SLOVENSKI STANDARD
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Specifikacija geometrijskih veličin izdelka (GPS) - Oprema za merjenje dimenzij - 1. del: Ploščati mejni merilniki linearne velikosti (ISO/DIS 1938-1:2025)

Geometrical product specifications (GPS) - Dimensional measuring equipment - Part 1: Plain limit gauges of linear size (ISO/DIS 1938-1:2025)

Geometrische Produktspezifikation (GPS) - Längenprüftechnik - Teil 1: Grenzlehren und Lehrung der Längenmaße (ISO/DIS 1938-1:2025)

Spécification géométrique des produits (GPS) - Équipement de mesure dimensionnel - Partie 1: Calibres lisses à limite de taille linéaire (ISO/DIS 1938-1:2025)

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ISO/DIS 1938-1

Geometrical product specifications (GPS) — Dimensional measuring equipment —

Part 1: Plain limit gauges of linear size

Spécification géométrique des produits (GPS) — Équipement de mesure dimensionnel —

Partie 1: Calibres lisses à limite de taille linéaire

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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).

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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*.

This second edition cancels and replaces the first edition (ISO 1938-1:2015), which has been technically revised.

The main changes are as follows:

— update of the definitions 3.1.3, 3.1.4, 3.2.1;

— in Clause 5 and in Tables 4 and 5, update of design and metrological characteristics of GO gauge type B to K;

— in Table B.1, inclusion of full form cylindrical ring, full form notch gauge and gap gauge.

A list of all parts in the ISO 1938 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.

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 links E, F and G of the size chain of standards in the general GPS matrix. For more detailed information of the relation of this document to other standards and the GPS matrix model, see Annex C.

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.

This document deals with verification, using plain limit gauges, of linear sizes for features of size when the dimensional specifications are required (see ISO 14405-1), for rigid workpieces.

NOTE Tables 4 and 5 use the modifiers given in ISO 14405-1 and ISO 1101.

Geometrical product specifications (GPS) — Dimensional measuring equipment —

Part 1:
Plain limit gauges of linear size

1 Scope

This document specifies the most important metrological and design characteristics of plain limit gauges of linear size.

This document defines the different types of plain limit gauges used to verify linear dimensional specifications associated with linear size.

This document also defines the design characteristics and the metrological characteristics for these limit gauges as well as the new or wear limits state maximum permissible limits (MPLs) for the new state or wear limits state for these metrological characteristics.

In addition, this document describes the use of limit gauges. It covers linear sizes up to 500 mm.

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 286-1:2010, *Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes — Part 1: Basis of tolerances, deviations and fits*

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

ISO 14405-1, *Geometrical product specifications (GPS) — Dimensional tolerancing — Part 1: Linear sizes*

ISO 14253-2, *Geometrical product specifications (GPS) — Inspection by measurement of workpieces and measuring equipment — Part 2: Guidance for the estimation of uncertainty in GPS measurement, in calibration of measuring equipment and in product verification*

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

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 286-1, ISO 14405-1, ISO 17450-2, ISO/IEC Guide 98-3 and ISO/IEC Guide 99 and the following definitions 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 Limits

3.1.1
maximum material limit of size
MMLS
limit of size corresponding to the maximum material condition of feature of size

Note 1 to entry: MMLS includes the numerical value for the size and the specified association criteria.

Note 2 to entry: A number of different association criteria for size are given in ISO 14405-1 and ISO 17450-3.

3.1.2
least material limit of size
LMLS
limit of size corresponding to the least material condition of feature of size

Note 1 to entry: LMLS includes the numerical value for the size and the specified association criteria.

Note 2 to entry: A number of different association criteria for size are given in ISO 14405-1 and ISO 17450-3.

3.1.3
upper limit of size
ULS
largest permissible size of a feature of size

Note 1 to entry: ULS is a numerical value.

[SOURCE: ISO 286-1:2010, 3.2.3.1]

3.1.4
lower limit of size
LLS
smallest permissible size of a feature of size

Note 1 to entry: LLS is a numerical value.

[SOURCE: ISO 286-1:2010, 3.2.3.2]

3.1.5
upper specification limit
USL
<of the gauge> limit of a specification for a metrological characteristic of a gauge having the largest value

3.1.6
lower specification limit
LSL
<of the gauge> limit of a specification for a metrological characteristic of a gauge having the smallest value

3.2 Gauge types

3.2.1
limit gauge
gauge designed and intended to verify only if workpiece characteristics are lower or upper at one of its tolerance limits

Note 1 to entry: When a limit gauge is designed to verify an internal feature of size (a hole for example), then it can be called internal limit gauge.

Note 2 to entry: When a limit gauge is designed to verify an external feature of size (a shaft for example), then it can be called external limit gauge.

Note 3 to entry: General application of limit gauge is given in Annex A.

Note 4 to entry: A limit gauge may be physical or a virtual object (simulated by a geometrical model to be compared to the extracted integral feature of size of the workpiece).

3.2.2
plain limit gauge
physical limit gauge with only one or two gauge elements, each one simulating a perfect feature of size, whose size is derived from upper or lower specification limits of the size of a feature of size

Note 1 to entry: When a plain limit gauge consists of only one element, it is qualified as simple (simple plain limit gauge: GO plain limit gauge or NO GO plain limit gauge).

Note 2 to entry: When a plain limit gauge consists of two elements, it is qualified as double (double plain limit gauge: GO and NO GO).

3.2.3
full form cylindrical plug gauge
gauge type A
plain limit gauge designed to simulate a cylinder as a contacting feature with an internal cylinder

Note 1 to entry: See Table 1.

Note 2 to entry: The GO gauge type A simulates a dimensional specification defining the maximum material limit of size with the envelope requirement when the gauge length is greater or at least equal to the length of the feature of size of the workpiece.

3.2.4
segmental cylindrical bar gauge
gauge type B
plain limit gauge designed to simulate two opposite angular portions of a cylinder as a contacting feature with an internal cylinder

Note 1 to entry: See Table 1.

3.2.5
segmental cylindrical bar gauge with reduced gauging surfaces
gauge type C
segmental cylindrical bar gauge designed to simulate two reduced opposite angular portions of a cylinder as a contacting surface with an internal cylinder

Note 1 to entry: See Table 1.

3.2.6
full form spherical plug gauge
gauge type D
plain limit gauge designed to simulate a circle as a contacting feature with an internal cylinder

Note 1 to entry: See Table 1.

Note 2 to entry: The shape of this gauge type is not spherical, but a torus - per tradition the name is “spherical plug gauge”.

3.2.7
segmental spherical plug gauge
gauge type E
plain limit gauge designed to simulate two opposite angular portions of a circle as a contacting feature with an internal cylinder

Note 1 to entry: See Table 1.

Note 2 to entry: The shape of this gauge type is not spherical but a torus - per tradition the name is “segmental spherical plug gauge”.