INTERNATIONAL STANDARD

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Rolling bearings — Thrust needle roller and cage assemblies, thrust washers — Boundary dimensions and tolerances

Roulements — Cages à aiguilles axiales et rondelles de butée — Dimensions d'encombrement et tolérances

Reference number
ISO 3031:2000(E)

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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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 3031 was prepared by Technical Committee ISO/TC 4, *Rolling bearings*, Subcommittee SC 5, *Needle roller bearings*.

This third edition cancels and replaces the second edition (ISO 3031:1979), which has been technically revised, in particular with the addition of the specification for checking and checking gauge dimensions.

Rolling bearings — Thrust needle roller and cage assemblies, thrust washers — Boundary dimensions and tolerances

1 Scope

This International Standard 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.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 286-2:1988, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts.*

ISO 1132-1:2000, *Rolling bearings — Tolerances — Part 1: Terms and definitions.*

ISO 3096:1996, *Rolling bearings — Needle rollers — Dimensions and tolerances.*

ISO 5593:1997, *Rolling bearings — Vocabulary.*

ISO 15241—[1)], *Rolling bearings — Symbols for quantities.*

3 Terms and definitions

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

1) To be published.

4 Thrust needle roller and cage assemblies

4.1 Symbols

For the purpose of this International Standard, the symbols given in ISO 15241 apply.

The symbols (except those for tolerances) shown in Figure 1 and the values given in Table 1 denote nominal dimensions unless specified otherwise.

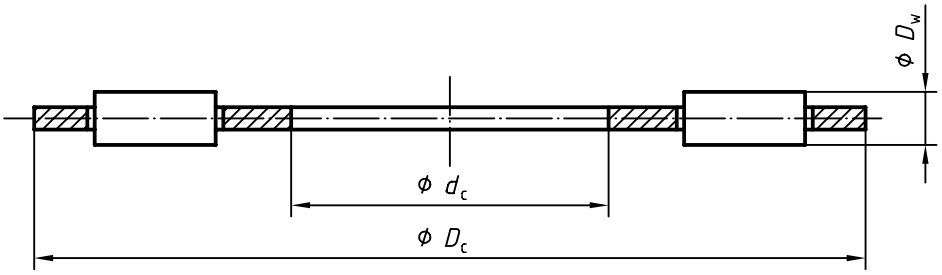

Figure 1 — Thrust needle roller and cage assembly

D_c outside diameter of cage

$D_{cs\ max}$ largest single outside diameter of cage

V_{Dcs} variation of outside diameter of cage

d_c bore diameter of cage

$d_{cs\ min}$ smallest bore diameter of cage

V_{dcs} variation of bore diameter of cage

D_w diameter of needle roller

4.2 Dimensions and tolerances

Dimensions and tolerances of thrust needle roller and cage assemblies are given in Table1.

Table 1 — Dimensions and tolerances of thrust needle roller and cage assemblies

Dimensions in millimetres, tolerances in micrometres

d_c	Tolerances for $d_{cs\ min}$ [a]		V_{dcs} max.	D_c	Tolerances for $D_{cs\ max}$ [b]		V_{Dcs} max.	D_w [c]
	high	low			high	low		
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
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] The values in this table give the limits of the difference between $d_{cs\ min}$ and d_c.

[b] The values in this table give the limits of the difference between $D_{cs\ max}$ and D_c.

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

4.3 Checking and checking gauge dimensions

Bore diameter and outside diameter of a free thrust needle roller and cage assembly may be gauged with GO and NOT GO gauges.

For bore diameter d_c the GO plug gauge size is equal to the low limit of $d_{cs\ min}$, the NOT GO plug gauge size is equal to the high limit of $d_{cs\ min}$.

For outside diameter D_c the GO ring gauge size is equal to the high limit of $D_{cs\ max}$, the NOT GO ring gauge size is equal to the low limit of $D_{cs\ max}$.

NOTE 1 While plug gauges and ring gauges are effective tools for checking dimensions of thrust needle roller and cage assemblies, other suitable gauging or measuring practices may be employed.

NOTE 2 Needle roller grade should be agreed between customer and supplier.

5 Thrust washers

5.1 Symbols

For the purpose of this International Standard, the symbols given in ISO 15241 apply.

The symbols (except those for tolerances) shown in Figure 2 and the values given in Table 2 denote nominal dimensions unless specified otherwise.

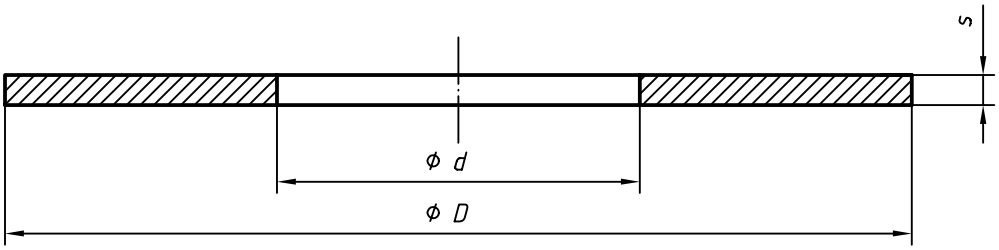

Figure 2 — Thrust washer

D outside diameter of thrust washer

$D_{s\ max}$ largest single outside diameter of thrust washer

V_{Ds} variation of outside diameter of thrust washer

d bore diameter of thrust washer

$d_{s\ min}$ smallest single bore diameter of thrust washer

V_{ds} variation of bore diameter of thrust washer

s thickness of thrust washer

5.2 Dimensions and tolerances

Dimensions and tolerances of thrust washers are given in Table 2.

Table 2 — Dimensions and tolerances of thrust washers

Dimensions in millimetres, tolerances in micrometres

d	Tolerances for $d_{s\,min}$ [a]		V_{ds} max.	D	Tolerances for $D_{s\,max}$ [b]		V_{Ds} max.	s [c]	
	high	low			high	low		series a	series b
6	+ 140	+ 20	120	19	– 40	– 370	330	0,8	1
7	+ 175	+ 25	150	20	– 40	– 370	330	0,8	1
8	+ 175	+ 25	150	21	– 40	– 370	330	0,8	1
9	+ 175	+ 25	150	22	– 40	– 370	330	0,8	1
10	+ 175	+ 25	150	24	– 40	– 370	330	0,8	1
12	+ 212	+ 32	180	26	– 40	– 370	330	0,8	1
14	+ 212	+ 32	180	27	– 40	– 370	330	0,8	1
15	+ 212	+ 32	180	28	– 40	– 370	330	0,8	1
16	+ 212	+ 32	180	29	– 40	– 370	330	0,8	1
17	+ 212	+ 32	180	30	– 40	– 370	330	0,8	1
18	+ 212	+ 32	180	31	– 50	– 440	390	0,8	1
20	+ 250	+ 40	210	35	– 50	– 440	390	0,8	1
22	+ 250	+ 40	210	37	– 50	– 440	390	0,8	1
25	+ 250	+ 40	210	42	– 50	– 440	390	0,8	1
28	+ 250	+ 40	210	45	– 50	– 440	390	0,8	1
30	+ 250	+ 40	210	47	– 50	– 440	390	0,8	1
32	+ 300	+ 50	250	49	– 50	– 440	390	0,8	1
35	+ 300	+ 50	250	52	– 60	– 520	460	0,8	1
40	+ 300	+ 50	250	60	– 60	– 520	460	0,8	1
45	+ 300	+ 50	250	65	– 60	– 520	460	0,8	1
50	+ 300	+ 50	250	70	– 60	– 520	460	0,8	1
55	+ 360	+ 60	300	78	– 60	– 520	460	0,8	1
60	+ 360	+ 60	300	85	– 72	– 612	540	0,8	1
65	+ 360	+ 60	300	90	– 72	– 612	540	0,8	1
70	+ 360	+ 60	300	95	– 72	– 612	540	0,8	1
75	+ 360	+ 60	300	100	– 72	– 612	540	0,8	1
80	+ 360	+ 60	300	105	– 72	– 612	540	0,8	1
85	+ 422	+ 72	350	110	– 72	– 612	540	0,8	1
90	+ 422	+ 72	350	120	– 72	– 612	540	0,8	1
100	+ 422	+72	350	135	– 85	– 715	630	—	1
110	+ 422	+ 72	350	145	– 85	– 715	630	—	1
120	+ 422	+ 72	350	155	– 85	– 715	630	—	1
130	+ 485	+ 85	400	170	– 85	– 715	630	—	1
140	+ 485	+ 85	400	180	– 85	– 715	630	—	1
150	+ 485	+ 85	400	190	– 100	– 820	720	—	1
160	+ 485	+ 85	400	200	– 100	– 820	720	—	1

[a] The values in the table give the limits of the difference between $d_{s\,min}$ and d.

[b] The values in the table give the limits of the difference between $D_{s\,max}$ and D.

[c] Tolerance according to tolerance class js12 in ISO 286-2

5.3 Checking and checking gauge dimensions

Bore diameter and outside diameter of a free thrust washer may be gauged with GO and NOT GO gauges.

For bore diameter d the GO plug gauge size is equal to the low limit of $d_{s\ min}$, the NOT GO plug gauge size is equal to the high limit of $d_{s\ min}$.

For outside diameter D the GO ring gauge size is equal to the high limit of $D_{s\ max}$, the NOT GO ring gauge size is equal to the low limit of $D_{s\ max}$.

NOTE While plug gauges and ring gauges are effective tools for checking dimensions of thrust washers, other suitable gauging or measuring practices may be used.

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