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Geometrical product specifications (GPS) — Basic concepts —

Part 4: Geometrical characteristics for quantifying GPS deviations

Spécification géométrique des produits (GPS) — Concepts généraux —

Partie 4: Caractéristiques géométriques pour la quantification des écarts GPS

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Foreword

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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).

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This document was prepared by Technical Committee is ISO/TC 213, *Dimensional and geometrical product specifications and verification*, in collaboration with Technical Committee CEN/TC 290, *Dimensional and geometrical product specification and verification*.

A list of all parts in the ISO 17450 series can be found on the ISO website.

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Introduction

This document is a geometrical product specification (GPS) standard and is to be regarded as a general GPS standard (see ISO 14638). The rules and principles given in this document apply to all segments of the ISO GPS matrix which are indicated with a filled dot (•).

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 specifications made in accordance with this document, unless otherwise indicated.

For more detailed information on the relationship of this document to other standards and to the GPS matrix model, see Annex A.

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Geometrical product specifications (GPS) — Basic concepts —

Part 4: Geometrical characteristics for quantifying GPS deviations

1 Scope

This document specifies general rules for quantifying GPS deviations for individual GPS characteristics.

NOTE GPS deviations can be local or global. A GPS characteristic defined from local GPS deviations is a parameter that transforms the set of local deviations into a global characteristic using a quantifying function (for more details, see Table 1).

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 25378, *Geometrical product specifications (GPS) — Characteristics and conditions — Definitions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 25378 and the following apply.

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

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

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

3.1
local geometrical deviation
$d(P), d(P)_{A_n}$
local signed distance between a point, *P*, of an input feature and a point of the reference feature

Note 1 to entry: $d(P)$ identifies any local geometrical deviation attached to any point (P) of the input feature.

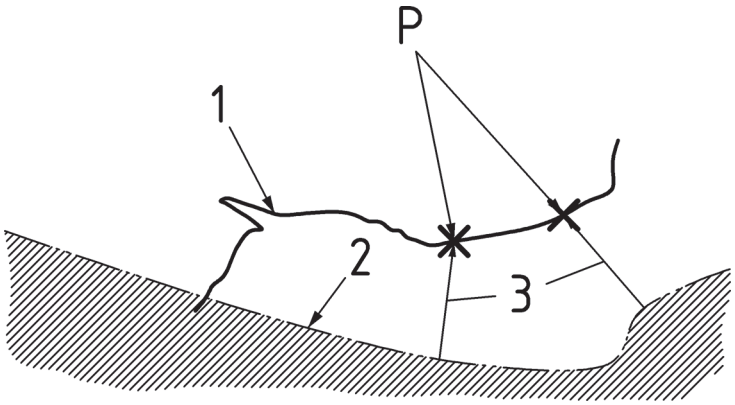
Note 2 to entry: A local geometrical deviation, $d(P)_{A_n}$, can be located in an n-dimensional reference space, A_n, attached to the reference feature.

Note 3 to entry: A local geometrical deviation exists in any point of the input feature (see Figure 1). Each local geometrical deviation of a point of the input feature can be represented in a reference space, A_n, by the abscises of its corresponding point of the reference feature and by the ordinate corresponding to the local geometrical deviation.

Note 4 to entry: A local geometrical deviation can be described as an ordinate of a point of the variation curve whose abscises are defined in the reference space, A_n.

Note 5 to entry: A local geometrical deviation is equal to zero when the deviated feature crosses the reference feature.

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Key

1 deviated feature (input feature)
2 reference feature
3 local geometrical deviation
P point of key 1 from which key 3 is defined

Figure 1 — Local geometrical deviation

3.2
reference space
A_n
space defined by *n* curvilinear axes attached to a reference feature in which for each point of an input feature a local deviation is defined

Note 1 to entry: *n* is equal to 1 for a reference line, or equal to 2 for a reference surface.

3.2.1
areal reference space
A_2
reference space (3.2) when the reference feature is a surface

Note 1 to entry: Reference space for a two-dimensional reference feature.

3.2.2
linear reference space
A_1
reference space (3.2) when the reference feature is a line

Note 1 to entry: Reference space for a one-dimensional reference feature.

3.2.3
two-directional reference space
combination of two *linear reference spaces* (3.2.2) of the same linear reference feature whose vectors normal to any point *P* of the reference feature are orthogonal

3.3
quantifying function
mathematical function using the complete set of local deviations to define a geometrical characteristic as a quantity

Note 1 to entry: A quantifying function can be a *rank-order characteristic* (3.4) (see Table 1).

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3.4
rank-order characteristic
geometrical characteristic defined mathematically from a set of local geometrical deviations

Note 1 to entry: A rank-order characteristic is defined from a quantifying function. Several kinds of rank-order characteristics exist. The formulae describing them are given in Table 1.

3.4.1
maximum
characteristic maximum value of a set of local geometrical deviations

Note 1 to entry: See Table 1.

3.4.2
minimum
characteristic minimum value of a set of local geometrical deviations

Note 1 to entry: See Table 1.

3.4.3
average
characteristic average of a set of local geometrical deviations

Note 1 to entry: See Table 1.

3.4.4
median
characteristic median value of a set of local geometrical deviations

Note 1 to entry: The median value splits the population of local geometrical deviations into two equal portions (50 % above and 50 % below). Depending on the distribution of the population, the median value and the average value can be identical or different.

Note 2 to entry: See Table 1.

3.4.5
mid-range
characteristic mean of the *maximum* (3.4.1) and the *minimum* (3.4.2)

Note 1 to entry: See Table 1.

3.4.6
range
characteristic difference between the *maximum* (3.4.1) and the *minimum* (3.4.2)

Note 1 to entry: See Table 1.

3.4.7
maximum absolute deviation
characteristic maximum of absolute values of the *maximum* (3.4.1) and the *minimum* (3.4.2)

Note 1 to entry: See Table 1.

4 Geometrical characteristic

4.1 General

Several families of geometrical characteristics, as defined in ISO 25378, exist:

— intrinsic characteristic: size, form or surface texture characteristics;

— situation characteristics: location, orientation and run-out characteristics.

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