SPHERICAL ROLLER BEARINGS

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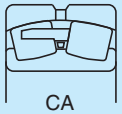
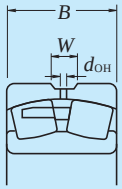
Cylindrical Bores, Tapered Bores
Bore Diameter 20 – 150mm ····· B184
Bore Diameter 160 – 560mm ····· B192
Bore Diameter 600 – 1400mm ····· B202

DESIGN, TYPES, AND FEATURES





Shown in the figures, types EA, C, CD, CA, which are designed for high load capacity, are available. Types EA, C and CD have pressed steel cages, and type CA has machined brass cages. The EA type bearings listed here are classified as NSKHPS bearings, which offer particularly high load-carrying capacity, high limiting speeds, and are highly functional under high-temperature operating conditions of up to 200°C.

An oil groove and holes are provided in the outer ring to supply lubricant and the bearing numbers are suffixed with E4.

To use bearings with oil grooves and holes, it is recommended to provide an oil groove in the housing bore, since the depth of the groove in the bearing is limited. The number and dimensions of the oil groove and holes are shown in Tables 1 and 2.

When bearings with a hole for a locking pin to prevent outer ring rotation are required, please inform NSK.

TOLERANCES AND RUNNING ACCURACY ····· Table 8.2 (Pages A60 to A63)
RECOMMENDED FITS ····· Table 9.2 (Page A84)
Table 9.4 (Page A85)
INTERNAL CLEARANCE ····· Table 9.15 (Page A92)

PERMISSIBLE MISALIGNMENT

The permissible misalignment of spherical roller bearings varies depending on the size and load, but it is approximately 0.018 to 0.045 radian (1° to 2.5°) with normal loads.

LIMITING SPEEDS

The limiting speeds listed in the bearing tables should be adjusted depending on the bearing load conditions. Also, higher speeds are attainable by making changes in the lubrication method, cage design, etc. Refer to Page A37 for detailed information.

Table 1 Dimensions of Oil Grooves and Holes Units : mm

Nominal Width B over	Nominal Width B incl.	Oil Groove Width W	Hole Diameter d_{OH}
18	30	5	2.5
30	40	6	3
40	50	7	4
50	65	8	5
65	80	10	6
80	100	12	8
100	120	15	10
120	160	20	12
160	200	25	15
200	250	30	20
250	315	35	20
315	400	40	25
400	—	40	25

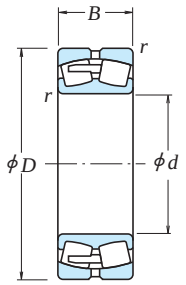
Table 2 Number of Oil Holes

Nominal Outer Ring Dia D (mm) over	Nominal Outer Ring Dia D (mm) incl.	Number of Holes
—	180	4
180	250	6
250	315	6
315	400	6
400	500	6
500	630	8
630	800	8
800	1000	8
1000	1250	8
1250	1600	8
1600	2000	8

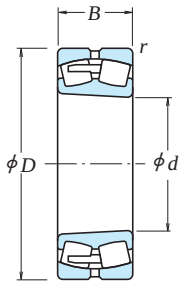
And if the load on spherical roller bearings becomes too small during operation or if the ratio of axial and radial loads is larger than the value of 'e'(listed in the bearing tables), slippage occurs between the rollers and raceways, which may result in smearing. The higher the weight of the rollers and cage, the higher this tendency becomes, especially for large spherical roller bearings.

If very small bearing loads are expected, please contact NSK for selection of an appropriate bearing.

Bore Diameter 160 – 190 mm



Cylindrical Bore

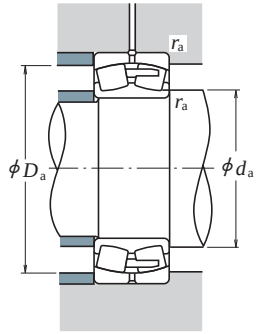


Tapered Bore

Without an Oil Groove and Holes

Boundary Dimensions (mm)				Basic Load Ratings (N)		Basic Load Ratings {kgf}		Limiting Speeds (min⁻¹)		Bearing
d	D	B	r min.	C_r	C_{0r}	C_r	C_{0r}	Grease	Oil	Cylindrical Bore
160	220	45	2	360 000	675 000	37 000	69 000	1 400	1 800	**23932CAE4**
	240	60	2.1	540 000	955 000	55 000	97 500	1 300	1 700	**23032CDE4**
	240	80	2.1	680 000	1 260 000	69 000	128 000	1 100	1 400	**24032CE4**
	270	86	2.1	855 000	1 400 000	87 000	143 000	1 000	1 300	**23132CE4**
	270	109	2.1	1 040 000	1 760 000	106 000	179 000	1 000	1 300	**24132CE4**
	290	80	3	910 000	1 320 000	93 000	135 000	1 200	1 500	**22232CDE4**
	290	104	3	1 100 000	1 770 000	112 000	180 000	1 000	1 300	**23232CE4**
	340	114	4	1 360 000	1 900 000	139 000	193 000	1 100	1 300	**22332CAE4**
170	230	45	2	350 000	660 000	35 500	67 500	1 400	1 800	**23934BCAE4**
	260	67	2.1	640 000	1 090 000	65 000	112 000	1 200	1 600	**23034CDE4**
	260	90	2.1	825 000	1 520 000	84 000	155 000	1 000	1 300	**24034CE4**
	280	88	2.1	940 000	1 570 000	96 000	160 000	1 000	1 300	**23134CE4**
	280	109	2.1	1 080 000	1 860 000	110 000	190 000	1 000	1 300	**24134CE4**
	310	86	4	990 000	1 500 000	101 000	153 000	1 100	1 400	**22234CDE4**
	310	110	4	1 200 000	1 910 000	122 000	195 000	900	1 200	**23234CE4**
	360	120	4	1 580 000	2 110 000	161 000	215 000	1 000	1 200	**22334CAE4**
180	250	52	2	470 000	890 000	48 000	90 500	1 200	1 600	**23936CAE4**
	280	74	2.1	750 000	1 270 000	76 000	129 000	1 200	1 400	**23036CDE4**
	280	100	2.1	965 000	1 750 000	98 500	178 000	950	1 200	**24036CE4**
	300	96	3	1 050 000	1 760 000	108 000	180 000	900	1 200	**23136CE4**
	300	118	3	1 190 000	2 040 000	121 000	208 000	900	1 200	**24136CE4**
	320	86	4	1 020 000	1 540 000	104 000	157 000	1 100	1 300	**22236CDE4**
	320	112	4	1 300 000	2 110 000	133 000	215 000	850	1 100	**23236CE4**
	380	126	4	1 740 000	2 340 000	177 000	238 000	950	1 200	**22336CAE4**
190	260	52	2	460 000	875 000	47 000	89 500	1 200	1 500	**23938CAE4**
	290	75	2.1	775 000	1 350 000	79 000	138 000	1 100	1 400	**23038CAE4**
	290	100	2.1	975 000	1 840 000	99 500	188 000	900	1 200	**24038CE4**
	320	104	3	1 190 000	2 020 000	121 000	206 000	850	1 100	**23138CE4**
	320	128	3	1 370 000	2 330 000	140 000	238 000	850	1 100	**24138CE4**
	340	92	4	1 140 000	1 730 000	116 000	176 000	1 000	1 200	**22238CAE4**
	340	120	4	1 440 000	2 350 000	147 000	240 000	800	1 100	**23238CE4**
	400	132	5	1 890 000	2 590 000	193 000	264 000	900	1 100	**22338CAE4**

Note (1) The suffix K or K30 represents bearings with tapered bores (taper 1 : 12 or 1 : 30).



Dynamic Equivalent Load

$P = XF_r + YF_a$

$F_a/F_r \leqq e$		$F_a/F_r > e$	
X	Y	X	Y
1	Y_3	0.67	Y_2

Static Equivalent Load

$P_0 = F_r + Y_0 F_a$

The values of e, Y_2, Y_3, and Y_0 are given in the table below.

Numbers	Abutment and Fillet Dimensions (mm)					Constant	Axial Load Factors			Mass (kg)
Tapered Bore(1)	d_a min.	d_a max.	D_a max.	D_a min.	r_a max.	e	Y_2	Y_3	Y_0	approx.
23932CAKE4	170	—	210	203	2	0.18	5.6	3.8	3.7	4.97
23032CDKE4	172	179	228	216	2	0.22	4.5	3.0	2.9	9.66
24032CK30E4	172	177	228	212	2	0.30	3.4	2.3	2.2	12.7
23132CKE4	172	185	258	234	2	0.30	3.4	2.3	2.2	20.3
24132CK30E4	172	179	258	229	2	0.39	2.6	1.7	1.7	25.4
22232CDKE4	174	190	276	255	2.5	0.26	3.8	2.6	2.5	23.1
23232CKE4	174	189	276	245	2.5	0.34	2.9	2.0	1.9	30.5
22332CAKE4	178	—	322	287	3	0.35	2.9	1.9	1.9	49.3
23934BCAKE4	180	—	220	213	2	0.17	5.8	3.9	3.8	5.38
23034CDKE4	182	191	248	233	2	0.23	4.3	2.9	2.8	13
24034CK30E4	182	188	248	228	2	0.31	3.2	2.2	2.1	17.3
23134CKE4	182	194	268	245	2	0.29	3.5	2.3	2.3	21.8
24134CK30E4	182	190	268	239	2	0.37	2.7	1.8	1.8	26.6
22234CDKE4	188	206	292	270	3	0.26	3.8	2.6	2.5	28.8
23234CKE4	188	201	292	261	3	0.34	2.9	2.0	1.9	36.4
22334CAKE4	188	—	342	304	3	0.35	2.9	1.9	1.9	57.9
23936CAKE4	190	—	240	230	2	0.18	5.5	3.7	3.6	7.64
23036CDKE4	192	202	268	249	2	0.24	4.2	2.8	2.8	17.1
24036CK30E4	192	200	268	245	2	0.32	3.1	2.1	2.0	22.7
23136CKE4	194	206	286	260	2.5	0.30	3.4	2.3	2.2	27.5
24136CK30E4	194	202	286	255	2.5	0.37	2.7	1.8	1.8	33.1
22236CDKE4	198	212	302	278	3	0.26	3.9	2.6	2.6	30.2
23236CKE4	198	211	302	274	3	0.33	3.0	2.0	2.0	38.9
22336CAKE4	198	—	362	322	3	0.34	2.9	2.0	1.9	67
23938CAKE4	200	—	250	240	2	0.18	5.7	3.8	3.7	8.03
23038CAKE4	202	—	278	261	2	0.24	4.2	2.8	2.8	17.6
24038CK30E4	202	210	278	253	2	0.31	3.2	2.2	2.1	24
23138CKE4	204	219	306	276	2.5	0.31	3.3	2.2	2.2	34.5
24138CK30E4	204	211	306	269	2.5	0.40	2.5	1.7	1.6	41.5
22238CAKE4	208	—	322	296	3	0.26	3.8	2.6	2.5	35.5
23238CKE4	208	222	322	288	3	0.35	2.9	1.9	1.9	47.6
22338CAKE4	212	—	378	338	4	0.34	2.9	2.0	1.9	77.6

Remarks For the dimensions of adapters and withdrawal sleeves, refer to Pages **B362** and **B368**.