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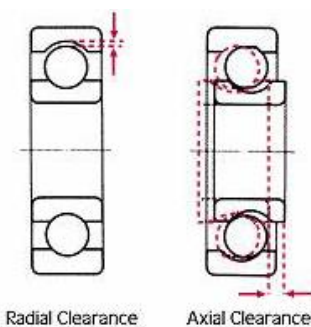
Internal Clearance

Internal clearance is the play within a ball bearing. It is the geometrical clearance between the inner ring, outer ring and ball. It is a critical factor in bearing selection that will directly impact bearing life. It is often overlooked, particularly as to how it is reduced by interference fits.

Radial clearance is the play between the ball and raceway perpendicular to the bearing axis. Axial clearance is the play parallel to the bearing axis and is typically at least 10 times greater than the radial clearance. Generally, internal radial clearance will be reduced 80% of the interference fit amount.

Too little or too much internal clearance will significantly influence factors such as heat, vibration, noise, and fatigue life.

In extreme applications that see high or low temperatures this clearance needs to be considered in the overall design to compensate for thermal expansion and contraction of housings and shafts.



Bearing Internal Clearance



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Selecting Bearing Clearance (General guidelines)		Clearance
Operating Condition		Clearance
Clearance fit on both inner and outer ring. Low to no axial loading. No preload. Low speeds. Little tolerance for play. Low temperature.		C2
Low torque. Standard loads. Light preload. Slight interference fit on inner or outer ring, not both. Low to medium speeds. Average temperature.		CN
Very low torque. High loads. Heavy interference fits. High temperature. Preloaded.		C3,C4,C5

Deep Groove Ball Bearing Radial Internal Clearance (Units: μm)											
Nominal Bore Diameter (mm)		Clearance									
		C2		CN (NORMAL)		C3		C4		C5	
over	incl	min	max	min	max	min	max	min	max	min	max
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
140	160	2	23	18	53	46	91	81	130	120	180
160	180	2	25	20	61	53	102	91	147	135	200
180	200	2	30	25	71	63	117	107	163	150	230
200	225	2	35	25	85	75	140	125	195	175	265
225	250	2	40	30	95	85	160	145	225	205	300
250	280	2	45	35	105	90	170	155	245	225	340
280	315	2	55	40	115	100	190	175	270	245	370
315	355	3	60	45	125	110	210	195	300	275	410

355	400	3	70	55	145	130	240	225	340	315	460
400	450	3	80	60	170	150	270	250	380	350	510
450	500	3	90	70	190	170	300	280	420	390	570
500	560	10	100	80	210	190	330	310	470	440	630
560	630	10	110	90	230	210	360	340	520	490	690
630	710	20	130	110	260	240	400	380	570	540	760
710	800	20	140	120	290	270	450	430	630	600	840

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