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Rolling bearings — Needle roller bearings with machined rings — Boundary dimensions, geometrical product specifications (GPS) and tolerance values

Roulements — Roulements à aiguilles avec bagues usinées — Dimensions d'encombrement, spécification géométrique des produits et valeurs de tolérance

Contents

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~~www.iso.org/directives).~~).

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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~~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~~) see the following URL: www.iso.org/iso/foreword.html.~~

This document was prepared by Technical Committee ISO/TC 4, *Rolling bearings*, Subcommittee SC 5, *Needle, cylindrical and spherical roller bearings*.

This fifth edition cancels and replaces the fourth edition (ISO 1206:2018), which has been technically revised.

The main changes ~~compared to the previous edition~~ are as follows:

— Figure 1 and Figure 2 have been updated;

— ~~The~~ the symbol for characteristic ΔFws has been replaced with ΔFwgn;

— Annex C on measuring and verification methods has been added.

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 (GPS) system as presented in the matrix model of ISO 14638.

The fundamental rules of ISO/GPS given in ISO 8015 apply to this document and the default decision rules given in ISO 14253-1 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 be considered.

Recommended values for the tolerances for shaft raceways for needle roller bearings without inner ring are given in Annex A.

Guidelines for measurement and verification of the specific characteristic of needle roller bearings with machined rings are given in Annex C.

Rolling bearings — Needle roller bearings with machined rings — Boundary dimensions, geometrical product specifications (GPS) and tolerance values

1 Scope

This document specifies the boundary dimensions and normal class tolerance values for needle roller bearings with machined rings.

This document specifies dimensional and geometrical characteristics, and limit deviations from nominal sizes.

These specifications apply to complete needle roller bearings and to bearings without inner ring.

~~Recommended values for the tolerances for shaft raceways for needle roller bearings without inner ring are given in Annex A.~~

~~Guidelines for measurement and verification of the specific characteristic of needle roller bearings with machined rings are given in Annex C~~

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 1101, *Geometrical product specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

ISO 5593, *Rolling bearings — Vocabulary*

ISO 14405-1, *Geometrical product specifications (GPS) — Dimensional tolerancing — Part 1: Linear sizes*

ISO/TS 17863, *Geometrical product specification (GPS) — Tolerancing of moveable assemblies*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1101, ISO 5593, ISO 14405-1, and ISO/TS 17863 apply.

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

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

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

4 Symbols

Descriptions for symbols are in accordance with GPS terminology; relationships with traditional terms are described in Annex B, Table B.1. The dimensional and geometrical specifications are described in Table 1.

Tolerance value associated to a characteristic is symbolized by *t*, followed by the symbol of characteristic, for example, $t_{\Delta Cs}$.

In this document, the ISO default specification operator for size is in accordance with ISO 14405-1; i.e. the two-point size is valid.

Table 1 — Symbols for nominal sizes, characteristics and specification modifiers

Symbol for nominal size[a]	Symbol for characteristic	GPS symbol and specification modifier[b,c]	Description[d]
B			nominal inner ring width
	VBs	(LP) (SR) LP SR	range of two-point sizes of inner ring width
	ΔBs	(LP) LP	deviation of a two-point size of inner ring width from its nominal size
C			nominal outer ring width
	VCs	(LP) (SR) LP SR	range of two-point sizes of outer ring width
	ΔCs	(LP) LP	deviation of a two-point size of outer ring width from its nominal size
d			nominal bore diameter
	Vdmp	(LP) (SD) ACS (SR) LP SD ACS SR	range of mid-range sizes (out of two-point sizes) of bore diameter in any cross-section of a cylindrical bore
	Δdmp	(LP) (SD) ACS LP SD ACS	deviation of a mid-range size (out of two-point sizes) of bore diameter in any cross-section from its nominal size
D			nominal outside diameter
	VDmp	(LP) (SD) ACS (SR) LP SD ACS SR	range of mid-range sizes (out of two-point sizes) of outside diameter in any cross-section

	ΔDmp	Ⓛ Ⓢ ACS Ⓛ Ⓢ ACS		deviation of a mid-range size (out of two-point sizes) of outside diameter in any cross-section from its nominal size
F_w				nominal bore diameter of needle roller complement
	ΔFwgn	Ⓖ Ⓢ Ⓖ Ⓢ [f]	[f]	deviation of the smallest maximum inscribed cylinder size of bore diameter of needle roller complement from its nominal size
	Kea	Ⓛ Ⓡ SCS ⊥ A [e] Ⓛ Ⓡ SCS ⊥ A	[e]	range of two-point sizes of section height between inner ring bore surface and outer ring outside surface of assembled needle roller set and fixed inner ring in a specific cross section perpendicular to datum, i.e. axis, established from the inner ring bore surface
	Kia	Ⓛ Ⓡ SCS ⊥ B [e] Ⓛ Ⓡ SCS ⊥ B	[e]	range of two-point sizes of section height between outer ring outside surface and inner ring bore surface of assembled needle roller bearing, obtained from a specific cross section of turning inner ring and needle roller set and fixed outer ring perpendicular to datum, i.e. axis, established from the outer ring outside surface
r				nominal chamfer dimension
	r_s			single chamfer dimension

[a] Symbols as defined in ISO 15241 except for the format used.

[b] Symbols as defined in ISO 1101 and ISO 14405-1.

[c] Specification modifier Ⓛ Ⓛ is not indicated on a drawing if the two-point size is applied for both specified limits.

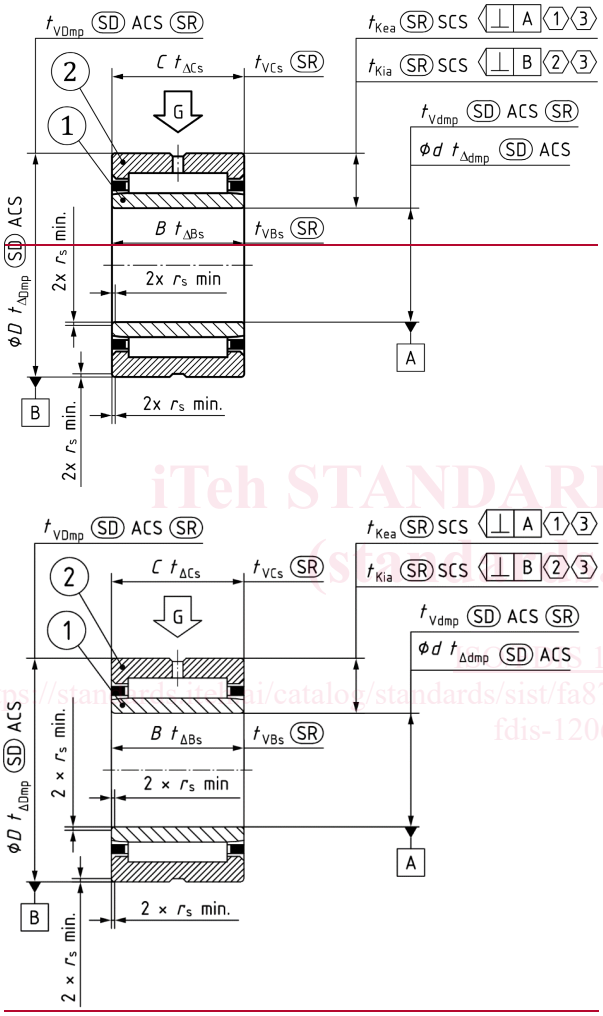
[d] Description based on ISO 1101, ISO 5459 and ISO 14405-1.

[e] Symbols for direction of gravity, G, fixed parts, FP and movable parts, MP, in accordance with ISO/TS 17863 and specific flagnotes (see Figures 1 and 2).

[f] Considering the influence of rotation of needle roller complement.

Figures 1 and 2 show GPS specifications for needle roller bearings with and without inner ring, respectively.

These principles shall be applied for all types of needle roller bearings (e.g. with or without cage, with one row or two rows of needle rollers and with or without lubrication groove and lubrication holes in the outer ring).



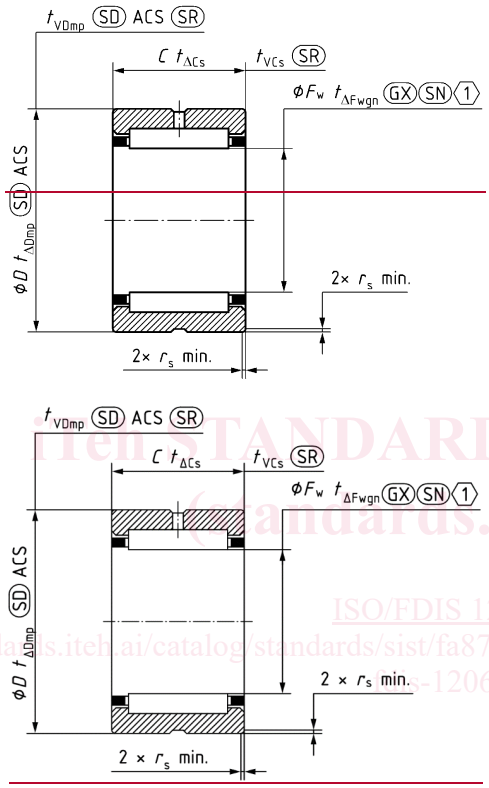
Key

1 (1) FP ① – MP ②, G

2 (2) FP ② – MP ①, G

~~The rolling elements~~ 3 ~~shall be in correct functional contact with both the inner and outer ring raceways.~~

Figure 1 — GPS specifications for needle roller bearing with inner ring



Key

1 1 influence of the rotation of the needle roller complement

Figure 2 — GPS specifications for needle roller bearing without inner ring

5 Nominal boundary and chamfer dimensions

The dimension series described in Tables 2 to 5 are defined in ISO 15. Maximum chamfer dimensions are in accordance with ISO 582.

Special series dimension are given in Table 6 for needle roller bearings with inner ring and in Table 7 for needle roller bearings without inner ring.

Table 2 — Dimension series 48