# SLOVENSKI STANDARD
# oSIST prEN ISO 21920-2:2020

**01-april-2020**

---

**Specifikacija geometrijskih veličin izdelka (GPS) - Tekstura površine: profil - 2. del: Izrazi, definicije in parametri teksture površine (ISO/DIS 21920-2:2020)**

Geometrical product specifications (GPS) - Surface texture: Profile - Part 2: Terms, definitions and surface texture parameters (ISO/DIS 21920-2:2020)

Geometrische Produktspezifikation (GPS) - Oberflächenbeschaffenheit: Profile - Teil 2: Begriffe und Parameter für die Oberflächenbeschaffenheit (ISO/DIS 21920-2:2020)



Spécification géométrique des produits (GPS) - État de surface: Méthode du profil - Partie 2: Termes, définitions et paramètres d'état de surface (ISO/DIS 21920-2:2020)



**Ta slovenski standard je istoveten z:** **prEN ISO 21920-2**

---

**ICS:**

| | | |
|---|---|---|
| 01.040.17 | Meroslovje in merjenje. Fizikalni pojavi (Slovarji) | Metrology and measurement. Physical phenomena (Vocabularies) |
| 17.040.20 | Lastnosti površin | Properties of surfaces |
| 17.040.40 | Specifikacija geometrijskih veličin izdelka (GPS) | Geometrical Product Specification (GPS) |

**oSIST prEN ISO 21920-2:2020** **en,fr,de**

DRAFT INTERNATIONAL STANDARD

# ISO/DIS 21920-2

ISO/TC **213**

Secretariat: **BSI**

Voting begins on:
**2020-02-19**

Voting terminates on:
**2020-05-13**

# 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*

ICS: 17.040.40; 01.040.17





This document is circulated as received from the committee secretariat.

**ISO/CEN PARALLEL PROCESSING**

Reference number
ISO/DIS 21920-2:2020(E)



ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

# Contents





## 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).

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).

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



For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.



The committee responsible for this document is Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.



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

This part of ISO 21920 replaces the following standards: ISO 4287:1997, ISO 4287:1997/Amd 1:2009, ISO 4287:1997/Cor 1:1998, ISO 4287:1997/Cor 2:2005, ISO 13565-2:1996, ISO 13565-2:1996/Cor 1:1998 and ISO 13565-3:1998.

## Introduction

This part of ISO 21920 is a geometrical product specification (GPS) standard and is to be regarded as a general GPS standard (see ISO 14638). It influences the chain link F of the chains of standards on profile and areal surface texture.

The ISO/GPS matrix model given in ISO 14638 gives an overview of the ISO/GPS system of which this part of ISO 21920 is a part. The fundamental rules of ISO/GPS given in ISO 8015 apply to this part of ISO 21920 and the default decision rules given in ISO 14253-1 apply to the specifications made in accordance with this part of ISO 21920, unless otherwise indicated.

For more detailed information of the relation of this part of ISO 21920 to other standards and the GPS matrix model, see Annex F.

This part of ISO 21920 develops the terminology, concepts and parameters for profile surface texture. It comprises the former ISO 4287:1997, ISO 13565-2:1996, ISO 13565-3:1998. Compared to ISO 4287:1997 almost all parameters are calculated over the evaluation length.

# Geometrical product specification (GPS) — Surface texture: Profile — Part 2: Terms, definitions and surface texture parameters

## 1 Scope

This part of ISO 21920 specifies terms, definitions and parameters for the determination of surface texture by profile methods.

## 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 21920-1, *Geometrical product specification (GPS) — Surface texture: Profile — Part 1: Indication of surface texture*

ISO 21920-3, *Geometrical product specification (GPS) — Surface texture: Profile — Part 3: Specification operators*

ISO 16610-1:2015, *Geometrical product specification (GPS) — Filtration: Profile — Part 1: Overview and basic concepts*

ISO 17450-1:2011, *Geometrical product specification (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 17450-1:2011 and ISO 16610-1:2015 and the following apply.

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

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

### 3.1 General terms

**3.1.1.**
**non-ideal surface model**
**skin 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**
<profile> geometrical irregularities contained in a scale-limited profile

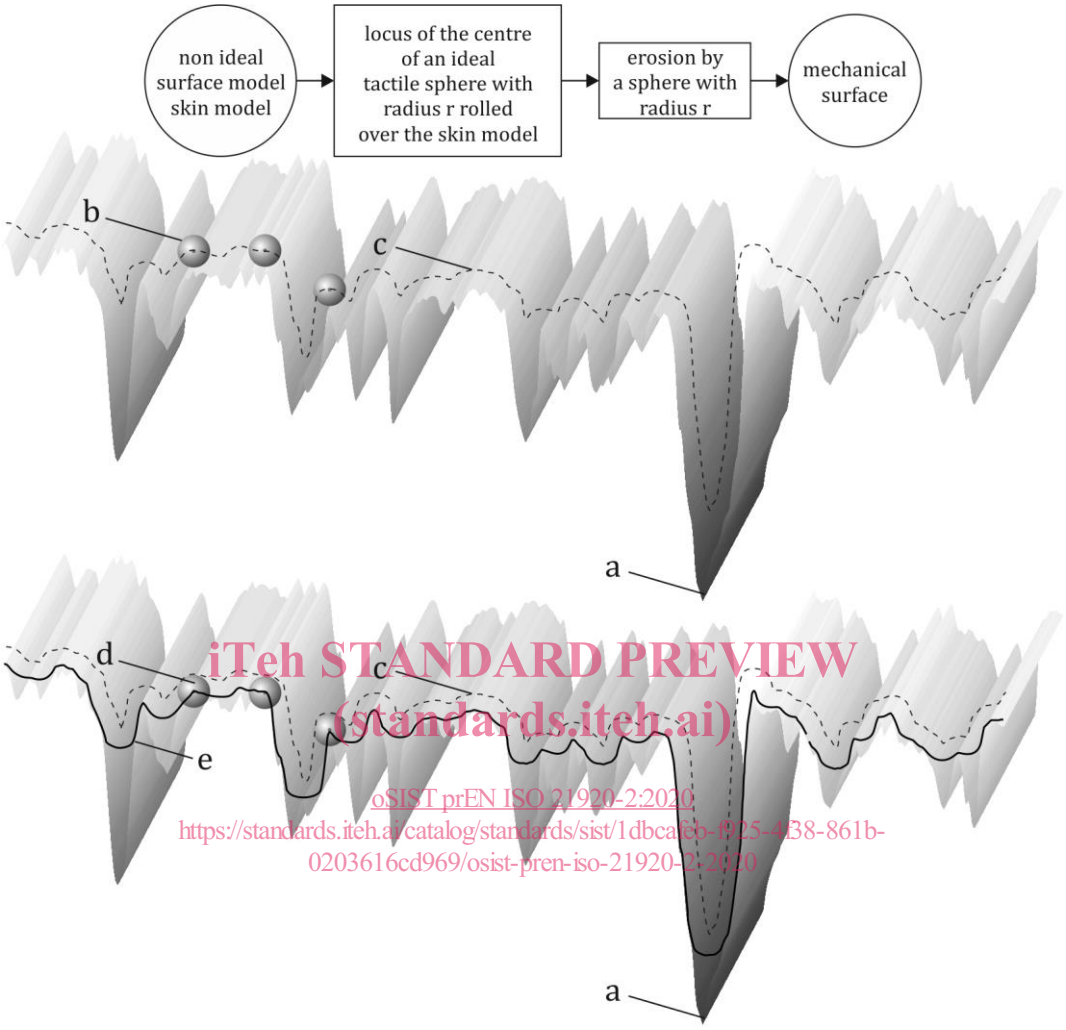
Note 1 to entry: Surface texture does not include those geometrical irregularities contributing to the form or shape of the profile.

**3.1.3.**
**mechanical surface**
boundary of the 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

[SOURCE: ISO 14406:2010, 3.1.1]

Note 1 to entry: Figure 1 is only an example to show the effect of mechanical filtering and is not related to a real measured surface.






**Key**

a skin model

b ideal tactile sphere with radius $r$

c envelope curve of the locus of the centre of an ideal tactile sphere rolled over the skin model

d sphere with 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.
### mechanical profile

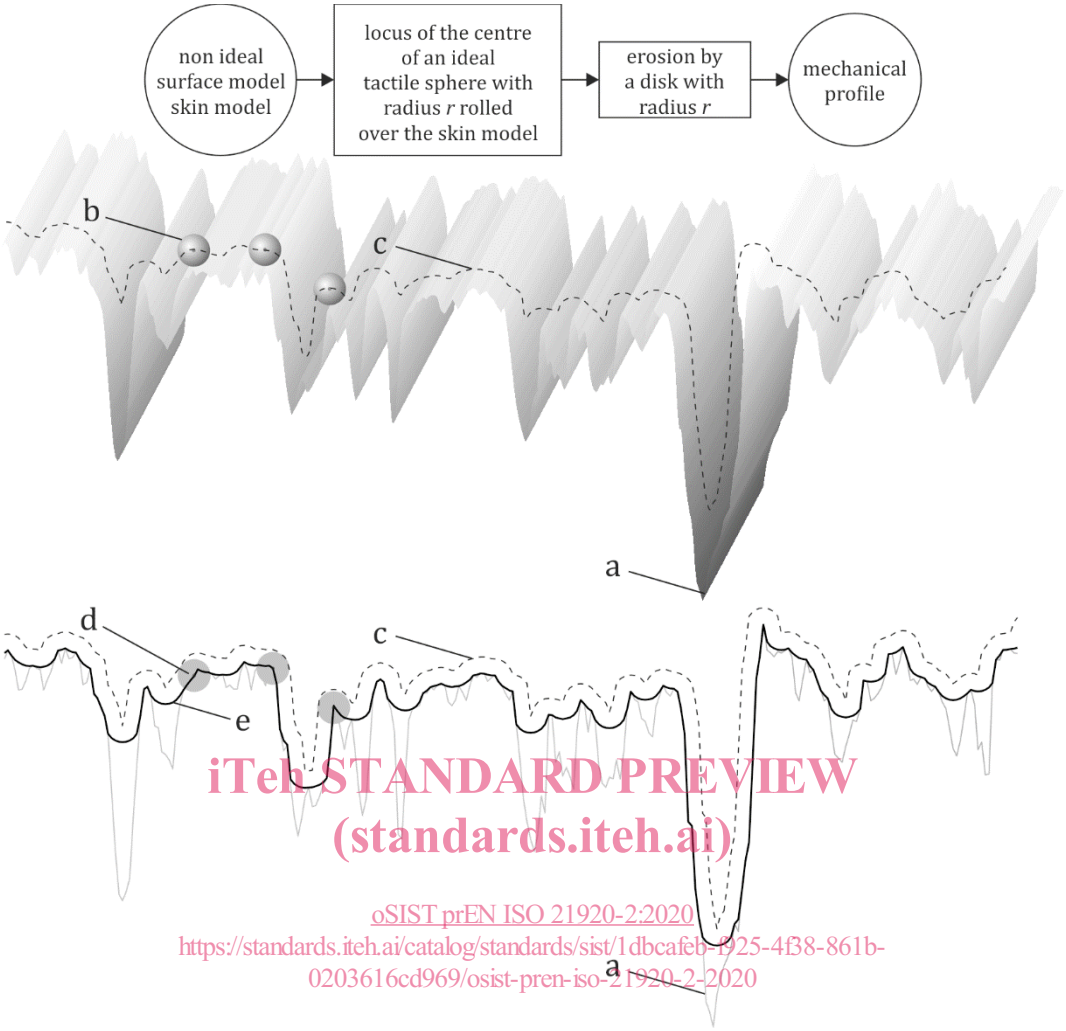
boundary of the mathematical erosion, by a circular disc of radius $r$, of the locus of the centre of an ideal tactile sphere, also with radius $r$, rolled along a trace over the skin model of a workpiece

Note 1 to entry: Figure 2 is only an example to show the effect of mechanical filtering and is not related to a real measured profile.

Note 2 to entry: In most cases the profile trace results from the intersection of the skin model by an intersection plane perpendicular to the skin model (see Figure 3) and in a specified direction (see ISO 21920-3).

Note 3 to entry: The treatment of non-measured and/or spurious points is part of the extraction process and is not considered in this document.






**Key**

a skin model

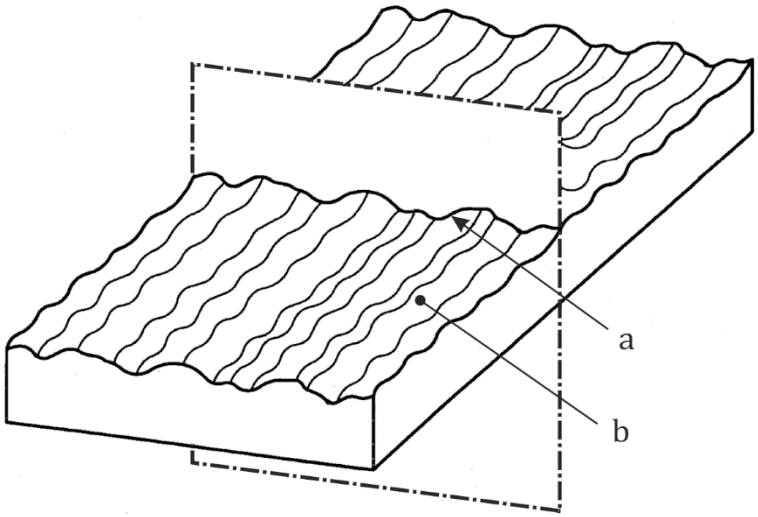
b ideal tactile sphere with radius $r$

c envelope curve of the locus of the centre of an ideal tactile sphere rolled over the skin model

d circular disc with radius $r$

e mechanical profile: boundary of the mathematical erosion, by the circular disc d, of the envelope curve c

**Figure 2 — Mechanical profile**




**Key**

a profile trace b skin model

**Figure 3 — Profile trace**

### 3.1.5.
### electromagnetic surface

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



[SOURCE: ISO 14406:2010, 3.1.2]

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 principal used for extraction.

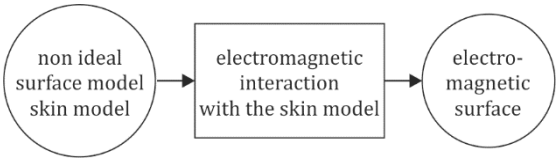



**Figure 4 — Electromagnetic surface**

### 3.1.6.
### electromagnetic profile

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

Note 1 to entry: See Figure 5.

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

Note 3 to entry: Electromagnetic profiles depend on the optical measurement principal used for extraction.

Note 4 to entry: In most cases the profile trace results from the intersection of the skin model by an intersection plane perpendicular to the skin model (see Figure 3) and in a specified direction (see ISO 21920-3).

Note 5 to entry: The treatment of non-measured and/or spurious points is part of the extraction process and is not considered in this document.

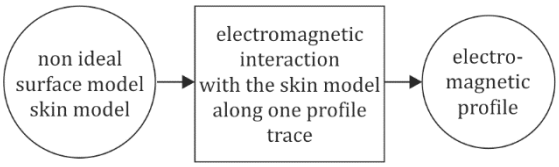



**Figure 5 — Electromagnetic profile**

**3.1.7.**
**auxiliary surface**
surface obtained by an arbitrary external source

Note 1 to entry: A software measurement standard is an example for an auxiliary surface. Other physical measurement principles which differ from a mechanical or electromagnetic surface, such as tunnelling microscopy or atomic force microscopy, can also serve as an auxiliary surface. See Figure 6.

**3.1.8.**
**auxiliary profile**
profile obtained by an arbitrary external source

Note 1 to entry: A software measurement standard is an example for an auxiliary profile. Other physical measurement principles which differ from a mechanical or electromagnetic profile, such as tunnelling microscopy or atomic force microscopy, can also serve as an auxiliary profile. See Figure 6.

**3.1.9.**
**nesting index**
$Nis, Nic, Nif$
number or set of numbers indicating the relative level of nesting for a particular primary mathematical model



[SOURCE: ISO 16610-1:2015, 3.2.1]



**3.1.10.**
**specification coordinate system**
system of coordinates in which surface texture parameters are specified

Note 1 to entry: If the nominal surface is a plane (or portion of a plane), it is common (practice) to use a rectangular coordinate system in which the axes form a right-handed Cartesian set, the X-axis and the Y-axis also lying on the nominal surface, and the Z-axis being in an outward direction (from the material to the surrounding medium). This convention is adopted throughout the rest of this part of ISO 21920.

**3.1.11.**
**primary surface**
surface portion obtained when a surface portion is represented as a specified primary mathematical model with specified nesting index $Nis$

[SOURCE: ISO 16610-1:2015, 3.3]

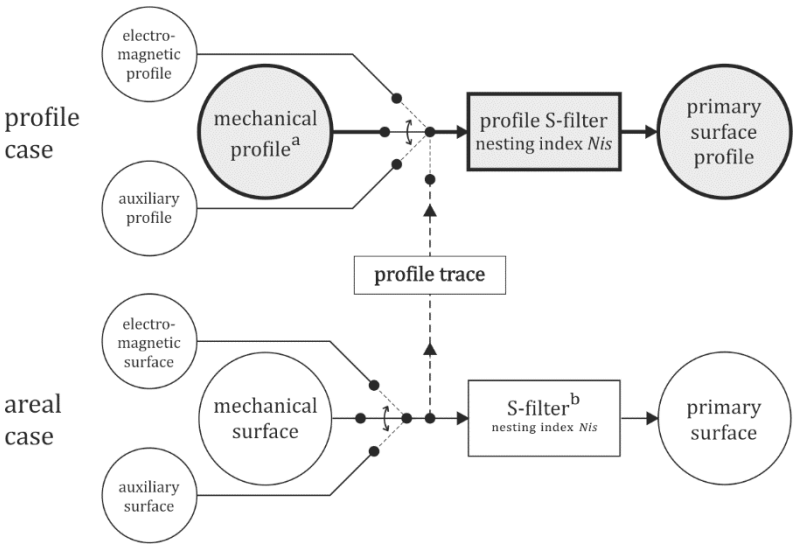
Note 1 to entry: See Figure 6.

**3.1.12.**
**primary surface profile**
surface profile trace obtained when a surface profile trace is represented as a specified primary mathematical model with specified nesting index $Nis$

Note 1 to entry: In this part of ISO 21920-2, a profile S-filter is used to derive the primary surface profile. See Figure 6.

Note 2 to entry: For some applications, the profile S-filter is not used. In such a case, e.g. for multi-scale analysis, the nesting index is equal "zero".

Note 3 to entry: The primary surface profile can also be derived from the mechanical surface (default), electromagnetic surface or auxiliary surface using an intersection plane perpendicular to the chosen type of surface and in a specified direction. See Figure 6.




**Key**

a default case (grey filled)

b [SOURCE: ISO 25178-2:2020, 3.1.4.1]



**Figure 6 — Definition of the primary surface and primary surface profile respectively**

### 3.1.13.
### profile F-operation
operation which removes form from a profile



### 3.1.14.
### profile filter
filtration operator applied to a profile

### 3.1.15.
### profile S-filter
profile filter which removes small lateral scale components from a profile

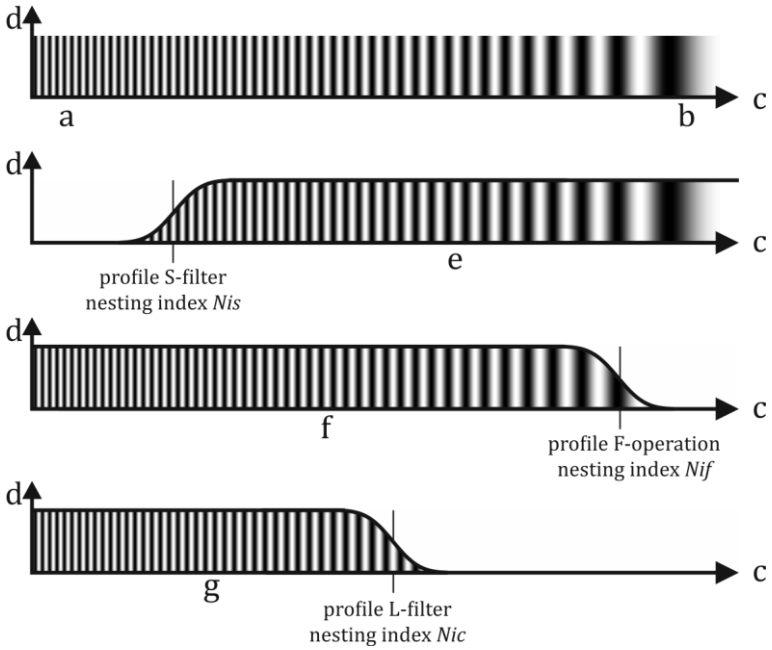
Note 1 to entry: See Figure 7.

### 3.1.16.
### profile L-filter
profile filter which removes large lateral scale components from a profile

Note 1 to entry: Some profile L-filters are sensitive to form and require the profile F-operator first as a prefilter before being applied.

Note 2 to entry: See Figure 7.




**Key**

| | | | |
|---|---|---|---|
| a | small lateral scale | e | structure scales extracted by the profile S-filter |
| b | large lateral scale | f | structure scales extracted by the profile F-operation |
| c | scale axis | g | structure scales extracted by the profile L-filter |
| d | amplitude axis | | |



**Figure 7 — Relationships between the S-filter, L-filter, F-operation**



### 3.1.17.
### scale limited profile



profile structure scales within specified nesting indices



EXAMPLE A profile is scale limited after applying a profile filter with a specified nesting index.

### 3.1.18.
### primary profile

$P$ profile

$p(x)$

scale limited profile at any position $x$ derived from the primary surface profile by removing the form using an profile F-operation with nesting index $Nif$

Note 1 to entry: The primary profile is the basis for evaluation of the primary profile parameters. See Figure 9 and Figure 10.

Note 2 to entry: The primary profile can also be derived from the S-F surface (Figure 8) using an intersection plane perpendicular to the S-F surface and in a specified direction.

Note 3 to entry: Usually a straight line total least squares fit is used as profile F-operation.

Note 4 to entry: The profile F-operation can be performed as a multi-stage operation e.g. a combination of a total least square fit and a profile L-filter.