INTERNATIONAL STANDARD

ISO 12085

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Geometrical Product Specification (GPS) — Surface texture: Profile method — Motif parameters

Spécification géométrique des produits (GPS) — État de surface: Méthode du profil — Paramètres liés aux motifs

Reference number
ISO 12085:1996(E)

Contents

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Annexes

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.

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.

International Standard ISO 12085 was prepared jointly by Technical Committees ISO/TC 57, *Metrology and properties of surfaces,* Subcommittee SC 1, *Geometrical parameters — Instruments and procedures for measurement of surface roughness and waviness,* ISO/TC 3, *Limits and fits* and ISO/TC 10, *Technical drawings, product definition and related documentation,* Subcommittee SC 5, *Dimensioning and tolerancing.*

Annex A forms an integral part of this International Standard. Annexes B, C and D are for information only.

Introduction

This International Standard is a Geometrical Product Specification (GPS) standard and is to be regarded as a General GPS standard (see ISO/TR 14638). It influences links 2, 3 and 4 of the surface texture chain of standards on roughness profile and waviness profile.

For more detailed information of the relation of this International Standard to other GPS standards, see annex C.

The approach described in this International Standard facilitates the determining roughness and waviness parameters from the primary profile by finding those motifs which characterize the surface under consideration. This method is independent of any profile filter and results in parameters which are based on the depth and spacing of the motifs. These parameters, which are complementary to those defined in ISO 4287, can be used to describe the functional properties of workpieces as indicated in Annex B.

Geometrical Product Specification (GPS) — Surface texture: Profile method — Motif parameters

1 Scope

This International Standard defines terms and parameters used for determining surface texture by the motif method. It also describes the corresponding ideal operator and measuring conditions.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1302:1992, *Technical drawings — Method of indicating surface texture.*

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

ISO 4287:1996, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Terms, definitions and parameters of surface texture.*

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

3 Definitions

For the purposes of this International Standard the following definitions apply.

3.1 General definitions

3.1.1 surface profile: (See ISO 4287.)

3.1.2 primary profile: (See ISO 3274.)

3.1.3 local peak of profile: A part of a profile between two adjacent minima of the profile (see figure 1).

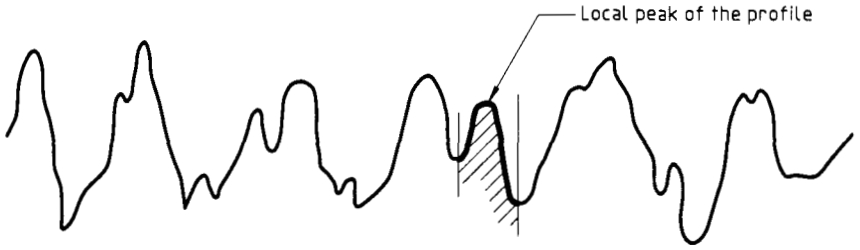


Figure 1 — Local peak of profile

3.1.4 local valley of profile: A part of a profile between two adjacent maxima of the profile (see figure 2).

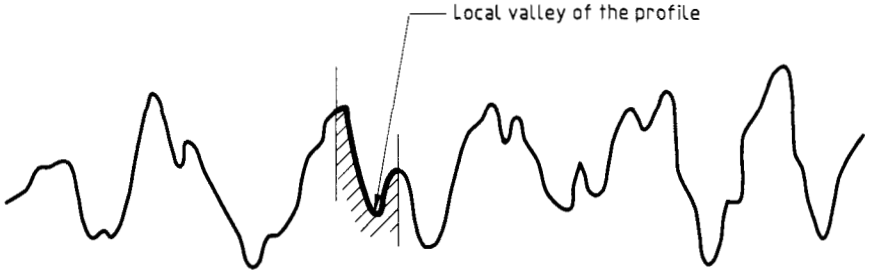


Figure 2 — Local valley of profile

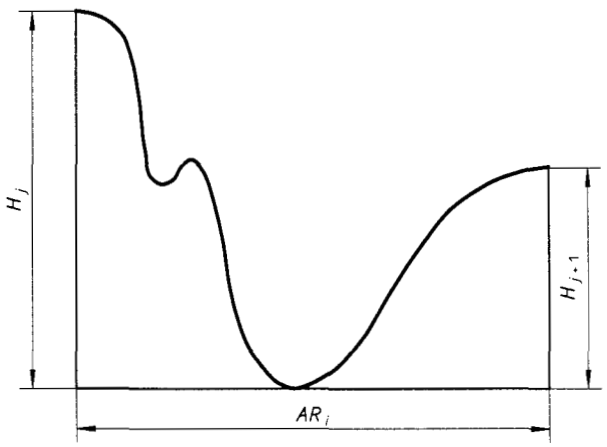
3.1.5 motif: A portion of the primary profile between the highest points of two local peaks of the profile, which are not necessarily adjacent.

A motif is characterized by (see figures 3 and 5):

— its length, AR_i or AW_i, measured parallel to the general direction of the profile;

— its two depths, H_j and H_{j+1}, or Hw_j and Hw_{j+1}, measured perpendicular to the general direction of the primary profile;

— its T characteristic, that is the smallest depth between the two depths.



$T = \text{MIN}\,[H_j ; H_{j+1}]$
here: $T = H_{j+1}$

Figure 3 — Roughness motif

3.1.6 roughness motif: Motif derived by using the ideal operator with limit value A (see figure 3).

NOTE 1 By this definition, a roughness motif has a length AR_i smaller than or equal to A.

3.1.7 upper envelope line of the primary profile (waviness profile): Straight lines joining the highest points of peaks of the primary profile, after conventional discrimination of peaks (see figure 4).

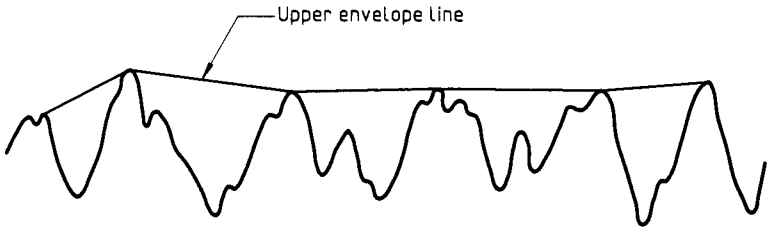


Figure 4 — Upper envelope line

3.1.8 waviness motif: Motif derived on the upper envelope line by using the ideal operator with limit value B (see figure 5).

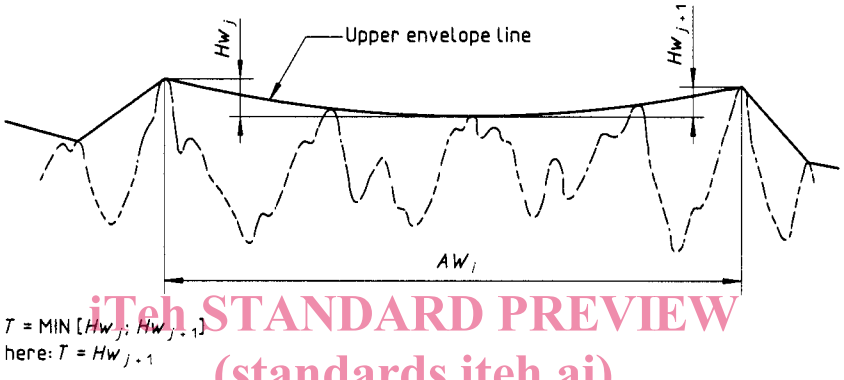


Figure 5 — Waviness motif

3.2 Parameter definitions

3.2.1 mean spacing of roughness motifs, AR: The arithmetical mean value of the lengths AR_i of roughness motifs, within the evaluation length (see figure 6), i.e.

$$AR = \frac{1}{n} \sum_{i=1}^{n} AR_i$$

where n is the number of roughness motifs (equal to the number of AR_i values).

3.2.2 mean depth of roughness motifs, R: The arithmetical mean value of the depths H_j of roughness motifs, within the evaluation length (see figure 6), i.e.

$$R = \frac{1}{m} \sum_{j=1}^{m} H_j$$

where m is the number of H_j values.

NOTE 2 The number of H_j values is twice the number of AR_i values ($m = 2n$).

3.2.3 maximum depth of profile irregularity, Rx: The largest depth, H_j, within the evaluation length.

EXAMPLE

On figure 6: $Rx = H_3$.

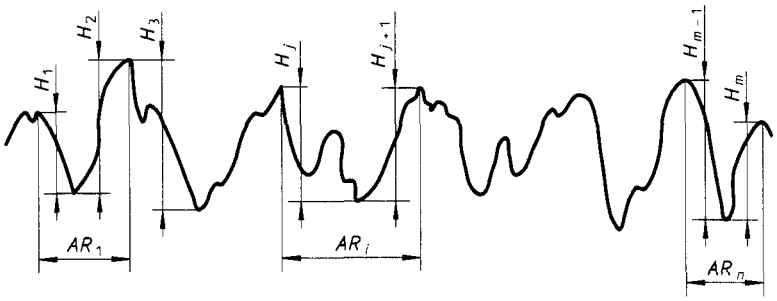


Figure 6 — Roughness parameters

3.2.4 mean spacing of waviness motifs, AW**:** The arithmetical mean value of the lengths AW_i of waviness motifs, within the evaluation length (see figure 7), i.e.

$$AW = \frac{1}{n} \sum_{i=1}^{n} AW_i$$

where n is the number of waviness motifs (equal to the number of AW_i values).

3.2.5 mean depth of waviness motifs, W**:** The arithmetical mean value of the depths Hw_j of waviness motifs, within the evaluation length (see figure 7), i.e.

$$W = \frac{1}{m} \sum_{j=1}^{m} Hw_j$$

where m is the number of Hw_j values.

NOTE 3 The number of Hw_j values is twice the number of AW_i values ($m = 2n$).

3.2.6 maximum depth of waviness, Wx**:** The largest depth Hw_j within the evaluation length (see figure 7).

3.2.7 total depth of waviness, Wte**:** The distance, measured in a direction perpendicular to the general direction of the primary profile, between the highest point and the lowest point of the upper envelope line of the primary profile (see figure 7).

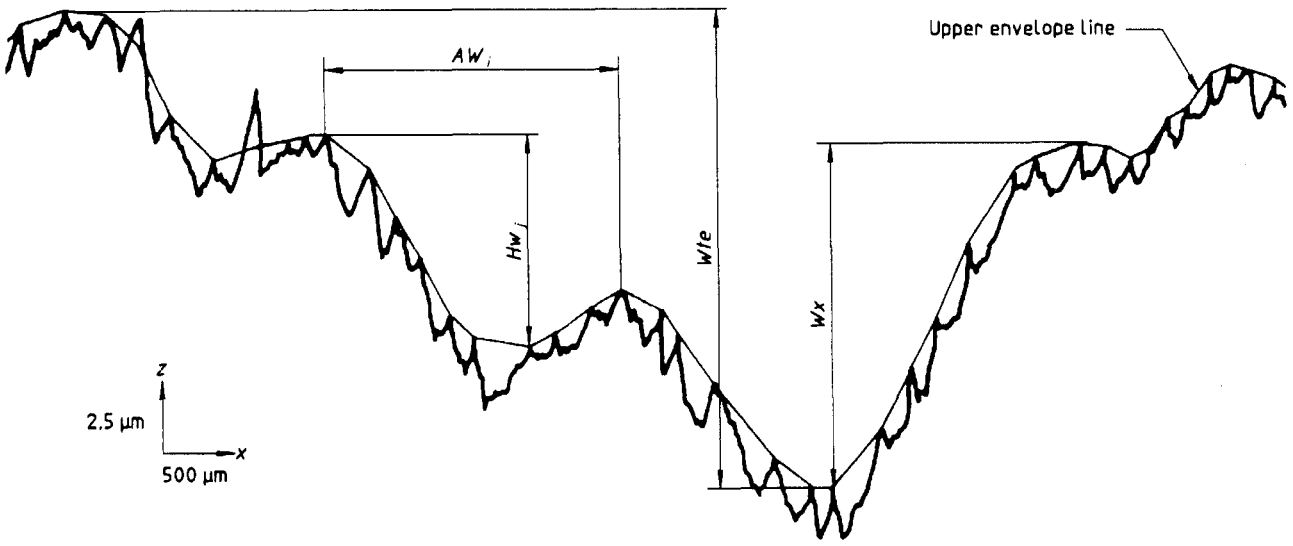


Figure 7 — Waviness parameters

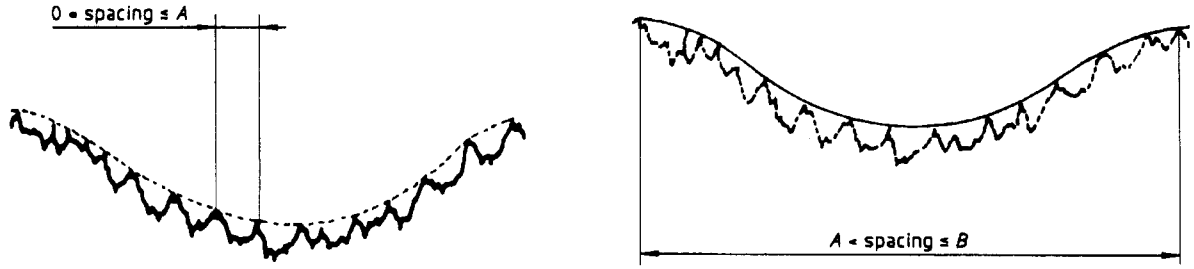
4 Theoretically exact operator of the motif method

4.1 General

This clause describes the identification conditions of motifs (length and depth discrimination) and presents the process for calculating roughness and waviness parameters.

4.2 Conventional limits of motifs

The recommended values for limits A and B as described in figure 8 are given under clause 5.



a) Roughness motifs b) Waviness motifs

Figure 8 — Conventional limits of motifs

4.3 Depth discrimination

The depth discrimination applies to the primary profile for the assessment of surface roughness.

4.3.1 Discrimination based on minimum depth

Divide the primary profile into sections of width $A/2$, and take the height of each rectangle.

The local peaks taken into account are those whose depth is larger than 5 % of the mean height of these rectangles (see figure 9).

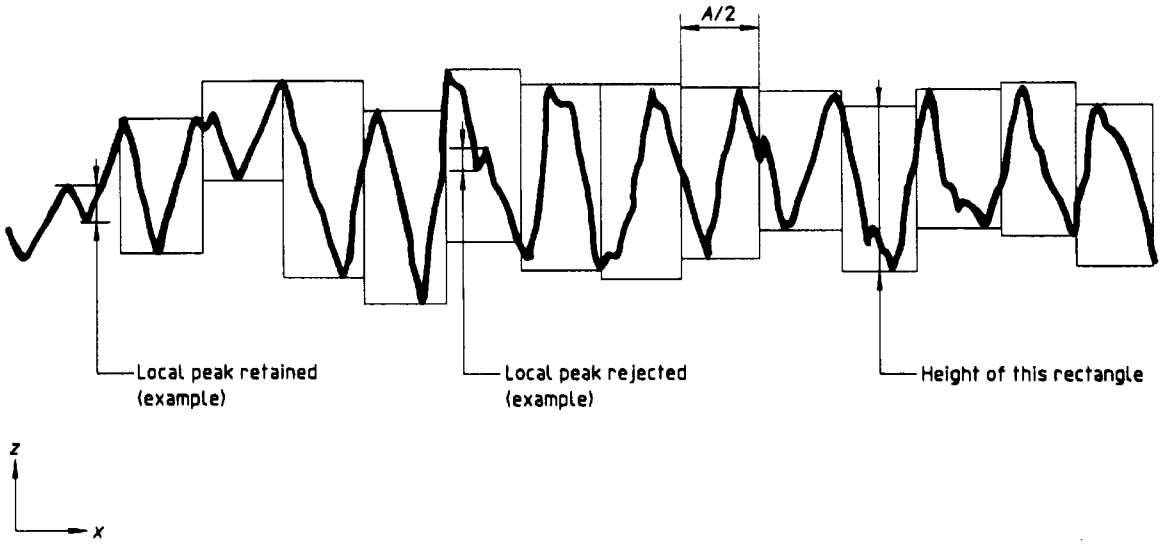


Figure 9 — Depth discrimination