TS 14253-2, ISO/TS 17450-2, VIM and GUM and the following apply.

3.1
measuring equipment
ME
any instrument, measurement standard, reference material and/or auxiliary apparatus or any combination thereof necessary to implement a measurement process for carrying out a specified and defined measurement

NOTE 1 This definition is necessarily wider than that of a measuring instrument [VIM:1993, 4.1] since it includes all the means necessary for producing a measurement result.

NOTE 2 The concept measuring equipment includes, for example, **indicating measuring instruments** (3.2) and **material measures** (3.3).

3.2
indicating measuring instrument

measuring equipment that displays an indication

NOTE 1 The display can be analog (continuous or discontinuous) or digital.

NOTE 2 Values of more than one quantity can be displayed simultaneously.

NOTE 3 A displaying measuring instrument can also provide a record.

[VIM:1993, 4.6]

EXAMPLES

- a) Analog mechanical dial gauge,
- b) digital calliper,
- c) micrometer.

NOTE 4 The examples given in VIM are changed here to examples in length units.

3.3
material measure

device intended to reproduce or supply, in a permanent manner during its use, one or more known values of a given quantity

NOTE 1 The quantity concerned can be called the supplied quantity.

[VIM:1993, 4.2]

2) Corrected and reprinted in 1995.

EXAMPLES

- a) Gauge block,
- b) ball plate,
- c) angle block,
- d) limit gauge (e.g. gap gauge),
- e) functional gauge,
- f) surface texture standard,
- g) reference ring,
- h) tape measure.

NOTE 2 Material measure is included in the concept measuring equipment.

NOTE 3 The examples given in VIM are changed here to examples in length units.

3.4

mono-characteristic measuring equipment

measuring equipment which can be characterised by a single metrological characteristic

NOTE 1 Mono-characteristic measuring equipment is a simplifying theoretical concept which is described in this standard as a contrast to the case of actual multi-characteristic measuring equipment.

NOTE 2 For simplification, especially when evaluating uncertainty contributions, **multi-characteristic measuring equipment** (3.5) can be considered as a “black box” and therefore can be assumed to be a mono-characteristic measuring equipment.

3.5

multi-characteristic measuring equipment

measuring equipment which is characterised by two or more metrological characteristics

NOTE All GPS measuring equipment is multi-characteristic (see 3.4 NOTE 2).

3.6

measurement process

set of interrelated resources, activities and influences which produce a measurement

NOTE 1 This term is commonly used for the calibration of measuring equipment and the measurement of workpieces.

NOTE 2 Resources can be human or material.

3.7

intended use

(measuring equipment) measurement process in which specific measuring equipment is to be used

NOTE 1 Knowledge about intended use usually reduces the number of metrological requirements to be calibrated.

NOTE 2 Knowledge about intended use of the maximum permissible errors (MPE, see 3.21) for the metrological requirements that need to be calibrated usually allows adjustment to more economical and less restrictive values.

3.8

calibration

(measuring equipment) set of operations that establish, under specified conditions, the relationship between values of quantities indicated by a measuring instrument or measuring system, or values represented by a material measure or a reference material, and the corresponding values realized by standards

NOTE 1 The result of a calibration permits either the assignment of values of measurands to the indications, or the determination of corrections with respect to indications.

NOTE 2 A calibration can also determine other metrological properties, such as the effect of influence quantities.