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Rolling bearings — Thrust needle roller and cage assemblies, thrust washers — Boundary dimensions, geometrical product specifications (GPS) and tolerance values

Roulements — Cages à aiguilles axiales et rondelles de butée — Dimensions d'encombrement, spécification géométrique des produits (GPS) et valeurs de tolérance

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Contents

Page

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).

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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 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 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 fourth edition cancels and replaces the third edition (ISO 3031:2000), which has been technically revised. The main change compared to the previous edition is the implementation of geometrical product specifications (GPS).

Introduction

This document is a machine element geometry standard as defined in the geometrical product specification system (GPS system) presented in the matrix model of ISO 14638[8].

The fundamental rules of ISO/GPS given in ISO 8015[5] apply to this document and the default decision rules given in ISO 14253-1[6] 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. The traditionally used measuring technique is described in ISO 1132-2[3]. For measurement uncertainty, it is intended that ISO 14253-2[7] should be considered.

Rolling bearings — Thrust needle roller and cage assemblies, thrust washers — Boundary dimensions, geometrical product specifications (GPS) and tolerance values

1 Scope

This document specifies the boundary dimensions and tolerances for thrust needle roller and cage assemblies. Furthermore, it recommends dimensions and tolerances for thrust washers, i.e. raceway members, which can be used either as shaft or housing washers.

Annex A gives general characteristics for application of thrust needle roller and cage assemblies and thrust washers.

Gauging method for thrust needle roller and cage assembly and thrust washer is given in Annex B.

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 5593, *Rolling bearings — Vocabulary*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5593 and ISO 14405-1 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/

4 Symbols

To express that the ISO/GPS system, ISO 8015[5], is applied, the dimensional and geometrical characteristics shall be included in the technical product documentation (for example, on the drawing).

The dimensional and geometrical specifications, associated to these characteristics are described in Table 1, Figure 1 and Figure 2.

Descriptions for symbols are in accordance with GPS terminology.

A tolerance value associated to a characteristic is symbolised by t followed by the symbol for the characteristic, in subscript, for example $t_{\Delta ds}$.

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

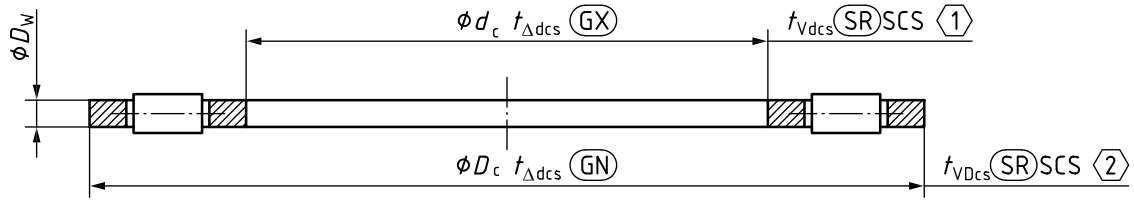
Symbol for nominal size[a]	Symbol for character-is-tic[a]	GPS symbol and specifica-tion modifier[bc]	Description[d]
d			nominal bore diameter of thrust washer
	Δds	GX	deviation of a maximum inscribed size of bore diam-eter of thrust washer from its nominal size
	Vds	LP SR SCS	range of two-point sizes of bore diameter of thrust washer in a specific cross section
d_c			nominal bore diameter of cage
	Δdcs	GX	deviation of a maximum inscribed size of bore di-ameter of cage from its nominal size
	Vdcs	LP SR SCS	range of two-point sizes of bore diameter of cage in a specific cross section
D			nominal outside diameter of thrust washer
	ΔDs	GN	deviation of a minimum circumscribed size of outside diameter of thrust washer from its nominal size
	VDs	LP SR SCS	range of two-point sizes of outside diameter of thrust washer in a specific cross section
D_c			nominal outside diameter of cage
	ΔDcs	GN	deviation of a minimum circumscribed size of outside diameter of cage from its nominal size
	VDcs	LP SR SCS	range of two-point sizes of outside diameter of cage in a specific cross section
D_w			nominal diameter of needle roller
s			nominal thickness of thrust washer
	Δs	LP	deviation of a two-point size of thickness of thrust washer from its nominal size

[a] Symbol as defined in ISO 15241[9] except for the format used.

[b] Symbol as defined in ISO 14405-1.

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

[d] Definition based on ISO 14405-1.

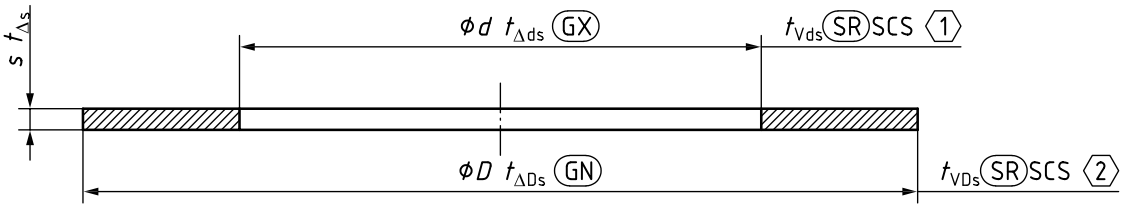


Key

1 = the specific cross section with the smallest bore diameter of the cage

2 = the specific cross section with the largest outside diameter of the cage

Figure 1 — Thrust needle roller and cage assembly



Key

1 = the specific cross section with the smallest bore diameter of the washer

2 = the specific cross section with the largest outside diameter of the washer

Figure 2 — Thrust washer

5 Thrust needle roller and cage assemblies

5.1 General

Dimensions and tolerance values for thrust needle roller and cage assemblies are given in Table 2.

In Table 2, the symbols U and L are used as follows:

U = upper limit deviation;

L = lower limit deviation.

5.2 Dimensions and tolerances

See Table 2.

Table 2 — Dimensions and tolerances of thrust needle roller and cage assemblies

d_c mm	$t_{\Delta dcs}$ µm		t_{Vdcs} µm	D_c mm	$t_{\Delta Dcs}$ µm		t_{VDcs} µm	D_w[a] mm
	U	L			U	L		
6	+95	+20	75	19	-110	-320	210	2
7	+115	+25	90	20	-110	-320	210	2
8	+115	+25	90	21	-110	-320	210	2
9	+115	+25	90	22	-110	-320	210	2
10	+115	+25	90	24	-110	-320	210	2
12	+142	+32	110	26	-110	-320	210	2
14	+142	+32	110	27	-110	-320	210	2
15	+142	+32	110	28	-110	-320	210	2
16	+142	+32	110	29	-110	-320	210	2
17	+142	+32	110	30	-110	-320	210	2
18	+142	+32	110	31	-120	-370	250	2
20	+170	+40	130	35	-120	-370	250	2
22	+170	+40	130	37	-120	-370	250	2
25	+170	+40	130	42	-130	-380	250	2

[a] For needle roller diameter values and gauges, see ISO 3096[4].

Table 2 *(continued)*

d_c mm	$t_{\Delta dcs}$ µm		t_{Vdcs} µm	D_c mm	$t_{\Delta Dcs}$ µm		t_{VDcs} µm	D_w[a] mm
	U	L			U	L		
28	+170	+40	130	45	-130	-380	250	2
30	+170	+40	130	47	-130	-380	250	2
32	+210	+50	160	49	-130	-380	250	2
35	+210	+50	160	52	-140	-440	300	2
40	+210	+50	160	60	-140	-440	300	3
45	+210	+50	160	65	-140	-440	300	3
50	+210	+50	160	70	-150	-450	300	3
55	+250	+60	190	78	-150	-450	300	3
60	+250	+60	190	85	-170	-520	350	3
65	+250	+60	190	90	-170	-520	350	3
70	+250	+60	190	95	-170	-520	350	4
75	+250	+60	190	100	-170	-520	350	4
80	+250	+60	190	105	-180	-530	350	4
85	+292	+72	220	110	-180	-530	350	4
90	+292	+72	220	120	-180	-530	350	4
100	+292	+72	220	135	-200	-600	400	4
110	+292	+72	220	145	-210	-610	400	4
120	+292	+72	220	155	-210	-610	400	4
130	+335	+85	250	170	-230	-630	400	5
140	+335	+85	250	180	-230	-630	400	5
150	+335	+85	250	190	-240	-700	460	5
160	+335	+85	250	200	-240	-700	460	5

[a] For needle roller diameter values and gauges, see ISO 3096[4].

5.3 Tolerances for the needle roller

Tolerances and "gauges" of needle rollers shall be in accordance with ISO 3096.

6 Thrust washers

6.1 General

Dimensions and tolerance values for thrust washers are given in Table 3.

In Table 3, the symbols U and L are used as follows:

U = upper limit deviation;

L = lower limit deviation.

6.2 Dimensions and tolerances

See Table 3.