

INTERNATIONAL STANDARD

**ISO
199**

Third edition
2005-10-01

Rolling bearings — Thrust bearings — Tolerances

Roulements — Butées — Tolérances

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Reference number
ISO 199:2005(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.

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 199 was prepared by Technical Committee ISO/TC 4, *Rolling bearings*, Subcommittee SC 4, *Tolerances*.

This third edition cancels and replaces the second edition (ISO 199:1997), which has been technically revised.

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Rolling bearings — Thrust bearings — Tolerances

1 Scope

This International Standard specifies tolerances for boundary dimensions (except chamfer dimensions) and for the running accuracy of thrust rolling bearings with flat back faces, as specified in ISO 104.

This International Standard is not applicable to certain thrust bearings, e.g. thrust needle roller bearings, or for particular fields of application, e.g. special thrust precision bearings.

Chamfer dimension limits are given in ISO 582.

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 referenced document (including any amendments) applies.

ISO 104, *Rolling bearings — Thrust bearings — Boundary dimensions, general plan*

ISO 582, *Rolling bearings — Chamfer dimensions — Maximum values*

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

ISO 1132-2, *Rolling bearings — Tolerances — Part 2: Measuring and gauging principles and methods*

ISO 5593, *Rolling bearings — Vocabulary*

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 and ISO 5593 apply.

4 Symbols

For the purposes of this document, 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 8, denote nominal dimensions unless specified otherwise.

D	outside diameter of housing washer
d	bore diameter of shaft washer, single-direction bearing
d_2	bore diameter of central washer, double-direction bearing

S_e variation in thickness between housing washer raceway and back face

NOTE Applies only to thrust ball bearings and thrust cylindrical roller bearings with 90° contact angle.

S_i variation in thickness between shaft washer raceway and back face

NOTE Applies only to thrust ball bearings and thrust cylindrical roller bearings with 90° contact angle.

T bearing height, single-direction bearing

T_1 bearing height, double-direction bearing

V_{Dsp} variation of outside diameter in a single plane of housing washer

V_{dsp} variation of bore diameter in a single plane of shaft washer, single-direction bearing

V_{d2sp} variation of bore diameter in a single plane of central shaft washer, double-direction bearing

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

Δ_{dmp} deviation of mean bore diameter in a single plane of shaft washer, single-direction bearing

Δ_{d2mp} deviation of mean bore diameter in a single plane of central shaft washer, double-direction bearing

Δ_{Ts} deviation of the actual bearing height, single-direction bearing

Δ_{T1s} deviation of the actual bearing height, double-direction bearing

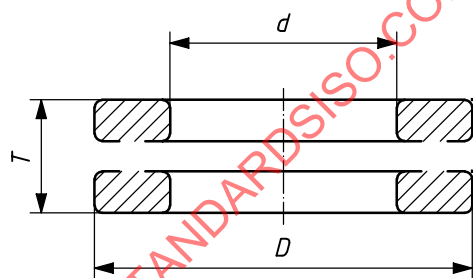


Figure 1 — Single-direction bearings

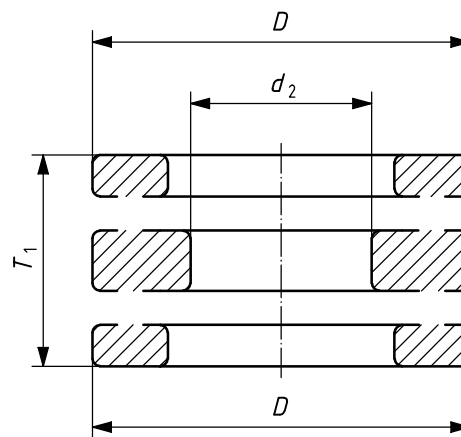


Figure 2 — Double-direction bearings

5 Tolerances

5.1 General

Tolerances for single-direction and double-direction thrust bearings are given in Tables 1 to 8.

5.2 Normal tolerance class

See Tables 1 and 2.

Table 1 — Shaft washer, central shaft washer and bearing height

Tolerance values in micrometres

d and d_2 mm		$\Delta_{dmp}, \Delta_{d2mp}$		V_{dsp}, V_{d2sp}	S_i	Δ_{Ts}		Δ_{T1s}	
>	≤	high	low	max.	max.	high	low	high	low
—	18	0	−8	6	10	+20	−250	+150	−400
18	30	0	−10	8	10	+20	−250	+150	−400
30	50	0	−12	9	10	+20	−250	+150	−400
50	80	0	−15	11	10	+20	−300	+150	−500
80	120	0	−20	15	15	+25	−300	+200	−500
120	180	0	−25	19	15	+25	−400	+200	−600
180	250	0	−30	23	20	+30	−400	+250	−600
250	315	0	−35	26	25	+40	−400	—	—
315	400	0	−40	30	30	+40	−500	—	—
400	500	0	−45	34	30	+50	−500	—	—
500	630	0	−50	38	35	+60	−600	—	—
630	800	0	−75	55	40	+70	−750	—	—
800	1 000	0	−100	75	45	+80	−1 000	—	—
1 000	1 250	0	−125	95	50	+100	−1 400	—	—
1 250	1 600	0	−160	120	60	+120	−1 600	—	—
1 600	2 000	0	−200	150	75	+140	−1 900	—	—
2 000	2 500	0	−250	190	90	+160	−2 300	—	—

NOTE For double-direction bearings, the values apply only up to and including $d_2 = 190$ mm.

Table 2 — Housing washer

Tolerance values in micrometres

D mm		Δ_{Dmp}		V_{Dsp}	S_e
>	$\leq$	high	low	max.	max.
10	18	0	−11	8	Identical to S_i of shaft washer of same bearing
18	30	0	−13	10	
30	50	0	−16	12	
50	80	0	−19	14	
80	120	0	−22	17	
120	180	0	−25	19	
180	250	0	−30	23	
250	315	0	−35	26	
315	400	0	−40	30	
400	500	0	−45	34	
500	630	0	−50	38	
630	800	0	−75	55	
800	1 000	0	−100	75	
1 000	1 250	0	−125	95	
1 250	1 600	0	−160	120	
1 600	2 000	0	−200	150	
2 000	2 500	0	−250	190	
2 500	2 850	0	−300	225	

NOTE For double-direction bearings, the values apply only up to and including $D = 360$ mm.

5.3 Tolerance class 6

See Tables 3 and 4.

Table 3 — Shaft washer, central shaft washer and bearing height

Tolerance values in micrometres

d and d_2 mm		$\Delta_{dmp}, \Delta_{d2mp}$		V_{dsp}, V_{d2sp}	S_i	Δ_{Ts}		Δ_{T1s}	
>	≤	high	low	max.	max.	high	low	high	low
—	18	0	−8	6	5	+20	−250	+150	−400
18	30	0	−10	8	5	+20	−250	+150	−400
30	50	0	−12	9	6	+20	−250	+150	−400
50	80	0	−15	11	7	+20	−300	+150	−500
80	120	0	−20	15	8	+25	−300	+200	−500
120	180	0	−25	19	9	+25	−400	+200	−600
180	250	0	−30	23	10	+30	−400	+250	−600
250	315	0	−35	26	13	+40	−400	—	—
315	400	0	−40	30	15	+40	−500	—	—
400	500	0	−45	34	18	+50	−500	—	—
500	630	0	−50	38	21	+60	−600	—	—
630	800	0	−75	55	25	+70	−750	—	—
800	1 000	0	−100	75	30	+80	−1 000	—	—
1 000	1 250	0	−125	95	35	+100	−1 400	—	—
1 250	1 600	0	−160	120	40	+120	−1 600	—	—
1 600	2 000	0	−200	150	45	+140	−1 900	—	—
2 000	2 500	0	−250	190	50	+160	−2 300	—	—

NOTE For double-direction bearings, the values apply only up to and including $d_2 = 190$ mm.

Table 4 — Housing washer

Tolerance values in micrometres

D mm		Δ_{Dmp}		V_{Dsp}	S_e
>	$\leq$	high	low	max.	max.
10	18	0	−11	8	Identical to S_i of shaft washer of same bearing
18	30	0	−13	10	
30	50	0	−16	12	
50	80	0	−19	14	
80	120	0	−22	17	
120	180	0	−25	19	
180	250	0	−30	23	
250	315	0	−35	26	
315	400	0	−40	30	
400	500	0	−45	34	
500	630	0	−50	38	
630	800	0	−75	55	
800	1 000	0	−100	75	
1 000	1 250	0	−125	95	
1 250	1 600	0	−160	120	
1 600	2 000	0	−200	150	
2 000	2 500	0	−250	190	
2 500	2 850	0	−300	225	
NOTE For double-direction bearings, the values apply only up to and including $D = 360$ mm.					

5.4 Tolerance class 5

See Tables 5 and 6.

Table 5 — Shaft washer, central shaft washer and bearing height

Tolerance values in micrometres

d and d_2 mm		$\Delta_{dmp}, \Delta_{d2mp}$		V_{dsp}, V_{d2sp}	S_i	Δ_{Ts}		Δ_{T1s}	
>	≤	high	low	max.	max.	high	low	high	low
—	18	0	−8	6	3	+20	−250	+150	−400
18	30	0	−10	8	3	+20	−250	+150	−400
30	50	0	−12	9	3	+20	−250	+150	−400
50	80	0	−15	11	4	+20	−300	+150	−500
80	120	0	−20	15	4	+25	−300	+200	−500
120	180	0	−25	19	5	+25	−400	+200	−600
180	250	0	−30	23	5	+30	−400	+250	−600
250	315	0	−35	26	7	+40	−400	—	—
315	400	0	−40	30	7	+40	−500	—	—
400	500	0	−45	34	9	+50	−500	—	—
500	630	0	−50	38	11	+60	−600	—	—
630	800	0	−75	55	13	+70	−750	—	—
800	1 000	0	−100	75	15	+80	−1 000	—	—
1 000	1 250	0	−125	95	18	+100	−1 400	—	—
1 250	1 600	0	−160	120	25	+120	−1 600	—	—
1 600	2 000	0	−200	150	30	+140	−1 900	—	—
2 000	2 500	0	−250	190	40	+160	−2 300	—	—

NOTE For double-direction bearings, the values apply only up to and including $d_2 = 190$ mm.

Table 6 — Housing washer

Tolerance values in micrometres

D mm		Δ_{Dmp}		V_{Dsp}	S_e
>	$\leq$	high	low	max.	max.
10	18	0	−11	8	Identical to S_i of shaft washer of same bearing
18	30	0	−13	10	
30	50	0	−16	12	
50	80	0	−19	14	
80	120	0	−22	17	
120	180	0	−25	19	
180	250	0	−30	23	
250	315	0	−35	26	
315	400	0	−40	30	
400	500	0	−45	34	
500	630	0	−50	38	
630	800	0	−75	55	
800	1 000	0	−100	75	
1 000	1 250	0	−125	95	
1 250	1 600	0	−160	120	
1 600	2 000	0	−200	150	
2 000	2 500	0	−250	190	
2 500	2 850	0	−300	225	
NOTE For double-direction bearings, the values apply only up to and including $D = 360$ mm.					