



Internal clearance

The bearing radial clearance is an important parameter for the rotation movement. It depends on the installation tolerance between the bearing, the housing and the shaft. It also depends on the rotation speed, service temperature (specially the temperature differential between the interior and exterior rings), as well as of other function conditions.

Assuming shaft diameters toleranced from j5 to k5 and housing bore diameters toleranced at j6, **the normal radial clearance CN** is set up in such a way that with normal mounting clearances and operating conditions, the remaining radial clearance is sufficiently large..

An increase of the radial bearing clearance should be taken in consideration in the following cases:

- if, for reasons of sollicitation, heavy shafts or housing fits were needed.
- in case of high temperature differential between inner and outer rings.
- in case of high running temperatures.
- to increase the axial load capacity.
- to increase the acceptable adjustment angle and offset misalignments.

A radial bearing clearance decrease should be foreseen in following cases:

- for precise shaft guidance in a low housing fit.
- to create a small radial preload.

There are 5 other groups with standard radial bearing clearance:

- C2 : Clearance smaller as CN
- CN (C0) : Normal clearance
- C3 : Clearance bigger than CN
- C4 : Clearance bigger than C3
- MC : Only miniature bearings clearance

Axial clearance

The axial component of the internal clearance depends directly on the radial clearance and the radii of curvature of the raceway, which can be adapted in order to adjust the axial clearance. An empirical rule indicates that for a standard bearing, the axial clearance is approximately 10 times the radial clearance.

Running clearance

The running clearance is the residual radial play after assembly of the bearing operating in its environment. It is calculated considering adjustment limits and thermal expansion.

Tilt clearance

The variation of the angular position of one ring compared to the other creates a tilt clearance. The value of this angular clearance depends on the radial clearance, the bend radii of the ball tracks and the internal construction of the bearing. Excessive tilt clearance may result in increased noise level.

Values in [mm]		Values in [µm]							
Bore d		C2		CN		C3		C4	
more than	to	min	max	min	max	min	max	min	max
1,5	6	0	7	2	13	8	23	13	26
6	10	0	7	2	13	8	23	14	29
10	18	0	9	3	18	11	25	18	33
18	24	0	10	5	20	13	28	20	36
24	30	1	11	5	20	13	28	23	41
30	40	1	11	6	20	15	33	28	46
40	50	1	11	6	23	18	36	30	51
50	65	1	15	8	28	23	43	38	61
65	80	1	15	10	30	25	51	46	71

Tableaux des jeux radiaux normalisés pour les roulements à billes à gorge Standard radial clearance chart for deep groove ball bearings

Values in [mm]		Values in [µm]			
Bore d		CN		C3	
more than	to	min	max	min	max
2,5	6	3	11	8	21
6	10	3	11	8	21
10	18	3	13	11	22
18	24	5	17	13	25
24	30	5	17	13	28
30	40	5	17	15	29
40	50	6	20	18	33
50	65	8	25	23	40
65	80	10	28	25	48

Standard radial clearance chart for double raw ball bearings