INTERNATIONAL STANDARD

ISO 10285

Second edition
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Rolling bearings — Sleeve type linear ball bearings — Boundary dimensions and tolerances

Roulements — Roulements linéaires à recirculation de billes, type manchon — Dimensions d'encombrement et tolérances

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 10285 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 10285:1992), which has been technically revised.

Introduction

Linear motion rolling bearings provide for linear motion as opposed to rotational motion. The sleeve type linear ball bearing described in this International Standard uses balls which circulate in a number of closed loops in the cylindrical bearing that surrounds the shaft.

Linear ball bearings are typically applied to meet one or more of the following criteria:

a) smooth low-friction motion, free from stick-slip or chatter;

b) low force required to produce relative linear motion between the bearing and the shaft.

These requirements, as well as others, can be met by appropriate use of the various linear motion rolling bearing types (closed sleeve type, adjustable sleeve type and open sleeve type). The appropriate selection of bearing type and specification is to be established between the manufacturer and the user.

Rolling bearings — Sleeve type linear ball bearings — Boundary dimensions and tolerances

1 Scope

This International Standard specifies the boundary dimensions, tolerances and definitions for sleeve type linear motion ball bearings.

It is applicable to the size ranges covered by Table 1.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the reference document (including any amendments) applies.

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

ISO 5593, *Rolling bearings — Vocabulary*

ISO 13012, *Rolling bearings — Linear motion, recirculating ball, sleeve type — Accessories*

ISO 15241, *Rolling bearings — Symbols for quantities*

3 Terms and definitions

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

3.1
sleeve type linear ball bearing
linear motion ball bearing incorporating an outer sleeve with a number of closed loops of recirculating balls, which is designed to achieve unlimited linear motion along a shaft

3.2
shaft
basically cylindrical rod along which a linear ball bearing traverses

3.3
nominal bore diameter of ball complement
diameter of the theoretical cylinder inscribed inside all of the balls

3.4
nominal outer sleeve width
distance between two theoretical end faces designated to bound the width of the linear ball bearing

3.5
radial runout
difference between the largest and the smallest of the radial distances between the outside surface of the cylindrical outer sleeve and the centreline of the bore diameter of ball complement

3.6
closed sleeve type linear ball bearing
sleeve type linear ball bearing in which the outer sleeve is continuous or virtually continuous, whereby adjustment of clearance between the bore diameter of ball complement and a shaft is achieved, in most cases, by selection of the housing fit, a shaft diameter and the bore diameter of ball complement of the bearing

3.7
adjustable sleeve type linear ball bearing
sleeve type linear ball bearing which has elastic features which permit mechanical adjustment of the clearance between the bore diameter of ball complement and a shaft

3.8
open sleeve type linear ball bearing
sleeve type linear ball bearing in which a longitudinal section is removed to provide clearance over a shaft and shaft support rail unit

4 Symbols

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

The symbols (except those for tolerances) shown in Figures 1 and 2 and the values given in Tables 1 to 9 denote nominal dimensions, unless specified otherwise.

b	snap ring groove width
C	outer sleeve width
C_s	single outer sleeve width
C_1	distance between outer faces of outer sleeve snap ring grooves
C_{1s}	single distance between outer faces of outer sleeve snap ring grooves
D	bearing outside diameter
D_1	snap ring groove diameter
d	outside diameter of shaft
E	width of sector opening at diameter F_w of open sleeve type bearing
F_w	bore diameter of ball complement
F_{ws}	single bore diameter of ball complement
$F_{ws\ min}$	smallest single bore diameter of ball complement [1)]
K_{ea}	radial runout of assembled bearing
α	angle of sector opening (included angle) of open sleeve type bearing

1) The smallest single bore diameter of ball complement is the diameter of the cylinder which, when placed in the ball complement bore, results in zero radial clearance in at least one radial direction.

Δ_{Cs} deviation of a single outer sleeve width

Δ_{C1s} deviation of a single distance between outer faces of outer sleeve snap ring grooves

Δ_{Dmp} deviation of mean bearing outside diameter in a single plane

5 Boundary dimensions

Boundary dimensions for dimension series 1, 3 and 5 are given in Table 1.

6 Tolerances

6.1 Classes

The degrees of precision to which linear ball bearings are manufactured are defined as tolerance classes L9, L7, L7A, L6, L6A, L6J and L6JA. The tolerance values are tabulated in Tables 2 to 8. For an overview of the basis for the tolerance values, see Annex A.

Tables 2 to 8 have been established on the basis of listing all the linear ball bearing tolerances for a given nominal bore diameter of ball complement (F_w).

6.2 Applicability

— Tolerance class L9 shall be applicable to series 1, closed and adjustable sleeve type bearings.

— Tolerance classes L7 and L6 shall be applicable to series 1 and 3, closed sleeve type bearings.

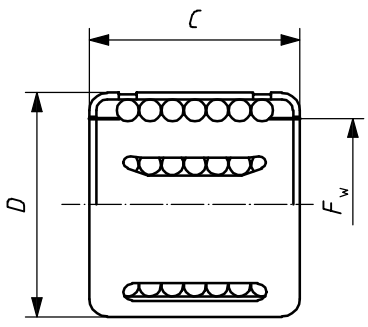
— Tolerance classes L7A and L6A shall be applicable to series 3, open and adjustable sleeve type bearings.

— Tolerance class L6J shall be applicable to series 5, closed sleeve type bearings.

— Tolerance class L6JA shall be applicable to series 5, open and adjustable sleeve type bearings.

6.3 Shaft tolerances

For the proper functioning and performance of sleeve type linear ball bearings, it is essential that they are matched with shafts having dimensional and geometrical tolerances that are matched to the size and series of the sleeve type linear ball bearing being used. Full details for the shafts suitable for use with the sleeve type linear ball bearings in this International Standard are specified in ISO 13012.



NOTE The figure shows an example of the design.

Figure 1 — Bearing without snap ring grooves (for series 1)