



**SLOVENSKI STANDARD**  
**SIST ISO 3650:2001**  
**01-julij-2001**

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Geometrical Product Specifications (GPS) -- Length standards -- Gauge blocks

Spécification géométrique des produits (GPS) -- Étalons de longueur -- Cales-étalons

**Ta slovenski standard je istoveten z: ISO 3650:1998**

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**ICS:**

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# INTERNATIONAL STANDARD

**ISO  
3650**

Second edition  
1998-12-15

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## **Geometrical Product Specifications (GPS) — Length standards — Gauge blocks**

*Spécification géométrique des produits (GPS) — Étalons de longueur —  
Cales-étalons*

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Reference number  
ISO 3650:1998(E)

## ISO 3650:1998(E)

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 3650 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 3650:1978), which has been technically revised.

Annexes A, B and C of this International Standard are for information only.

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## Introduction

This International Standard is a geometrical product specification standard and is to be regarded as a general GPS standard (see ISO/TR 14638). It influences chain link 6 (Calibration requirements — Calibration standards) of the chain of standards on size and distance.

For more detailed information on the relation of this standard to the GPS matrix model, see annex B.

Gauge blocks are length standards representing specified fractions of the unit of length, the metre, of the international system of units SI. Depending on the kind of application and the required quality, gauge blocks are offered in several grades. The calibration of the gauge blocks, i.e. the measurement of the length value at a specified point of the measuring face and the evaluation of the measurement uncertainty, is the basis for the application of gauge blocks as length standards.

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# Geometrical Product Specifications (GPS) — Length standards — Gauge blocks

## 1 Scope

This International Standard specifies the most important design and metrological characteristics of gauge blocks with a rectangular cross section and a nominal length  $l_n$  ranging from 0,5 mm to 1 000 mm.

Limit deviations and tolerances are stated for the calibration grade K and for the grades 0, 1 and 2 for various measuring purposes.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1:1975, *Standard reference temperature for industrial length measurements*.  
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ISO 1101:—<sup>1)</sup>, *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Generalities, definitions, symbols, indication on drawings*.

ISO 6507-1:1997, *Metallic materials — Vickers hardness test — Part 1: Test method*.

ISO 14253-1:1998, *Geometrical Product Specifications (GPS) — Inspection by measurement of workpieces and measuring equipment — Part 1: Decision rules for proving conformance or non-conformance with specifications*.

*International vocabulary of basic and general terms in metrology (VIM)*. BIPM, IEC, IFCC, ISO, IUPAC, IUPAP, OIML, 2nd edition, 1993.

## 3 Definitions

For the purposes of this International Standard, the definitions given in ISO 14253-1, VIM and the following apply.

### 3.1

#### **gauge block**

material measure of rectangular section, made of wear-resistant material, with one pair of planar, mutually parallel measuring faces, which can be wrung to the measuring faces of other gauge blocks to make composite assemblies, or to similarly finished surfaces of auxiliary plates for length measurements

<sup>1)</sup> To be published. (Revision of ISO 1101:1983)

### 3.2 length of a gauge block

 $l$ 

perpendicular distance between any particular point of the measuring face and the planar surface of an auxiliary plate of the same material and surface texture upon which the other measuring face has been wrung

See figure 1.

#### NOTES

- 1 The length of a gauge block,  $l$ , includes the effect of one-face wringing (see 8.3.1).
- 2 The length,  $l$ , is a physical quantity consisting of a numerical value and a length unit (e.g. metre, millimetre or micrometre). If only the numerical value is treated (e.g. in tables), the units should be stated explicitly.

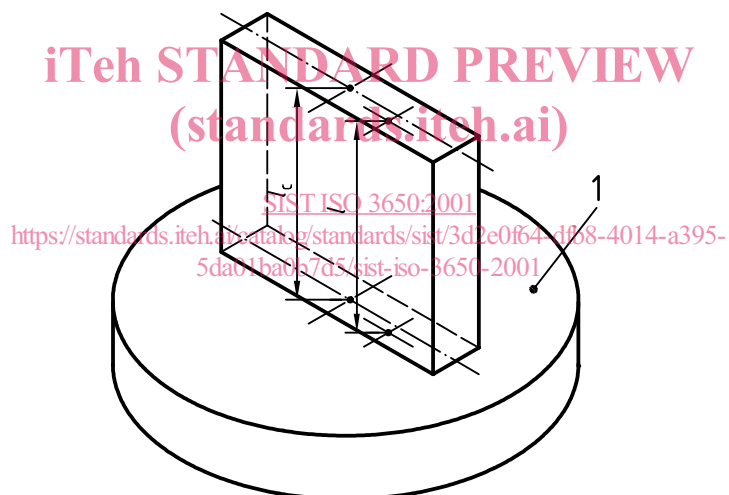
### 3.3 central length of a gauge block

 $l_c$ 

length of a gauge block taken at the centre point of the free measuring face

See figure 1.

NOTE — Length  $l_c$  is a special instance of length  $l$ .



#### Key

- 1 Auxiliary plate

**Figure 1 — Central length  $l_c$  and another example of length  $l$  at any point of a gauge block wrung to the plane surface of an auxiliary plate**

### 3.4 deviation of the length at any point from nominal length

 $e$ 

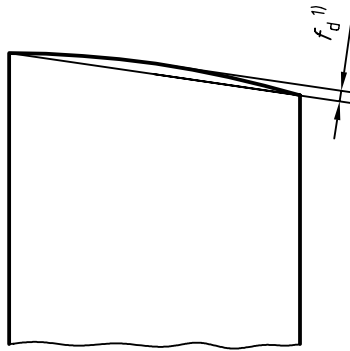
algebraic difference  $l - l_n$

### 3.5 deviation from flatness

 $f_d$ 

minimum distance between two parallel planes between which all points of the measuring face lie

See figure 2.



1) See 7.1.

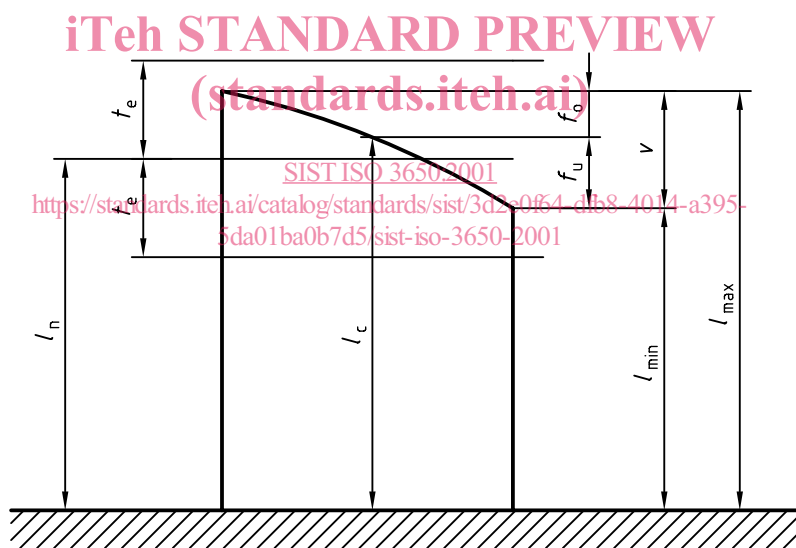
Figure 2 — Deviation  $f_d$  from flatness

### 3.6 variation in length

$v$   
difference between the maximum length  $l_{\max}$  and the minimum length  $l_{\min}$

See figure 3.

NOTE — The variation in length is equal to the sum of the deviations  $f_o$  and  $f_u$  from the central length  $l_c$ .



NOTE — See table 4.

Figure 3 — Nominal length  $l_n$ ; central length  $l_c$ ; variation  $v$  with  $f_o$  and  $f_u$ ; limit deviations  $t_e$  for the length at any point, proceeding from the nominal length

### 3.7 wringing

property of the measuring faces of gauge blocks to adhere to other measuring faces or to faces with similar surface finish as a result of molecular forces

## 4 Nomenclature of faces

See figure 4.