FINAL
DRAFT

INTERNATIONAL
STANDARD

**ISO/FDIS
3030**

ISO/TC **4**/SC **5**

Secretariat: **AFNOR**

Voting begins on:
2021-10-22

Voting terminates on:
2021-12-17

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

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

Reference number
ISO/FDIS 3030:2021(E)

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Published in Switzerland

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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 5, *Needle, cylindrical and spherical roller bearings*.

This fourth edition cancels and replaces the third edition (ISO 3030:2011), which has been technically revised.

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

— geometrical product specifications (GPS) have been implemented;

— an informative annex on functional gauging of radial needle roller and cage assembly 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 system (GPS system) presented in the matrix model of ISO 14638[9].

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[7] 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. For measurement uncertainty, ISO 14253-2[8] should be considered.

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

1 Scope

This document specifies the boundary dimensions for radial needle roller and cage assemblies.

In addition, it gives the tolerances for the cage width and method of functional gauging of bore diameter of needle roller complement.

Informative values for the tolerances of shaft raceway, housing raceway and raceway widths are given in Annex A.

Functional gauging of radial needle roller and cage assembly is given in Annex B.

2 Normative references

The following documents are referenced 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 3096, *Rolling bearings — Needle rollers — Boundary dimensions, geometrical product specifications (GPS) and tolerance values*

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 1132-1, 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 https://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 (e.g. on the drawing).

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

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, $t_{\Delta Bs}$.

In this document, the ISO default specification operator for size is in accordance with ISO 14405-1.

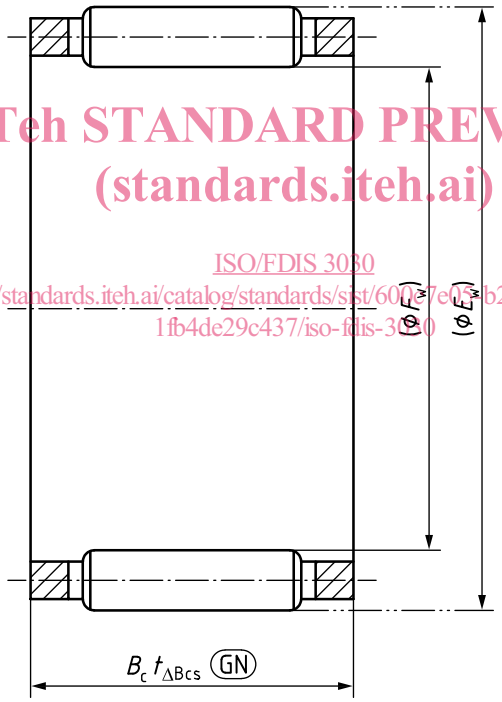
Table 1 — Symbols for nominal sizes, characteristics and specification modifiers

Symbol for nominal size[a]	Symbol for characteristic[a]	GPS symbol and specification modifier[b]	Description[c]
B_c			nominal cage width
	Δ_{Bc}	GN	deviation of minimum circumscribed size of cage width from its nominal size
E_w			nominal circumscribed diameter of needle roller complement
F_w			nominal inscribed diameter of needle roller complement

[a] Symbols as defined in ISO 15241[10] except for the format used.

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

[c] Description based on ISO 14405-1.



NOTE Radial needle roller and cage assemblies can also be with two rows of needle roller or split-type.

Figure 1 — Radial needle roller and cage assembly

5 Dimensions

The general plan of nominal boundary dimensions of needle roller and cage assemblies is given in Table 2 and Table 3.

Table 2 — Diameter series 1C and 2C

Dimensions in millimetres

F_w	Diameter series 1C								Diameter series 2C							
	E_w	Dimension series B_c							E_w	Dimension series B_c						
		11C	21C	31C	41C	51C	61C	71C		12C	22C	32C	42C	52C	62C	72C
4	7	6	8	10	—	—	—	—	—	—	—	—	—	—	—	—
5	8	6	8	10	13	—	—	—	9	8	10	13	—	—	—	—
6	9	6	8	10	13	15	—	—	10	8	10	13	15	—	—	—
7	10	6	8	10	13	15	17	—	11	8	10	13	15	17	—	—
8	11	6	8	10	13	15	17	—	12	8	10	13	15	17	20	—
9	12	6	8	10	13	15	17	—	13	8	10	13	15	17	20	—
10	13	6	8	10	13	15	17	—	14	8	10	13	15	17	20	—
12	15	6	8	10	13	15	17	—	16	8	10	13	15	17	20	—
14	18	8	10	13	15	17	20	23	19	10	13	15	17	20	23	27
15	19	8	10	13	15	17	20	23	20	10	13	15	17	20	23	27
16	20	8	10	13	15	17	20	23	21	10	13	15	17	20	23	27
17	21	8	10	13	15	17	20	23	22	10	13	15	17	20	23	27
18	22	8	10	13	15	17	20	23	23	10	13	15	17	20	23	27
20	24	8	10	13	15	17	20	23	25	10	13	15	17	20	23	27
22	26	8	10	13	15	17	20	23	27	10	13	15	17	20	23	27
25	29	8	10	13	15	17	20	23	30	10	13	15	17	20	23	27
28	33	10	13	15	17	20	23	27	34	12	15	17	20	25	30	35
30	35	10	13	15	17	20	23	27	36	12	15	17	20	25	30	35
32	37	10	13	15	17	20	23	27	38	12	15	17	20	25	30	35
35	40	10	13	15	17	20	23	27	41	12	15	17	20	25	30	35
38	43	10	13	15	17	20	23	27	44	12	15	17	20	25	30	35
40	45	10	13	15	17	20	23	27	46	12	15	17	20	25	30	35
42	47	10	13	15	17	20	23	27	48	12	15	17	20	25	30	35
45	50	10	13	15	17	20	23	27	51	12	15	17	20	25	30	35
50	55	10	13	15	17	20	23	27	56	12	15	17	20	25	30	35
55	61	12	15	17	20	25	30	35	62	16	20	25	30	35	40	—
60	66	12	15	17	20	25	30	35	67	16	20	25	30	35	40	—
65	71	12	15	17	20	25	30	35	72	16	20	25	30	35	40	—
70	76	12	15	17	20	25	30	35	77	16	20	25	30	35	40	—
75	81	12	15	17	20	25	30	35	82	16	20	25	30	35	40	—
80	86	12	15	17	20	25	30	35	87	16	20	25	30	35	40	—
85	92	16	20	25	30	35	40	—	93	20	25	30	35	40	45	—
90	97	16	20	25	30	35	40	—	98	20	25	30	35	40	45	—
95	102	16	20	25	30	35	40	—	103	20	25	30	35	40	45	—
100	107	16	20	25	30	35	40	—	108	20	25	30	35	40	45	—

Table 3 — Diameter series 3C, 4C and 5C

Dimensions in millimetres

F_w	Diameter series 3C							Diameter series 4C							Diameter series 5C				
	E_w	Dimension series B_c						E_w	Dimension series B_c						E_w	Dimension series B_c			
		13C	23C	33C	43C	53C	63C		14C	24C	34C	44C	54C	64C		15C	25C	35C	45C
6	11	10	13	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7	12	10	13	15	17	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8	13	10	13	15	17	20	—	14	12	15	17	20	—	—	—	—	—	—	—
9	14	10	13	15	17	20	—	15	12	15	17	20	—	—	—	—	—	—	—
10	15	10	13	15	17	20	—	16	12	15	17	20	—	—	17	16	20	25	—
12	17	10	13	15	17	20	23	18	12	15	17	20	—	—	19	16	20	25	—
14	20	12	15	17	20	25	30	21	16	20	25	30	35	—	22	20	25	30	—
15	21	12	15	17	20	25	30	22	16	20	25	30	35	—	23	20	25	30	—
16	22	12	15	17	20	25	30	23	16	20	25	30	35	—	24	20	25	30	35
17	23	12	15	17	20	25	30	24	16	20	25	30	35	—	25	20	25	30	35
18	24	12	15	17	20	25	30	25	16	20	25	30	35	40	26	20	25	30	35
20	26	12	15	17	20	25	30	27	16	20	25	30	35	40	28	20	25	30	35
22	28	12	15	17	20	25	30	29	16	20	25	30	35	40	30	20	25	30	35
25	31	12	15	17	20	25	30	32	16	20	25	30	35	40	33	20	25	30	35
28	35	16	20	25	30	35	40	36	20	25	30	35	40	45	38	25	30	35	40
30	37	16	20	25	30	35	40	38	20	25	30	35	40	45	40	25	30	35	40
32	39	16	20	25	30	35	40	40	20	25	30	35	40	45	42	25	30	35	40
35	42	16	20	25	30	35	40	43	20	25	30	35	40	45	45	25	30	35	40
38	45	16	20	25	30	35	40	46	20	25	30	35	40	45	48	25	30	35	40
40	47	16	20	25	30	35	40	48	20	25	30	35	40	45	50	25	30	35	40
42	49	16	20	25	30	35	40	50	20	25	30	35	40	45	52	25	30	35	40
45	52	16	20	25	30	35	40	53	20	25	30	35	40	45	55	25	30	35	40
50	57	16	20	25	30	35	40	58	20	25	30	35	40	45	60	25	30	35	40
55	63	20	25	30	35	40	45	65	25	30	35	40	45	50	70	35	40	45	50
60	68	20	25	30	35	40	45	70	25	30	35	40	45	50	75	35	40	45	50
65	73	20	25	30	35	40	45	75	25	30	35	40	45	50	80	35	40	45	50
70	78	20	25	30	35	40	45	80	25	30	35	40	45	50	85	35	40	45	50
75	83	20	25	30	35	40	45	85	25	30	35	40	45	50	90	35	40	45	50
80	88	20	25	30	35	40	45	90	25	30	35	40	45	50	95	35	40	45	50
85	95	25	30	35	40	45	50	100	35	40	45	50	60	—	105	45	50	60	70
90	100	25	30	35	40	45	50	105	35	40	45	50	60	—	110	45	50	60	70
95	105	25	30	35	40	45	50	110	35	40	45	50	60	—	115	45	50	60	70
100	110	25	30	35	40	45	50	115	35	40	45	50	60	—	120	45	50	60	70

6 Tolerances

6.1 Tolerances for the needle roller

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

The needle roller grade should be agreed between the customer and the supplier.

6.2 Tolerance for the cage width

The tolerance for cage width, B_c, is given in Table 4.