INTERNATIONAL STANDARD

ISO
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Geometrical product specifications (GPS) — Flatness —

Part 1:
Vocabulary and parameters of flatness

Spécification géométrique des produits (GPS) — Planéité —

Partie 1: Vocabulaire et paramètres de planéité

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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.

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 12781-1 was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

This first edition of ISO 12781-1 cancels and replaces ISO/TS 12781-1:2003, which has been technically revised.

ISO 12781 consists of the following parts, under the general title *Geometrical product specifications (GPS) — Flatness*:

— *Part 1: Vocabulary and parameters of flatness*

— *Part 2: Specification operators*

Introduction

This part of ISO 12781 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 2 of the chain of standards on form of a surface (independent of a datum).

The ISO/GPS Masterplan given in ISO/TR 14638 gives an overview of the ISO/GPS system of which this part of ISO 12781 is a part. The fundamental rules of ISO/GPS given in ISO 8015 apply to this part of ISO 12781 and the default decision rules given in ISO 14253-1 apply to specifications made in accordance with this part of ISO 12781, unless otherwise indicated.

For more detailed information on the relationship of this part of ISO 12781 to other standards and the GPS matrix model, see Annex C.

This part of ISO 12781 defines terms and concepts necessary for defining the specification operators according to ISO 17450-2 for flatness of integral features.

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

This part of ISO 12781 is not intended to disallow any means of measuring flatness.

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fbae5c97b8b5/iso-12781-1-2011

Geometrical product specifications (GPS) — Flatness —

Part 1:
Vocabulary and parameters of flatness

1 Scope

This part of ISO 12781 defines the terms and concepts related to flatness of individual complete integral features only.

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 14660-1:1999, *Geometrical Product Specifications (GPS) — Geometrical features — Part 1: General terms and definitions*

ISO 14660-2:1999, *Geometrical Product Specifications (GPS) — Geometrical features — Part 2: Extracted median line of a cylinder and a cone, extracted median surface, local size of an extracted feature*

ISO 17450-1:— [1], *Geometrical Product Specifications (GPS) — General concepts — Part 1: Model for geometrical specification and verification*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14660-1, ISO 14660-2, ISO 17450-1 and the following apply.

3.1 General terms

3.1.1
flatness
property of a plane

3.1.2
nominal plane
mathematically defined plane as specified by the design

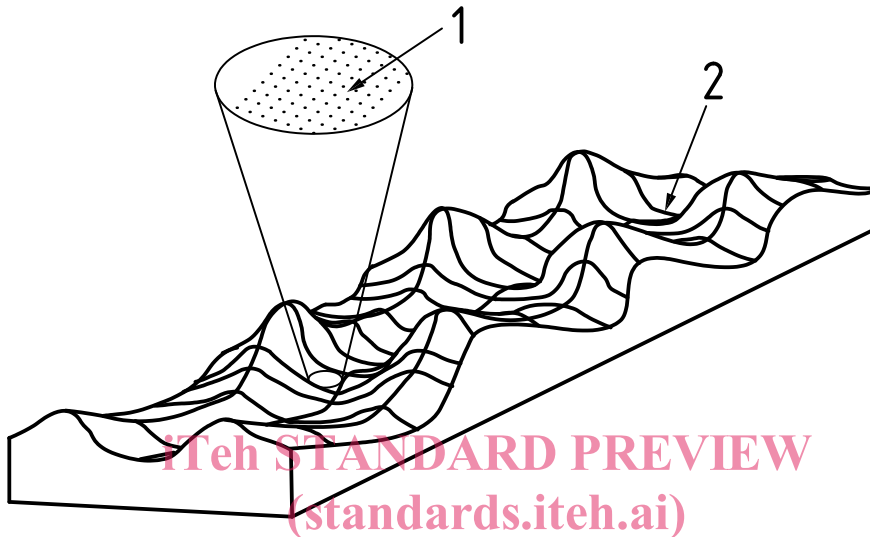1) To be published. (Revision of ISO/TS 17450-1:2005).

3.2   Terms relating to the surface

3.2.1
extracted surface
⟨flatness⟩ digital representation of the real surface

See Figure 1.

NOTE   The extraction conventions for flatness are given in ISO 12781-2. This extracted surface is an extracted integral feature as defined in ISO 14660-1.

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Key

1   extracted surface

2   real surface

Figure 1 — Extracted surface

3.2.2
flatness surface
extracted surface (type plane) intentionally modified by a filter

NOTE 1   This is the surface to which the concepts and parameters of this part of ISO 12781 can be applied.

NOTE 2   The areal Gaussian filter is a convolution of two orthogonal profile Gaussian filters.

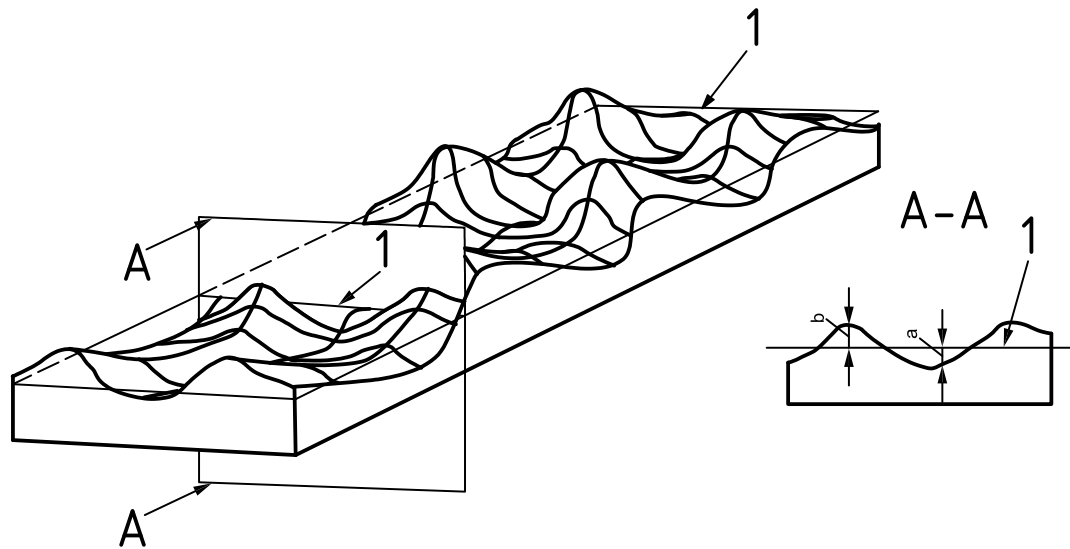### 3.2.3
local flatness deviation
deviation of a point on a flatness surface from a reference plane, the deviation being normal to the reference plane

See Figure 2.

NOTE 1   The deviation is negative if from the reference plane the point lies in the direction of the material.

NOTE 2   For reference plane, see 3.3.1.

Key

1   any reference plane

^a   Negative local flatness deviation.

^b   Positive local flatness deviation.

Figure 2 — Local form deviation for flatness

3.3   Terms relating to the reference plane

3.3.1
reference plane
associated plane fitting the flatness surface in accordance with specified conventions, to which the deviations from flatness and the flatness parameters are referred

3.3.1.1
minimum zone reference planes
two parallel planes enclosing the flatness surface and having the least separation

NOTE   The abbreviated term MZ is used to refer to minimum zone reference elements.

See Figure 3.

3.3.1.1.1
outer minimum zone reference plane
minimum zone reference plane outside the material

See Figure 3.

3.3.1.1.2
inner minimum zone reference plane
minimum zone reference plane inside the material

See Figure 3.

3.3.1.1.3
mean minimum zone reference plane
arithmetic mean plane of the minimum zone reference planes

See Figure 3.

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