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

Part 2: Measurement of wall thickness and flange thickness

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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 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 5, *Quality analysis and assurance*.

This second edition cancels and replaces the first edition (ISO 3548-2:2009), which has been technically revised. The main changes compared to the previous edition are as follows:

— the term “flange thickness” has been introduced in Clause 3;

— Table 1 has been updated;

— several figures have been revised;

— a new Table 3 “Thin walled half bearings with flange — Distance to measuring position a_{ch}” has been introduced.

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 2: Measurement of wall thickness and flange thickness

1 Scope

This document specifies in accordance with ISO 12301 the checking of the wall-thickness of thin-walled half bearings with or without flange and describes the necessary checking methods and measuring equipment.

It applies to a maximum bearing diameter of 150 mm. It can be applied to a bigger diameter, provided that there is an agreement between the supplier and the user.

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 3548-1, *Plain bearings — Thin-walled half bearings with or without flange — Part 1: Tolerances, design features and methods of test*

3 Terms and definition

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

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

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

For the purposes of thisdocument, the following definitions apply:

3.1
wall thickness
s_3
radial distance between the opposing measuring points at the inner and outer cylindrical surfaces

Note 1 to entry: See Figure 1.

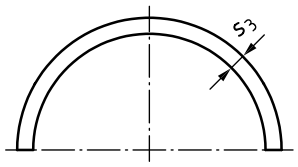


Figure 1 — Wall thickness, s_3, of a half bearing

3.2
measuring point
agreed point established to facilitate agreement on checking

Note 1 to entry: The establishment of measuring points (lines) does not preclude the need to comply with dimensional specifications in other areas.

3.3
measuring line
agreed line established to facilitate agreement on checking

Note 1 to entry: The establishment of measuring lines does not preclude the need to comply with dimensional specifications in other areas.

3.4
tolerance
range between the upper specified limit and the lower specified limit

3.5
flange thickness
axial distance between the opposing measuring points at the inside and the outside surface of flange

4 Symbols and units

For the purposes of this document, the symbols and units are those given in Table 1.

Table 1 — Symbols and units

Symbol	Description	Unit
a_{ch}	distance to measuring position	mm
a_9	minimum height of transition	mm
$a_{ch,fl}$	radial distance to measuring position from flange outside edge	mm
B	width	mm
B_{fl}	flange width	mm
C_i	inner chamfer width	mm
D_0	nominal outside diameter	mm
e_B	eccentricity of bore centre to outside diameter centre	mm
F_{pin}	measuring pin load	N
H	distance to measuring position from bearing parting line	mm
s_a	wall thickness at angle α	mm
s_{fl}	flange thickness	mm
s_3	wall thickness at crown	mm
u	wall thickness reduction at angle α_2	mm
x_1	centre point of nominal outside diameter	—
x_2	centre point of eccentric bore	—
α	angle to measuring position	°
α_2	angle to measuring position from parting line	°
M1, M2	measuring line	—

5 Purpose of checking

In order to ensure the required bearing clearance, and consequently, the operational efficiency of the plain bearing unit, keep to the wall thickness tolerances specified in ISO 3548-1.

6 Checking methods

6.1 Measuring principle of wall thickness

The gauging axis of the measuring device shall be in the radial direction and perpendicular to the outside surface of the test piece in order to find the minimum value of the wall thickness. The measured values may be recorded by a single measurement or by sum measurement, which are symbolically represented in Figure 2.

a) Single wall thickness measurement by contact (mechanical/electronic gauge)

b) Sum wall thickness measurement by contact/non-contact (electronic/pneumatic gauge)

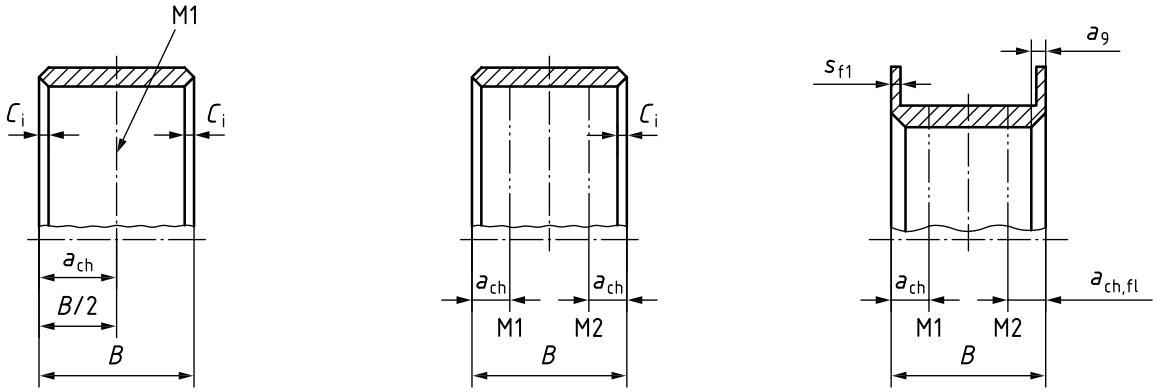
Figure 2 — Methods for recording the measured value

The presence of lubricating holes, oil pockets, oil grooves, markings or special chamfers may require deviation from the measuring lines and measuring points specified in the following and shall be agreed between the customer and the supplier.

Any wall thickness not conforming to the specified values due to the manufacturing process, because of deformation of the bearing backing in the area of marking or at non-load bearing places, shall be agreed between the customer and the supplier.

6.2 Line measurement around the circumference

Measurement of the wall thickness around the circumference shall be carried out at the measuring lines specified in Figure 3 and Tables 2 and 3.



a) Thin wall bearing without flange, B < 15 mm

b) Thin wall bearing without flange $B \geq 15$ mm

c) Thin wall bearing with flanges

Key

C_i inner chamfer width

a_{ch} distance to measuring position

$a_{ch,fl}$ distance to measuring position for thin wall bearings with flanges

M1,M2measuring line

Figure 3 — Position of measuring lines

Table 2 — Thin-walled half bearings without flange — Distance to measuring position, a_{ch}

Width B	**Distance to measuring position** a_{ch}	**Number of measuring lines** M1, M2
$B \leq 15$	$B/2 - C_i$	1
$15 < B \leq 50$	4	2
$B > 50$	6	2

Table 3 — Thin-walled half bearings with flange — Distance to measuring position, a_{ch}

Width B	**Distance to measuring position** a_{ch}	**Number of measuring lines** M1, M2
$B < 15$	$B/2$	1
$15 \leq B \leq 50$	$C_{i} + s_{fl} + a_9 + 4$ mm	2[a]
$50 < B \leq 90$	$C_{i} + s_{fl} + a_9 + 4$ mm	2[a]
$B > 90$	$C_{i} + s_{fl} + a_9 + 8$ mm	2[b]

[a] Only valid for: $C_i + S_{fl} + a_9 + 4$ mm $\leq B/2–2$ mm, otherwise only one measuring line shall be used.

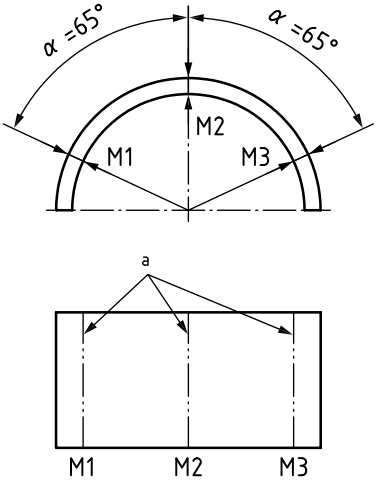
[b] Only valid for: $C_i + S_{fl} + a_9 + 8$ mm $\leq B/2–2$ mm, otherwise only one measuring line shall be used

6.3 Line measurement in axial direction

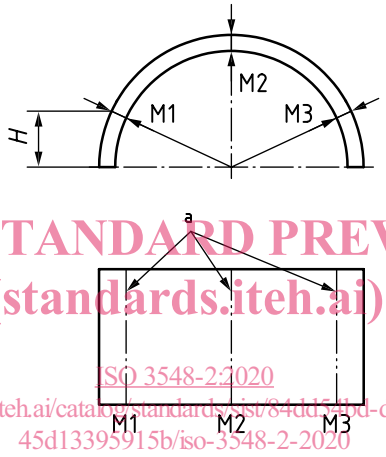
Measurement of the wall thickness in axial direction shall be carried out by using the definition of measuring lines specified in Figure 4 a) (Method A) or by using the definition of measuring lines specified in Figure 4 b) and Table 3 (Method B).

For Method B, the distance to the measuring position H shall not result into measurement within the crush relief area.

The position of the measuring lines for bearings with a nominal outside diameter greater than 150 mm is subject to agreement between the manufacturer and the customer.



a) Position of measuring lines — Method A



b) Position of measuring lines — Method B

[a] Measuring lines, M.

Figure 4 — Position of measuring lines

Table 4 — Distance to measuring position

Nominal outside diameter D_0	Distance to measuring position H
$25 < D_0 \leq 40$	$6 < H \leq 8$
$40 < D_0 \leq 90$	$9 < H \leq 13$
$90 < D_0 \leq 120$	$H = 13$
$120 < D_0 \leq 150$	$H = 20$

6.4 Point measurement

Point-by-point measurement of wall thickness shall be carried out by using the definition of measuring points specified in Figure 5 or Figure 6 a) (Method A) or Figure 6 b) and Table 3 (Method B) for widths less than or equal to 90 mm. In the case where B is greater than 90 mm, the selection of the measurement method (Method A or Method B) shall be subject to agreement between the manufacturer and the customer. The measuring position distance, a_{ch}, shall be taken from Table 2.