



**SLOVENSKI STANDARD**  
**SIST-TS CEN ISO/TS 12780-2:2008**  
**01-april-2008**

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Geometrical product specifications (GPS) - Straightness - Part 2: Specification operators (ISO/TS 12780-2:2003)

Geometrische Produktspezifikation (GPS) - Geradheit - Teil 2: Spezifikationsoperatoren (ISO/TS 12780-2:2003)

Spécification géométrique des produits (GPS) - Rectitude - Partie 2: Opérateurs de spécification (ISO/TS 12780-2:2003)

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**Ta slovenski standard je istoveten z: CEN ISO/TS 12780-2:2007**

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**ICS:**

17.040.01	Linearne in kotne meritve na splošno	Linear and angular measurements in general
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ICS 17.040.01

English Version

**Geometrical product specifications (GPS) - Straightness - Part  
2: Specification operators (ISO/TS 12780-2:2003)**

Spécification géométrique des produits (GPS) - Rectitude -  
Partie 2: Opérateurs de spécification (ISO/TS 12780-  
2:2003)

Geometrische Produktspezifikation (GPS) - Geradheit - Teil  
2: Spezifikationsoperatoren (ISO/TS 12780-2:2003)

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.

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## Foreword

The text of ISO/TS 12780-2:2003 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 12780-2:2007 by Technical Committee CEN/TC 290 "Dimensional and geometrical product specification and verification" the secretariat of which is held by AFNOR.

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 announce this Technical Specification: Austria, Belgium, Bulgaria, 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/TS 12780-2:2003 has been approved by CEN as a CEN ISO/TS 12780-2:2007 without any modification.

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**Geometrical Product Specifications  
(GPS) — Straightness —**

**Part 2:  
Specification operators**

*Spécification géométrique des produits (GPS) — Rectitude —  
Partie 2: Opérateurs de spécification*  
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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.

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 12780-2 was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

ISO/TS 12780 consists of the following parts, under the general title *Geometrical Product Specifications (GPS) — Straightness*:

- *Part 1: Vocabulary and parameters of straightness*
- *Part 2: Specification operators*

## Introduction

This part of ISO/TS 12780 is a geometrical product specification (GPS) Technical Specification and is to be regarded as a general GPS standard (see ISO/TR 14638). It influences chain link 3 of the chain of standards on form of line independent of datum.

For more detailed information on the relation of this part of ISO/TS 12780 to other standards and the GPS matrix model, see Annex B.

This part of ISO/TS 12780 specifies the specification operators according to ISO/TS 17450-2 for straightness of integral features.

At the current state of development, ISO/TC 213 has not been able to reach a consensus on defaults for filter cut-off, probe tip radius and method of association (reference line). This means that a straightness specification must explicitly state which values are to be used for these specification operations in order for it to be unique.

Consequently, if a specification does not explicitly state which values are to be used for one or more of these operators, the specification is uncertain (see ISO/TS 17450-2) and a supplier can use any value for the operator(s) not specified when proving conformance.

Extracting data will always involve applying a certain filtering process. An additional filtering of the extracted data may or may not be applied. This additional filtering can be a mean line filter (Gaussian, spline, wavelet, etc.) or a non-linear filter (e.g. morphological filter). The type of filtering will influence the definition of straightness and the specification operators and, therefore, needs to be stated unambiguously.

NOTE 1 Stylus filtering is not sufficient on its own to smooth a profile. In certain circumstances it can create spurious high-frequency content, thus giving incorrect values. To correct this, a longwave-pass filter is employed. A Gaussian filter is used, since this is the current state-of-the-art in ISO standards. This filter has some shortcomings, e.g. it can distort, rather than eliminate some roughness features and it can distort, rather than transmit correctly some waviness features. It is envisioned that new filters under development within ISO will provide better solutions for several of these issues.

NOTE 2 If a smaller tip radius than the one specified is used for a given cut-off length, the resulting measured value will generally be higher. This effect is usually insignificant. If a larger tip radius is used, the resulting measured value will generally be lower. The amount of change is heavily dependent on the surface measured.

NOTE 3 The measuring force of 0 N is chosen to eliminate effects of elastic deformation of the workpiece from the specification operator. On metal surfaces with adequate thickness, the effect of normally occurring measuring forces will be negligible.

NOTE 4 Aliasing and other problems during extraction (see Annex A) due to the higher harmonic content of the skin model, in the straightness directions, can cause specification uncertainty.

This part of ISO/TS 12780 is not intended to disallow any means of measuring straightness.