INTERNATIONAL STANDARD

ISO 3548-1

Second edition
2022-08

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

Reference number
ISO 3548-1:2022(E)

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Published in Switzerland

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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).

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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 123, *Plain Bearings*, Subcommittee SC 3, *Dimensions, tolerances and constructions details*.

This second edition cancels and replaces the first edition (ISO 3548:2014), which has been technically revised.

The main changes are as follows:

— normative references have been revised in Clause 2;

— symbols and terms with units have been added to Table 1;

— symbols in Figure 2 have been modified;

— symbols and measures in Figure 7 have been modified;

— Figures 3, 10 and 11 have been modified;

— symbols in 7.2 and 7.3 have been modified.

A list of all parts in the ISO 3548 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.

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

Part 1: Tolerances, design features and methods of test

1 Scope

This document 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 document 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 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 3548-3, *Plain bearings — Thin-walled half bearings with or without flange — Part 3: Measurement of peripheral length*

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

ISO 21920-3, *Geometrical product specifications (GPS) — Surface texture: Profile — Part 3: Specification operators*

3 Terms and definitions

No terms and definitions are listed in this document.

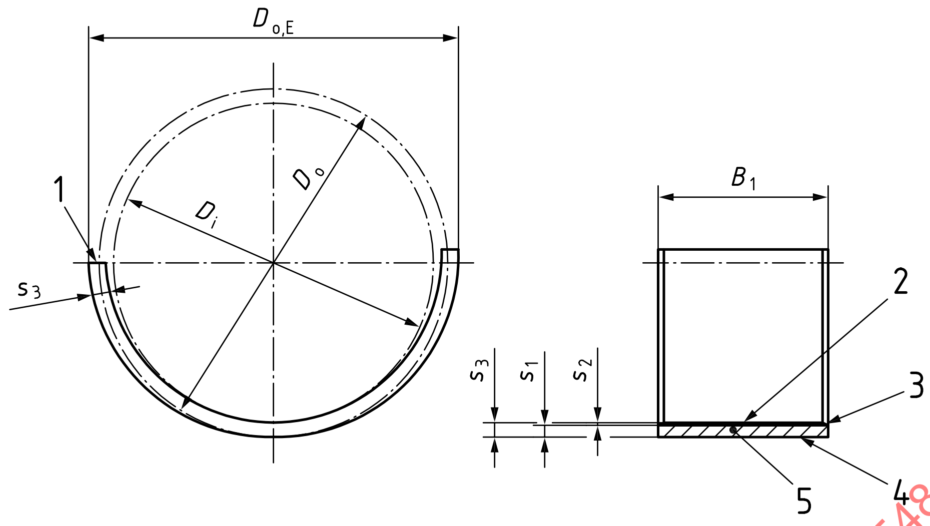
ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Symbols

Symbols and units are shown in Figures 1 and 2 and Table 1.



Key

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

Figure 1 — Half bearing without flange with positive free spread

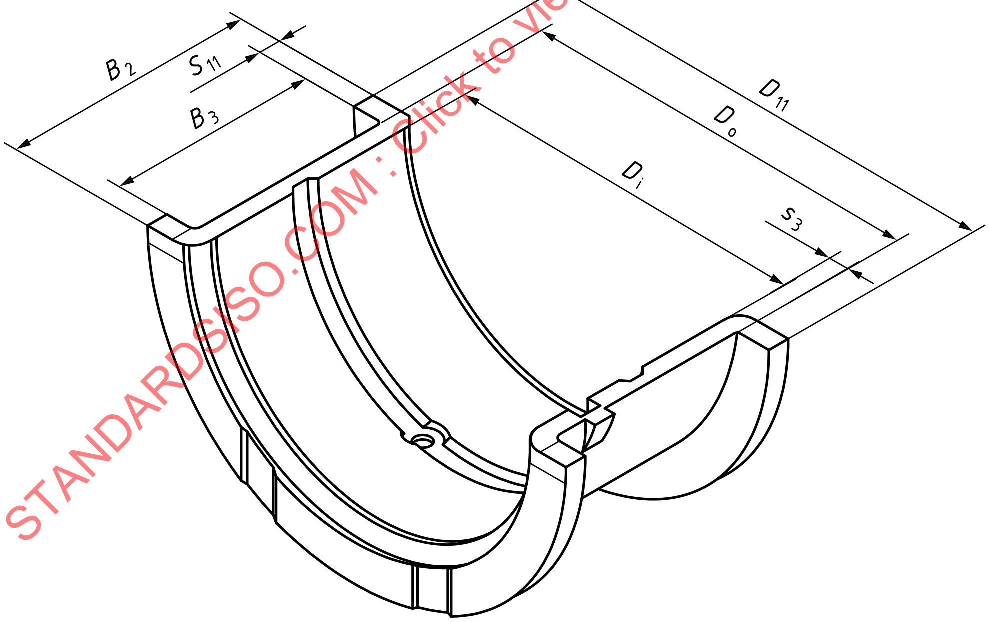


Figure 2 — Flange half bearing, integral or assembled, excluding free spread

Table 1 — Symbols and units

Symbol	Description	Unit
a	Crush height	mm
a_A	Crush height in checking method A	mm
a_B	Crush height in checking method B	mm
a_{B1}	Crush height on first joint face side in checking method B	mm
a_{B2}	Crush height on second joint face side in checking method B	mm
a_1	Measuring point perpendicular to plane of joint face	mm
a_2	Circumferential length of locating nick	mm
a_4	Locating nick protrusion	mm
a_5	Locating recess depth	mm
a_6	Bearing bore relief length	mm
a_7	Sliding relief length	mm
a_8	Sliding relief length under 10° inclination	mm
a_9	Bending transition length	mm
a_{10}	Undercut length	mm
a_{11}	Groove centre distance	mm
A_{cal}	Reduced area of cross section (calculated value) of half bearing	mm^2
A_f	Face area of flange	mm^2
b_1	Distance to locating nick	mm
b_2	Locating nick width	mm
b_3	Distance recess centre to locating nick	mm
b_4	Distance locating nick groove to lubrication hole	mm
b_5	Locating recess width	mm
b_6	Clearance	mm
b_G	Oil groove width	mm
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_i	Inside chamfer	mm
c_o	Outside chamfer	mm
d_{cb}	Diameter of the checking block bore	mm
d_H	Housing diameter	mm
D_{11}	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
i_1	Bearing bore relief height	mm
i_2	Flange bearing, sliding relief length	mm
i_3	Flange bearing, sliding relief length under 10° inclination	mm
L_{Bu}	Bottom limit of u	—
L_{Uu}	Upper limit of u	—

Table 1 *(continued)*

Symbol	Description	Unit
P	Amount of free spread	mm
Ra	Arithmetic average surface roughness	µm
s	Wall thickness (general)	mm
s_1	Steel backing thickness	mm
s_2	Bearing metal thickness	mm
s_3	Half bearing wall thickness	mm
$s_{3,\text{ act}}$	Actual value of s_3	—
s_4	Wall thickness at the base of the groove	mm
s_5	Contact width assembled flange with half bearing	mm
s_6	Assembled flange joint thickness	mm
s_{11}	Flange thickness	mm
s_α	Wall thickness at different angle	mm
$s_{\alpha,\text{ BL}}$	Bottom value of s_α	—
$s_{\alpha,\text{ UL}}$	Upper value of s_α	—
u	Amount of wall thickness reduction for eccentric bearing	mm
x	Tolerance, position limit of oil groove and oil hole	mm
x_1	Centre of the bearing outside surface	—
x_2	Centre of the bearing bore	—
α	Angle	°
α_2	Angle at eccentricity measuring point	°
β	Chamfer angle of oil groove	°

5 Dimensions and tolerances

5.1 Housing diameter, half bearing outside diameter and crush height

The housing diameter should be manufactured to limit deviations H6 as defined in ISO 286-2. 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 standard tolerance grade 6 values.

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). The calculation of the effective interference fit of the half bearings in the housing is provided in Reference [7].

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.

5.2 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.

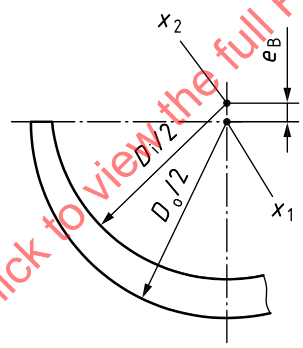
The tolerance for the half bearing wall thickness depends on the fact whether the bearing bore is subject to a final machining operation (i.e. “as machined”) or whether the bearing bore is electroplated without further machining (i.e. “as-plated”).

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[7].

NOTE In certain applications, it can 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 α_2 is approximately 25° from the joint face. The measuring point is subject to agreement between the user and manufacturer.

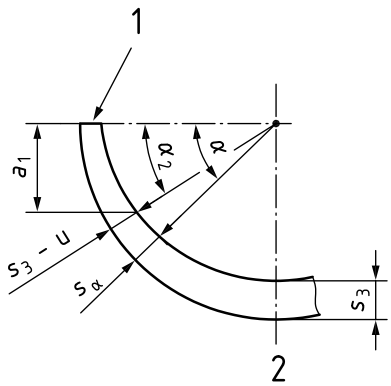


Key

x_1 centre of the bearing outside surface

x_2 centre of the bearing bore

Figure 3 — Eccentric bearing bore of half bearing



Key

1 joint face

2 crown

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:

$$s_{\alpha,\mathrm{BL}} = s_{3,\mathrm{act}} - L_{\mathrm{B}u} \cdot \frac{1-\sin\alpha}{1-\sin\alpha_2} \tag{1}$$

$$s_{\alpha,\mathrm{UL}} = s_{3,\mathrm{act}} - L_{\mathrm{U}u} \cdot \frac{1-\sin\alpha}{1-\sin\alpha_2} \tag{2}$$

where

$L_{\mathrm{B}u}$ is the bottom limit of u;

$L_{\mathrm{U}u}$ is the upper limit of u;

$s_{3,\mathrm{act}}$ is the actual value of s_3;

$s_{\alpha,\mathrm{BL}}$ is the bottom value of s_α;

$s_{\alpha,\mathrm{UL}}$ is the upper value of s_α.

5.3 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 $B_1(B_2)/D_\mathrm{i} \leq 0{,}5$. 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).

5.4 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 document, 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		Half bearing wall thickness	Tolerance or limit deviation for[a]										Surface roughness[b,c] µm	
			Half bearing wall thickness		Flange thickness[d,e]	Half bearing width			Flange outside diameter	Distance between flanges[e]	Housing width	Crush height[f]	Bearing back	Sliding surface
d_H		s_3	s_3		s_{11}	B_1	B_2		D_{11}	B_3	b_H	a	Ra	Ra
>	≤	preferred nominal dimension	without electroplated anti-friction layer	with electroplated anti-friction layer[g]		without flange	integral flange bearing	assembled flange bearing[h]						
—	50	1,5	0,008	—[a]	0 −0,05	0 −0,3	0 −0,05	0 −0,12	±1	+0,05 0	−0,02 −0,07	0,03	1,6	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	0,035	1,6	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	1,6	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	1,6	0,8
		3,5												
		4												
		5												

a Closer tolerances are subjected to agreement between the user and manufacturer.

b Surface roughness shall be in accordance with ISO 21920-3.

c Surface roughness measurements of bearings with an electroplated antifriction layer can be unreliable due to penetration of the soft layer by the stylus of the measuring equipment.

d On the pressure loaded side.

e The limit deviations shall not be added.

f See Clause 7 and Figures 18 and 19. For crush height of bearings with an electroplated antifriction layer and without subsequent machining of the joint faces, add 0,01 mm to the tolerance value.

g For larger half bearings, thicker electroplated antifriction layers are often used which require another machining operation. In such cases, the tolerances for sliding surfaces without electroplated antifriction layer apply.

h Checked as shown in 7.1 and 7.2.

Table 2 *(continued)*

Housing diameter		Half bearing wall thickness	Tolerance or limit deviation for[a]										Surface roughness[b,c] µm	
			Half bearing wall thickness		Flange thickness[d,e]	Half bearing width			Flange outside diameter	Distance between flanges[e]	Housing width	Crush height[f]	Bearing back	Sliding surface
d_H		s_3	s_3		s_{11}	B_1	B_2		D_{11}	B_3	b_H	a	Ra	Ra
>	≤	preferred nominal dimension	without electroplated anti-friction layer	with electroplated anti-friction layer[g]		without flange	integral flange bearing	assembled flange bearing[h]						
160	200	3,5 4 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	1,6	0,8
200	250	4 5 6	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	1,6	0,8
250	315	5 6 8	0,02	0,03	—	0 −0,05	—	—	—	—	—	0,06	1,6	1,2
315	400	6 8 10	0,025	0,035	—	0 −0,05	—	—	—	—	—	0,07	1,6	1,2
400	500	8 10 12	0,03	0,04	—	0 −0,05	—	—	—	—	—	0,07	1,6	1,2

a Closer tolerances are subjected to agreement between the user and manufacturer.

b Surface roughness shall be in accordance with ISO 21920-3.

c Surface roughness measurements of bearings with an electroplated antifriction layer can be unreliable due to penetration of the soft layer by the stylus of the measuring equipment.

d On the pressure loaded side.

e The limit deviations shall not be added.

f See Clause 7 and Figures 18 and 19. For crush height of bearings with an electroplated antifriction layer and without subsequent machining of the joint faces, add 0,01 mm to the tolerance value.

g For larger half bearings, thicker electroplated antifriction layers are often used which require another machining operation. In such cases, the tolerances for sliding surfaces without electroplated antifriction layer apply.

h Checked as shown in 7.1 and 7.2.

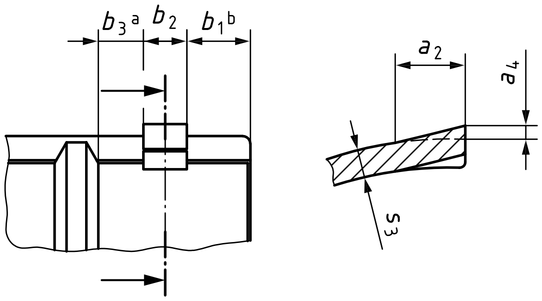
6 Design features

6.1 General

Dimensions are by agreement and tolerances shall be as given in Tables 3 and 4.

6.2 Locating nick and recess

Locating nicks and recesses are shown in Figures 5, 6 and 7.

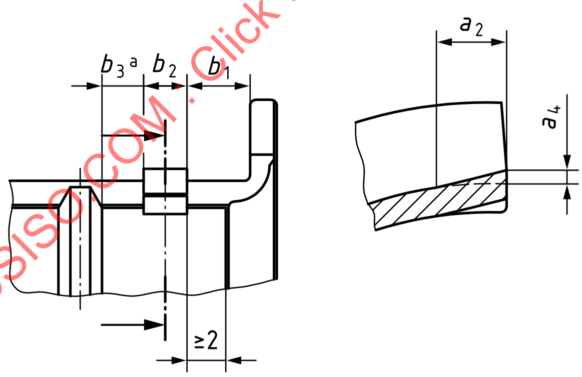


$b_1 \geq 1{,}5 \times s_3$, but not less than 3 mm.

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, $b_1 = 0$.

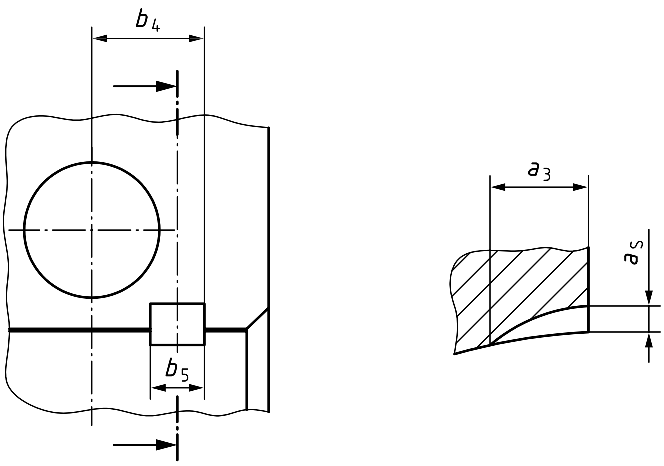
Figure 5 — Locating nick in a half bearing without flange



$b_1 \geq 1{,}5 \times s_3$, 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



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

[a] See Figure 5 or Figure 6.

Figure 7 — Locating recess in the housing

6.3 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, ($a_6 \approx 0{,}1 \times D_i$) 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.

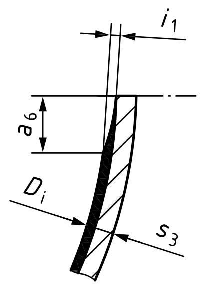


Figure 8 — Bearing bore relief

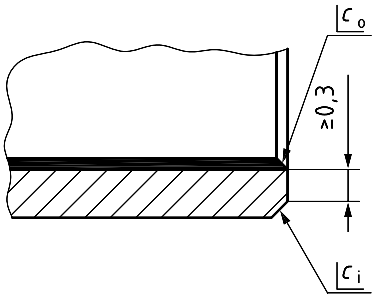
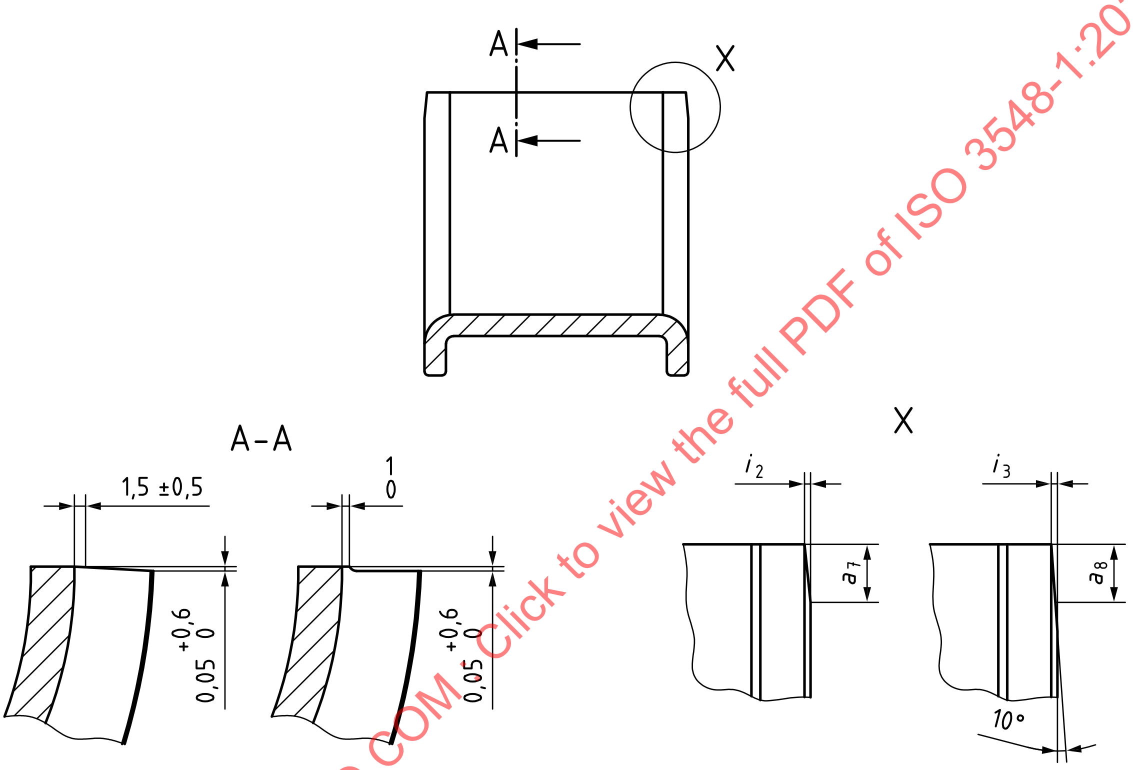


Figure 9 — Chamfers



a) Joint face relief

b) Sliding surface relief for flange bearing

The sliding surface relief for assembled flange bearing [see Figure 10 b)] shall be in accordance with ISO 6526.

NOTE The design of the flange relief is the choice of the manufacturer.

Figure 10 — Flange reliefs

6.4 Transition between radial part and flange

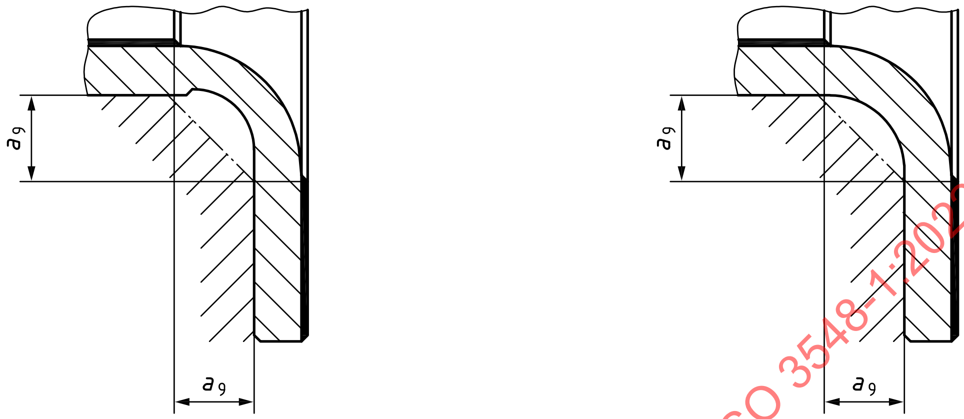
Figure 11 shows typical examples of the transition region, the actual form used being dependent upon the manufacturing method and the ratio between wall thickness and flange thickness.

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.

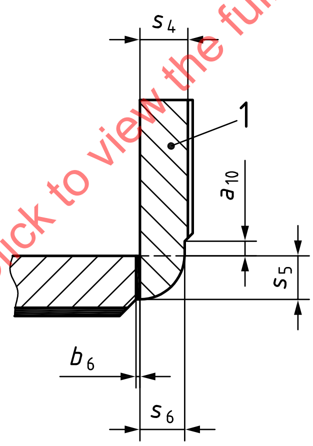
Figure 12 shows an example of the transition region between half bearing and the flange of an assembled flange bearing.

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



a) Reduced wall thickness **b) Constant wall thickness**

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 $< s_4$.

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

— a_{10} = 0,5 mm min.

— b_6 = 0,25 mm min.

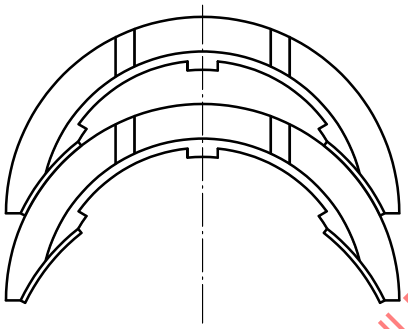
Figure 12 — Type of transition between half bearing and flange of an assembled flange bearing

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

d_H		a_7	a_8	a_9	i_2	i_3
>	≤	±2	±2	min.	$^{+0,2}_{0}$	$^{+0,3}_{0}$
—	120	5,5	3	2	0,1	0,3
120	250	8	3	3	0,2	0,3
120	250	8	3	3	0,2	0,3

6.5 Assembled flange scalloped toes

This feature is used to improve material utilization and should be shown as optional, see Figure 13.



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

Figure 13 — Assembled flange scalloped toes

6.6 Oil grooves and holes

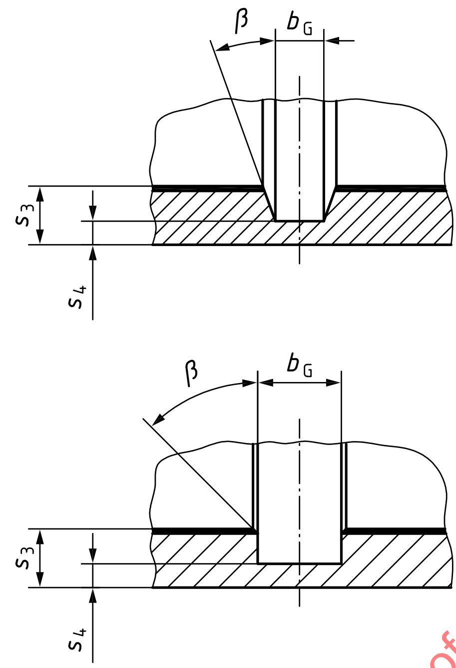
Oil grooves and holes are shown in Figures 14, 15, 16, and 17.

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

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.

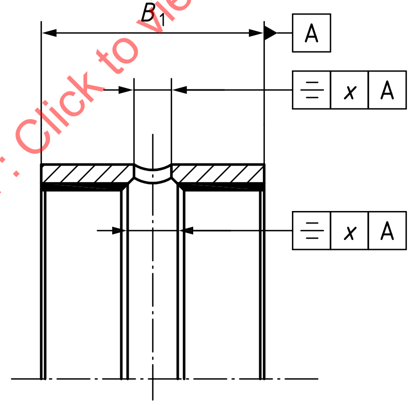
Oil holes can be drilled or punched. In both cases, the sharp edges of the oil holes shall be free of burrs, except at the transition to the oil groove. If a chamfer is provided, its form is at the option of the manufacturer. A chamfer is necessary on the sliding surface.



β = 30° or 45° are usual.

s_4 ≈ approximately 0,35 × s_3, but ≥ 0,7 mm.

Figure 14 — Types of oil groove



NOTE For tolerance *x*, see Table 4.

Figure 15 — Position of the oil groove and oil hole

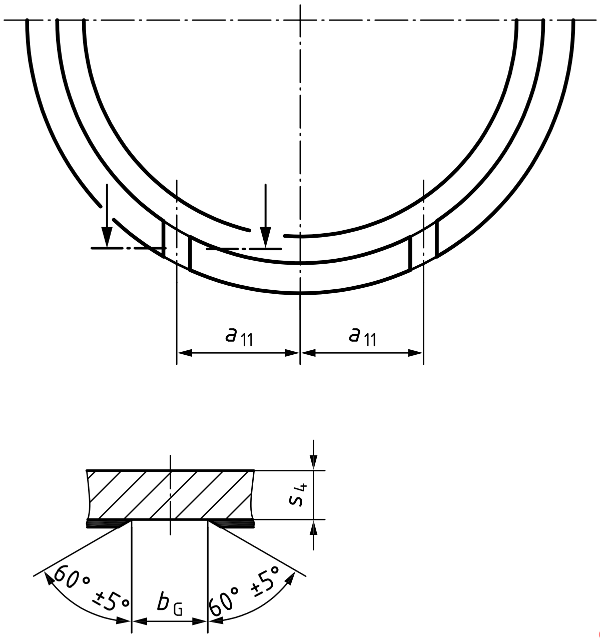
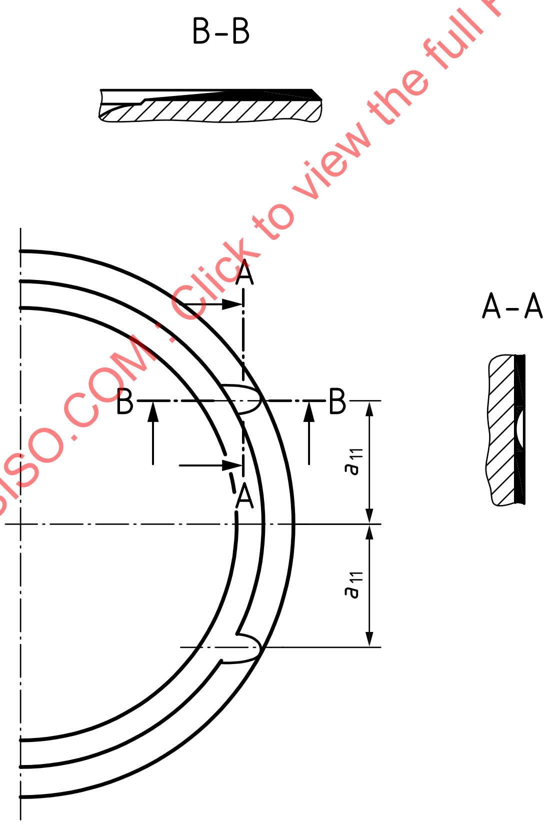


Figure 16 — Groove form on the flange face



NOTE Pocket can 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

Housing diameter d_H >	≤	Tolerance and limit deviation[a] for a_2	a_3	a_4	a_5	a_6	a_{11}	b_2	b_5	b_G	C_o, C_i	i_1	s_4	x
—	50	0 −1,5	+1,5 0	0 −0,3	+0,25 0	0 −3	±1,5	0 −0,15	+0,15 0	±0,25	−0,1 −0,6	0 −0,015	+0,3 0	0,6
50	80	0 −2	+1,5 0	0 −0,4	+0,4 0	0 −3	±1,5	0 −0,15	+0,15 0	±0,25	−0,1 −0,6	0 −0,020	+0,3 0	
80	120	0 −2	+2 0	0 −0,4	+0,6 0	0 −4	±2,5	0 −0,15	+0,15 0	±0,25	−0,1 −0,6	0 −0,020	+0,4 0	
120	160	0 −2	+3 0	0 −0,4	+0,75 0	0 −4	±2,5	0 −0,15	+0,15 0	±0,25	−0,4 −1,2	0 −0,020	+0,4 0	
160	200	0 −2,5	+3,5 0	0 −0,5	+1 0	0 −5	±2,5	0 −0,15	+0,15 0	±0,25	−0,4 −1,2	0 −0,020	+0,4 0	
200	250	0 −2,5	+5 0	0 −0,5	+1,2 0	0 −6	±2,5	0 −0,15	+0,15 0	±0,25	−0,4 −1,2	0 −0,025	+0,4 0	
250	315	0 −2,5	+5 0	0 −0,5	+1,2 0	0 −6	±2,5	0 −0,15	+0,15 0	±0,25	−1 −2	0 −0,025	+0,5 0	0,8
315	400	0 −3	+5 0	0 −0,5	+1,5 0	0 −8	±2,5	0 −0,2	+0,2 0	±0,25	−1 −2	0 −0,030	+0,5 0	
400	500	0 −3	+5 0	0 −0,6	+1,5 0	0 −8	±2,5	0 −0,25	+0,25 0	±0,25	−1,5 −2,5	0 −0,035	+0,6 0	1

[a] Closer tolerances are subject to agreement between the user and the manufacturer.

7 Test data for determining the peripheral length

7.1 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, a, in a checking block with an inside diameter, d_{cb} (normally equal to the maximum housing diameter) is calculated using Formula (3):

$$F = 100 \cdot A_{cal} \tag{3}$$

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) to (9):

— for steel/lead and steel/tin alloys:

$$A_{cal} = B_1 \cdot s_1 \tag{4}$$

or

$$A_{cal} = B_2 \cdot s_1 \tag{5}$$

— for steel/copper alloy:

$$A_{cal} = B_1 \cdot \left(s_1 + \frac{s_2}{2} \right) \tag{6}$$

or

$$A_{cal} = B_2 \cdot \left(s_1 + \frac{s_2}{2} \right) \quad (7)$$

— for steel/aluminium alloy:

$$A_{cal} = B_1 \cdot \left(s_1 + \frac{s_2}{3} \right) \quad (8)$$

or

$$A_{cal} = B_2 \cdot \left(s_1 + \frac{s_2}{3} \right) \quad (9)$$

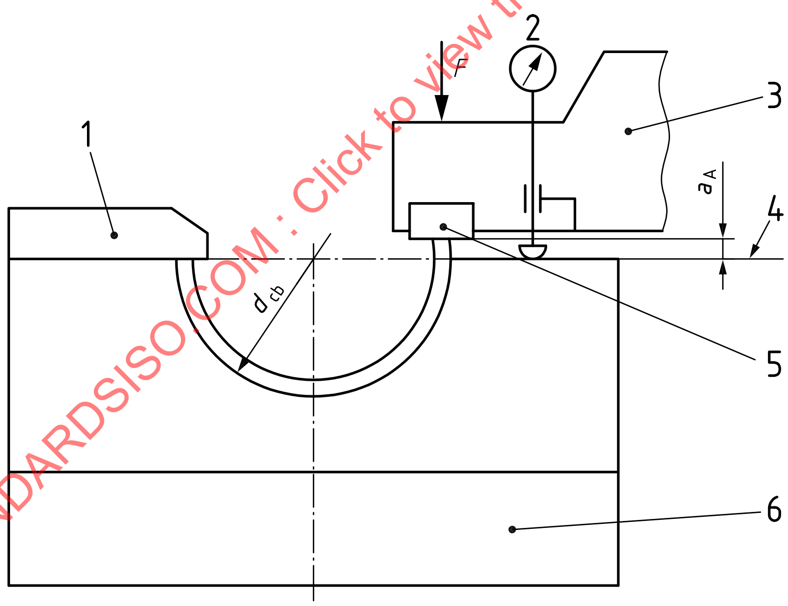
Depending on form, position, and type of manufacture, oil grooves can diminish the reduced cross-sectional area A_{cal}. If the proportion is above 10 %, this is to be taken into account in the calculation.

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 3548-3.

When checking whether method B is used, a test force F shall be applied to each joint face (see Figure 19). The total force to be applied is 2 × F.

7.2 Checking method A

When using checking method A, the following shall be indicated in the drawing in accordance with ISO 3548-3.



Key

1 fixed stop
2 dial gauge
3 movable measuring head
4 datum
5 metering bar
6 checking block

Figure 18 — Example of checking method A for test force F = 6 000 N