Reduction of Radial Clearance for Spherical Roller Bearings with Tapered Bores

Units: inch

Nominal Bore Diameter (mm)		Radial Internal Clearance (Inch)						Reduction in Radial Clearance		Axial Displacement*				Minimum Permissible Residual Clearance after Mounting
		CN		C3		C4				Taper 1:12		Taper 1:30		
from	to (incl.)	min	max	min	max	min	max	min	max	min	max	min	max	CN
31	40	0.0014	0.0020	0.0020	0.0026	0.0026	0.0033	0.0010	0.0012	0.016	0.018	-	-	0.0004
41	50	0.0018	0.0024	0.0024	0.0031	0.0031	0.0039	0.0012	0.0014	0.018	0.022	-	-	0.0006
51	65	0.0022	0.0030	0.0030	0.0037	0.0037	0.0047	0.0012	0.0014	0.018	0.022	-	-	0.0010
66	80	0.0028	0.0037	0.0037	0.0047	0.0047	0.0059	0.0016	0.0018	0.024	0.028	-	-	0.0012
81	100	0.0031	0.0043	0.0043	0.0055	0.0055	0.0071	0.0018	0.0022	0.028	0.034	0.069	0.085	0.0014
101	120	0.0039	0.0053	0.0053	0.0067	0.0067	0.0087	0.0020	0.0024	0.030	0.035	0.075	0.089	0.0018
121	140	0.0047	0.0063	0.0063	0.0079	0.0079	0.0102	0.0024	0.0028	0.035	0.043	0.089	0.108	0.0022
141	160	0.0051	0.0071	0.0071	0.0091	0.0091	0.0118	0.0026	0.0031	0.039	0.051	0.098	0.128	0.0024
161	180	0.0055	0.0079	0.0079	0.0102	0.0102	0.0134	0.0028	0.0035	0.043	0.055	0.108	0.138	0.0028
181	200	0.0063	0.0087	0.0087	0.0114	0.0114	0.0146	0.0031	0.0039	0.051	0.063	0.128	0.157	0.0028
201	225	0.0071	0.0098	0.0098	0.0126	0.0126	0.0161	0.0035	0.0043	0.055	0.067	0.138	0.167	0.0031
226	250	0.0079	0.0106	0.0106	0.0138	0.0138	0.0177	0.0039	0.0047	0.063	0.075	0.157	0.187	0.0035
251	280	0.0087	0.0118	0.0118	0.0154	0.0154	0.0193	0.0043	0.0055	0.067	0.087	0.167	0.217	0.0039
281	315	0.0094	0.0130	0.0130	0.0169	0.0169	0.0213	0.0047	0.0059	0.075	0.095	0.187	0.236	0.0043
316	355	0.0106	0.0142	0.0142	0.0185	0.0185	0.0232	0.0055	0.0067	0.087	0.106	0.217	0.266	0.0047
356	400	0.0118	0.0157	0.0157	0.0205	0.0205	0.0256	0.0059	0.0075	0.095	0.118	0.236	0.295	0.0051
401	450	0.0130	0.0173	0.0173	0.0224	0.0224	0.0283	0.0067	0.0083	0.106	0.130	0.266	0.325	0.0055
451	500	0.0146	0.0193	0.0193	0.0248	0.0248	0.0311	0.0075	0.0094	0.118	0.146	0.295	0.364	0.0063
501	560	0.0161	0.0213	0.0213	0.0268	0.0268	0.0343	0.0083	0.0106	0.134	0.169	0.335	0.433	0.0067
561	630	0.0181	0.0236	0.0236	0.0299	0.0299	0.0386	0.0091	0.0118	0.146	0.189	0.364	0.472	0.0079
631	710	0.0201	0.0264	0.0264	0.0335	0.0335	0.0429	0.0102	0.0130	0.165	0.209	0.413	0.512	0.0087
711	800	0.0224	0.0295	0.0295	0.0378	0.0378	0.0480	0.0110	0.0146	0.177	0.232	0.453	0.591	0.0094
801	900	0.0252	0.0331	0.0331	0.0421	0.0421	0.0539	0.0122	0.0161	0.197	0.260	0.492	0.650	0.0110
901	1000	0.0280	0.0366	0.0366	0.0469	0.0469	0.0598	0.0134	0.0181	0.217	0.291	0.551	0.728	0.0122

*Axial displacement values apply only to solid steel shafts or hollow steel shafts where the bore is equal to or less than one-half of the outside diameter. If the material is other than steel, or if thin wall journals are used, please consult NSK.

1:12 Taper applies to Series 222, 223, 230, 231, 232, 233 and 239. • 1:30 Taper applies to Series 240, 241 and 242.

For Pe less than 0.13Cr, use the lower half of the reduction range. For heavier loads or Pe greater than 0.13Cr, carburized or TL inner rings should be specified and the upper half of the reduction range can be used.

Mounting of Spherical Roller Bearings with Tapered Bores

Bearings with tapered bores are mounted on tapered shafts or adapters (Figs. 1 and 2).

The internal clearance of a bearing varies with the axial movement of the taper. Check the clearance before mounting the bearing. Axially displace the bearing until the radial clearance reduction equals the value calculated on the reverse side.

Measure radial clearance during mounting with a feeler gauge. As shown in Fig. 3, the clearances for both rows of rollers must be measured simultaneously, and these two values should be kept roughly the same by adjusting the relative position of the outer and inner rings.

The average of these two measurements, taken for both rows, may be used as the residual internal clearance.

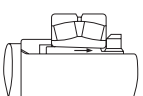

Fig. 1

Mounting with Adapter

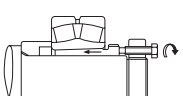

Fig. 2

Mounting with Withdrawal Sleeve

Measuring Clearance of Large Size Spherical Roller Bearings

When a large bearing is mounted on a shaft, the outer ring may be deformed into an oval shape by its own weight.

If the clearance is measured at the top of the deformed bearing, the measured value may be smaller than the true value. If an incorrect radial internal clearance is obtained in this manner and the values in the table on the reverse side of this card are used, then the actual interference fit may become too small. In large bearings (over 200mm) measurements should be taken at locations a, b, and c (shown on Fig. 4 below) and entered into the following equation:

radial clearance = (a + b + c)/2

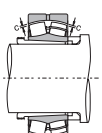

Fig. 3

Measuring Clearance of Spherical Roller Bearing

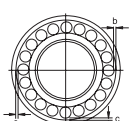

Fig. 4

Measuring Clearance of Large Size Spherical Roller Bearing

Determining Bearing Bore Size

Note: To obtain bore size, multiply the last two digits of part number by 5; e.g. part 22314 (14 x 5 = 70mm bore). Part numbers with bore sizes 500mm and larger are written with a slash, followed by the actual bore size; e.g. 232/710 (710 = bore size).

Example: The bearing to be mounted is a 22340CAMKE4C3 [200mm bore (40x5) with C3 clearance].

1. Using feeler gauges, the clearance in the bearing measures .0090".
2. From the "Reduction in Radial Clearance" column in the chart, the reduction in clearance is .0031" to .0039". Subtract these numbers from the measured clearance.

Measured Clearance	.0090"	.0090"
Reduction	.0031"	.0039"
Mounted Clearance	.0059"	.0051"

3. Bearing is installed by one of the recommended methods until the clearance in the bearing is within the mounted clearance range. For best results, mount bearing at the middle of the range.