



# SLOVENSKI STANDARD

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**Drsni ležaji - Tankostene ležajne blazinice s prirobnico ali brez nje - 1. del:**  
**Tolerance, konstrukcija in metode preskušanja**

Plain bearings - Thin-walled half bearings with or without flange - Part 1: Tolerances, design features and methods of test

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Paliers lisses - Demi-coussinets minces à ou sans collerette - Partie 1: Tolérances, caractéristiques de conception et méthodes d'essai

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**Ta slovenski standard je istoveten z: ISO 3548-1:2014**

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**ICS:**

21.100.10      Drsni ležaji

Plain bearings

**SIST ISO 3548-1:2015**

**en**

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# INTERNATIONAL STANDARD

**ISO  
3548-1**

First edition  
2014-06-15

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## Plain bearings — Thin-walled half bearings with or without flange —

### Part 1: Tolerances, design features and methods of test

**iTeh STANDARD PREVIEW**  
*Paliers lisses — Demi-coussinets minces à ou sans collerette —*  
*Partie 1: Tolérances, caractéristiques de conception et méthodes*  
*d'essai*  
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## ISO 3548-1:2014(E)

## 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](http://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](http://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

The committee responsible for this document is ISO/TC 123, *Plain Bearings*, Subcommittee SC 3 *Dimensions, tolerances and constructions details*.

This first edition of ISO 3548-1 cancels and replaces the second edition of ISO 3548:1999, which has been technically revised.

ISO 3548 consists of the following parts, under the general title *Plain bearings — Thin walled half bearings with or without flange*:

- *Part 1: Tolerances, design features and methods of test*
- *Part 2: Measurement of wall thickness and flange thickness*
- *Part 3: Measurement of peripheral length*

# Plain bearings — Thin-walled half bearings with or without flange —

## Part 1: Tolerances, design features and methods of test

### 1 Scope

This part of ISO 3548 specifies tolerances, design features, and test methods for thin-walled half bearings with integral flange up to an outside diameter of  $D_o = 250$  mm and without flange up to an outside diameter of  $D_o = 500$  mm. Due to the variety of design, it is, however, not possible to standardize the dimensions of the half bearings.

Half bearings according to this part of ISO 3548 are predominantly used in reciprocating machinery and consist of a steel backing and one or more bearing metal layers on the inside.

In reciprocating machinery, flanged half bearings can be used in connection with half bearings without flange.

Alternatively, to serve as a flanged half bearing, it is possible to use a half bearing without flange together with two separate half thrust washers according to ISO 6526; or a half bearing with assembled flanges.

NOTE All dimensions and tolerances are given in millimetres.

### 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.

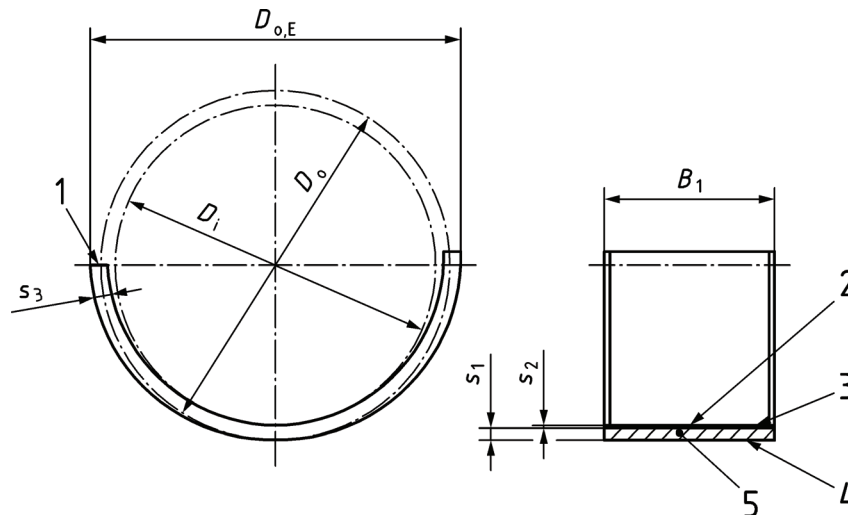
ISO 4288, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture*

ISO 6524, *Plain bearings — Thin-walled half bearings — Checking of peripheral length*

ISO 6526, *Plain bearings — Pressed bimetallic half thrust washers — Features and tolerances*

### 3 Symbols

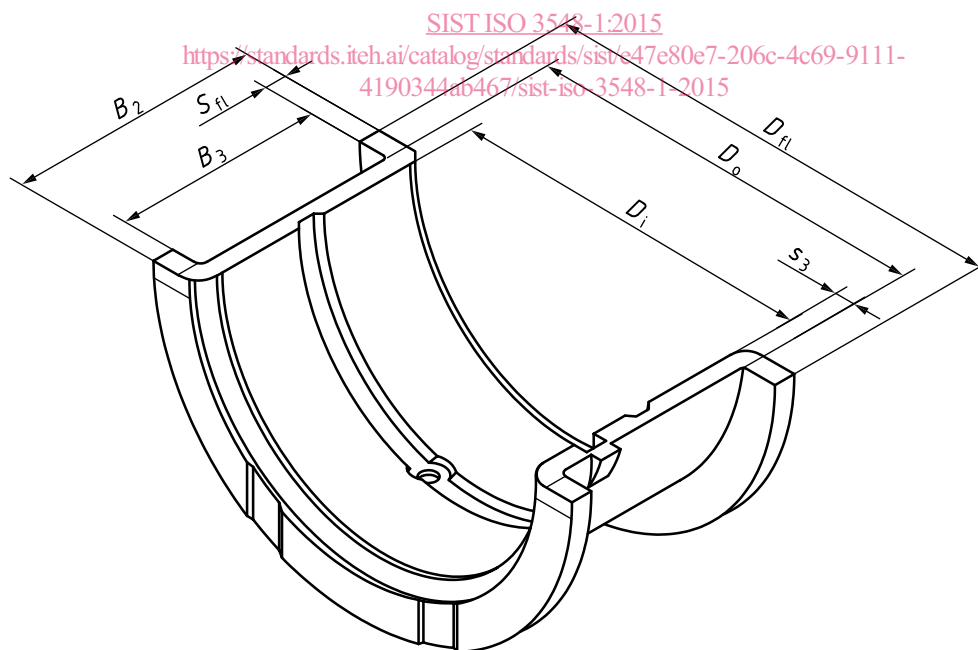
See [Figures 1](#) and [2](#) and [Table 1](#).

**Key**

- 1 joint face
- 2 sliding surface
- 3 bearing metal
- 4 bearing back
- 5 steel back

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**Figure 1 — Half bearing without flange**  
(with positive free spread)



**Figure 2 — Flange half bearing**  
(integral or assembled, excluding free spread)



Table 1 — Symbols and units

Symbol	Term	Unit
$a_1$	Measuring point perpendicular to plane of joint face	mm
$A_{cal}$	Reduced area of cross section (calculated value) of half bearing	mm <sup>2</sup>
$b_H$	Housing width	mm
$B_1$	Half bearing width (without flange)	mm
$B_2$	Flange half bearing width	mm
$B_3$	Distance between flanges	mm
$C_1$	Outside chamfer	mm
$C_2$	Inside chamfer	mm
$d_{ch}$	Diameter of the checking block bore	mm
$d_H$	Housing diameter	mm
$D_{fl}$	Outside diameter of flange	mm
$D_i$	Nominal Inside diameter of the half bearing (bearing bore)	mm
$D_o$	Nominal Outside diameter of the half bearing	mm
$D_{o,E}$	Outside diameter of the half bearing in the free state (with free spread)	mm
$e_B$	Amount of eccentricity	mm
$F$	Test force	N
$F_{ax}$	Axial test force for assembled flange bearings	N
$h$	Crush height, $h = h_1 + h_2$ (in checking method B)	mm
$p$	Amount of free spread	mm
$s_{fl}$	Flange thickness	mm
$s_1$	Thickness of the steel backing	mm
$s_2$	Bearing metal thickness	mm
$s_3$	Half bearing wall thickness	mm
$s_4$	Wall thickness at base of groove	mm
$u$	Amount of wall thickness reduction for eccentric bearing	mm

## 4 Dimensions and tolerances

### 4.1 Housing diameter, half bearing outside diameter and crush height

The housing diameter should be manufactured to ISO H6 limits. Thereby the half bearing outside diameter shall be selected with such an oversize that an adequate interference fit is ensured in the housing diameter.

In the case of housings made from materials having a high coefficient of expansion or where other factors such as housing dimensional stability are involved, the housing size may depart from tolerance class H6 but shall always be produced in accordance with a grade 6 tolerance.

The half bearing in a free state is flexible so that its outside diameter cannot be measured directly. Instead of this, its peripheral length is determined by means of special checking fixtures. The peripheral length results from the periphery of the checking block bore and the crush height taking into account the reduction under a given checking load per joint face (see [Clause 6](#)). For the calculation of the effective interference fit of the half bearings in the housing, see Reference [5].

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The tolerances given in [Table 2](#) for the crush height apply to half bearings with machined joint faces. Different materials and housing design require different interference fits, therefore only tolerances are given in [Table 2](#).

## 4.2 Half bearing wall thickness and bearing bore

Nominal dimensions to be preferred for the wall thickness of the bearing are given in [Table 2](#) (the particulars of the wall thickness for each application cannot be specified in general). Therefore, only tolerances can be given for the wall thickness. These tolerances and the surface roughnesses of the bearing back and the sliding surface of half bearings with or without electroplated antifriction layers are given in [Table 2](#).

The tolerance for the half bearing wall thickness depends on the fact whether the bearing bore is subject to a final machining operation (i.e. “as machined”) or whether the bearing bore is electroplated without further machining (i.e. “as-plated”).

Slight surface deformations are acceptable on the outside diameter of the bearing provided that they are not numerous. However, the measurement of the wall thickness shall not be carried out in these areas.

The bearing bore in the fitted state results from the housing bore which is elastically enlarged by the press fit, reduced by twice the value of the half bearing wall thickness.[\[5\]](#)

NOTE In certain applications it might be necessary to use plain or flange half bearings with eccentric bores, i.e. the wall thickness of the half bearing decreases uniformly from the crown to the joint faces (see [Figures 3](#) and [4](#)).

The eccentricity  $e_B$  is characterized in a radial plane by the distance between the centre  $x_1$  of the bearing outside surface and the centre  $x_2$  of the bearing bore.  $e_B$  is not dimensioned specifically. The eccentricity is controlled by the specified reduction  $u$  which is measured at a vertical distance  $a_1$  from the plane of the joint face. (For guidance of draughtsmen,  $a_1$  is generally specified so that the angle  $\alpha_2$  is approximately  $25^\circ$  from the joint face). It is subject to agreement between the user and manufacturer.

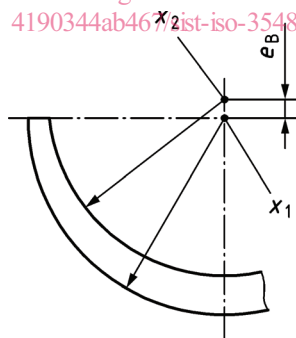
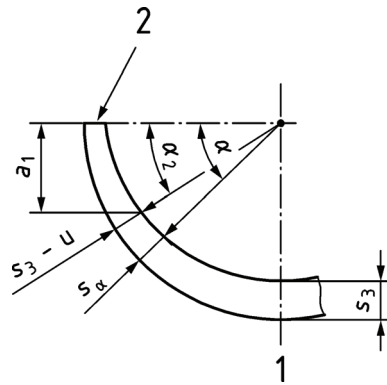


Figure 3 — Eccentric bearing bore of half bearing

**Key**

- 1 crown
- 2 joint face

**Figure 4 — Example of the wall thickness at different angles**

The tolerance limit for the behaviour of wall thickness can be calculated using Formulae 1 and 2:

$$s_{\alpha, BL} = s_{3, act} - BL_u \times \frac{1 - \sin \alpha}{1 - \sin \alpha_2} \quad (1)$$

$$s_{\alpha, UL} = s_{3, act} - UL_u \times \frac{1 - \sin \alpha}{1 - \sin \alpha_2} \quad (2)$$

where

- $BL_u$  is the bottom limit of  $u$ ;
- $UL_u$  is the upper limit of  $u$ ;
- $s_{3, act}$  is the actual value of  $s_3$ ;
- $s_{\alpha, BL}$  is the bottom value of  $s_\alpha$ ;
- $s_{\alpha, UL}$  is the upper value of  $s_\alpha$ .

For an example of calculations, see [Annex A](#).

### 4.3 Width of half bearing, distance between flanges, outside diameter of flange and flange thickness

The nominal dimension for the half bearing width and the distance between flanges depends upon the type of application, the common ratio being  $B_1(B_2)/D_i \leq 0,5$ . The tolerances for the half bearing width are given in [Table 2](#). The flange outside diameter should be smaller than the diameter of the shoulder of the shaft and smaller than the diameter of the housing block.

In most cases the flange thickness is fixed in conformity with the half bearing wall thickness and, in general, a tolerance is fixed only for the flange thickness of the pressure loaded side in order to ensure that these flanges of the upper and lower half bearing have approximately the same thickness. In this case, the position of these flanges with respect to the locating lips is fixed.

If the upper and lower half bearings are of the same design, then generally the two flanges of one half bearing shall have the same thickness within the tolerance range fixed in [Table 2](#). In that case, the flange thicknesses result from the bearing width and the distance between flanges. Nevertheless, another tolerance can be accepted after agreement between the user and the manufacturer (see [Clause 7](#)).