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Geometrical product specifications (GPS) — Dimensional measuring equipment —

Part 2: Reference disk gauges

Spécification géométrique des produits (GPS) — Équipement de mesurage dimensionnel —
Partie 2: Disques de référence pour calibres

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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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: http://www.iso.org/iso/foreword.html.

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

A list of all parts in the ISO 1938 series can be found on the ISO website.

This document does not include requirements for setting plug gauges and setting ring gauges, which were dealt with in ISO/R 1938:1971, 3.9.4.

This document covers the concepts and principles developed in ISO 14978.

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

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.

The terms and concepts used in this document (compared to ISO/R 1938:1971) have been changed according to needs and terminology in the other GPS standards.

This document deals with reference disk gauges. The use of reference disk gauges is explained in Annex A.

NOTE The content of Table 2 uses the modifiers given in ISO 14405-1 and ISO 1101.

Geometrical product specifications (GPS) — Dimensional measuring equipment —

Part 2:
Reference disk gauges

1 Scope

This document specifies the most important metrological and design characteristics of reference disk gauges.

This document covers linear sizes of the gauge 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, *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 1938-1:2015, *Geometrical product specifications (GPS) — Dimensional measuring equipment — Part 1: Plain limit gauges of linear size*

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

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)*

ISO/IEC Guide 99, *International vocabulary of metrology — Basic and general concepts and associated terms (VIM)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 286-1, ISO 1938-1, ISO 14405-1, ISO 17450-2, ISO/IEC Guide 98-3 and ISO/IEC Guide 99 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 http://www.iso.org/obp

3.1
reference disk gauge
gauge designed and intended to determine the working size of a gap gauge

3.2
unloaded size
US
<of a gap gauge> perpendicular distance between the gauging faces of a gap gauge when the measuring force is zero

3.3
working size
WS
<of a gap gauge> diameter of a disk over which the gap gauge just passes in a vertical direction under the working load marked on it, or, if this is not indicated, under its own weight

4 Symbols and abbreviated terms

For the purposes of this document, the symbols and abbreviated terms given in ISO 1938-1 and Table 1 apply.

Table 1 — Symbols and abbreviated terms

Symbols and abbreviated terms	Description
H_p	tolerance on the size characteristic, S, of a reference disk gauge
ref. GO-M	reference disk gauge for a new state GO gap gauge
ref. GO-U	reference disk gauge for a wear limits state GO gap gauge
ref. NO GO	reference disk gauge for a NO GO gap gauge
US	unloaded size (of a gap gauge)
WS	working size (of a gap gauge)

5 Design characteristics

For the purposes of this document, the design characteristics for gauges given in ISO 1938-1 apply.

Reference disk gauges can be made as full form cylindrical plug gauges (gauge type A) or as segmental cylindrical bar gauges (gauge type B).

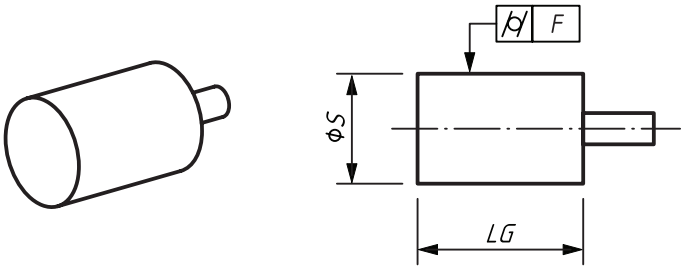
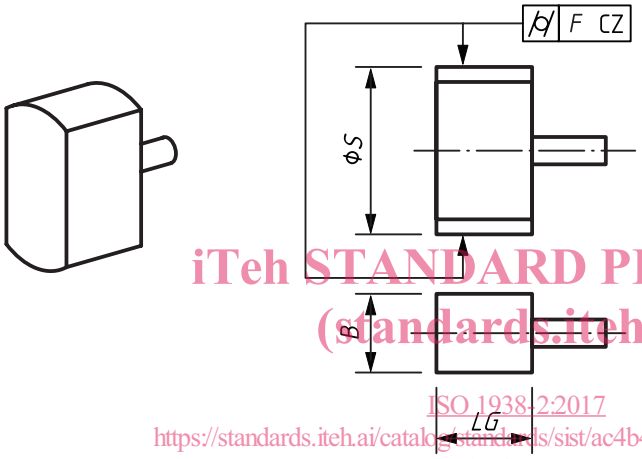
6 Metrological characteristics

The most important metrological characteristics are the size S and the form characteristics of the measuring feature of the reference disk gauge. To define the metrological characteristic on a reference disk gauge, the modifiers defined in ISO 14405-1 and the symbols defined in ISO 1101 shall be used.

This document describes potential metrological characteristics available on reference disk gauges. The final decision to select one or several metrological characteristics is left to the user.

Table 2 gives potential metrological characteristics for reference disk gauges, but also complementary design characteristics as defined in Clause 5. Depending on the need of the user, a set of these metrological characteristics shall be defined; by default, the two point size, S, of the gauge limit and the form deviation are required.

Table 2 — List of design and metrological characteristics for reference disk gauges

Description	Complementary design characteristics	Metrological characteristics
Full form cylindrical plug gauge — Gauge type A 	*LG*	ϕS GX ϕS GN ϕS LP a F a F
Segmental cylindrical bar gauge — Gauge type B 	*LG* *B*	ϕS GX CT ϕS GN CT ϕS LP CT a F CZ a F CZ
a Default metrological characteristics to be considered.		
F Cylindricity (form) tolerance value (see ISO 1101).		
GX Maximum inscribed (see ISO 14405-1).		
GN Minimum circumscribed (see ISO 14405-1).		
LP Two point size (see ISO 14405-1).		
CT Common tolerance (see ISO 14405-1).		
CZ Combined zone (see ISO 1101).		

7 Maximum permissible limits on metrological characteristics

The positions of tolerance limits for reference disk gauges in relation to workpiece tolerance limits are shown in Figure 1.