Table 7-13 Permissible values for chamfer dimensions = JIS B 1514-3 =

(1) Radial bearing (tapered roller bearings excluded)

Unit : mm

$r_{\min}$ or $r_{1\min}$	Nominal bore diameter d mm over	up to	$r_{\max}$ or $r_{1\max}$ Radial direction	Axial direction
0.05	–	–	0.1	0.2
0.08	–	–	0.16	0.3
0.1	–	–	0.2	0.4
0.15	–	–	0.3	0.6
0.2	–	–	0.5	0.8
0.3	–	40	0.6	1
	40	–	0.8	1
0.6	–	40	1	2
	40	–	1.3	2
1	–	50	1.5	3
	50	–	1.9	3
1.1	–	120	2	3.5
	120	–	2.5	4
1.5	–	120	2.3	4
	120	–	3	5
2	–	80	3	4.5
	80	220	3.5	5
	220	–	3.8	6
2.1	–	280	4	6.5
	280	–	4.5	7
2.5	–	100	3.8	6
	100	280	4.5	6
	280	–	5	7
3	–	280	5	8
	280	–	5.5	8
4	–	–	6.5	9
5	–	–	8	10
6	–	–	10	13
7.5	–	–	12.5	17
9.5	–	–	15	19
12	–	–	18	24
15	–	–	21	30
19	–	–	25	38

[Remarks]

1. Value of $r_{\max}$ or $r_{1\max}$ in the axial direction of bearings with nominal width lower than 2 mm shall be the same as the value in radial direction.
2. There shall be no specification for the accuracy of the shape of the chamfer surface, but its outline in the axial plane shall not be situated outside of the imaginary circle arc with a radius of $r_{\min}$ or $r_{1\min}$ which contacts the inner ring side face and bore, or the outer ring side face and outside surface.

(2) Radial bearings with locating snap ring (snap ring groove side) and cylindrical roller bearings (separete thrust collar and loose rib side)

Unit : mm

$r_{1\min}$	Nominal bore dia. or nominal outside dia. d or D over	up to	$r_{1\max}$ Radial direction	Axial direction
0.2	–	–	0.5	0.5
0.3	–	40	0.6	0.8
	40	–	0.8	0.8
0.5	–	40	1	1.5
	40	–	1.3	1.5
0.6	–	40	1	1.5
	40	–	1.3	1.5
1	–	50	1.5	2.2
	50	–	1.9	2.2
1.1	–	120	2	2.7
	120	–	2.5	2.7
1.5	–	120	2.3	3.5
	120	–	3	3.5
2	–	80	3	4
	80	220	3.5	4
	220	–	3.8	4
2.1	–	280	4	4.5
	280	–	4.5	4.5
2.5	–	100	3.8	5
	100	280	4.5	5
	280	–	5	5
3	–	280	5	5.5
	280	–	5.5	5.5
4	–	–	6.5	6.5
5	–	–	8	8
6	–	–	10	10

[Remark] There shall be no specification for the accuracy of the shape of the chamfer surface, but its outline in the axial plane shall not be situated outside of the imaginary circle arc with a radius of $r_{1\min}$ which contacts the inner ring side face and bore, or the outer ring side face and outside surface.

(3) Cylindrical roller bearings (non-rib side) and angular contact ball bearings (front face side)

Unit : mm

$r_{1\min}$	Nominal bore dia. or nominal outside dia. d or D over	up to	$r_{1\max}$ Radial direction	Axial direction
0.1	–	–	0.2	0.4
0.15	–	–	0.3	0.6
0.2	–	–	0.5	0.8
0.3	–	40	0.6	1
	40	–	0.8	1
0.6	–	40	1	2
	40	–	1.3	2
1	–	50	1.5	3
	50	–	1.9	3
1.1	–	120	2	3.5
	120	–	2.5	4
1.5	–	120	2.3	4
	120	–	3	5
2	–	80	3	4.5
	80	220	3.5	5
	220	–	3.8	6

[Remark] There shall be no specification for the accuracy of the shape of the chamfer surface, but its outline in the axial plane shall not be situated outside of the imaginary circle arc with a radius of $r_{1\min}$ which contacts the inner ring side face and bore, or the outer ring side face and outside surface.

(4) Metric series tapered roller bearing

Unit : mm

$r_{\min}$ or $r_{1\min}$	Nominal bore dia. or nominal outside dia.[1] d or D, mm over	up to	$r_{\max}$ or $r_{1\max}$ Radial direction	Axial direction
0.3	–	40	0.7	1.4
	40	–	0.9	1.6
0.6	–	40	1.1	1.7
	40	–	1.3	2
1	–	50	1.6	2.5
	50	–	1.9	3
1.5	–	120	2.3	3
	120	250	2.8	3.5
	250	–	3.5	4
2	–	120	2.8	4
	120	250	3.5	4.5
	250	–	4	5
2.5	–	120	3.5	5
	120	250	4	5.5
	250	–	4.5	6
3	–	120	4	5.5
	120	250	4.5	6.5
	250	400	5	7
	400	–	5.5	7.5
4	–	120	5	7
	120	250	5.5	7.5
	250	400	6	8
	400	–	6.5	8.5
5	–	180	6.5	8
	180	–	7.5	9
6	–	180	7.5	10
	180	–	9	11
7.5	–	–	*12.5*	*17*
9.5	–	–	*15*	*19*

[Note] 1) Inner ring shall be included in division d, and outer ring, in division D.

[Remarks]

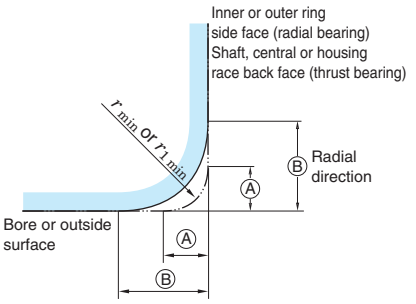
1. There shall be no specification for the accuracy of the shape of the chamfer surface, but its outline in the axial plane shall not be situated outside of the imaginary circle arc with a radius of $r_{\min}$ or $r_{1\min}$ which contacts the inner ring back face and bore, or the outer ring back face and outside surface.
2. Values in Italics are provided in JTEKT standards.

(5) Thrust bearing

Unit : mm

$r_{\min}$ or $r_{1\min}$	$r_{\max}$ or $r_{1\max}$ Radial and axial direction
0.05	0.1
0.08	0.16
0.1	0.2
0.15	0.3
0.2	0.5
0.3	0.8
0.6	1.5
1	2.2
1.1	2.7
1.5	3.5
2	4
2.1	4.5
3	5.5
4	6.5
5	8
6	10
7.5	12.5
9.5	15
12	18
15	21
19	25

[Remark] There shall be no specification for the accuracy of the shape of the chamfer surface, but its outline in the axial plane shall not be situated outside of the imaginary circle arc with a radius of $r_{\min}$ or $r_{1\min}$ which contacts with the shaft or central race back face and bore, or the housing race back face and outside surface.



(Ⓐ : $r_{\min}$ or $r_{1\min}$
Ⓑ : $r_{\max}$ or $r_{1\max}$)

7-2 Tolerance measuring method (reference)

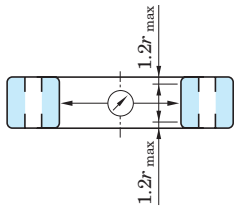
The details on measuring methods for bearings are prescribed in JIS B 1515.

This section outlines measuring methods for dimensional and running accuracy.

Dimensional accuracy (1)

Bore diameter (d) Cylindrical bore bearings

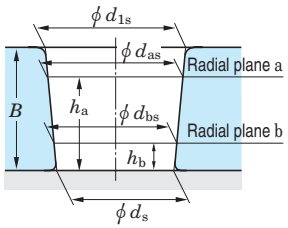
Obtain the maximum value ($d_{sp\,max}$) and the minimum value ($d_{sp\,min}$) of the bore diameter (d_s) acquired in a single radial plane.
Obtain the single plane mean bore diameter (d_{mp}) as the arithmetic mean value of the maximum value ($d_{sp\,max}$) and minimum values ($d_{sp\,min}$).



$$d_{mp} = \frac{d_{sp\,max} + d_{sp\,min}}{2}$$

Single plane mean bore diameter deviation ;
$\Delta_{dmp} = d_{mp} - d$
Bore diameter variation in a single plane ;
$V_{dsp} = d_{sp\,max} - d_{sp\,min}$
Mean bore diameter variation ;
$V_{dmp} = d_{mp\,max} - d_{mp\,min}$
Deviation of a single bore diameter ;
$\Delta_{ds} = d_s - d$

Bore diameter (d) Tapered bore bearings



Bore diameter at the theoretical small end and bore diameter at the theoretical large end ;

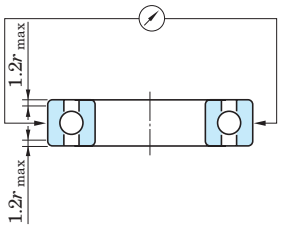
$$d_s = \frac{d_{bs} \cdot h_a - d_{as} \cdot h_b}{h_a - h_b}$$

$$d_{1s} = \frac{d_{as}\,(B - h_b) - d_{bs}\,(B - h_a)}{h_a - h_b}$$

Single plane mean bore diameter deviation at the theoretical small end ;
$\Delta_{dmp} = d_{mp} - d$
Deviation on taper ;
$(\Delta_{d1mp} - \Delta_{dmp}) = (d_{1mp} - d_1) - (d_{mp} - d)$
Bore diameter variation in a single plane ;
$V_{dsp} = d_{sp\,max} - d_{sp\,min}$

Outside diameter (D)

Obtain the single plane mean outside diameter (D_{mp}) as the arithmetical mean value of the maximum value ($D_{sp\,max}$) and the minimum value ($D_{sp\,min}$) of the outside diameters (D_s) acquired in a single radial plane.

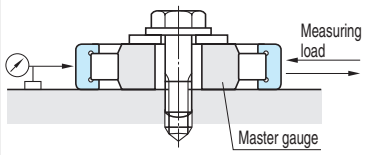


$$D_{mp} = \frac{D_{sp\,max} + D_{sp\,min}}{2}$$

Single plane mean outside diameter deviation ;
$\Delta_{Dmp} = D_{mp} - D$
Outside diameter variation in a single plane ;
$V_{Dsp} = D_{sp\,max} - D_{sp\,min}$
Mean outside diameter variation ;
$V_{Dmp} = D_{mp\,max} - D_{mp\,min}$
Deviation of a single outside diameter ;
$\Delta_{Ds} = D_s - D$

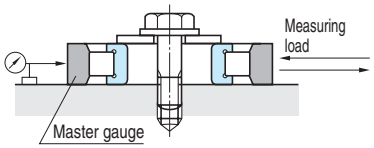
Dimensional accuracy (2)

Roller set bore diameter (F_w)



Deviation of the roller set bore diameter ;
$\Delta_{Fw} = (d_G + \delta_{1m}) - F_w$
Deviation of the minimum diameter of the roller set bore diameter ;
$\Delta_{Fw\,min} = (d_G + \delta_{1min}) - F_w$
(d_G) outside diameter of the master gauge
(δ_{1m}) arithmetical mean value of the amount of movement of the outer ring
(δ_{1min}) minimum value of the amount of movement of the outer ring

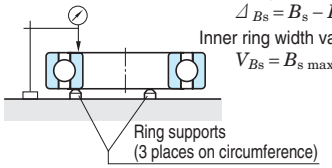
Roller set outside diameter (E_w)



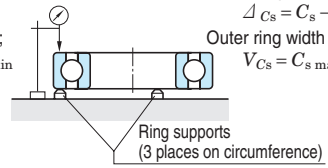
Deviation of the roller set outside diameter ;
$\Delta_{Ew} = (D_G + \delta_{2m}) - E_w$
(D_G) bore diameter of the master gauge
(δ_{2m}) arithmetical mean value of the amount of movement of the master gauge

Inner ring width (B)

Outer ring width (C)

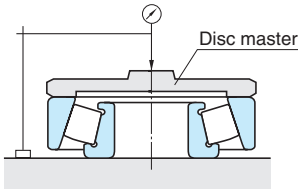


Deviation of a single inner ring width ;
$\Delta_{Bs} = B_s - B$
Inner ring width variation ;
$V_{Bs} = B_{s\,max} - B_{s\,min}$



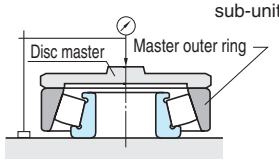
Deviation of a single outer ring width ;
$\Delta_{Cs} = C_s - C$
Outer ring width variation ;
$V_{Cs} = C_{s\,max} - C_{s\,min}$

Assembled bearing width of tapered roller bearing (T)

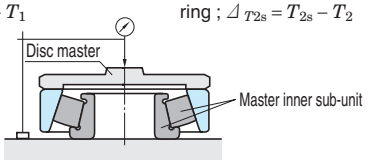


Deviation of the actual bearing width ; $\Delta_{Ts} = T_s - T$

Nominal effective width of tapered roller bearing (T_1, T_2)

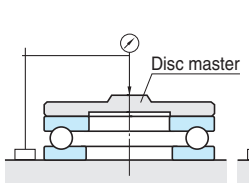


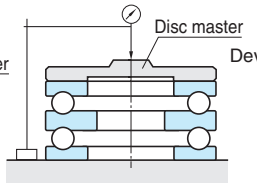
Deviation of the actual effective width of inner sub-unit ; $\Delta_{T1s} = T_{1s} - T_1$



Deviation of the actual effective width of outer ring ; $\Delta_{T2s} = T_{2s} - T_2$

Nominal height of thrust ball bearing with flat back face (T, T_1)

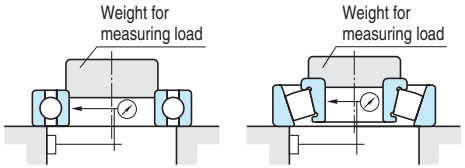




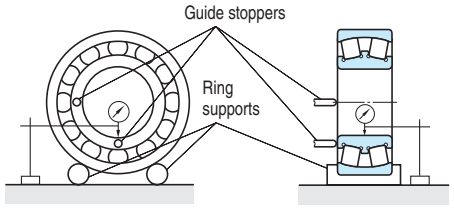
Deviation of the actual bearing height ;
$\Delta_{Ts} = T_s - T$ (single direction)
$\Delta_{T1s} = T_{1s} - T_1$ (double direction)

Running accuracy (1)

Radial runout of assembled bearing inner ring (K_{ia})

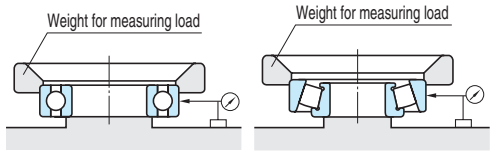


The radial runout of the inner ring (K_{ia}) shall be obtained as the difference between the maximum value and the minimum value of the readings of the measuring instrument, when the inner ring has been rotated through one rotation.

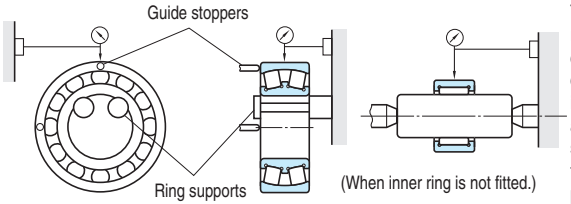


[Note]
The measurement of the radial runout of the inner ring of cylindrical roller bearings, machined ring needle roller bearings, self-aligning ball bearings and spherical roller bearings shall be carried out by fixing the outer ring with ring supports.

Radial runout of assembled bearing outer ring (K_{ea})

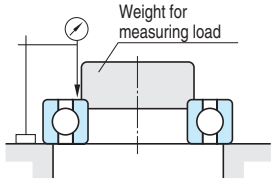


The measurement of outer ring runout (K_{ea}) shall be obtained as the difference between the maximum value and the minimum value of the readings of the measuring instrument, when the outer ring has been rotated through one rotation.



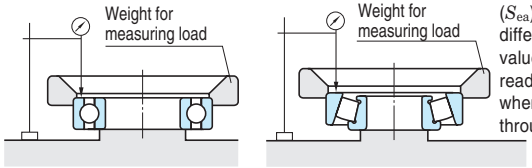
[Note]
The measurement of the radial runout of the outer ring of cylindrical roller bearings, machined ring needle roller bearings, self-aligning ball bearings and spherical roller bearings shall be carried out by fixing the inner ring with ring supports.

Axial runout of assembled bearing inner ring (S_{ia})



The axial runout of the inner ring (S_{ia}) shall be obtained as the difference between the maximum value and the minimum value of the readings of the measuring instrument, when the inner ring has been rotated through one rotation.

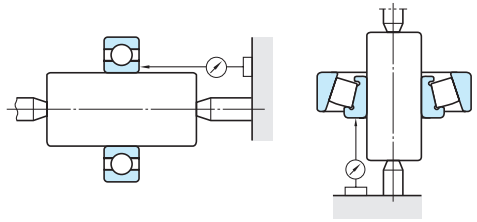
Axial runout of assembled bearing outer ring (S_{ea})



The axial runout of the outer ring (S_{ea}) shall be obtained as the difference between the maximum value and the minimum value of the readings of the measuring instrument, when the outer ring has been rotated through one rotation.

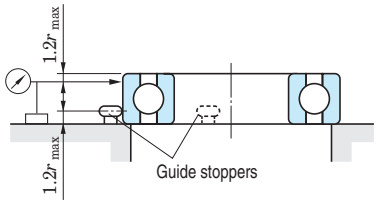
Running accuracy (2)

Perpendicularity of inner ring face with respect to the bore (S_d)



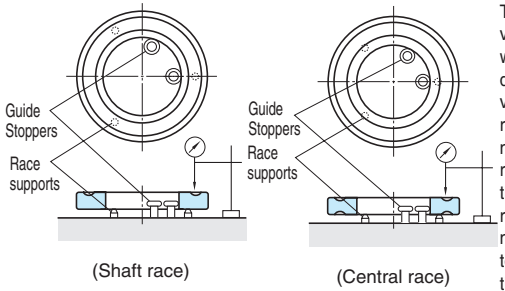
Perpendicularity of inner ring face (S_d) shall be obtained as the difference between the maximum value and the minimum value of the readings of the measuring instrument, when the inner ring has been rotated through one rotation with the tapered arbor.

Perpendicularity of outer ring outside surface with respect to the face (S_D)



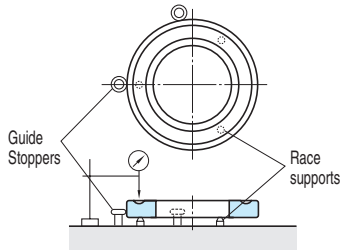
Perpendicularity of outer ring outside surface (S_D) shall be obtained as the difference between the maximum value and the minimum value of the readings of the measuring instrument, when the outer ring has been rotated through one rotation along the guide stopper.

Shaft/central race raceway to back face thickness variation of thrust ball bearing with flat back face (S_i)



The measurement of the thickness variation (S_i) of shaft race raceway track shall be obtained as the difference between the maximum value and the minimum value of the readings of the measuring instrument, when the shaft race has been rotated through one rotation along the guide stopper. For the central race, carry out the same measurement for the two raceway grooves to obtain the thickness variation of the raceway track (S_i).

Housing race raceway to back face thickness variation of thrust ball bearing with flat back face (S_e)



The measurement of the thickness variation (S_e) of housing race raceway track shall be obtained as the difference between the maximum value and the minimum value of the readings of the measuring instrument, when the housing race has been rotated through one rotation along the guide stopper.