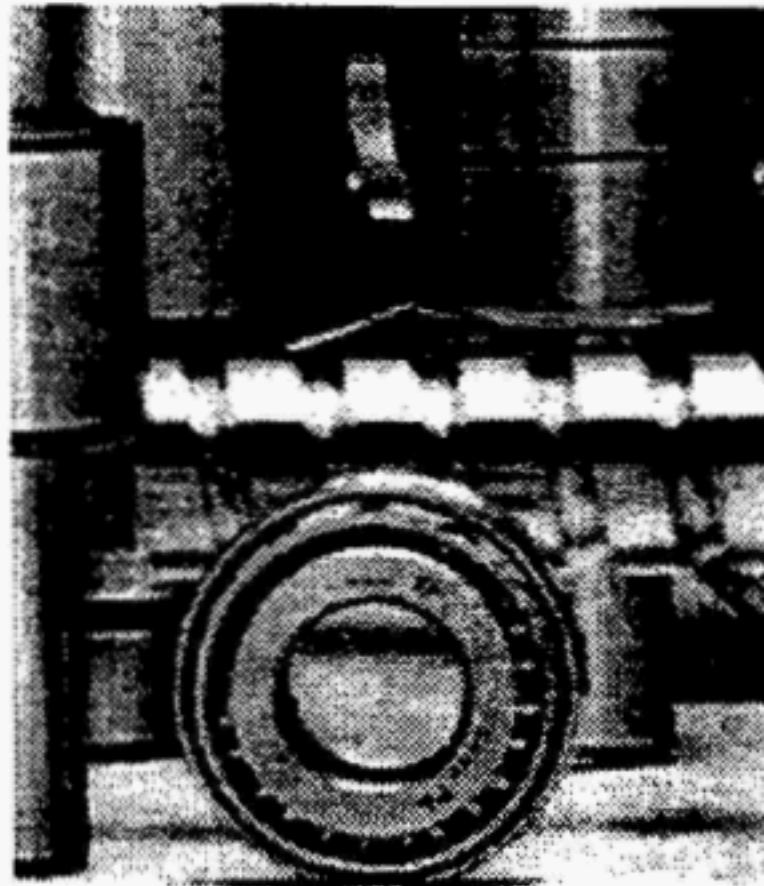


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# AMERICAN NATIONAL STANDARD

ABMA Standard

ISO Standard

## Rolling bearings – Thrust bearings – Tolerances

Secretariat  
American Bearing Manufacturers Association

Approved November 9, 1999  
American National Standards Institute



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# Rolling bearings – Thrust bearings – Tolerances

**Secretariat**  
**American Bearing Manufacturers Association**

**Approved November 9, 1999**  
**American National Standards Institute, Inc.**



## Foreword

(This foreword is not part of ANSI/ABMA/ISO 199:1997.)

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized 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.

Draft International Standards adopted by the technical committee are circulated to member bodies for voting. Publication as an International Standard requires approval of at least 75% of the member bodies casting a vote.

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

This second edition cancels and replaces the first edition (ISO 199:1979) which has been technically revised.

This standard was processed and approved for submittal to ANSI by Accredited Standards Committee B3 on Ball and Roller Bearings. Committee approval of this standard does not necessarily imply that all committee members voted for its approval.

Suggestions for the improvement of this standard gained through experience with its use will be welcomed. These should be sent to: American Bearing Manufacturers Association Secretariat, ANSI ASC B3, 1200 19th Street, NW, Suite 300, Washington DC 20036-2422.

# Rolling bearings — Thrust bearings — Tolerances

## 1 Scope

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

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

Chamfer dimension limits are given in ISO 582.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 104:1994, *Rolling bearings — Thrust bearings — Boundary dimensions, general plan.*

ISO 582:1995, *Rolling bearings — Chamfer dimensions — Maximum values.*

ISO 1132:1980, *Rolling bearings — Tolerances — Definitions.*

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

## 3 Definitions

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

## 4 Symbols

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

$d$  bore diameter of shaft washer, single-direction bearing

$d_2$  bore diameter of shaft washer, double-direction bearing

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

$\Delta_{d2mp}$  deviation of mean bore diameter in a single plane of shaft washer, double-direction bearing

$D$  outside diameter of housing washer

$\Delta_{Dmp}$  deviation of mean outside diameter in a single plane of housing washer

$S_e$  variation in thickness between housing washer raceway and back face

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

$S_i$  variation in thickness between shaft washer raceway and back face

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

$T$  bearing height, single-direction bearing

$T_1$  bearing height, double direction bearing

$\Delta_{Ts}$  deviation of the actual bearing height, single-direction bearing

$\Delta_{T1s}$  deviation of the actual bearing height, double-direction bearing

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

$V_{d2p}$  variation of bore diameter in a single plane of shaft washer, double-direction bearing

$V_{Dp}$  variation of outside diameter in a single radial plane of housing washer

## 5 Tolerances

Tables 1 to 8 give the tolerances for single-direction and double-direction thrust bearings.



## 5.1 Normal tolerance class

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See tables 1 and 2.

**Table 1 — Shaft washer and bearing height**

Tolerance values in micrometres

$d$ and $d_2$ mm		$\Delta_{dmp}, \Delta_{d2mp}$		$V_{dp}, V_{d2p}$	$S_i$	$\Delta_{Ts}$		$\Delta_{T1s}$	
>	≤	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		$\Delta_{Dmp}$		$V_{Dp}$	$S_e$
>	≤	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.



See tables 3 and 4.

Table 3 — Shaft washer and bearing height

Tolerance values in micrometres

$d$ and $d_2$ mm		$\Delta_{dmp}, \Delta_{d2mp}$		$V_{dp}, V_{d2p}$	$S_i$	$\Delta_{Ts}$		$\Delta_{T1s}$	
>	≤	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		$\Delta_{Dmp}$		$V_{Dp}$	$S_e$
>	≤	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 5

See tables 5 and 6.

**Table 5 — Shaft washer and bearing height**

Tolerance values in micrometres

$d$ and $d_2$ mm		$\Delta_{dmp}, \Delta_{d2mp}$		$V_{dp}, V_{d2p}$	$S_i$	$\Delta_{Ts}$		$\Delta_{T1s}$	
>	≤	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		$\Delta_{Dmp}$		$V_{Dp}$	$S_e$
>	≤	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 4

See tables 7 and 8.

**Table 7 — Shaft washer and bearing height**

Tolerance values in micrometres

$d$ and $d_2$ mm		$\Delta_{dmp}, \Delta_{d2mp}$		$V_{dp}, V_{d2p}$	$S_i$	$\Delta_{Ts}$		$\Delta_{T1s}$	
>	≤	high	low	max.	max.	high	low	high	low
—	18	0	−7	5	2	+20	−250	+150	−400
18	30	0	−8	6	2	+20	−250	+150	−400
30	50	0	−10	8	2	+20	−250	+150	−400
50	80	0	−12	9	3	+20	−300	+150	−500
80	120	0	−15	11	3	+25	−300	+200	−500
120	180	0	−18	14	4	+25	−400	+200	−600
180	250	0	−22	17	4	+30	−400	+250	−600
250	315	0	−25	19	5	+40	−400	—	—
315	400	0	−30	23	5	+40	−500	—	—
400	500	0	−35	26	6	+50	−500	—	—
500	630	0	−40	30	7	+60	−600	—	—
630	800	0	−50	40	8	+70	−750	—	—

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

**Table 8 — Housing washer**

Tolerance values in micrometres

$D$ mm		$\Delta_{Dmp}$		$V_{Dp}$	$S_e$
>	≤	high	low	max.	max.
10	18	0	−7	5	Identical to $S_i$ of shaft washer of same bearing
18	30	0	−8	6	
30	50	0	−9	7	
50	80	0	−11	8	
80	120	0	−13	10	
120	180	0	−15	11	
180	250	0	−20	15	
250	315	0	−25	19	
315	400	0	−28	21	
400	500	0	−33	25	
500	630	0	−38	29	
630	800	0	−45	34	
800	1 000	0	−60	45	

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



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**ICS 21.100.20**

**Descriptors:** bearings, rolling bearings, thrust bearings, form specifications, dimensions, overall dimensions, dimensional tolerances.

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