SLOVENSKI STANDARD

oSIST prEN ISO 5458:2015

01-september-2015

Specifikacija geometrijskih veličin izdelka (GPS) - Toleriranje geometrije - Toleriranje pozicij (ISO/DIS 5458:2015)

Geometrical Product Specifications (GPS) - Geometrical tolerancing - Positional tolerancing (ISO/DIS 5458:2015)

Geometrische Produktspezifikation (GPS) - Form- und Lagetolerierung - Positionstolerierung (ISO/DIS 5458:2015)

Spécification géométrique des produits (GPS) - Tolérancement géométrique - Tolérancement de position et de motif (ISO/DIS 5458:2015)

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17.040.30	Merila	Measuring instruments

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Geometrical Product Specifications (GPS) — Geometrical tolerancing — Positional and pattern tolerancing

Spécification géométrique des produits (GPS) — Tolérancement géométrique — Tolérancement de position et de motif

ICS 17.040.10

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
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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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

ISO 5458 was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*.

This third edition cancels and replaces the second edition (ISO 5458:1998), which has been technically revised.

Introduction

This International Standard is a geometrical product specification (GPS) standard and is to be regarded as a general GPS standard (see ISO 14638). It influences chain links A, B and C of the chain of standards of geometrical characteristic with or without datum or datum system.

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 of the relation of this standard to the GPS matrix model, see Annex B.

Other relevant International Standards, such as those dealing with the least and maximum material requirement (ISO 2692), and datum system (ISO 5459) should be taken into consideration when using this standard.

This International Standard provides tools to describe functionalities in relation to more than one feature considered together, and facilitate the relationship between design, manufacturing and quality services.

More information is provided in Annexes A and B, which cover changes in practice and differences between ISO 1101:2012 and ISO 5458:1998.

Geometrical product specifications (GPS) — Geometrical tolerancing — Positional and pattern tolerancing

1 Scope

This International Standard establishes complementary rules to ISO 1101 for geometrical tolerancing of form, orientation, location or run-out. These rules are applicable when:

— one geometrical specification is applied to more than one geometrical feature considered individually or as united feature or as a pattern for GPS specification;

— more than one geometrical specification is to be established simultaneously with orientation and/ or location constraints between them.

This International standard does not cover the use of the pattern (3.1):

— when the least and maximum material requirement is applied (see ISO 2692*)*;

— when a datum is established from a collection of datum features without priority between them as a pattern (see ISO 5459*)*.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1101, *Geometrical product specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

ISO 8015, *Geometrical product specifications (GPS) — Fundamentals -- Concepts, principles and rules*

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

ISO 17450-2, *Geometrical product specifications (GPS) — General concepts — Part 2: Basic tenets, specifications, operators, uncertainties and ambiguities*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8015, ISO 1101, ISO 17450-1, ISO 17450-2 and the following apply.

3.1
pattern
compound feature, consisting of a set of more than one individual feature with defined nominal orientation and/or location to each other (without priority)

Note 1 to entry: The geometrical features composing a pattern can be compound features or a single feature, which can be features of size (linear or angular).

Note 2 to entry: A pattern is composed by several geometrical features which either can or cannot be of the same nominal geometry.

Note 3 to entry: A pattern does not exist when no orientation constraint or no orientation and location constraint exists between two or more geometrical specifications of form, orientation, location or run-out.

Note 4 to entry: A pattern is qualified as:

— an homogeneous pattern, when it is composed of several single features or united features, which may have the same nominal geometry and is managed by one geometrical specification;

— a non-homogeneous pattern, when it is composed of several single features or united features having more than one nominal geometry and managed by more than one geometrical specification.

4 Specification modifiers and symbols

For the purposes of this International Standard, the following specification modifiers and symbols apply (see Table 1).

Table 1 — Specification modifiers for linear size

Description	Symbol
Combined zone	CZ
Separate zones	SZ
Orientation only	><
Simultaneous requirement N° i	SIMi

5 Principles

5.1 General

In order to manage functional needs, the toleranced feature can be identifiedy as:

— a single feature: complete or restricted;

— a pattern: homogeneous or non-homogeneous.

This International Standard deals only with a pattern.

This same functional need can be applied to several toleranced features, considered independently to each other or with constraint between them.

This pattern (homogeneous or non-homogeneous) can be constrained in orientation or in location from a datum system.

There is no functional difference in using or not using the concept of pattern when the specifications managing the patterns (composed by *n* geometrical features) use a datum system which locks all degrees of freedom of the related tolerance zones. However, when the concept of pattern is used there is only one result of measurement, and when the concept of pattern is not used there are *n* results of measurement.

There is a functional difference in using or not using the concept of pattern when the specifications managing the patterns (composed by *n* geometrical features) use a datum system which does not lock all degrees of freedom of the related tolerance zones.

The rules, applied for repetition or pattern, are presented in 5.2 and examples with their meanings are given in Annex C.

5.2 Rules

To create a specification on a homogeneous pattern, it is necessary to indicate that a geometrical specification applies to a repetition of geometrical features.

To create a requirement on a non-homogeneous pattern, it is necessary to indicate that a set of more than one geometrical specification is applied simultaneously.

The rules A to F allow expressing requirements on homogeneous and non-homogeneous pattern and their repetition.

Rule A: Indication of repetition of application of the same specification

It is possible to indicate a repetition as described in ISO 1101, in different ways:

a) directly by using several leader lines coming from an unique tolerance indicator or by using an "all around" symbol (see Figure 1);

b) indirectly by using:

   1) nx above the tolerance indicator (see Figure 2) when no interpretation is possible for the identification of *n* members;

   2) nx above the tolerance indicator followed by an identifier letter (see Figure 3) when an interpretation is possible for the identification of *n* members of a pattern on the workpiece. The identifier letter shall be also indicated individually to identify each member with a leader line with a terminator (arrow or dot).

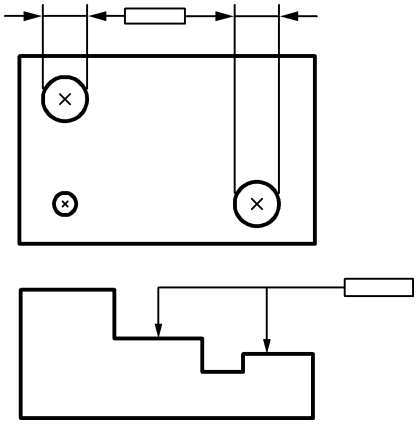

Figure 1 — Direct indication

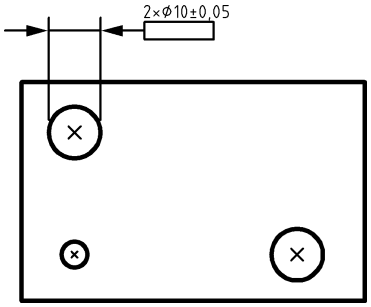

Figure 2 — Indirect indication with implicit identification

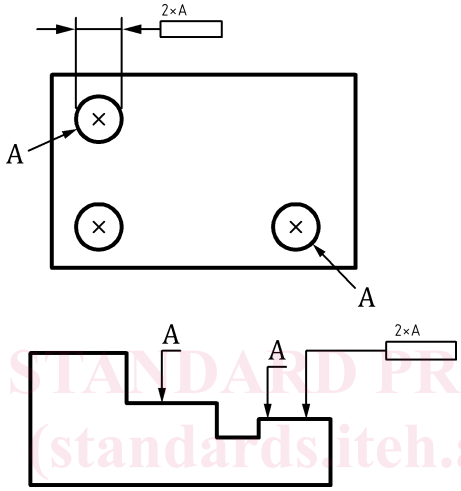

Figure 3 — Indirect indication with explicit identification

Rule B: Independency between members of repetition or dependency rule for homogeneous pattern

By default, based on the independency principle defined in ISO 8015, a geometrical specification of form, orientation, location or run-out, without modifier, applied to *n* geometrical features (*n* being greater than one), is equivalent to *n* independent geometrical specifications: each geometrical feature shall be considered individually and each specification shall be considered individually (independent between them). The resulting independent tolerance zones correspond to an implicit indication of the SZ (separate zones) modifier: the "all around" modifier does not create itself a united feature or a pattern.

When positional tolerancing is applied to several geometrical features and all the non-redundant degrees of freedoms of the tolerances zones are un-locked, either the SZ (separate zones) modifier or the CZ (combined zone) modifier shall always be indicated in the second compartment of the tolerance indicator.

NOTE This rule allows the potential conflict of interpretation between ISO 1101:2012 and the former ISO 5458:1998 to be resolved (see Annex B).

To create one homogeneous pattern, the modifier CZ shall be indicated in the tolerance section of the tolerance indicator.

To create a new level of pattern defined as a homogeneous pattern of more than one homogeneous patterns, an additional CZ modifier shall be indicated after the sequence defining the previous level of pattern.

EXAMPLE One CZ in the tolerance section defines a single pattern. The sequence CZ CZ CZ in the tolerance section defines a pattern of patterns of patterns (pattern of level three).