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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*

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

TECHNICAL CORRIGENDUM 1

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

RECTIFICATIF TECHNIQUE 1

Technical Corrigendum 1 to International Standard ISO 12085:1996 was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

Page 1

Clause 2

Replace "ISO 4287:1996" with "ISO 4287:1997".

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Figure C.1

Replace "Data" with "Datums".

Annexes

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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.)

3.1.7 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).

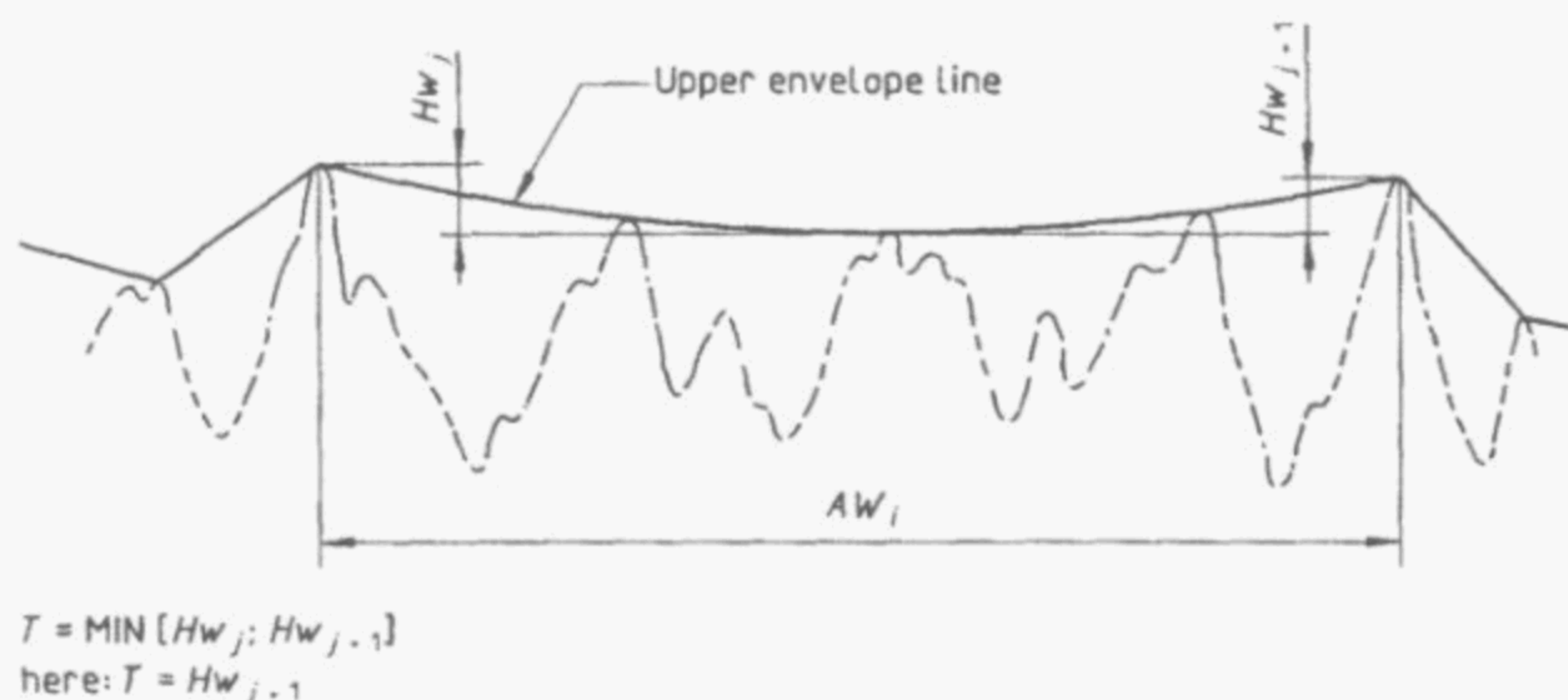


Figure 5 — Waviness motif

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, R_x : The largest depth, H_j , within the evaluation length.

EXAMPLE

On figure 6: $R_x = H_3$.

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.

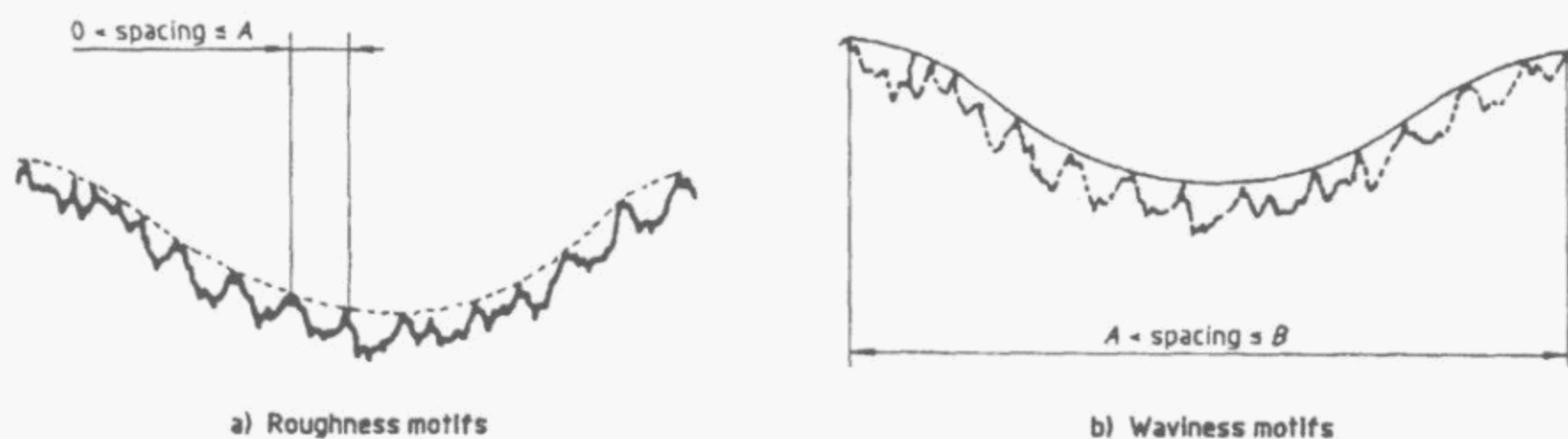


Figure 8 — Conventional limits of motifs

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).

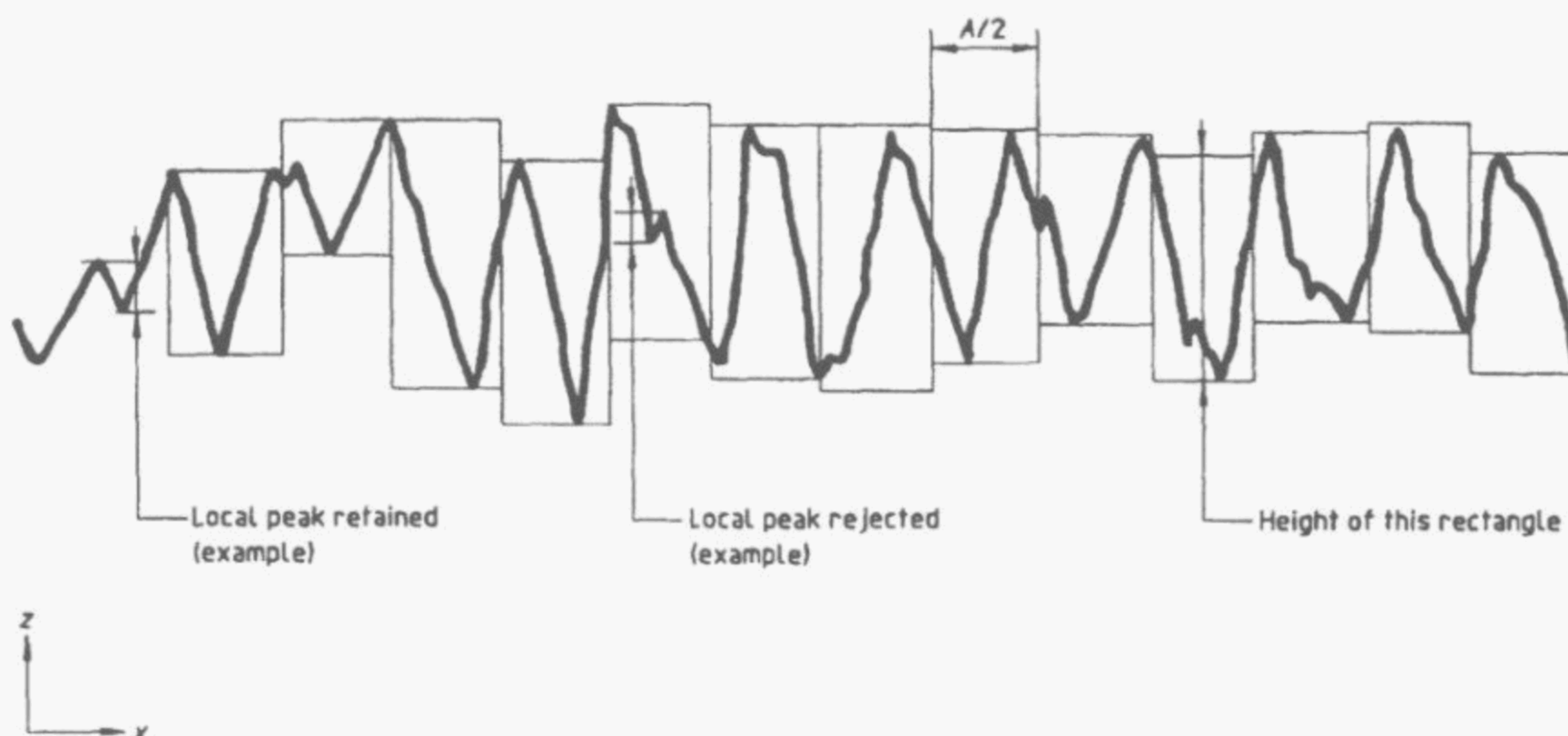


Figure 9 — Depth discrimination

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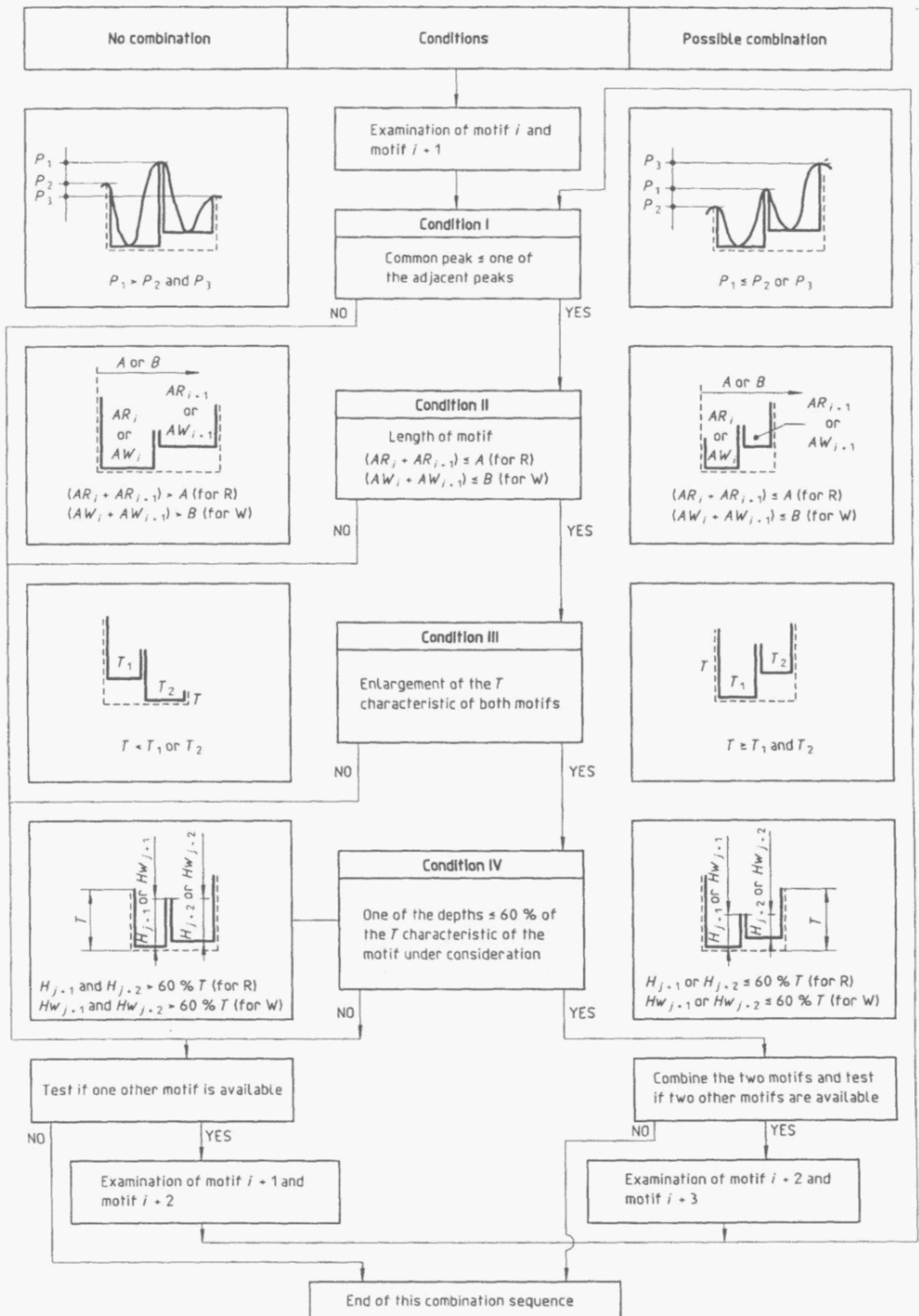


Figure 11 — Combination of motifs

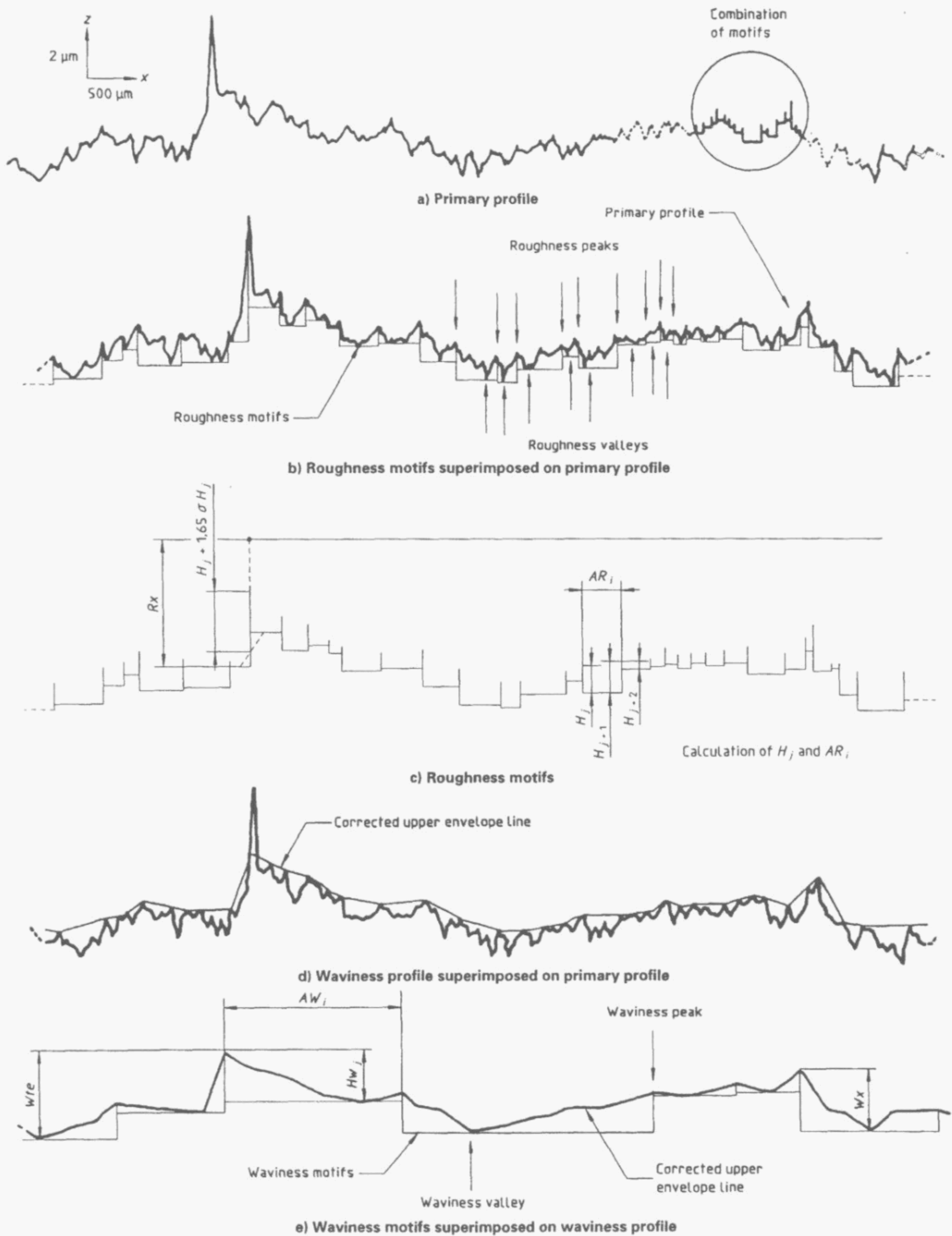


Figure 12 — Illustration of procedure for parameter calculation

Annex A

(normative)

Calculation method for combination of motifs

In order to have reproducible results with existing apparatus, the method of calculation given in A.1 to A.3 shall be applied in the software (see figure A.1).

A.1 Profile decomposition in "segments", the length of which is smaller than or equal to "A" for roughness and "B" for waviness ("A" and "B" values in 5.2)

Find two peaks P_i, P_{i+1} satisfying the following conditions:

- the horizontal distance between these two peaks is maximum;
- this horizontal distance is smaller than or equal to A or B (see table 1);
- there is no peak between them, higher than either of them.

The part of the profile comprised between these two peaks is called "segment".

A.2 Motif combination inside each segment

Inside each segment, the three conditions I, III, IV of 4.4 are successively tested on each pair of motifs. The combination of two individual motifs is only possible if these three conditions are fulfilled.

For condition IV, the minimum (H_{j+1}, H_{j+2}) is compared to 60 % of the vertical reference T of the segment (T = minimum of the two heights h_1, h_2 of the segment) and not to that of the possible combined motif.

When all individual motifs inside the segment have been successively tested, the combination operation is performed again from the beginning of the segment until no combination is possible inside this segment.

The following segments are then examined in the same manner.

A.3 Combination over the whole profile

All motifs resulting from the previous step are combined two by two over the whole profile. For each pair of motifs, the conditions I, II, III, IV are successively tested. The two considered motifs are combined only if these four conditions are fulfilled. For condition IV, the vertical characteristic T is the minimum of the two heights of the possible combined motif considered.

When all motifs of the profile are successively tested, the combination operation is performed again from the beginning of the profile until no combination is possible.

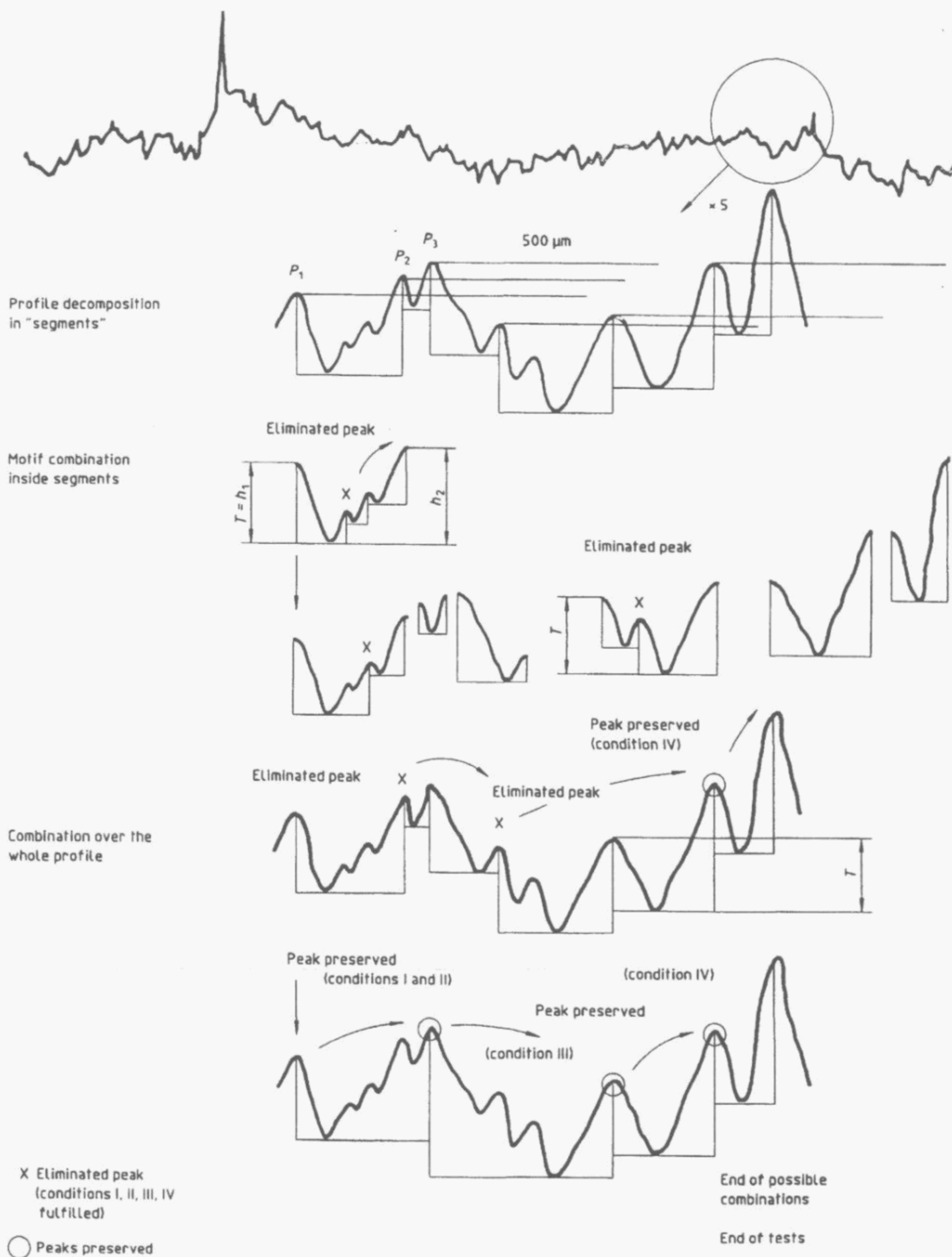


Figure A.1 — Combination of motifs

Annex C

(informative)

Relation to the GPS matrix model

For full details about the GPS matrix model, see ISO/TR 14638.

C.1 Information about the standard and its use

This International Standard defines roughness and waviness parameters which are complementary to the profile method parameters defined in ISO 4287. They can be used when the peaks of the surface are important for the function of the surface.

NOTE 5 The conversion from the profile method parameters to the motif parameters and vice versa is not, in general, possible.

C.2 Position in the GPS matrix model

This International Standard is a general GPS standard, which influences chain links 2, 3 and 4 of the chain of standards on roughness profile and waviness profile in the general GPS matrix, as graphically illustrated in figure C.1.

Fundamental GPS standards	Global GPS standards					
	General GPS matrix					
Chain link number	1	2	3	4	5	6
Size						
Distance						
Radius						
Angle						
Form of line independent of datum						
Form of line dependent on datum						
Form of surface independent of datum						
Form of surface dependent on datum						
Orientation						
Location						
Circular run-out						
Total run-out						
Data						
Roughness profile						
Waviness profile						
Primary profile						
Surface defects						
Edges						

Figure C.1

C.3 Related International Standards

The related International Standards are those of the chains of standards indicated in figure C.1.

