SLOVENSKI STANDARD
oSIST prEN ISO 4351:2022

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Specifikacija geometrijskih veličin izdelka (GPS) - Povezave (ISO/DIS 4351:2022)

Geometrical product specifications (GPS) - Association (ISO/DIS 4351:2022)

Geometrische Produktspezifikationen(GPS) - Assoziation (ISO/DIS 4351:2022)

Spécification géométrique des produits (GPS) - Association (ISO/DIS 4351:2022)

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Geometrical product specifications (GPS) — Association

Spécification géométrique des produits (GPS) — Association

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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 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.

This document was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

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.

Introduction

This document is a geometrical product specifications (GPS) standard and is to be regarded as a global GPS standard (see ISO 14638). It influences all chain links in all chains of standards in the general GPS matrix.

The ISO GPS Masterplan 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 on the relationship of this document to other standards and to the GPS matrix model, see Annex C.

It is pointed out that these ideas — and, for that matter, all the other ideas and concepts applied by ISO/TC 213 — are subject to development and refinement, as the TC's recognition and understanding of them further evolves during its ongoing standards work.

Geometrical product specifications (GPS) — Association

1 Scope

This document gives the terminology, and basic concepts of association including objective functions and association constraints and material offset shifting.

This document is not intended to define association defaults and GPS syntax which are defined in other standards.

NOTE The association can be used to establish for example:

— a datum;

— a reference feature in link with a geometrical specification or to a surface texture specification,

— any dimensional characteristic,

— an intersection plane, an orientation plane, a collection plane or a direction feature.

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 17450-1:2011, *Geometrical product specifications (GPS) — General concepts — Part 1: Model for geometrical specification and verification*

ISO 17450-4, *Geometrical product specifications (GPS) — Basic concepts — Part 4: Geometrical characteristics for quantifying GPS deviations*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 17450-1 and ISO 17450-4 and the following apply.

ISO and IEC maintain terminological 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
association
feature operation used to fit ideal feature(s) to input feature(s)(non-ideal feature(s)) according to a criterion

3.2
<association> input feature
non ideal feature, which is an extracted feature or a real feature, which can be filtered or not.

3.3
associated feature
ideal feature which is fitted to an input feature (non-ideal feature) with a specific association criterion

Note 1 to entry: An ideal feature is defined by a mathematical description of an ideal feature using a finite set of real numbers called description parameters

Note 2 to entry: An associated feature can be a feature of size. In this case, it is possible to use the term associated feature of size.

EXAMPLE An extruded surface having as directrix an ellipse, can be described by the formula "$a.(x-c)^2 + b.(y-d)^2 = R^2, \forall z$" (with a non-equal to b): It describes for any point (having as coordinate x, y and z, in a local cartesian coordinate system) of an ideal feature which belongs to the prismatic invariance class (prismatic surface with an elliptic base, the parameters a and b being non-equal). If the parameter a and b are equal, then the surface belongs to the cylindrical invariance class.

3.4
restricted associated feature
set of points of an *associated feature* (3.3), where local geometrical deviations are defined between the input feature (non-ideal feature) and the associated feature

3.5
(optimizing) association criterion
objective function with or without association constraints, and with or without offset material, defined for an association

Note 1 to entry: Several association constraints may be used for association.

Note 2 to entry: Association results (associated features) can differ, depending upon the choice of association criterion.

3.5.1
<association> objective function
<association> optimization function

formula that describes the goal of association from the input feature (non-ideal feature) and the ideal feature (associated feature)

3.5.1.1
L-function
objective function defined from the set of the signed local geometrical deviations between an input feature and the *associated feature* (3.3)

Note 1 to entry: The local geometrical deviations are defined in ISO 17450-4, with the convention sign based on the material side defined from the ideal geometry.

3.5.1.2
S-function
objective function, based on the size of the associated feature of size

Note 1 to entry: The maximum inscribed feature and the minimum circumscribed feature are associated feature obtained with S-function.

3.5.2
association constraint
set of restrictions on variability of the mathematical parameters describing an *associated feature* (3.3) taken into account in the optimization process.

EXAMPLE Orientation constraint, location constraint, material constraint or size constraint are the different types of association constraint.

3.5.2.1
orientation constraint
association constraint (3.5.2) on one or more rotational degrees of freedom of *associated feature* (3.3)

3.5.2.2
location constraint
association constraint (3.5.2) on one or more translational degrees of freedom of *associated feature* (3.3)

3.5.2.3
material constraint
association constraint (3.5.2) to the *associated feature* (3.3), in relation to the material side of the input feature

EXAMPLE The outside material constraint implies that all distances between the associated feature and the input feature are positive or equal to zero, i.e. the associated feature is tangent outside of the input feature.

3.5.2.4
size constraint
association constraint (3.5.2) on the size of *associated feature* (3.3)

Note 1 to entry: Without size constraint, the size of associated feature is variable for the association.

4 Association specification elements description of association process

The association operation is an optimization process, to fit an ideal feature with a predefined geometry to an input feature (non-ideal feature) or to fit a set of ideal features to predefined geometries to a set of input features. The input feature for this optimization process is a non-ideal (an extracted feature or a real feature), which can be filtered or not.

To perform this optimization process, an association objective function shall be defined without or with association constraints. After this step of optimization, an offset step can be optionally performed (see Figure 1).

An associated feature or a set of associated features is yet defined, from which it is possible to define the set of one or more situation features (allowing to locate in the space this associated feature or this set of associated features).

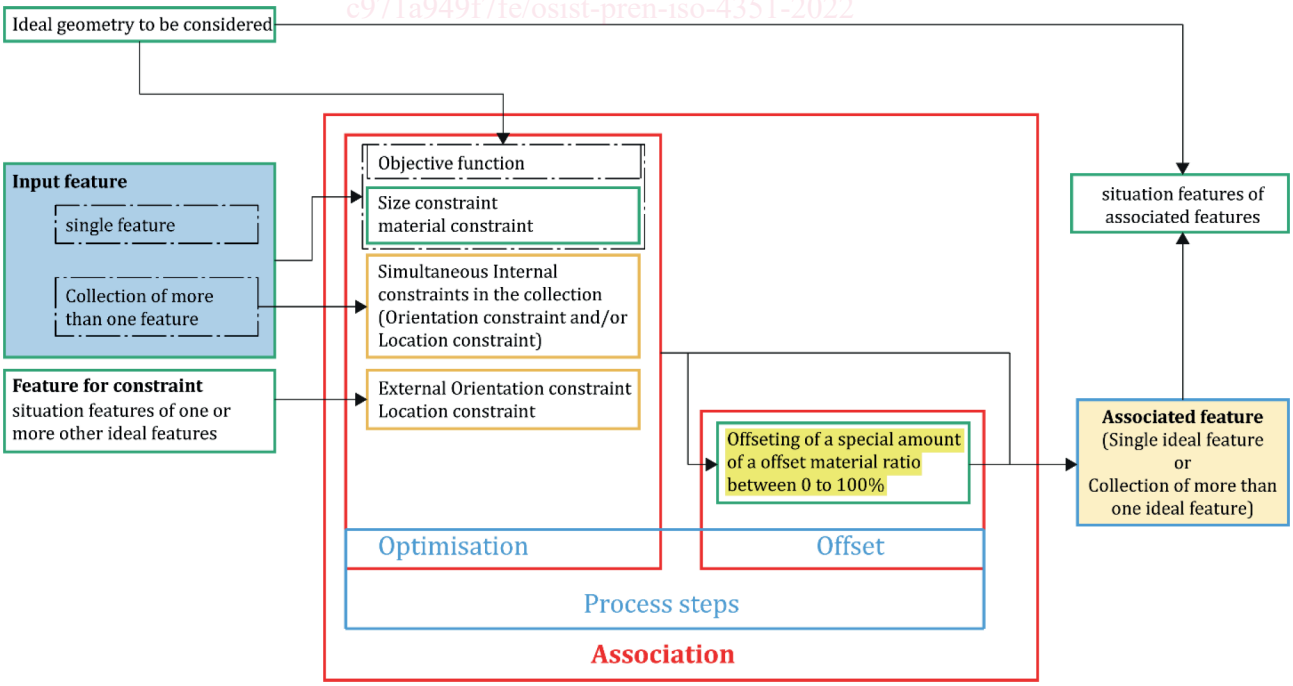

Figure 1 — Concept diagram illustrating the association process

The input feature (non-ideal feature) used to establish the associated feature is filtered or non-filtered.