
**Rolling bearings — Accessories for
sleeve type linear ball bearings —**

**Part 1:
Boundary dimensions, geometrical
product specifications (GPS) and
tolerances for series 1 and 3**

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Roulements — Accessoires pour douilles à billes linéaires —

*Partie 1: Dimensions d'encombrement, spécification géométrique des
produits (GPS) et tolérances pour les séries 1 et 3*

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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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 4, *Rolling bearings*, Subcommittee SC 11, *Linear motion rolling bearings*.

This second edition cancels and replaces the first edition (ISO 13012-1:2009), which has been technically revised. The main changes compared to the previous edition are as follows:

- Change of title;
- Change of scope;
- Update of normative references;
- Revision of terms, definitions, symbols and dimensional tolerance indications in figures and tables according to rules of geometrical product specification (GPS) system;
- Deletion of F_w 35 and L_1 ;
- Inclusion of [Tables 2, 4, 6, 8, 10, 12, 14, 16, 18](#);
- Inclusion of a bibliography.

A list of all the parts in the ISO 13012 series can be found on the ISO website.

This document was developed to be used in conjunction with ISO 10285.

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.

Introduction

This document is a machine element geometry standard as defined in the geometrical product specification system (GPS system) as presented in matrix model of ISO 14638^[5].

The fundamental rules of ISO/GPS given in ISO 8015^[2] apply to this document and the default decision rules given in ISO 14253-1^[3] apply to specifications made in accordance with this document, unless otherwise indicated.

The connection between functional requirements, measuring technique and measuring uncertainty is always intended to be considered. For measurement uncertainty, it is intended that ISO 14253-2^[4] be considered.

The use of sleeve type linear ball bearings can be facilitated by the selection of bearing housings, shafts, shaft support blocks and shaft support rails. These items, referred to as accessories, can aid in the application of the sleeve type linear ball bearings to achieve the desired criteria of smooth, accurate and low friction linear motion free from chatter or stick-slip.

The appropriate selection of bearing housing type, shaft and shaft support should be established between the manufacturer and the user.

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Rolling bearings — Accessories for sleeve type linear ball bearings —

Part 1:

Boundary dimensions, geometrical product specifications (GPS) and tolerances for series 1 and 3

1 Scope

This document specifies the boundary dimensions, other relevant dimensions and the corresponding tolerances of accessories for sleeve type linear ball bearings which are specified in ISO 10285.

This document applies to:

- the following housings:
 - closed and adjustable flangeless housings for series 1 sleeve type linear ball bearings,
 - closed and adjustable flanged housings for series 3 sleeve type linear ball bearings,
 - open flanged housings for series 3 sleeve type linear ball bearings,
 - closed and adjustable flangeless housings for series 3 sleeve type linear ball bearings,
 - open and open adjustable flangeless housings for series 3 sleeve type linear ball bearings;
- the following shaft support rails:
 - standard height shaft support rails for series 3 sleeve type linear ball bearings,
 - low height shaft support rails for series 3 sleeve type linear ball bearings;
- the following shaft support blocks:
 - flanged shaft support blocks for series 1 and 3 sleeve type linear ball bearings,
 - flangeless shaft support blocks for series 1 and 3 sleeve type linear ball bearings;
- solid and tubular shafts for series 1 and 3 sleeve type linear ball bearings.

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 1132-1, *Rolling bearings — Tolerances — Part 1: Terms and definitions*

ISO 5593, *Rolling bearings — Vocabulary*

ISO 10285, *Rolling bearings — Sleeve type linear ball bearings — Boundary dimensions and tolerances*

ISO 15241, *Rolling bearings — Symbols for physical quantities*

ISO 18203, *Steel — Determination of the thickness of surface-hardened layers*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1132-1, ISO 5593, ISO 10285, ISO 24393 and the following apply.

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

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

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

3.1 flangeless housing
<sleeve type linear ball bearing> bearing housing which has a face with bolt holes or threaded holes for attachment to a support surface nominally parallel to the bearing axis

3.2 flanged housing
<sleeve type linear ball bearing> bearing housing which has a mounting face with projecting lugs having bolt holes for attachment to a support surface nominally parallel to the bearing axis

3.3 closed housing
<sleeve type linear ball bearing> bearing housing in which the bearing seating is circumferentially continuous

3.4 adjustable housing
<sleeve type linear ball bearing> bearing housing with a longitudinal slit across its bearing seating which facilitates the mechanical adjustment of the bearing seating diameter

3.5 open housing
<sleeve type linear ball bearing> bearing housing with a longitudinal section removed to provide clearance over a *shaft* (3.9) and support rail unit

3.6 open adjustable housing
<sleeve type linear ball bearing> bearing housing which has the features of both *open* (3.5) and *adjustable* (3.4) sleeve type linear ball bearing housings

3.7 shaft support rail
longitudinal pedestal which provides continuous support to a *shaft* (3.9)

Note 1 to entry: Shaft support rails may be used with open sleeve type linear ball bearings.

3.8 shaft support block
block which provides support to a *shaft* (3.9)

Note 1 to entry: Shaft support blocks are normally used to support the shaft at its ends and can be used with closed sleeve type, adjustable sleeve type or open sleeve type linear ball bearings.

3.9 shaft
basically cylindrical rod along which a linear ball bearing traverses

4 Symbols

4.1 General

For the purposes of this document, the symbols given in ISO 15241 and the following apply.

The symbols (except those for tolerances) shown in [Figures 1](#) to [10](#) and the values given in [Tables 1](#) to [20](#) denote nominal dimensions, unless specified otherwise.

NOTE [Figures 1](#) to [10](#) are drawn schematically and do not necessarily show all design details.

Tolerance values associated to a characteristic are symbolized by t followed by the symbol of characteristic, for example, t_{p1} .

In this document, the ISO default specification operator for size is according to ISO 14405-1, i.e. the two-point size is valid.

4.2 Closed and adjustable flangeless housings for series 1 sleeve type linear ball bearings

See [Tables 1](#) and [2](#) and [Figure 1](#).

A	(overall) width
D_a	seating diameter
F_w	bore diameter of ball complement of sleeve type linear ball bearing (reference)
G	designation of a screw thread of attachment hole
H	distance from mounting face to centreline of seating diameter
H_1	(overall) height
J	centre distance between bolt holes (length)
L	length of housing
N	diameter of bolt hole
t_{p1}	position tolerance of bore in correlation to mounting surface
t_{p2}	position tolerance of threaded holes in correlation to mounting surface and mounting reference surface
t_{p3}	position tolerance of bore in correlation to mounting surface

4.3 Closed and adjustable flanged housings for series 3 sleeve type linear ball bearings

See [Tables 3](#) and [4](#) and [Figure 2](#).

A	(overall) width
A_1	width of seating
D_a	seating diameter
F_w	bore diameter of ball complement of sleeve type linear ball bearing (reference)
H	distance from mounting face to centreline of seating diameter

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H_1	height of flange
H_2	(overall) height
J	centre distance between bolt holes (length)
J_1	centre distance between bolt holes (width)
L	length of housing
N	diameter of bolt hole
t_{p1}	position tolerance of bore in correlation to mounting surface
t_{p2}	position tolerance of threaded holes in correlation to mounting surface and mounting reference surface
t_{p3}	position tolerance of bore in correlation to mounting surface

4.4 Open flanged housings for series 3 sleeve type linear ball bearings

See [Tables 5](#) and [6](#) and [Figure 3](#).

A	(overall) width
A_1	width of seating
D_a	seating diameter
E	width of sector opening (at diameter D_a)
F_w	bore diameter of ball complement of sleeve type linear ball bearing (reference)
H	distance from mounting face to centreline of seating diameter
H_1	height of flange
H_2	(overall) height
J	centre distance between bolt holes (length)
J_1	centre distance between bolt holes (width)
L	length of housing
N	diameter of bolt hole
t_{p1}	position tolerance of bore in correlation to mounting surface
t_{p2}	position tolerance of threaded holes in correlation to mounting surface and mounting reference surface
t_{p3}	position tolerance of bore in correlation to mounting surface
α	angle of sector opening

4.5 Closed and adjustable flangeless housings for series 3 sleeve type linear ball bearings

See [Tables 7](#) and [8](#) and [Figure 4](#).

<i>A</i>	(overall) width
<i>D_a</i>	seating diameter
<i>F_w</i>	bore diameter of ball complement of sleeve type linear ball bearing (reference)
<i>G</i>	designation of a screw thread of attachment hole
<i>H</i>	distance from mounting face to centreline of seating diameter
<i>H₁</i>	(overall) height
<i>J</i>	centre distance between bolt holes (length)
<i>J₁</i>	centre distance between bolt holes (width)
<i>L</i>	length of housing
<i>N</i>	diameter of bolt hole
<i>t_{p1}</i>	position tolerance of bore in correlation to mounting surface
<i>t_{p2}</i>	position tolerance of threaded holes in correlation to mounting surface and mounting reference surface
<i>t_{p3}</i>	position tolerance of bore in correlation to mounting surface

4.6 Open and open adjustable flangeless housings for series 3 sleeve type linear ball bearings

See [Tables 9](#) and [10](#) and [Figure 5](#). [ISO 13012-1:2018](https://standards.iteh.ai/catalog/standards/sist/e465ede9-fda5-4f42-a05a-c3d6fae52f5a/iso-13012-1-2018)
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<i>A</i>	(overall) width
<i>D_a</i>	seating diameter
<i>E</i>	width of sector opening (at diameter <i>D_a</i>)
<i>F_w</i>	bore diameter of ball complement of sleeve type linear ball bearing (reference)
<i>G</i>	designation of a screw thread of attachment hole
<i>H</i>	distance from mounting face to centreline of seating diameter
<i>H₁</i>	(overall) height
<i>J</i>	centre distance between bolt holes (length)
<i>J₁</i>	centre distance between bolt holes (width)
<i>L</i>	length of housing
<i>N</i>	diameter of bolt hole
<i>t_{p1}</i>	position tolerance of bore in correlation to mounting surface

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- t_{p2} position tolerance of threaded holes in correlation to mounting surface and mounting reference surface
- t_{p3} position tolerance of bore in correlation to mounting surface
- α angle of sector opening

4.7 Standard height shaft support rails for series 3 sleeve type linear ball bearings

See [Tables 11](#) and [12](#) and [Figure 6](#).

- A (overall) width
- d outside diameter of shaft (reference)
- H distance from mounting face to centreline of shaft
- H_1 height of flange
- J centre distance between bolt holes (length)
- J_1 centre distance between bolt holes (width)
- M width of shaft support
- N diameter of bolt hole
- N_1 diameter of bolt hole (shaft attachment)
- t_{p1} position tolerance of centreline of shaft in correlation to mounting surface
- t_{p2} position tolerance of centreline of shaft in correlation to mounting reference surface
- t_{p3} position tolerance of mounting holes in correlation to mounting surface and mounting reference surface

4.8 Low height shaft support rails for series 3 sleeve type linear ball bearings

See [Tables 13](#) and [14](#) and [Figure 7](#).

- A (overall) width
- d outside diameter of shaft (reference)
- H distance from mounting face to centreline of shaft
- H_1 height of flange
- H_2 distance from mounting face to top of attachment screw head
- J centre distance between bolt holes (length)
- J_1 centre distance between bolt holes (width)
- M width of shaft support
- N diameter of bolt hole
- N_1 diameter of bolt hole (shaft attachment)