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

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

*Paliers lisses — Demi-coussinets minces à ou sans collerette —*

*Partie 1: Tolérances, caractéristiques de conception et méthodes  
d'essai*



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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](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.

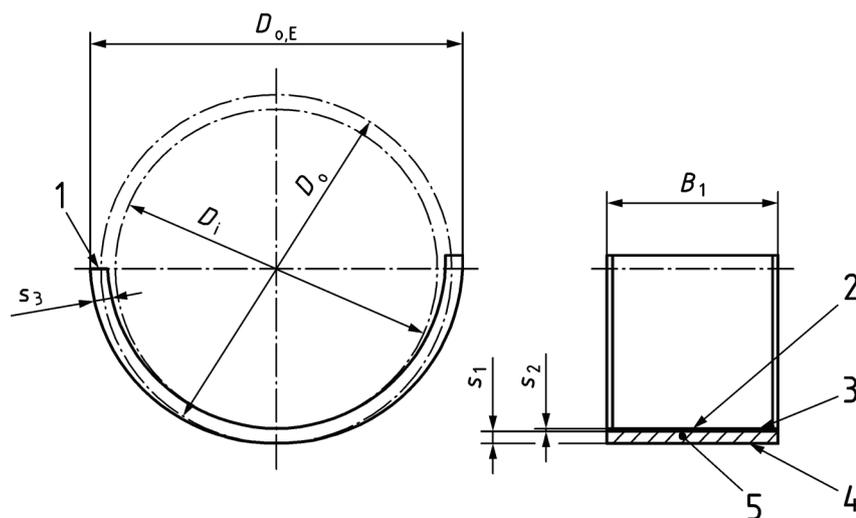
ISO 4288, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture*

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

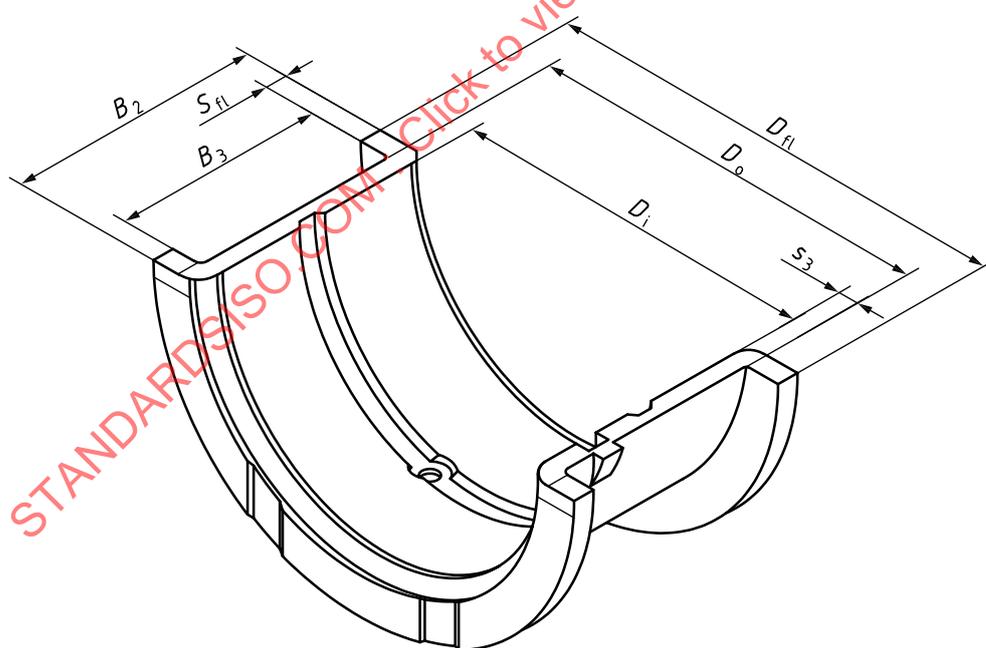
See [Figures 1](#) and [2](#) and [Table 1](#).



**Key**

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

**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].

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.<sup>[5]</sup>

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.

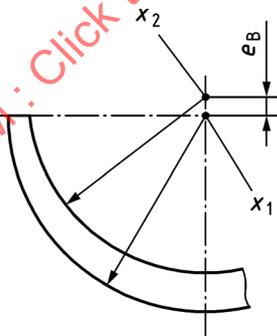
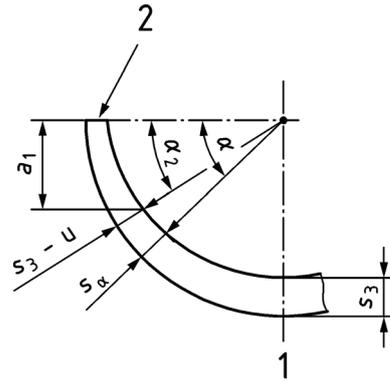


Figure 3 — Eccentric bearing bore of half bearing

**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](#)).

4.4 Free spread

Free spread is influenced by factors such as the lining material, its thickness and its physical properties, by the bearing backing material and its properties, and by the operating temperature of the assembly. Since these features are not specified in this part of ISO 3548, it is not possible to specify free spread. Free spread shall in all circumstances be positive. After operation in the combustion engine at normal conditions, a sufficient amount of free spread remains in the bearing to enable it to be refitted. The actual amount of free spread shall be the subject of agreement between the manufacturer and user.

Half bearings for reciprocating machinery normally have a free spread of 0,2 mm up to 3 mm. For very large, thin-walled half bearings, the free spread may be greater but it shall not be such that the half bearing cannot be fitted into the housing.

Table 2 — Dimensions, tolerances and limit deviations for half bearings with and without flange

Housing diameter		Wall thickness	Tolerance or limit deviation for <sup>a</sup>									Surface roughness <sup>bc</sup>		
			Wall thickness		Flange thickness <sup>de</sup>	Half bearing width			Flange outside diameter	Distance between flanges <sup>e</sup>	Housing width	Crush height <sup>f</sup>	Bearing back	Sliding surface
$d_H$	$s_3$	$s_3$		$s_{fl}$	$B_1$	$B_2$		$D_{fl}$	$B_3$	$b_H$	$h$	$R_a$	$R_a$	
	preferred nominal dimension	without electroplated antifriction layer	with electroplated antifriction layer <sup>g</sup>		with-out flange	Integral flange bearing	Assembled flange bearing <sup>h</sup>							
>	≤													
—	50	1,5	0,008	— <sup>a</sup>	0 -0,05	0 -0,3	0 -0,05	0 -0,12	±1	+0,05 0	-0,02 -0,07	0,03	0,8	0,8
		1,75												
		2												
		2,5												
50	80	1,75	0,008	0,012	0 -0,05	0 -0,3	0 -0,05	0 -0,12	±1	+0,05 0	-0,02 -0,07	0,045	1,2	0,8
		2												
		2,5												
		3												
80	120	2	0,01	0,015	0 -0,05	0 -0,3	0 -0,07	0 -0,12	±1	+0,07 0	-0,02 -0,07	0,04	0,8	0,8
		2,5												
		3												
		3,5												
120	160	3	0,015	0,022	0 -0,05	0 -0,4	0 -0,07	0 -0,2	±1,5	+0,07 0	-0,02 -0,1	0,045	1,2	0,8
		3,5												
		4												
		5												
160	200	3,5	0,015	0,022	0 -0,05	0 -0,4	0 -0,12	0 -0,2	±1,5	+0,07 0	-0,02 -0,1	0,05	1,2	0,8
		4												
		5												
200	250	4	0,02	0,03	0 -0,05	0 -0,4	0 -0,12	0 -0,2	±1,5	+0,07 0	-0,02 -0,1	0,055	1,2	0,8
		5												
		6												

Table 2 (continued)

Housing diameter		Wall thickness	Tolerance or limit deviation for <sup>a</sup>								Surface roughness <sup>bc</sup>			
			Wall thickness		Flange thickness <sup>de</sup>	Half bearing width			Flange outside diameter	Distance between flanges <sup>e</sup>	Housing width	Crush height <sup>f</sup>	Bearing back	Sliding surface
$d_H$		$s_3$	$s_3$		$s_{fl}$	$B_1$	$B_2$		$D_{fl}$	$B_3$	$b_H$	$h$	$R_a$	$R_a$
		preferred nominal dimension	without electroplated antifric-tion layer	with electroplated anti-friction layers <sup>g</sup>		with-out flange	Inte-gral flange bear-ing	Assem-bled flange bear-ing <sup>h</sup>						
>	≤													
250	315	5	0,02	0,03	—	0 -0,5	—	—	—	—	—	0,06	1,6	1,2
		5												
		8												
315	400	6	0,025	0,035	—	0 -0,5	—	—	—	—	—	0,07	1,6	1,2
		8												
		10												
400	500	8	0,03	0,04	—	0 -0,5	—	—	—	—	—	0,07	1,6	1,2
		10												
		12												

<sup>a</sup> Subject to agreement between the user and manufacturer.

<sup>b</sup> Surface roughness in accordance with ISO 4288.

<sup>c</sup> Surface roughness measurements of bearings with an electroplated antifric-tion layer may be unreliable due to penetration of the soft layer by the stylus of the measuring equipment.

<sup>d</sup> On the pressure loaded side.

<sup>e</sup> The limit deviations shall not be added.

<sup>f</sup> See [Clause 6](#) and [Figures 18](#) and [19](#). For crush height of bearings with an electroplated antifric-tion layer and without subse-quent machining of the joint faces add 0,01 mm to the tolerance value.

<sup>g</sup> For larger half bearings, thicker electroplated antifric-tion layers are often used which require another machining operation. In such cases, the tolerances for sliding surfaces without electroplated antifric-tion layer apply.

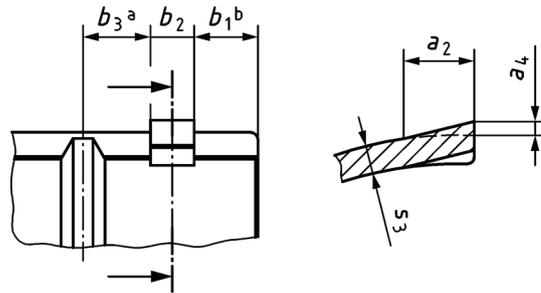
<sup>h</sup> Checked as shown in [7.1](#) and [7.2](#).

## 5 Design features

Dimensions are by agreement and tolerances shall be as given in [Tables 3](#) and [4](#).

### 5.1 Locating lip and recess

See [Figures 5](#), [6](#), and [7](#).

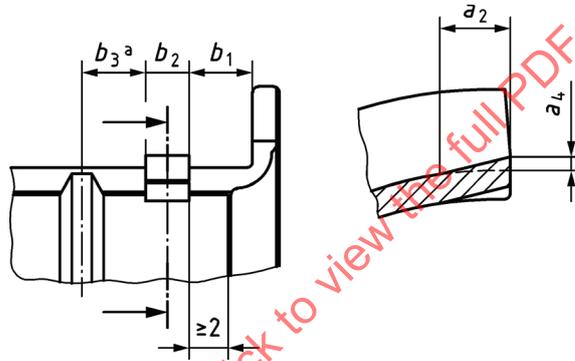


**Key**

$b_1 \geq 1,5 \times s_3$ , but not less than 3 mm.

- a If  $b_3$  is less than 2 mm, this area is permitted to be free of bearing metal over a circumferential length  $a_2$  to avoid the breaking of bearing metal when the bearing bore is machined. The locating nick can also break into the oil groove.
- b The locating nick can also be designed to be produced at the end of the half bearing; in this case is  $b_1 = 0$ .

**Figure 5 — Locating nick in a half bearing without flange**

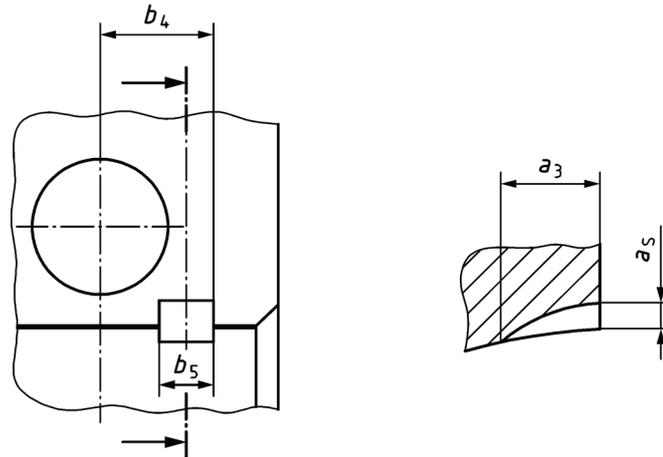


**Key**

$b_1 \geq 1,5 \times s_3$ , but not less than 3 mm.

- a If  $b_3$  is less than 2 mm, this area is permitted to be free of bearing metal over a circumferential length  $a_2$  to avoid the breaking of bearing metal when the bearing bore is machined. The locating nick can also break into the oil groove.

**Figure 6 — Locating nick in a flanged half bearing**



Key

$$b_4 \approx \frac{(B_1 \text{ or } B_3)}{2} - b_1^a$$

a See Figure 5 or Figure 6.

Figure 7 — Locating lip recess in the housing

## 5.2 Reliefs and chamfers

Joint face bore reliefs are normally provided at both sides of the half bearing (with or without flange) on the whole width. For guidance, it is suggested that the dimension  $a_6$  be approximately 1/10 of the inside diameter  $D_i$ , but the actual value of this dimension will be dependent on the application and is subject to agreement between the user and manufacturer (see [Figure 8](#)).

Chamfers are provided at both ends of a half bearing without flange (see [Figure 9](#)).

Flange reliefs are provided at all joint faces (see [Figure 10](#), section A-A) as well as at the edges of the flange sliding surfaces (see [Figure 10](#), detail X).

For dimensions and limit deviations, see [Table 3](#).

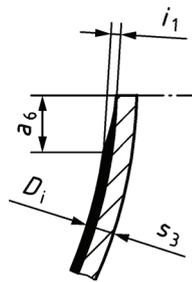


Figure 8 — Bearing bore relief

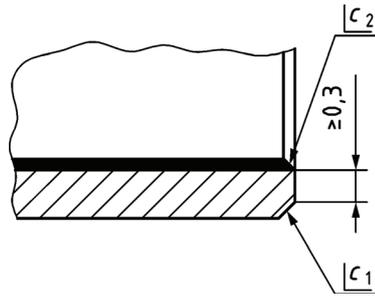
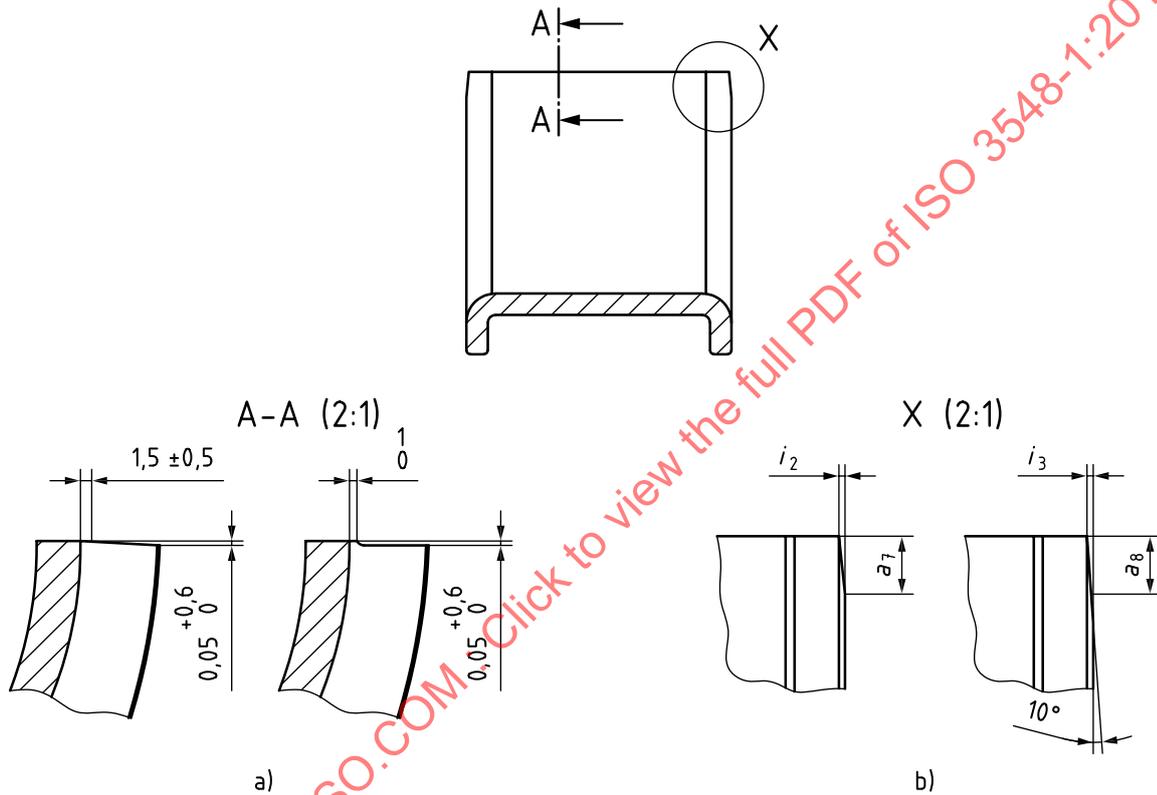


Figure 9 — Chamfers



a) Joint face relief

b) Sliding surface relief for flange bearing

Sliding surface relief for assembled flange bearing to be in accordance with ISO 6526.

Figure 10 — Flange reliefs  
(design at the option of the manufacturer)

### 5.3 Transition between radial part and flange

Figure 11 shows typical examples of the transition region, the actual form used being dependent upon the manufacturing method, and the ratio between wall thickness and flange thickness.

The transition between the radial part and flange shall comply with dimension  $a_9$  in order to avoid cracking.

The transition geometry shall be adapted to the form of the shaft in order to avoid fouling of the fillet radius and of the housing inside diameter.

Figure 12 shows an example of the transition region between half bearing and the flange of an assembled flange bearing.

For assembled flange bearings, the preferred dimensions of transition to maximize material for flange attachment are indicated in Figure 12.

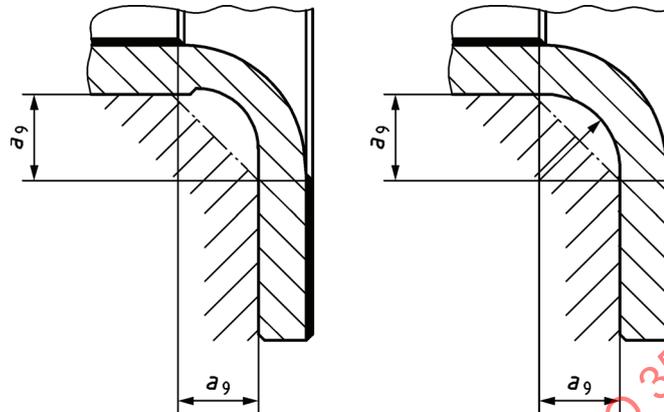
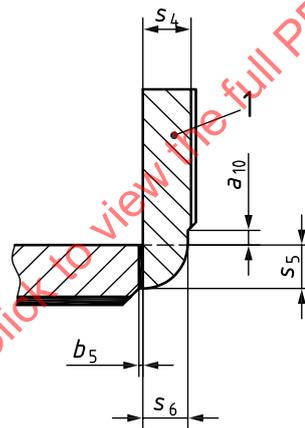


Figure 11 — Types of transition between radial parts of the flange



**Key**

1 flange

$s_5 \geq$  No less than 66 % of half bearing wall thickness

$s_6 \geq$  No less than 50 % of flange thickness but  $< s_4$ ;

corner profile should always overlap flange and half bearing thickness as follows:

$a_{10} = 0,5$  mm min.

$b_5 = 0,25$  mm min.

Oil groove depth shall be clear of half bearing maximum profile.

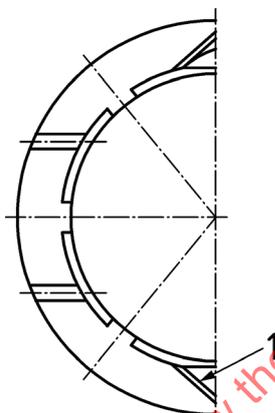
Figure 12 — Type of transition between half bearing and flange of a assembled flange bearing

**Table 3 — Minimum height (and width) of transition and relief of the flanges**

Housing diameter $d_H$		$a_7$	$a_8$	$a_9$	$i_2$	$i_3$
>	≤	±2	±0,5	min.	$\begin{matrix} +0,2 \\ 0 \end{matrix}$	$\begin{matrix} +0,3 \\ 0 \end{matrix}$
—	120	5,5	3	2	0,1	0,3
120	250	8	3	3	0,2	0,3

#### 5.4 Assembled flange scalloped toes

This feature is used to improve material utilization and should be shown optional, see [Figure 13](#).



#### Key

1 thrust washer

NOTE Scalloped toe optional at joints to facilitate maximum material utilization in accordance with ISO 6526.

**Figure 13 — Assembled flange scalloped toes**

#### 5.5 Oil grooves and holes

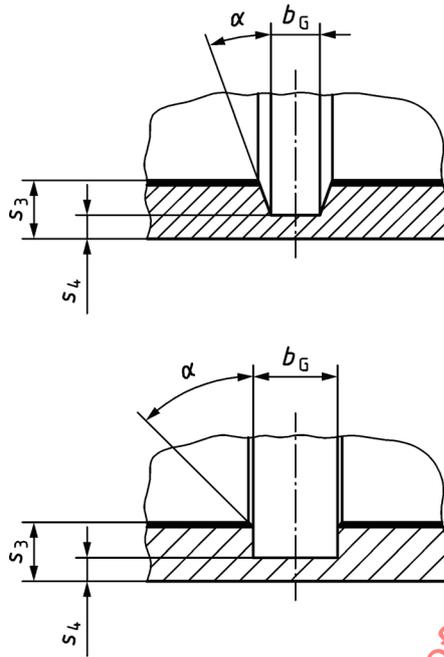
See [Figures 14, 15, 16, and 17](#).

The sizes of oil grooves, pockets, and holes are determined by functional requirements and are not specified in this part of ISO 3548.

For preferred groove forms in the radial part, see [Figure 14](#).

Oil grooves and oil pockets on the flange faces are preferably cut up to the steel backing in the bearing metal and are normally provided up to  $D_{fl} = 160$  mm flange outside diameter. Above this size other shapes of grooves or pockets can be provided.

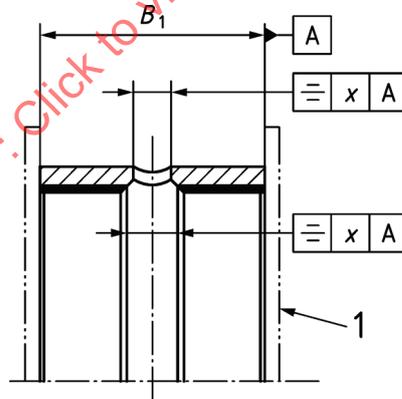
Oil holes can be drilled or punched. In both cases the sharp edges of the oil holes shall be free of burrs, except at the transition to the oil groove. If a chamfer is provided, its form is at the option of the manufacturer. A chamfer is necessary on the sliding surface.



$\alpha = 30^\circ$  or  $45^\circ$  are usual.

$s_4 \approx$  approximately  $0,35 \times s_3$ , but  $\geq 0,7$  mm.

Figure 14 — Types of oil groove



**Key**

1 profile of flange bearing

NOTE For tolerance  $x$ , see [Table 4](#).

Figure 15 — Position of the oil groove and oil hole

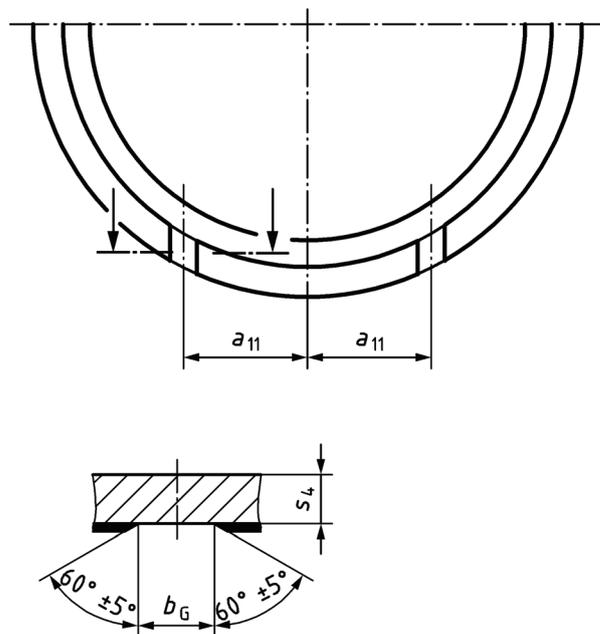
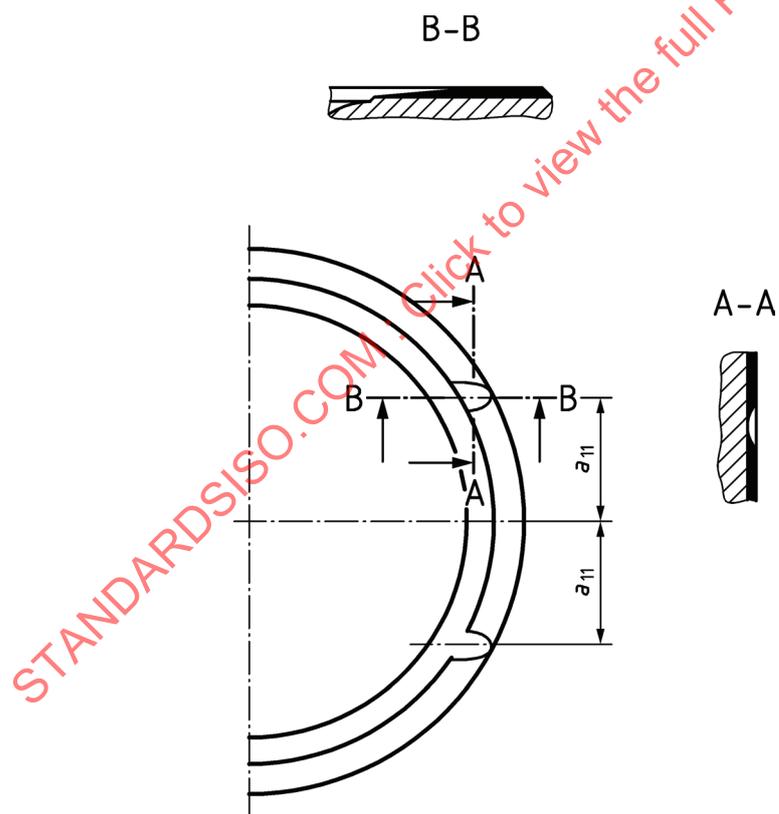


Figure 16 — Groove form on the flange face



NOTE Pocket may be closed or opened to the outer flange diameter.

Figure 17 — Pocket form on the flange face

Table 4 — Tolerances and limit deviations for design features<sup>a</sup>

Housing diameter $d_H$		Tolerance and limit deviation for												
>	≤	$a_2$	$a_3$	$a_4$	$a_5$	$a_6$	$a_{11}$	$b_2$	$b_5$	$b_G$	$C_1, C_2$	$i_1$	$s_4$	$x$
—	50	$\begin{matrix} 0 \\ -1,5 \end{matrix}$	$\begin{matrix} +1,5 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -0,3 \end{matrix}$	$\begin{matrix} +0,25 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -3 \end{matrix}$	$\pm 1,5$	$\begin{matrix} 0 \\ -0,15 \end{matrix}$	$\begin{matrix} +0,15 \\ 0 \end{matrix}$	$\pm 0,25$	$\begin{matrix} -0,1 \\ -0,6 \end{matrix}$	$\begin{matrix} 0 \\ -0,015 \end{matrix}$	$\begin{matrix} +0,3 \\ 0 \end{matrix}$	0,6
50	80	$\begin{matrix} 0 \\ -2 \end{matrix}$	$\begin{matrix} +1,5 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -0,4 \end{matrix}$	$\begin{matrix} +0,4 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -3 \end{matrix}$	$\pm 1,5$	$\begin{matrix} 0 \\ -0,15 \end{matrix}$	$\begin{matrix} +0,15 \\ 0 \end{matrix}$	$\pm 0,25$	$\begin{matrix} -0,1 \\ -0,6 \end{matrix}$	$\begin{matrix} 0 \\ -0,020 \end{matrix}$	$\begin{matrix} +0,3 \\ 0 \end{matrix}$	
80	120	$\begin{matrix} 0 \\ -2 \end{matrix}$	$\begin{matrix} +2 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -0,4 \end{matrix}$	$\begin{matrix} +0,6 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -4 \end{matrix}$	$\pm 2,5$	$\begin{matrix} 0 \\ -0,15 \end{matrix}$	$\begin{matrix} +0,15 \\ 0 \end{matrix}$	$\pm 0,25$	$\begin{matrix} -0,1 \\ -0,6 \end{matrix}$	$\begin{matrix} 0 \\ -0,020 \end{matrix}$	$\begin{matrix} +0,4 \\ 0 \end{matrix}$	
120	160	$\begin{matrix} 0 \\ -2 \end{matrix}$	$\begin{matrix} +3 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -0,4 \end{matrix}$	$\begin{matrix} +0,75 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -4 \end{matrix}$	$\pm 2,5$	$\begin{matrix} 0 \\ -0,15 \end{matrix}$	$\begin{matrix} +0,15 \\ 0 \end{matrix}$	$\pm 0,25$	$\begin{matrix} -0,4 \\ -1,2 \end{matrix}$	$\begin{matrix} 0 \\ -0,020 \end{matrix}$	$\begin{matrix} +0,4 \\ 0 \end{matrix}$	
160	200	$\begin{matrix} 0 \\ -2,5 \end{matrix}$	$\begin{matrix} +3,5 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -0,5 \end{matrix}$	$\begin{matrix} +1 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -5 \end{matrix}$	$\pm 2,5$	$\begin{matrix} 0 \\ -0,15 \end{matrix}$	$\begin{matrix} +0,15 \\ 0 \end{matrix}$	$\pm 0,25$	$\begin{matrix} -0,4 \\ -1,2 \end{matrix}$	$\begin{matrix} 0 \\ -0,020 \end{matrix}$	$\begin{matrix} +0,4 \\ 0 \end{matrix}$	
200	250	$\begin{matrix} 0 \\ -2,5 \end{matrix}$	$\begin{matrix} +5 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -0,5 \end{matrix}$	$\begin{matrix} +1,2 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -6 \end{matrix}$	$\pm 2,5$	$\begin{matrix} 0 \\ -0,15 \end{matrix}$	$\begin{matrix} +0,15 \\ 0 \end{matrix}$	$\pm 0,25$	$\begin{matrix} -0,4 \\ -1,2 \end{matrix}$	$\begin{matrix} 0 \\ -0,025 \end{matrix}$	$\begin{matrix} +0,4 \\ 0 \end{matrix}$	
250	315	$\begin{matrix} 0 \\ -2,5 \end{matrix}$	$\begin{matrix} +5 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -0,5 \end{matrix}$	$\begin{matrix} +1,2 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -6 \end{matrix}$	$\pm 2,5$	$\begin{matrix} 0 \\ -0,15 \end{matrix}$	$\begin{matrix} +0,15 \\ 0 \end{matrix}$	$\pm 0,25$	$\begin{matrix} -1 \\ -2 \end{matrix}$	$\begin{matrix} 0 \\ -0,025 \end{matrix}$	$\begin{matrix} +0,5 \\ 0 \end{matrix}$	0,8
315	400	$\begin{matrix} 0 \\ -3 \end{matrix}$	$\begin{matrix} +5 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -0,5 \end{matrix}$	$\begin{matrix} +1,5 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -8 \end{matrix}$	$\pm 2,5$	$\begin{matrix} 0 \\ -0,2 \end{matrix}$	$\begin{matrix} +0,2 \\ 0 \end{matrix}$	$\pm 0,25$	$\begin{matrix} -1 \\ -2 \end{matrix}$	$\begin{matrix} 0 \\ -0,030 \end{matrix}$	$\begin{matrix} +0,5 \\ 0 \end{matrix}$	
400	500	$\begin{matrix} 0 \\ -3 \end{matrix}$	$\begin{matrix} +5 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -0,6 \end{matrix}$	$\begin{matrix} +1,5 \\ 0 \end{matrix}$	$\begin{matrix} 0 \\ -8 \end{matrix}$	$\pm 2,5$	$\begin{matrix} 0 \\ -0,25 \end{matrix}$	$\begin{matrix} +0,25 \\ 0 \end{matrix}$	$\pm 0,25$	$\begin{matrix} -1,5 \\ -2,5 \end{matrix}$	$\begin{matrix} 0 \\ -0,035 \end{matrix}$	$\begin{matrix} +0,6 \\ 0 \end{matrix}$	1

<sup>a</sup> Closer tolerances are subject to agreement between the user and the manufacturer.

## 6 Test data for determining the peripheral length

### 6.1 Calculation of test force $F$

For half bearings with steel backing, the test force,  $F$ , in Newtons, per joint face for determining the crush height,  $h$ , in a checking block with an inside diameter,  $d_{ch}$  (normally equal to the maximum housing diameter) is calculated using Formula (3):

$$F = 100 \times A_{cal} \quad (3)$$

(rounded to the nearest 500 N, but limited to a maximum of 100 000 N)

The reduced cross-sectional area,  $A_{cal}$  (calculated value) of the half bearing, in square millimetres, is calculated using Formulae (4), (5) and (6):

for steel/lead alloy, steel/tin alloy:

$$A_{cal} = (B_1 \text{ or } B_2) \times s_1 \tag{4}$$

for steel/copper alloy:

$$A_{cal} = (B_1 \text{ or } B_2) \times \left( s_1 + \frac{s_2}{2} \right) \tag{5}$$

for steel/aluminium alloy:

$$A_{cal} = (B_1 \text{ or } B_2) \times \left( s_1 + \frac{s_2}{3} \right) \tag{6}$$

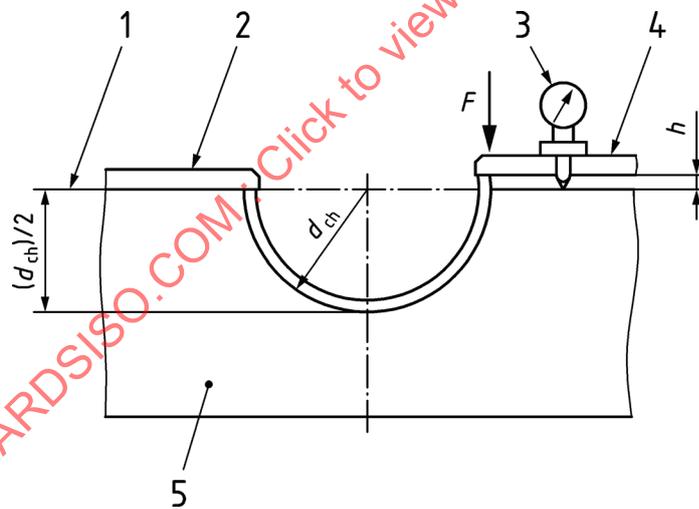
Depending on form, position, and type of manufacture, oil grooves can diminish the reduced cross-sectional area  $A_{cal}$ . If the proportion is above 10 %, this is to be taken into account in the calculation.

Depending on the size of the half bearing outside diameter, it is recommended to use either checking method A (see [Figure 18](#)) or checking method B (see [Figure 19](#)) as specified in ISO 6524.

When checking method B is used, a test force  $F$  is to be applied to each joint face (see [Figure 19](#)). The total force to be applied is  $2 \times F$ .

### 6.2 Checking method A

When using checking method A, the following shall be indicated in the drawing in accordance with ISO 6524.



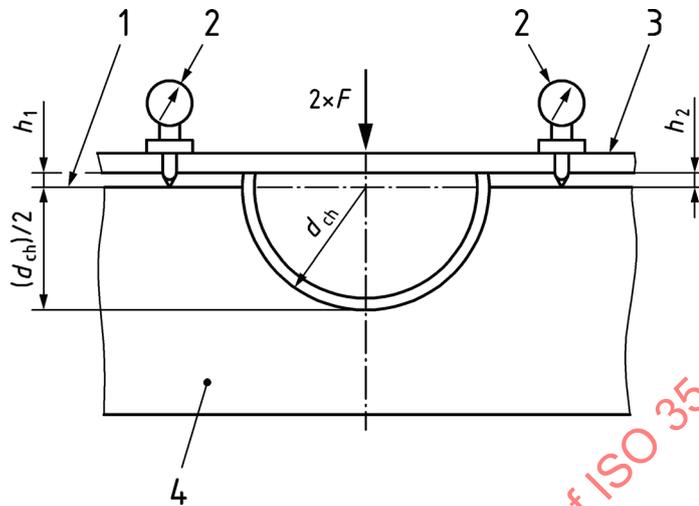
#### Key

- 1 date
- 2 fixed stop
- 3 dial gauge
- 4 pressure plate
- 5 checking block

Figure 18 — Example of checking method A for test force  $F = 6\,000\text{ N}$

### 6.3 Checking method B

When using checking method B, the following shall be indicated in the drawing in accordance with ISO 6524.



#### Key

- 1 date
- 2 dial gauge
- 3 pressure plate
- 4 checking block

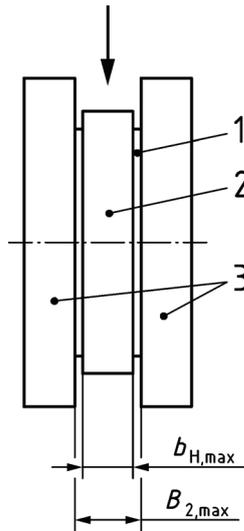
Figure 19 — Example of checking method B for test force  $F = 6\,000\text{ N}$  (total force  $2 \times F = 12\,000\text{ N}$ )

## 7 Test data for determining axial width, $B_2$ , of flange bearings

The method of checking and test force (if relevant) shall be agreed between the manufacturer and user.

### 7.1 Go between two parallel plates

With a gauge block inserted between the flanges of an integral or assembled flange bearing the bearing shall pass freely between two static plates; see [Figure 20](#).



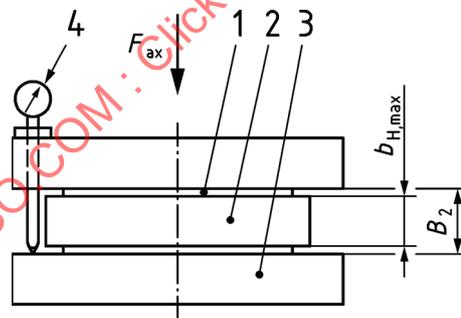
**Key**

- 1 integral or assembled flange bearing
- 2 gauge block
- 3 static plate

**Figure 20 — Freestate reference check for integral or assembled flange bearings**

**7.2 Axial width  $B_2$  checked under force**

With a gauge block inserted between the flanges of an assembled flange bearing the bearing axial length is checked under an axial force,  $F_{ax}$ ; see [Figure 21](#).



**Key**

- 1 assembled flange bearing
- 2 gauge block
- 3 fixed plate of the equipment test
- 4 dial gauge

NOTE  $F_{ax}$  = face area of flange  $\times$  1 N/mm<sup>2</sup>.

**Figure 21 — Example of test equipment**

**8 Function and characteristics of assembled flange bearings**

This clause specifies precisely the assembled flange bearing.