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**Geometrical product specifications  
(GPS) — Surface texture: Profile —**

**Part 2:  
Terms, definitions and surface texture  
parameters**

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

*Partie 2: Termes, définitions et paramètres d'état de surface*





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# Contents

Page

<b>Foreword</b>	<b>v</b>
<b>Introduction</b>	<b>vi</b>
<b>1 Scope</b>	<b>1</b>
<b>2 Normative references</b>	<b>1</b>
<b>3 Terms and definitions</b>	<b>1</b>
3.1 General terms	1
3.2 Geometrical parameter terms	10
3.3 Geometrical feature terms	14
<b>4 Field parameters</b>	<b>22</b>
4.1 General	22
4.2 Height parameters	22
4.2.1 General	22
4.2.2 Arithmetic mean height	22
4.2.3 Root mean square height	22
4.2.4 Skewness	22
4.2.5 Kurtosis	22
4.2.6 Total height	23
4.2.7 Maximum height per section	23
4.3 Spatial parameters	24
4.3.1 General	24
4.3.2 Autocorrelation length	24
4.3.3 Dominant spatial wavelength	24
4.4 Hybrid parameters	25
4.4.1 General	25
4.4.2 Root mean square gradient	25
4.4.3 Arithmetic mean of absolute gradient	25
4.4.4 Maximum absolute gradient	25
4.4.5 Developed length	25
4.4.6 Developed length ratio	26
4.5 Material ratio functions and related parameters	26
4.5.1 Material ratio functions	26
4.5.2 Material ratio parameters	31
4.5.3 Parameters for stratified surfaces using the material ratio curve	33
4.5.4 Parameters for stratified surfaces using the material probability curve	35
4.5.5 Volume parameters	36
<b>5 Feature parameters</b>	<b>38</b>
5.1 Parameters based on peak heights and pit depths	38
5.1.1 General	38
5.1.2 Maximum peak height	39
5.1.3 Mean peak height	39
5.1.4 Maximum pit depth	39
5.1.5 Mean pit depth	40
5.1.6 Maximum height	40
5.2 Parameters based on profile elements	40
5.2.1 General	40
5.2.2 Mean profile element spacing	42
5.2.3 Maximum profile element spacing	42
5.2.4 Standard deviation of profile element spacings	42
5.2.5 Mean profile element height	42
5.2.6 Maximum profile element height	42
5.2.7 Standard deviation of profile element heights	42
5.2.8 Peak count parameter	43

5.3	Parameters based on feature characterization.....	43
5.3.1	General.....	43
5.3.2	Named feature parameters.....	43
<b>Annex A</b>	<b>(informative) Determination of the first and second derivative .....</b>	<b>45</b>
<b>Annex B</b>	<b>(informative) Determination of the local curvature.....</b>	<b>48</b>
<b>Annex C</b>	<b>(normative) Determination of the material ratio curve .....</b>	<b>49</b>
<b>Annex D</b>	<b>(normative) Determination of profile parameters for stratified surfaces .....</b>	<b>50</b>
<b>Annex E</b>	<b>(normative) Crossing-the-line segmentation to determine profile elements .....</b>	<b>59</b>
<b>Annex F</b>	<b>(normative) Feature characterization .....</b>	<b>65</b>
<b>Annex G</b>	<b>(informative) Summary of profile surface texture parameters and functions .....</b>	<b>69</b>
<b>Annex H</b>	<b>(informative) Specification analysis workflow .....</b>	<b>72</b>
<b>Annex I</b>	<b>(informative) Changes to previous ISO profile documents .....</b>	<b>74</b>
<b>Annex J</b>	<b>(informative) Overview of profile and areal standards in the GPS matrix model .....</b>	<b>75</b>
<b>Annex K</b>	<b>(informative) Relation to the GPS matrix model .....</b>	<b>76</b>
<b>Bibliography</b>	<b>.....</b>	<b>77</b>

## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 290, *Dimensional and geometrical product specification and verification*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This first edition of ISO 21920-2 cancels and replaces ISO 4287:1997, ISO 12085:1996, ISO 13565-2:1996 and ISO 13565-3:1998, which have been technically revised.

It also incorporates the Amendment ISO 4287:1997/Amd 1:2009 and the Technical Corrigenda ISO 4287:1997/Cor 1:1998, ISO 4287:1997/Cor 2:2005, ISO 12085:1996/Cor 1:1998 and ISO 13565-2:1996/Cor 1:1998.

The main changes are related to ISO 4287 and are as follows:

- all field parameters are now related to the evaluation length;
- unambiguous evaluation of profile elements;
- definition of new parameters, in particular parameters based on the watershed transformation.

A list of all parts in the ISO 21920 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

This document is a geometrical product specification (GPS) standard and is to be regarded as a general GPS standard (see ISO 14638). It influences chain link B of the chains of standards on profile surface texture.

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

For more detailed information of the relation of this document to other standards and the GPS matrix model, see [Annex K](#).

This document develops the terminology, concepts and parameters for profile surface texture.

Throughout this document, parameters are written as abbreviated terms with lower-case suffixes (as in  $R_q$ ) when used in a sentence, and are written as symbols with subscripts (as in  $R_q$ ) when used in formulae, to avoid misinterpretations of compound letters as an indication of multiplication between quantities in formulae. The parameters with lower-case suffixes are used in product documentation, drawings and data sheets.

# Geometrical product specifications (GPS) — Surface texture: Profile —

## Part 2: Terms, definitions and surface texture parameters

### 1 Scope

This document specifies terms, definitions and parameters for the determination of surface texture by profile methods.

NOTE 1 The main changes to previous ISO profile documents are described in [Annex I](#).

NOTE 2 An overview of profile and areal standards in the GPS matrix model is given in [Annex J](#).

NOTE 3 The relation of this document to the GPS matrix model is given in [Annex K](#).

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 16610-1:2015, *Geometrical product specifications (GPS) — Filtration — Part 1: Overview and basic concepts*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16610-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

#### 3.1 General terms

##### 3.1.1

##### **skin model**

non-ideal surface model

<of a workpiece> model of the physical interface of the workpiece with its environment

[SOURCE: ISO 17450-1:2011, 3.2.2]

##### 3.1.2

##### **surface texture**

geometrical irregularities contained in a scale-limited profile

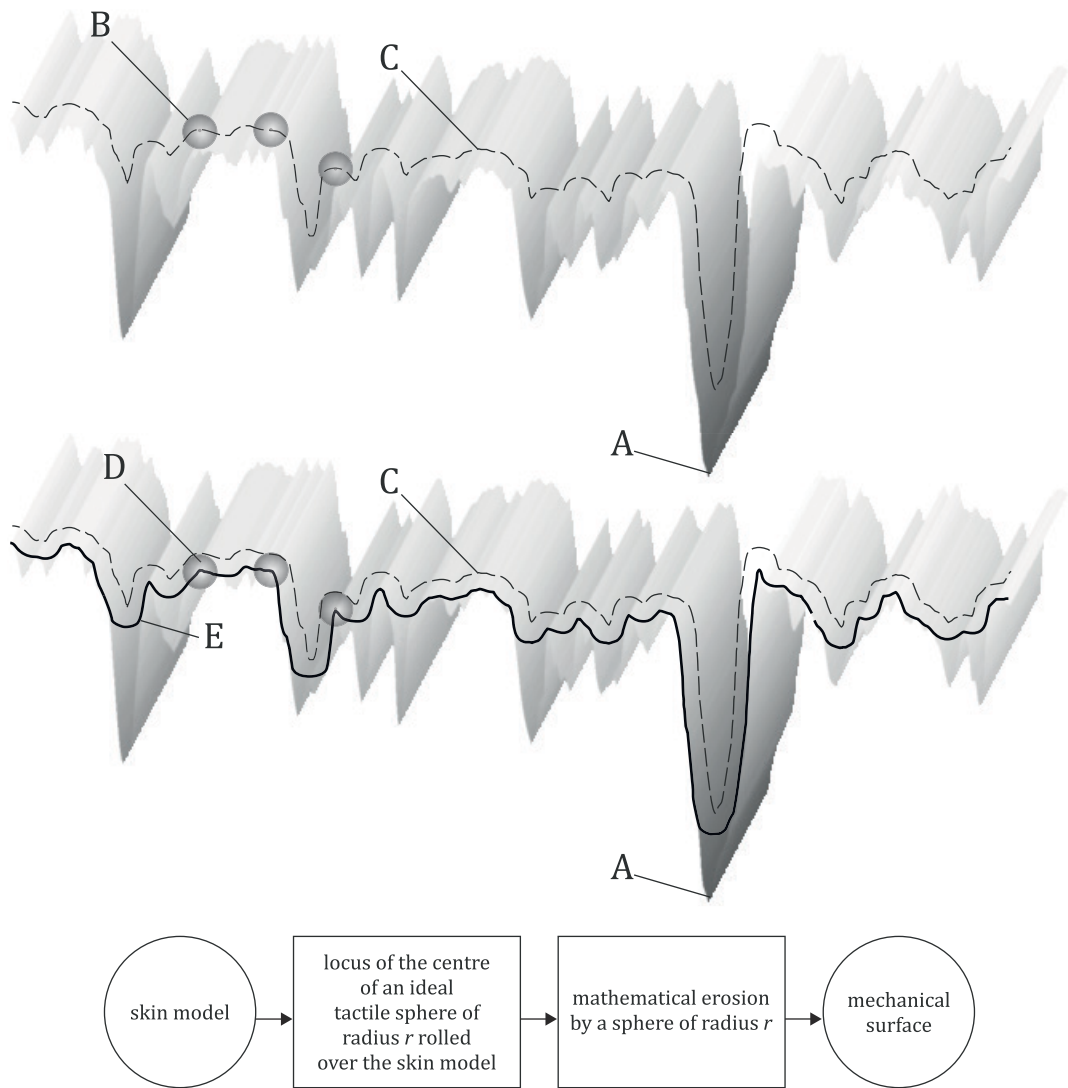
Note 1 to entry: Surface texture does not include geometrical irregularities contributing to the form or shape of the profile.

3.1.3  
mechanical surface

boundary of the mathematical erosion, by a sphere of radius  $r$ , of the locus of the centre of an ideal tactile sphere, also with radius  $r$ , rolled over the skin model of a workpiece

Note 1 to entry: [Figure 1](#) is an example to show the effect of mechanical filtering and is not related to a real measured surface.

[SOURCE: ISO 14406:2010, 3.1.1, modified — Notes to entry replaced.]



- Key**
- A skin model
  - B ideal tactile sphere of radius  $r$
  - C envelope curve of the locus of the centre of an ideal tactile sphere B rolled over the skin model
  - D sphere of radius  $r$
  - E mechanical surface: boundary of the mathematical erosion, by the sphere D, of the envelope curve C

Figure 1 — Mechanical surface

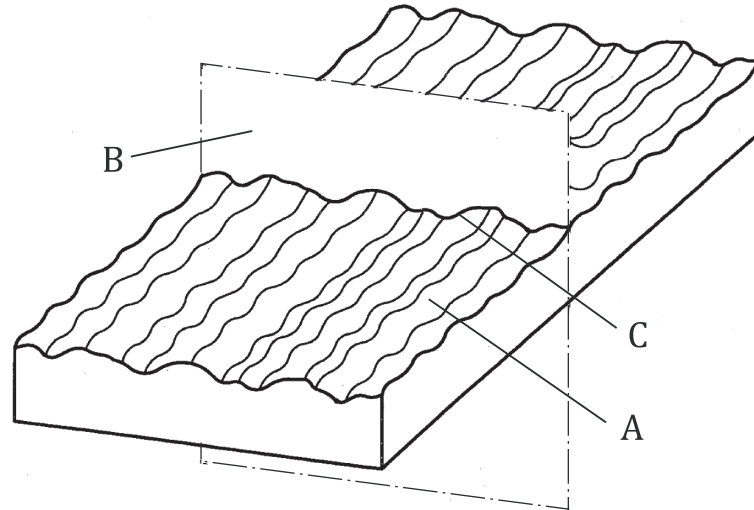


**3.1.4****profile trace**

intersection of the skin model by an intersection plane perpendicular to the skin model and in a specified direction

Note 1 to entry: See [Figure 2](#).

Note 2 to entry: See ISO 21920-3:2021, 4.3.

**Key**

- A skin model
- B intersection plane
- C profile trace

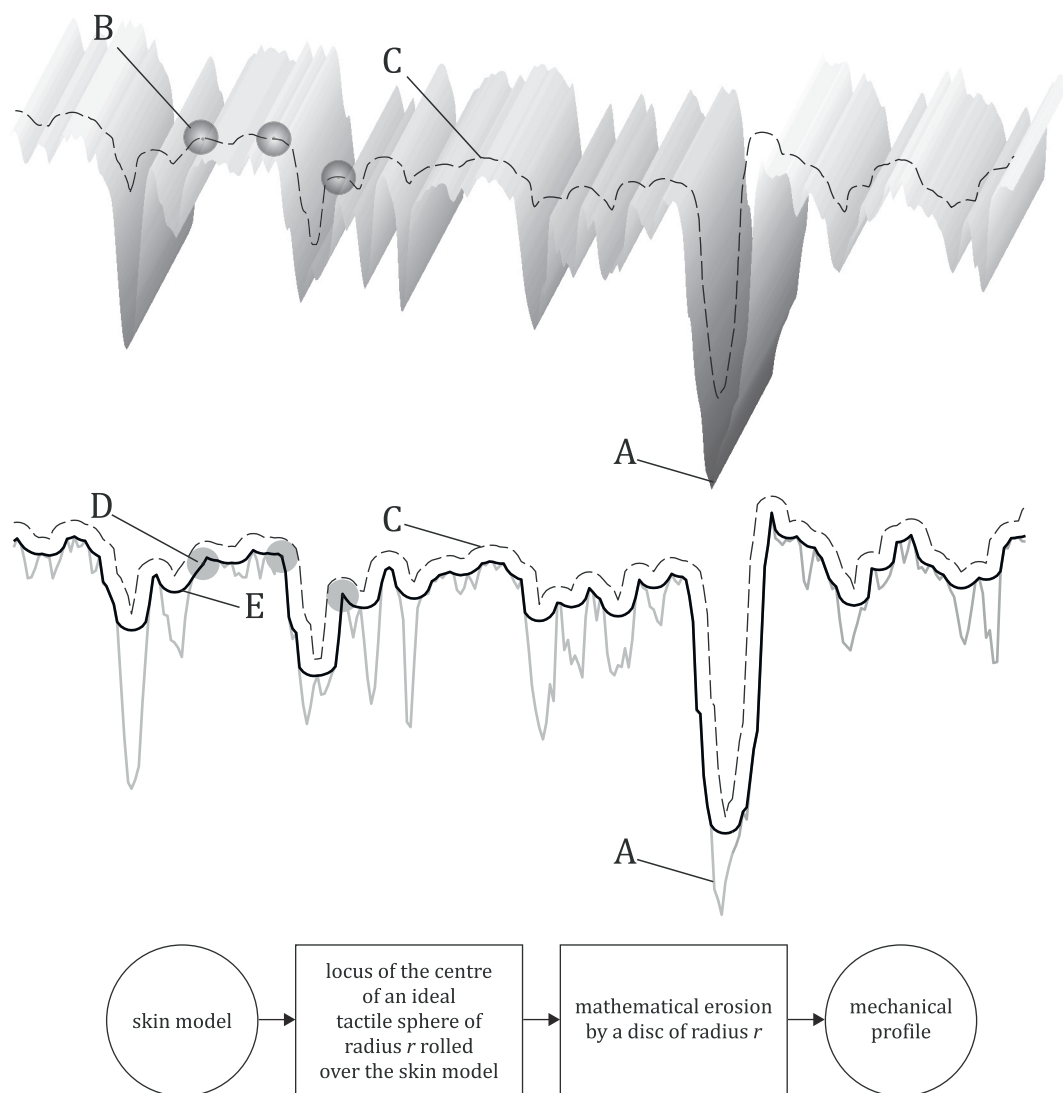
**Figure 2 — Profile trace**

**3.1.5****mechanical profile**

boundary of the mathematical erosion, by a circular disc of radius  $r$ , of the locus of the centre of an ideal tactile sphere, also with radius  $r$ , rolled along a trace over the skin model of a workpiece

Note 1 to entry: [Figure 3](#) is an example to show the effect of mechanical filtering and is not related to a real measured profile.

Note 2 to entry: The treatment of non-measured points and spurious points is part of the extraction process (see ISO 17450-1:2011, 8.1.3) and is not considered in this document.



#### Key

- A skin model
- B ideal tactile sphere of radius  $r$
- C envelope curve of the planar locus of the centre of an ideal tactile sphere rolled over the skin model
- D circular disc of radius  $r$
- E mechanical profile: boundary of the mathematical erosion, by the circular disc D, of the envelope curve C

**Figure 3 — Mechanical profile**

#### 3.1.6

##### **electromagnetic surface**

surface obtained by the electromagnetic interaction with the skin model of a workpiece

Note 1 to entry: See [Figure 4](#).

Note 2 to entry: The electromagnetic surface is an inherent characteristic of a skin model of a workpiece.

Note 3 to entry: Electromagnetic surfaces depend on the optical measurement principle used for extraction.

[SOURCE: ISO 14406:2010, 3.1.2, modified — Notes to entry replaced.]