International Standard

ISO 492

Radial bearings — Tolerances

Roulements radiaux — Tolérances

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (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 set up 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 committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 492 was developed by Technical Committee ISO/TC 4, *Rolling bearings*, and was circulated to the member bodies in August 1980.

It has been approved by the member bodies of the following countries :

Austria	India	Romania
Brazil	Italy	South Africa, Rep. of
Canada	Japan	Spain
China	Korea, Dem. P. Rep. of	Sweden
Czechoslovakia	Korea, Rep. of	Switzerland
France	Mexico	United Kingdom
Germany, F.R.	Netherlands	USSR
Hungary	Poland	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Australia
USA

This International Standard cancels and replaces the following ISO Recommendations and International Standard :

ISO/R 492, *Rolling bearings — Radial bearings — Tolerances.*

ISO/R 577/1, *Rolling bearings — Tapered roller bearings — Metric series — Tolerances — Part 1 : Normal tolerances.*

ISO/R 577/2, *Rolling bearings — Tapered roller bearings — Metric series — Tolerances — Part 2 : Tolerance classes 6 and 5.*

ISO 577/3, *Rolling bearings — Tapered roller bearings — Metric series — Tolerances — Part 3 : Tolerance class 4.*

ISO/R 1648, *Rolling bearings — Radial bearings with shields or seals — Outside diameter tolerances — Normal tolerance class and tolerance class 6.*

In addition, this International Standard replaces the tolerances given for metric series bearings in the following ISO International Standard :

ISO 2349, *Rolling bearings — Tapered roller bearings — Sub-units — Tolerances — Metric series, normal tolerance class and tolerance class 6 — Inch series, tolerance class 4 (normal tolerance class).*

Radial bearings — Tolerances

1 Scope and field of application

This International Standard specifies the tolerances for boundary dimensions (except chamfer dimensions) and running accuracy of radial rolling bearings, metric series.

Chamfer dimension limits are given in ISO 582.

This International Standard does not apply to certain radial bearings of particular types (for example, drawn cup needle roller bearings) or for particular fields of application (for example, airframe bearings and instrument precision bearings). Tolerances for such bearings are given in the relevant ISO International Standards.

2 References

ISO 15, *Rolling bearings — Radial bearings — Boundary dimensions — General plan.*[1]

ISO 286/1, *ISO system of limits and fits — Part 1 : General, tolerances and deviations.*[2]

ISO 582, *Rolling bearings — Metric series — Chamfer dimension limits.*

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

3 Definitions

Definitions of the concepts to which the tolerances specified in this International Standard apply are given in ISO 1132.

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[1] At present at the stage of draft. (Revision of ISO/R 15/1-1968 and ISO/R 15/2-1970.)

[2] At present at the stage of draft. (Revision of ISO/R 286-1962.)

4 Symbols

4.1 Symbols for boundary dimensions

d = bearing bore diameter, nominal

d_1 = basic diameter at theoretical large end of a basically tapered bore

Δ_{ds} = deviation of a single bore diameter

Δ_{dmp} = single plane mean bore diameter deviation (for a basically tapered bore Δ_{dmp} refers only to the theoretical small end of bore)

Δ_{d1mp} = mean bore diameter deviation at theoretical large end of a basically tapered bore

V_{dp} = bore diameter variation in a single radial plane

V_{dmp} = mean bore diameter variation (this applies only to a basically cylindrical bore)

α = taper angle, nominal

D = bearing outside diameter, nominal

Δ_{Ds} = deviation of a single outside diameter

Δ_{Dmp} = single plane mean outside diameter deviation

V_{Dp} = outside diameter variation in a single radial plane

V_{Dmp} = mean outside diameter variation

B = inner ring width, nominal

Δ_{Bs} = deviation of a single width of the inner ring

V_{Bs} = inner ring width variation

C = outer ring width, nominal

Δ_{Cs} = deviation of a single width of the outer ring

V_{Cs} = outer ring width variation

K_{ia} = radial runout of assembled bearing inner ring

K_{ea} = radial runout of assembled bearing outer ring

S_d = inner ring reference face (backface, where applicable) runout with bore

S_D = variation of outside surface generatrix inclination with outer ring reference face (backface)

S_{ia} = assembled bearing inner ring face (backface) runout with raceway

S_{ea} = assembled bearing outer ring face (backface) runout with raceway
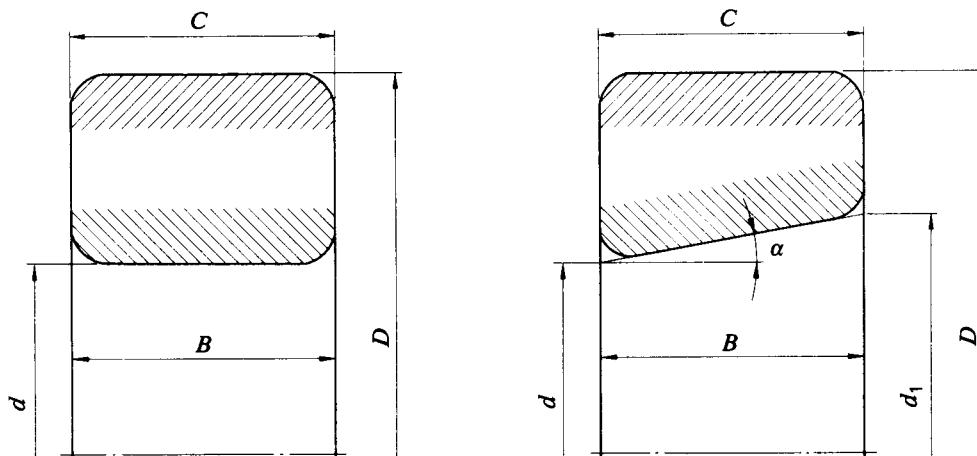
Figure 1 — Symbols for boundary dimensions

4.2 Additional symbols for tapered roller bearings

D_1 = outer ring flange outside diameter, nominal

T = bearing width, nominal

Δ_{Ts} = deviation of the actual bearing width

T_1 = effective width of inner sub-unit, nominal

Δ_{T1s} = deviation of the actual effective width of inner sub-unit

T_2 = effective width of outer sub-unit, nominal

Δ_{T2s} = deviation of the actual effective width of outer sub-unit

Figure 2 — Additional symbols for tapered roller bearings
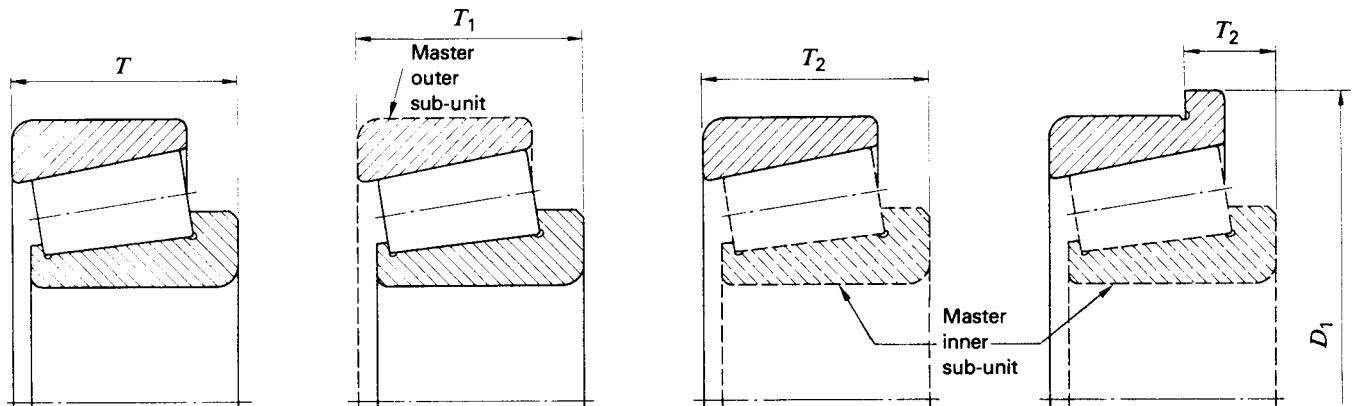
5 Tolerance values

5.1 Radial bearings except tapered roller bearings

Bore diameter tolerances given in this clause apply to basically cylindrical bores. Tolerances for tapered bores are given in 5.3.

The diameter series referred to in the tables of this clause are those defined in ISO 15.

5.1.1 Normal tolerance class

Table 1 — Inner ring

Tolerance values in micrometres

| d mm		Δ_{dmp}		V_{dp} diameter series			V_{dmp}	K_{ia}	Δ_{Bs}			V_{Bs}
				7,8,9	0,1	2,3,4			all	normal	modified[2]	
over	incl.	high	low	max.			max.	max.	high	low		max.
0,6[1]	2,5	0	−8	10	8	6	6	10	0	−40	—	12
2,5	10	0	−8	10	8	6	6	10	0	−120	−250	15
10	18	0	−8	10	8	6	6	10	0	−120	−250	20
18	30	0	−10	13	10	8	8	13	0	−120	−250	20
30	50	0	−12	15	12	9	9	15	0	−120	−250	20
50	80	0	−15	19	19	11	11	20	0	−150	−380	25
80	120	0	−20	25	25	15	15	25	0	−200	−380	25
120	180	0	−25	31	31	19	19	30	0	−250	−500	30
180	250	0	−30	38	38	23	23	40	0	−300	−500	30
250	315	0	−35	44	44	26	26	50	0	−350	−500	35
315	400	0	−40	50	50	30	30	60	0	−400	−630	40
400	500	0	−45	56	56	34	34	65	0	−450	—	50
500	630	0	−50	63	63	38	38	70	0	−500	—	60
630	800	0	−75	—	—	—	—	80	0	−750	—	70
800	1 000	0	−100	—	—	—	—	90	0	−1 000	—	80
1 000	1 250	0	−125	—	—	—	—	100	0	−1 250	—	100
1 250	1 600	0	−160	—	—	—	—	120	0	−1 600	—	120
1 600	2 000	0	−200	—	—	—	—	140	0	−2 000	—	140

1) This diameter is included in the group.

2) This refers to the rings of single bearings made for paired or stack mounting.

Table 2 — Outer ring

Tolerance values in micrometres

D mm		Δ_{Dmp}		V_{Dp}[3]				V_{Dmp}[3]	K_{ea}	Δ_{Cs}		V_{Cs}
				Open bearings			Capped bearings[2]					
				diameter series								
				7,8,9	0,1	2,3,4	2,3,4					
over	incl.	high	low	max.				max.	max.	high	low	max.
2,5[1]	6	0	−8	10	8	6	10	6	15			
6	18	0	−8	10	8	6	10	6	15			
18	30	0	−9	12	9	7	12	7	15			
30	50	0	−11	14	11	8	16	8	20			
50	80	0	−13	16	13	10	20	10	25			
80	120	0	−15	19	19	11	26	11	35			
120	150	0	−18	23	23	14	30	14	40	Identical to Δ_{Bs} and V_{Bs} of inner ring of same bearing		
150	180	0	−25	31	31	19	38	19	45			
180	250	0	−30	38	38	23	—	23	50			
250	315	0	−35	44	44	26	—	26	60			
315	400	0	−40	50	50	30	—	30	70			
400	500	0	−45	56	56	34	—	34	80			
500	630	0	−50	63	63	38	—	38	100			
630	800	0	−75	94	94	55	—	55	120			
800	1 000	0	−100	125	125	75	—	75	140			
1 000	1 250	0	−125	—	—	—	—	—	160			
1 250	1 600	0	−160	—	—	—	—	—	190			
1 600	2 000	0	−200	—	—	—	—	—	220			
2 000	2 500	0	−250	—	—	—	—	—	250			

1) This diameter is included in the group.

2) No values have been established for diameter series 7, 8, 9, 0 and 1.

3) Applies before mounting and after removal of internal or external snap ring.

5.1.2 Tolerance class 6

Table 3 — Inner ring

Tolerance values in micrometres

d mm		Δ_{dmp}		V_{dp} diameter series			V_{dmp}	K_{ia}	Δ_{Bs}			V_{Bs}
				7,8,9	0,1	2,3,4			all	normal	modified[2]	
over	incl.	high	low	max.			max.	max.	high	low		max.
0,6[1]	2,5	0	−7	9	7	5	5	5	0	−40	—	12
2,5	10	0	−7	9	7	5	5	6	0	−120	−250	15
10	18	0	−7	9	7	5	5	7	0	−120	−250	20
18	30	0	−8	10	8	6	6	8	0	−120	−250	20
30	50	0	−10	13	10	8	8	10	0	−120	−250	20
50	80	0	−12	15	15	9	9	10	0	−150	−380	25
80	120	0	−15	19	19	11	11	13	0	−200	−380	25
120	180	0	−18	23	23	14	14	18	0	−250	−500	30
180	250	0	−22	28	28	17	17	20	0	−300	−500	30
250	315	0	−25	31	31	19	19	25	0	−350	−500	35
315	400	0	−30	38	38	23	23	30	0	−400	−630	40
400	500	0	−35	44	44	26	26	35	0	−450	—	45
500	630	0	−40	50	50	30	30	40	0	−500	—	50

1) This diameter is included in the group.

2) This refers to the rings of single bearings made for paired or stack mounting.

Table 4 — Outer ring

Tolerance values in micrometres

D mm		Δ_{Dmp}		V_{Dp}[2] Open bearings			Capped bearings[2]	V_{Dmp}[3]	K_{ea}	Δ_{Cs}		V_{Cs}
				diameter series								
				7,8,9	0,1	2,3,4	0,1,2,3,4					
over	incl.	high	low	max.				max.	max.	high	low	max.
2,5[1]	6	0	−7	9	7	5	9	5	8			
6	18	0	−7	9	7	5	9	5	8			
18	30	0	−8	10	8	6	10	6	9			
30	50	0	−9	11	9	7	13	7	10			
50	80	0	−11	14	11	8	16	8	13			
80	120	0	−13	16	16	10	20	10	18			
120	150	0	−15	19	19	11	25	11	20	Identical to Δ_{Bs} and V_{Bs} of inner ring of same bearing		
150	180	0	−18	23	23	14	30	14	23			
180	250	0	−20	25	25	15	—	15	25			
250	315	0	−25	31	31	19	—	19	30			
315	400	0	−28	35	35	21	—	21	35			
400	500	0	−33	41	41	25	—	25	40			
500	630	0	−38	48	48	29	—	29	50			
630	800	0	−45	56	56	34	—	34	60			
800	1 000	0	−60	75	75	45	—	45	75			

1) This diameter is included in the group.

2) No values have been established for diameter series 7, 8, and 9.

3) Applies before mounting and after removal of internal or external snap ring.

5.1.3 Tolerance class 5

Table 5 — Inner ring

Tolerance values in micrometres

d mm		Δ_{dmp}		V_{dp} diameter series		V_{dmp}	K_{ia}	S_d	S_{ia} [2]	Δ_{Bs}			V_{Bs}
				7,8,9	0,1,2,3,4					all	normal	modified [3]	
over	incl.	high	low	max.		max.	max.	max.	max.	high	low		max.
0,6 [1]	2,5	0	−5	5	4	3	4	7	7	0	−40	−250	5
2,5	10	0	−5	5	4	3	4	7	7	0	−40	−250	5
10	18	0	−5	5	4	3	4	7	7	0	−80	−250	5
18	30	0	−6	6	5	3	4	8	8	0	−120	−250	5
30	50	0	−8	8	6	4	5	8	8	0	−120	−250	5
50	80	0	−9	9	7	5	5	8	8	0	−150	−250	6
80	120	0	−10	10	8	5	6	9	9	0	−200	−380	7
120	180	0	−13	13	10	7	8	10	10	0	−250	−380	8
180	250	0	−15	15	12	8	10	11	13	0	−300	−500	10
250	315	0	−18	18	14	9	13	13	15	0	−350	−500	13
315	400	0	−23	23	18	12	15	15	20	0	−400	−630	15

1) This diameter is included in the group.

2) Applies to groove type ball bearings only.

3) This refers to the rings of single bearings made for paired or stack mounting.

Table 6 — Outer ring

Tolerance values in micrometres

D mm		Δ_{Dmp}		V_{Dp} [2] diameter series		V_{Dmp}	K_{ea}	S_D	S_{ea} [3]	Δ_{Cs}		V_{Cs}
				7,8,9	0,1,2,3,4					high	low	
over	incl.	high	low	max.		max.	max.	max.	max.	high	low	max.
2,5 [1]	6	0	−5	5	4	3	5	8	8			5
6	18	0	−5	5	4	3	5	8	8			5
18	30	0	−6	6	5	3	6	8	8			5
30	50	0	−7	7	5	4	7	8	8			5
50	80	0	−9	9	7	5	8	8	10			6
80	120	0	−10	10	8	5	10	9	11			8
120	150	0	−11	11	8	6	11	10	13	Identical to Δ_{Bs} of inner ring of same bearing		8
150	180	0	−13	13	10	7	13	10	14			8
180	250	0	−15	15	11	8	15	11	15			10
250	315	0	−18	18	14	9	18	13	18			11
315	400	0	−20	20	15	10	20	13	20			13
400	500	0	−23	23	17	12	23	15	23			15
500	630	0	−28	28	21	14	25	18	25			18
630	800	0	−35	35	26	18	30	20	30			20

1) This diameter is included in the group.

2) No values have been established for capped bearings.

3) Applies to groove type ball bearings only.