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Specifikacija geometrijskih veliļ in izdelka - Tekstura povrġine: Profilna metoda; standardi za merjenje - 1. del: Meritve materiala

Geometrical Product Specifications (GPS) -- Surface texture: Profile method; Measurement standards -- Part 1: Material measures

Spécification géométrique des produits (GPS) -- État de surface: Méthode du profil; Étalons -- Partie 1: Mesures matérialisées

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Geometrical Product Specifications (GPS) — Surface texture: Profile method; Measurement standards —

Part 1: Material measures

Spécification géométrique des produits (GPS) — État de surface: Méthode du profil; Étalons —

Partie 1: Mesures matérialisées

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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 3.

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 part of ISO 5436 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 5436-1 was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

This first edition of ISO 5436-1, together with ISO 5436-2, cancels and replaces (ISO 5436:1985), which has been technically revised.

ISO 5436 consists of the following parts, under the general title *Geometrical Product Specifications (GPS) — Surface texture: Profile method; Measurement standards*:

— *Part 1: Material measures*

— *Part 2: Software measurement standards*

Annex A of this part of ISO 5436 is for information only.

Introduction

This part of ISO 5436 is a geometrical product specification (GPS) standard and is to be regarded as a general GPS standard (see ISO/TR 14638). It influences chain link 6 of the chain of standards on roughness, waviness and primary profile.

For more detailed information of the relation of this part of ISO 5436 to the GPS matrix model, see annex A.

This part of ISO 5436 introduces a new measurement standard, namely Type E, to calibrate the profile co-ordinate system.

NOTE "Measurement standards" were formerly referred to as "calibration specimens".

Geometrical Product Specifications (GPS) — Surface texture: Profile method; Measurement standards —

Part 1: Material measures

1 Scope

This part of ISO 5436 specifies the characteristics of material measures used as measurement standards (etalons) for the calibration of metrological characteristics of instruments for the measurement of surface texture by the profile method as defined in ISO 3274.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 5436. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 5436 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3274:1996, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Nominal characteristics of contact (stylus) instruments.*

ISO 4287:1997, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters.*

ISO 4288:1996, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture.*

ISO 10012-1:1992, *Quality assurance requirements for measuring equipment — Part 1: Metrological confirmation system for measuring equipment.*

ISO 12085:1996, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Motif parameters.*

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 in product verification.*

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

BIPM, IEC IFCC, ISO, IUPAC, IUPAP, OIML. *Guide to the expression of uncertainty in measurement (GUM)*, 1993.

3 Terms and definitions

For the purposes of this part of ISO 5436, the terms and definitions given in ISO 3274, ISO 4287 and VIM apply.

4 Design requirements

4.1 Material

The material used for measurement standards A to E shall be hard enough to ensure adequate life in relation to cost (manufacturing and calibration). Its surface shall be smooth and flat enough not to affect the evaluation.

4.2 Size of measurement standard

The measurement window shall be large enough to provide for the total length of traverse required for all intended determinations. The measurement window consists of that region of the total surface over which calibration measurements are made. One or more kinds of measurement standards may be provided on a single block. To ensure the best possible economic conditions, overall dimensions of measurement standards are not given.

5 Types, purposes and metrological characteristics of measurement standards

5.1 General

The calibration of the existing wide range of instruments in all modes of operation calls for more than one type of measurement standard. Each measurement standard may have a limited range of application according to its own characteristics and those of the instrument to be calibrated. The validity of the calibration of an instrument will be dependent on the correct association of these characteristics.

To cover the range of requirements, five types of measurement standards are described, each of which may have a number of variants (see Table 1).

Table 1 — Types and names of measurement standards

Type	Name
A	Depth measurement standard
B	Tip condition measurement standard
C	Spacing measurement standard
D	Roughness measurement standard
E	Profile coordinate measurement standard

5.2 Type A — Depth measurement standard

These measurement standards are for calibrating the vertical profile component of stylus instruments.

5.2.1 Type A1 — Wide grooves with flat bottoms

These measurement standards have a wide calibrated groove with a flat bottom, a ridge with a flat top, or a number of such separated features of equal or increasing depth or height. Each feature is wide enough to be insensitive to the shape or condition of the stylus tip (see Figure 1).

5.2.2 Type A2 — Wide grooves with rounded bottoms

These measurement standards are similar to type A1, except that the grooves have rounded bottoms of sufficient radius to be insensitive to the shape or condition of the stylus tip (see Figure 2).

5.3 Type B — Tip condition measurement standard

These measurement standards are primarily for calibrating the condition of the stylus tip.

5.3.1 Type B1

These measurement standards have a narrow groove or a number of separated grooves proportioned to be increasingly sensitive to the dimensions of the stylus tip. The narrow grooves have rounded bottoms of sufficient radius to be sensitive to the shape or condition of the stylus tip.

5.3.2 Type B2

These measurement standards have two groove patterns of nominally equal Ra values, one being sensitive and the other insensitive to the dimensions of the stylus tip (see Figures 3 and 4).

5.3.3 Type B3

These measurement standards have a fine protruding edge. Uncoated razor blades, for example, have edge widths of approximately 0,1 µm or less. The stylus condition may be assessed by traversing such a specimen and recording the surface profile.

5.4 Type C — Spacing measurement standard

These measurement standards are used primarily for calibrating vertical profile components. They may also be used for calibrating horizontal profile components if the spacing of the groves is held within limits acceptable for this purpose. The purpose of the series of measurement standards is to enable the transmission characteristics to be checked for a number of spacings and amplitudes.

They have a grid of repetitive grooves of simple shape (either sinusoidal, triangular or arcuate).

An essential requirement of type C measurement standards is that standardized measurement standards of differing waveform are nevertheless compatible, in the sense that they will all lead to the same state of instrument calibration or verification, provided they are used correctly.

5.5 Type D — Roughness measurement standard

5.5.1 General

These measurement standards are for overall calibration of instruments.

NOTE The variation over the area of a type D standard is typically higher than that of a type C standard. Therefore it is normally necessary to average a statistically determined number of appropriately positioned tracings to get the full benefit of the D standard.

5.5.2 Type D1 — Unidirectional irregular profile

These measurement standards have irregular profiles (for example as obtained by grinding) in the direction of traverse, but they have the convenience of an approximately constant cross-section perpendicular to the direction of traverse.

The measurement standards simulate work pieces containing a wide range of crest spacings, but reduce the number of traverses needed to give a good average value. They provide, for reassurance, a final overall check on calibration.

