<TABLE 4.2.3> Mechanical characteristic of zinc plated die casting
(KS D6005 = JIS H 5301 = ISO 301 = ASTM B 86)

Type	No.	Alloy	Tensile strength N/㎟	Extension percentage %	Impact value N·m/㎠	hardness HB(10 / 500)
class 2	ZDC 2	Zn-Al	285	10	140	82

<TABLE 4.2.4> Chemical characteristic of zinc plated die casting(%)

Type	No.	Al	Cu	Mg	Fe	Zn	Pb	Cd	Sn
class 2	ZDC 2	3.5 ~ 4.3	under 0.25	0.02 ~ 0.06	under 0.1	remainder	under 0.005	under 0.004	under 0.003

Reamrk : Corrosion is caused by impurities, so the sum should not exceed 0.01%.

4.3 Other components materials

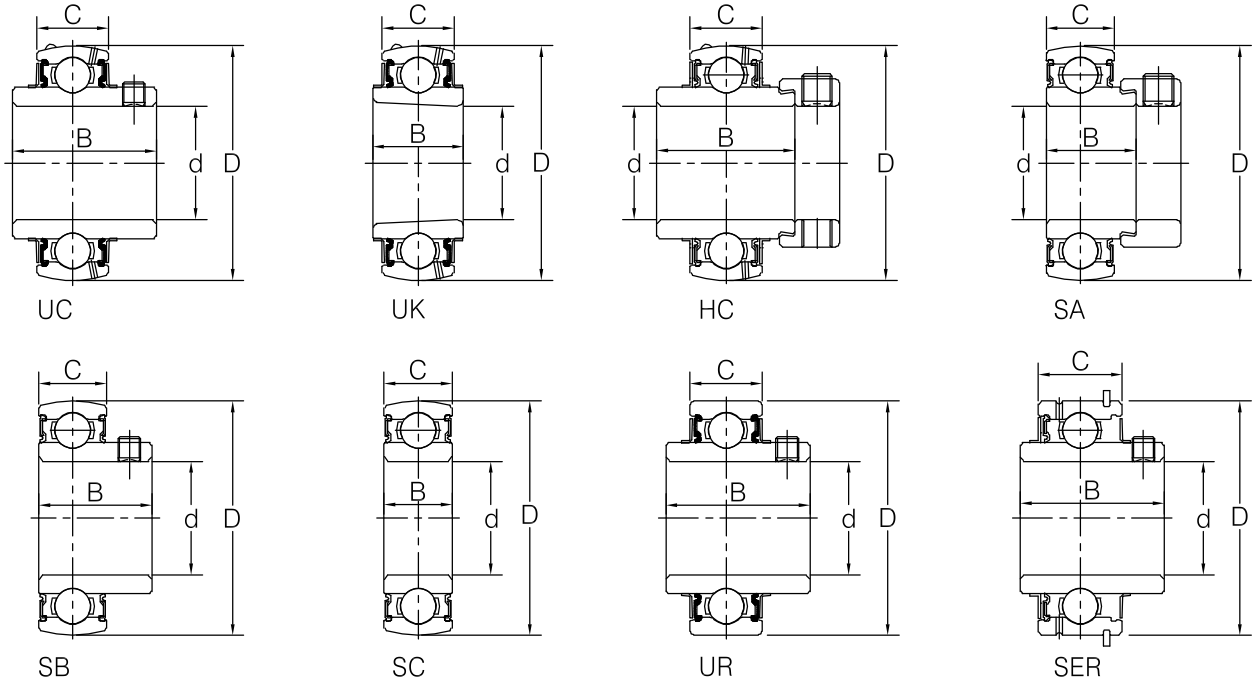
The materials for rolling bearing components are listed in Table 4.3.

<TABLE 4.3> Parts material

Component	Material	No.	KS standard No.
Steel ball	High carbonized chrome bearing steel	SUJ2	KS D 3525
Retainer	Cold rolling steel plate	SPCC	KS D 3512
Seal(heat resistant)	Fluorine synthetic rubber	FKM	
Seal(regular)	Nitrile compound rubber	NBR	
Shield	Cold rolled carbon steel	SCPI-S	KS D 3512
Cast-iron cover	Gray cast-iron, Class 3	GC200	KS D 4301
Stamped steel cover	Cold rolled carbon steel	SPCC	KS D 3512
Hexagonal set screw	Chromium-molybdenum steel	SCM435	KS D 3711
Hexagonal spanner	Chromiim-molybdenum steel	SCM435	KS D 3711
Grease nipple	Brass bar	C3604BE	KS D 5101
Eccentric self-locking collar	Machine use carbon steel	SM25C	KS D 3752
Sleeve adapter	Machine use carbon steel	SM25C	KS D 3752
Nut adapter	Machine use carbon steel	SM25C	KS D 3752
Adapter washer	Cold rolled carbon steel	SPCC	KS D 3512

5. Ball bearing unit accuracy

Ball bearing unit accuracy are based on KS B 2049 rolling bearing unit ball bearing and KS B 2050 rolling bearing unit bearing housing standards. JIB also follows the same accuracy standards for ball bearing production.



5.1 Bearing accuracy

<TABLE 5.1> Inner race accuracy

(unit : 0.001mm)

Nominal inside diameter, d(mm)		Inside diameter								Tolerance of inner race width Bi		Tolerance in radial run-out (Kia)
		UC, HC, UR, SER, SA, SB				SC						
		Tolerance of dm		Tolerance of d		Tolerance of dm		Tolerance of d				
over	incl.	max	min	max	min	max	min	max	min	max	min	max
10	18	+ 15	0	+ 19	- 4	0	- 8	+ 3	- 11	0	- 120	15
18	31.75	+ 18	0	+ 22	- 4	0	- 10	+ 3	- 13	0	- 120	18
31.75	50.8	+ 21	0	+ 25	- 5	0	- 12	+ 3	- 15	0	- 120	20
50.8	80	+ 24	0	+ 28	- 6	-	-	-	-	0	- 150	25
80	120	+ 28	0	+ 32	- 7	-	-	-	-	0	- 200	30
120	180	+ 33	0	+ 37	- 8	-	-	-	-	0	- 250	35

Remark : dm is an average diameter calculated from two point measurement of the minimum and maximum diameter.

<TABLE 5.2> Accuracy of inside diameter for Blower bearing unit(J5)

(unit : 0.001mm)

Nominal inside diameter, D		Tolerance of dm		Tolerance of d	
over	incl.	max	min	max	min
10	18	+ 13	0	+ 16	- 3
18	30	+ 13	0	+ 16	- 3
30	50	+ 13	0	+ 18	- 5
50	80	+ 15	0	+ 23	- 5
80	120	+ 18	0	+ 25	- 7
120	180	+ 23	0	+ 30	- 7

Remark : dm is an average diameter calculated from two point measurement of the minimum and maximum diameter.

<TABLE 5.3> Outer race accuracy

(unit : 0.001mm)

Nominal outside diameter, D(mm)		Tolerance of outside diameter, Dim		Tolerance in radial movement	
over	incl.	max	min	max	min
10	18	+ 13	0	+ 16	- 3
18	30	+ 13	0	+ 16	- 3
30	50	+ 13	0	+ 18	- 5
50	80	+ 15	0	+ 23	- 5
80	120	+ 18	0	+ 25	- 7
120	180	+ 23	0	+ 30	- 7

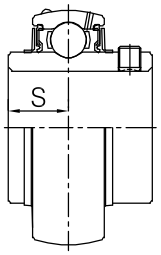
Remark : 1) The low side tolerance number for the bearing outside diameter Dm in the table does not apply when the distance from the outer race side is less than 1/4 of the outer race width.

2) Dm is an average diameter calculated from two point measurement of the maximum and minimum diamerter.

<TABLE 5.4> Distance between the center axis of the outer race to the inner race, S

(unit : 0.001mm)

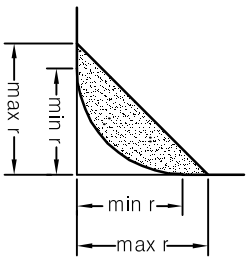
Nominal inside diameter, d(mm)	Tolerance of S
under 50	± 200
over 50 ~ 80	± 250
over 80 ~ 120	± 300
over 120 ~	± 350



<TABLE 5.5> Chamfering No.

(unit : mm)

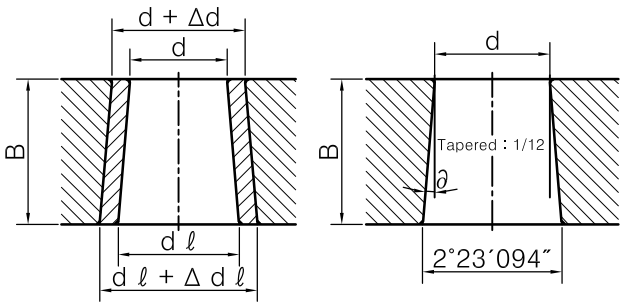
Chamfering radius r. No.	r	
	max	min
0.2	0.2	0.1
0.3	0.3	0.15
0.4	0.5	0.2
0.5	0.8	0.3
1	1.5	0.6
1.5	2	1
2	2.5	1.5
2.5	3	2
3	3.5	2.5
3.5	4	2.5
4	4.5	3
5	6	4



Remark : The Chamfering shape of the race ring should fall inside the shaded area shown in the figure. The shaded area does not represent the actual shape of the Chamfering race.

<TABLE 5.6> Tapered bore accuracy (unit : 0.001mm)

Nominal inside diameter, d(mm)		Tolerance of d		Tolerance of ($\Delta d\ell - \Delta d$)	
over	incl.	max	min	max	min
18	30	+ 33	0	+ 21	0
30	50	+ 39	0	+ 25	0
50	80	+ 46	0	+ 30	0
80	120	+ 54	0	+ 35	0
120	180	+ 63	0	+ 40	0



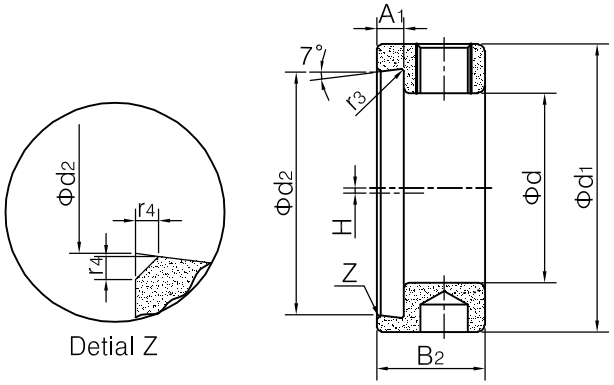
Remark : 1) Taper tolerance is defined as tolerance of ($\Delta d\ell - \Delta d$), $\Delta d\ell$ and Δd each represents the difference between the tolerances tolerances of the large and small end of the taper.

2) $d\ell$ is calculated by the following equation.

$d\ell = d + 0.08333\ B$, Here B : Inner race width Taper 1/12

5.2 Accuracy of eccentric locking race

In accuracy of JIB eccentric locking race conforming the tolerance in KS B 2049, please refer to the table as follows.



Remark : The mutual angle of drell hole, screw hole and eccentric location is selective.

<TABLE 5.7> Tolerance of eccentric locking race (unit : mm)

d(mm)		Tolerance of d		Tolerance of d_2		Tolerance of H	
over	incl.	max	min	max	min	max	min
10	36.512	+ 0.250	+ 0.025	+ 0.3	0	+ 0.1	- 0.1
36.512	5.562	+ 0.300	+ 0.025	+ 0.4	0	+ 0.1	- 0.1
55.562	61.912	+ 0.300	+ 0.025	+ 0.4	0	+ 0.1	- 0.1

<TABLE 5.8> Number and dimension of eccentric locking race (unit : mm)

No.	Dimensions							
	d (mm)	d_1 (max)	d_2	B_2	H	A_1	r_{3max}	r_{4min}
E201	12	28.6	21.6	13.5	0.8	4	0.4	0.8
E202	15	28.6	21.6	13.5	0.8	4	0.4	0.8
E203	17	28.6	21.6	13.5	0.8	4	0.4	0.8
E204	20	33.3	26.6	13.5	0.8	4	0.4	0.8
E205	25	38.1	31.6	13.5	0.8	4	0.4	0.8
E206	30	44.5	37.9	15.9	0.8	4	0.4	0.8
E207	35	55.6	44.7	17.5	0.8	4	0.4	0.8
E208	40	60.3	49.4	18.3	1.6	4.8	0.4	1.2
E209	45	63.5	54.4	18.3	1.6	4.8	0.4	1.2
E210	50	69.9	60	18.3	1.6	4.8	0.4	1.2
E211	55	76.2	66.9	20.7	1.6	4.8	0.4	1.2
E212	60	84.2	73.5	22.3	1.6	6.4	0.4	1.6

5.3 Housing accuracy

JIB housing's spherical inside diameter tolerance listed in the table below are based on clase H7.

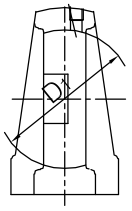
<TABLE 5.9> Classes for housing spherical inside diameter and their tolerances (unit : 0.001mm)

Nominal spherical inside diameter, D_1(mm)		Tolerance class H7				Tolerance class J7				Tolerance class K7			
		tolerance of D_{1m}		Tolerance of D_1		tolerance of D_{1m}		Tolerance of D_1		tolerance of D_{1m}		Tolerance of D_1	
over	incl.	max	min	max	min	max	min	max	min	max	min	max	min
30	50	+ 25	0	+ 30	- 5	+ 14	- 11	+ 19	- 16	+ 7	- 16	+ 12	- 23
50	80	+ 30	0	+ 36	- 6	+ 18	- 12	+ 19	- 18	+ 9	- 18	+ 15	- 27
80	120	+ 35	0	+ 42	- 7	+ 22	- 13	+ 29	- 20	+ 10	- 20	+ 17	- 32
120	180	+ 40	0	+ 48	- 8	+ 26	- 14	+ 34	- 22	+ 12	- 22	+ 20	- 36
180	250	+ 46	0	+ 55	- 9	+ 30	- 16	+ 39	- 25	+ 13	- 25	+ 22	- 42
250	315	+ 52	0	+ 62	- 10	+ 36	- 16	+ 46	- 26	+ 16	- 26	+ 26	- 46

Remark : 1) D_{1m} is calculated by the equation below where, D_{1max} and D_{1min} are maximum and minimum measurements of D_1.

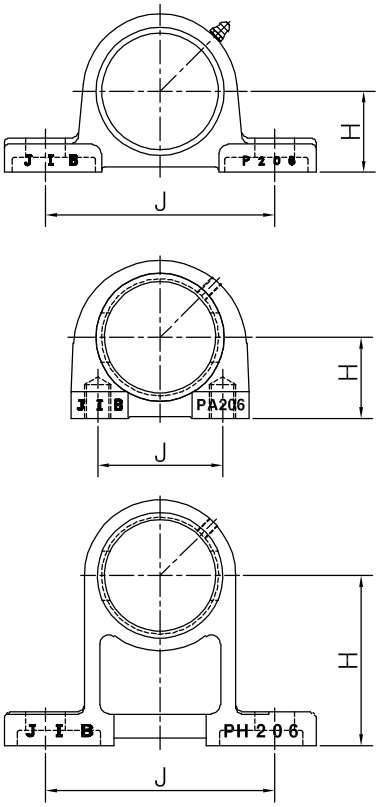
$$D_{1m} = \frac{D_{1max} + D_{1min}}{2}$$

2) JIB unit ball bearings have locking pins to prevent rotation of the outer race and therefore meets the H7 classification. Depending on the usage, SA and SB style housings which do not have locking pins are commonly classfied as J7.
In situations where shock loading and unbalanced operation is a common occurance, J7 or K7 classified units are needed for high strength and for preventing friction.



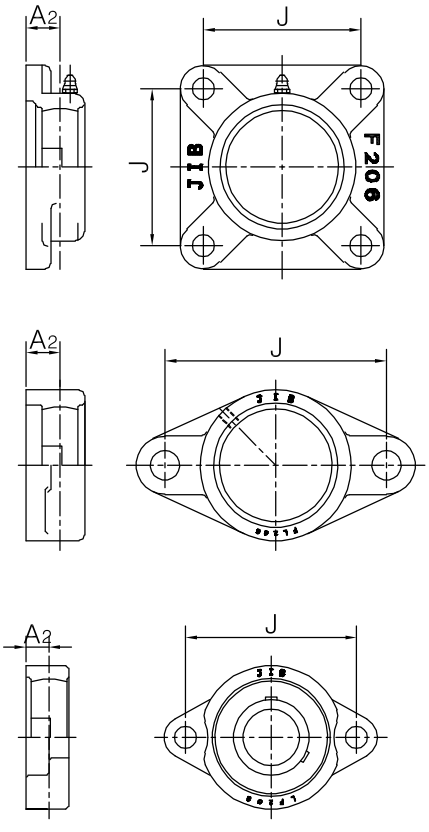
<TABLE 5.10> Pillow block(P, PA, IP, LP, PH) tolerances (unit : 0.001mm)

Housing No.			Tolerance of H	Tolerance of J
203			±150	±500
204				
205	305	X05		
206	306	X06		
207	307	X07		
208	308	X08		
209	309	X09		
210	310	X10		
211	311	X11	±200	±700
212	312	X12		
213	313	X13		
214	314	X14		
215	315	X15		
216	316	X16		
217	317	X17		
218	318	X18		
	319	–	±300	
	320	X20		
	321			
	322			
	324			
	326			
	328			



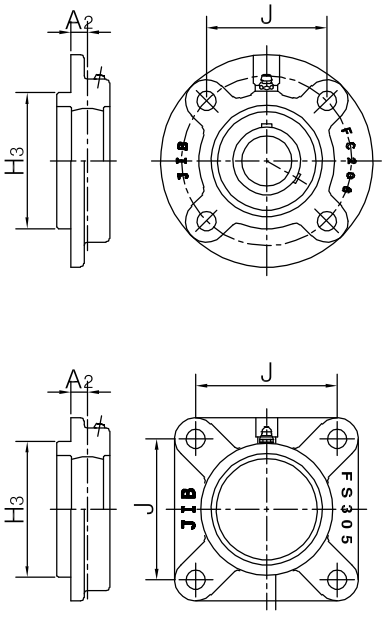
<TABLE 5.11> Flange unit(LF, F, FL) tolerances (unit : 0.001mm)

Housing No.			Tolerance of J	Tolerance of A_2
203			±150	±500
204				
205	305	X05		
206	306	X06		
207	307	X07		
208	308	X08		
209	309	X09		
210	310	X10		
211	311	X11	±1000	±800
212	312	X12		
213	313	X13		
214	314	X14		
215	315	X15		
216	316	X16		
217	317	X17		
218	318	X18		
	319	–		
	320	X20		
	321			
	322			
	324			
	326			
	328			



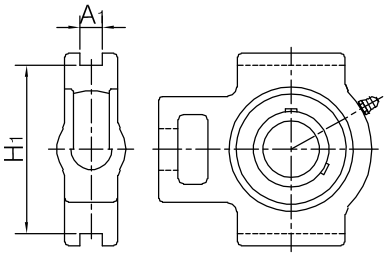
<TABLE 5.12> Piloted flange unit(FC, FS) tolerances (unit : 0.001mm)

Housing No.			Tolerance of J	Tolerance of A2	Tolerance of pilot lip run-out (maximum)	Tolerance of H3					
						FC2		FCX		FS3	
						max	min	max	min	max	min
204			±700	±500	200	0	-46	-	-	-	-
205	305	X05						0	-46	0	-46
206	306	X06									
207	307	X07								0	-54
208	308	X08				0	-54	0	-54		
209	309	X09									
210	310	X10								0	-63
211	311	X11	±1000	±800	300						
212	312	X12						0	-63		
213	313	X13				0	-63				
214	314	X14								0	-72
215	315	X15									
216	316	X16									
217	317	X17									
218	318	X18				0	-72				
	319	-			400	-	-	0	-72		
	320	X20									
	321									0	-81
	322										
	324							-	-		
	326									0	-89
	328										



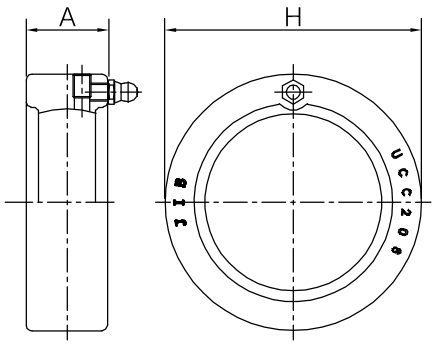
<TABLE 5.13> Take-up(T) tolerances (unit : 0.001mm)

Housing No.			Tolerance of A_1	Tolerance of H_1	Tolerance of parallel grooves on two sides(maximum)
204			+200 0	0 -500	500
205	305	X05			
206	306	X06			
207	307	X07			
208	308	X08			
209	309	X09			
210	310	X10			
211	311	X11	+300 0	0 -800	600
212	312	X12			
213	313	X13			
214	314	X14			
215	315	X15			
216	316	X16			
217	317	X17			
218	318	X18			
	319	-			700
	320	X20			
	321				
	322				
	324				800
	326				
	328				



<TABLE 5.14> Cartridge unit (C) tolerances (unit : 0.001mm)

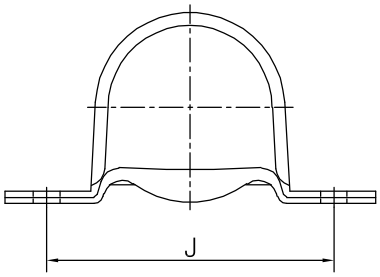
Housing No.			Tolerance of H						Tolerance of outside diameter run-out(maximum)	Tolerance of A
			2		3		X			
			max	min	max	min	max	min		
204			0	-30	-	-	-	-	200	±200
205	305	X05			0	-35	0	-35		
206	306	X06								
207	307	X07	0	-35						
208	308	X08								
209	309	X09								
210	310	X10								
211	311	X11	0	-40	0	-40	0	-40	300	±300
212	312	X12								
213	313	X13								
214	314	X14	-	-	0	-46	-	-		
215	315	X15								
216	316	X16								
217	317	X17								
218	318	X18								
	319	-								
	320	X20			0	-52			400	
	321									
	322									
	324									
	326				0	-57				
	328									



<TABLE 5.15>
Pressed steel pillow block(PP) tolerances

(unit : 0.001mm)

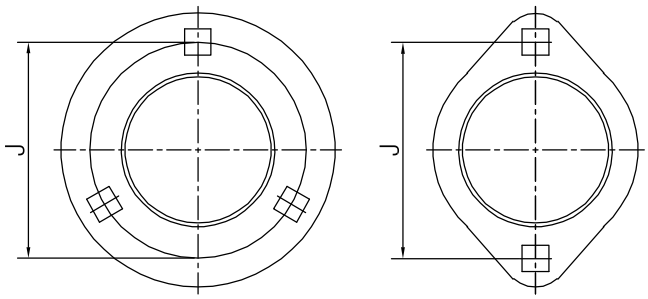
Housing No.	Tolerance of J
PP203	±400
PP204	
PP205	
PP206	
PP207	



<TABLE 5.16>
Pressed steel flange unit(PF,PFL) tolerances

(unit : 0.001mm)

Housing No.(PF, PFL)	Tolerance of J
203	±400
204	
205	
206	
207	



<TABLE 5.17> Dimensional accuracies which are not prescribed individually in dimensional accuracy of housings

Item	KS Standard No.	Grade
Permissible machining parts	KS B 0412 Normal tolerance - Section 1 : length dimension not indicated in individual tolerance and tolerance in angle	m
Castings parts	KS B 0250 Die-cast - dimension tolerance	CT9
Parts formed by press working	KS B 0413 Dimensional tolerance for metal processed items	C

The dimensional accuracies of permissible machining parts, castings and press working parts which are not prescribed in Table 5.9 ~ 5.16 follow KS standards listed in the below Table.

5.4 Bearing radial clearance

Bearing radial clearance has a large influence on the operating characteristics of the bearing unit such as bearing life, noise, vibration and heat generation. Therefore, full consideration of the radial clearance at the desired operating temperature should be made when selecting a bearing unit. The ball bearing unit radial clearance is standardized based on the reference table of KS B 21 02 (radial internal clearance of rolling bearing - deep grooved ball bearing). JIB's general purpose bearing is classified as C3. Consideration is based on the CN for the Cylindrical bore style unit and the sleeve inner race expansion for the tapered bore style unit. Specially ordered low temperature bearing should be of a class greater than C3. Class C2 bearing should be used in fan units or high speed operation bearings.

<TABLE 5.18> Bearing radial clearances

(unit : 0.001mm)

Nominal bearing inside diameter, d(mm)		Clearance									
		C2		CN		C3		C4		C5	
over	incl.	min	max	min	max	min	max	min	max	min	max
6	10	0	7	2	13	8	23	14	29	20	37
10	18	0	9	3	18	11	25	18	33	25	45
18	24	0	10	5	20	13	28	20	36	28	48
24	30	1	11	5	20	13	28	23	41	30	53
30	40	1	11	6	20	15	33	28	46	40	64
40	50	1	11	6	23	18	36	30	51	45	73
50	65	1	15	8	28	23	43	38	61	55	90
65	80	1	15	10	30	25	51	46	71	65	105
80	100	1	18	12	36	30	58	53	84	75	120
100	120	2	20	15	41	36	66	61	97	90	140
120	140	2	23	18	48	41	81	71	114	105	160

Remark : (1) Radial Clearance No. is measured at temperature of 20℃ without any external forces acting on any parts of the the bearing.

(2) Correction rate which is revising the radial clearance increasing rate by measuring load rate is based on the following table. In the clearance correction rate of C2 clearance, a small side is applied with minimum clearance and a big side is applied with maximum clearance.

(unit : 0.001mm)

Inner bore of bearing d(mm)		Measuring load		Correction rate of Clearance				
over	incl.	N	kgf	C2	CN	C3	C4	C5
2.5	18	24.5	2.5	3~4	4	4	4	4
18	50	49	5	4~5	5	6	6	6
50	280	147	15	6~8	8	9	9	9