

SPHERICAL ROLLER BEARINGS

SPHERICAL ROLLER BEARINGS

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.



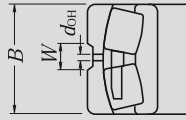
EA



C and CD



CA



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.

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 ϵ' (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.

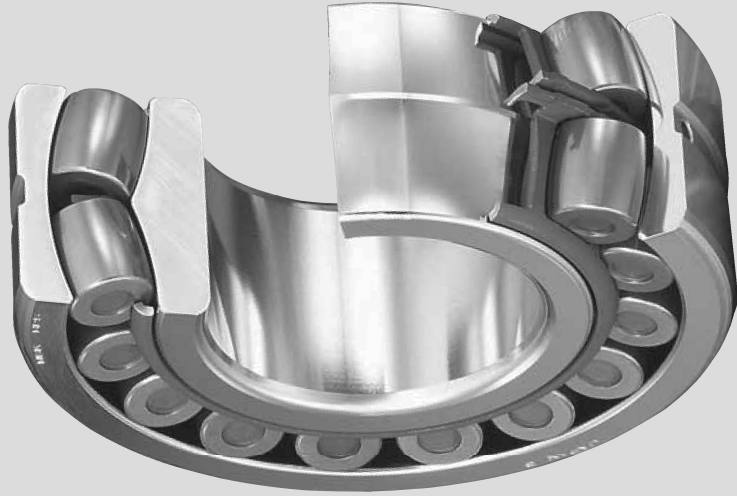
If very small bearing loads are expected, please contact NSK for selection of an appropriate bearing.

Table 2 Number of Oil Holes

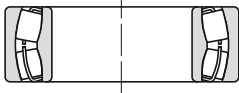
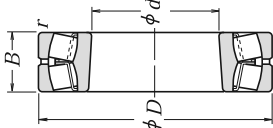
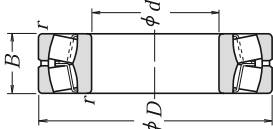
Nominal Outer Ring Dia D (mm)	Number of Holes	
	over	incl.
180	—	180
180	180	250
250	250	315
315	315	400
400	400	500
500	500	630
630	630	800
800	800	1000
1000	1000	1250
1250	1250	1600
1600	1600	2000

Table 1 Dimensions of Oil Grooves and Holes

Units : mm		Hole Diameter	
Nominal Width B		d_{OH}	
over	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



Bore Diameter 20 – 55 mm



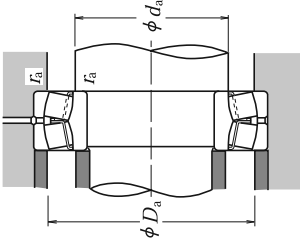
Cylindrical Bore

Tapered Bore

Without an Oil Groove or Holes

Boundary Dimensions (mm)		(N)		Basic Load Ratings {kgf}		Limiting Speeds (min ⁻¹)		Bearing
d	D	B	r	C _r	C _{0r}	C _r	C _{0r}	Cylindrical Bore
20	52	15	1.1	29 300	26 900	2 980	2 740	21304CDE4
						Grease	Oil	
25	52	18	1	37 500	37 000	3 850	3 800	22205CE4 21305CDE4
	62	17	1.1	43 000	40 500	4 350	4 150	
30	62	20	1	50 000	50 000	5 100	5 100	22206CE4 21306CDE4
	72	19	1.1	55 000	54 000	5 600	5 500	
35	72	23	1.1	69 000	71 000	7 050	7 200	22207CE4 21307CDE4
	80	21	1.5	71 500	76 000	7 250	7 750	
40	80	23	1.1	113 000	99 500	11 500	10 100	*22208EAE4 *21308EAE4 *22308EAE4
	90	23	1.5	118 000	111 000	12 000	11 300	
	90	33	1.5	170 000	153 000	17 300	15 600	
45	85	23	1.1	118 000	111 000	12 000	11 300	*22209EAE4 *21309EAE4 *22309EAE4
	100	25	1.5	149 000	144 000	15 200	14 600	
	100	36	1.5	207 000	195 000	21 100	19 900	
50	90	23	1.1	124 000	119 000	12 600	12 100	*22210EAE4 *21310EAE4 *22310EAE4
	110	27	2	178 000	174 000	18 100	17 800	
	110	40	2	246 000	234 000	25 100	23 900	
55	100	25	1.5	149 000	144 000	15 200	14 600	*22211EAE4 *21311EAE4 *22311EAE4
	120	29	2	178 000	174 000	18 100	17 800	
	120	43	2	292 000	292 000	29 800	29 800	

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



Dynamic Equivalent Load

$P = XF_r + YF_a$

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

Static Equivalent Load

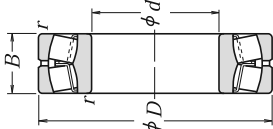
$P_0 = F_r + Y_0 F_a$

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

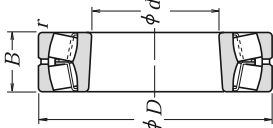
Numbers	Abutment and Fillet Dimensions (mm)				Constant	Axial Load Factors			Mass (kg)
Tapered Bore ⁽¹⁾	d_a min.	d_a max.	D_a min.	r_a max.	e	Y_2	Y_3	Y_0	approx.
21304CDE4	27	28	45	1	0.31	3.2	2.1	2.1	0.17
22205CE4 21305CDE4	31	31	46	1	0.35	2.9	1.9	1.9	0.17
	32	34	55	1	0.29	3.4	2.3	2.3	0.26
22206CE4 21306CDE4	36	37	56	1	0.33	3.1	2.1	2.0	0.27
	37	40	65	1	0.28	3.6	2.4	2.3	0.39
22207CE4 21307CDE4	42	43	65	1	0.32	3.1	2.1	2.0	0.42
	44	47	71	1.5	0.28	3.6	2.4	2.4	0.53
*22208EAE4 *21308EAE4 *22308EAE4	47	49	73	1	0.28	3.6	2.4	2.4	0.50
	49	54	81	1.5	0.25	3.9	2.7	2.6	0.73
	49	52	81	1.5	0.35	2.8	1.9	1.9	0.98
*22209EAE4 *21309EAE4 *22309EAE4	52	54	78	1	0.25	3.9	2.7	2.6	0.55
	54	65	91	1.5	0.23	4.3	2.9	2.8	0.96
	54	59	91	1.5	0.34	2.9	2.0	1.9	1.34
*22210EAE4 *21310EAE4 *22310EAE4	57	60	83	1	0.24	4.3	2.9	2.8	0.61
	60	72	100	2	0.23	4.4	3.0	2.9	1.21
	60	64	100	2	0.35	2.8	1.9	1.9	1.78
*22211EAE4 *21311EAE4 *22311EAE4	64	65	91	1.5	0.23	4.3	2.9	2.8	0.81
	65	72	110	2	0.23	4.4	3.0	2.9	1.58
	65	73	110	103	0.34	2.9	2.0	1.9	2.3

- Remarks
- The bearings denoted by an asterisk (*) are NSK/HPS bearings and an oil groove and holes are standard for them.
 - When making a selection of the recommended fit (Tolerance of Shaft) on Page A84 of the NSK Rolling Bearings catalog, in case of NSK/HPS bearings, the conditions are different.
The segmentations are: Light Loads ($\leq 0.05C_r$); Normal Loads (0.05 to $0.10C_r$); and Heavy Loads ($> 0.10C_r$).
 - For the dimensions of adapters and withdrawal sleeves, refer to Pages B358 – B359, and B366.

Bore Diameter 60 – 85 mm

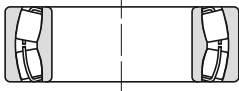


Cylindrical Bore



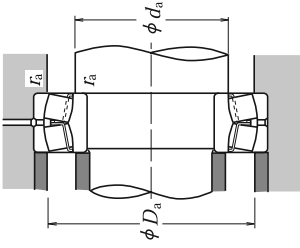
Tapered Bore

Without an Oil Groove or Holes



Boundary Dimensions (mm)			Basic Load Ratings (N)			Limiting Speeds (min ⁻¹)		Bearing	
d	D	B	C _r	C _{0r}	C _r	C _{0r}	Grease	Oil	Cylindrical Bore
60	95	26	98 500	141 000	10 000	14 400	3 600	4 500	23012CE4
	110	28	178 000	174 000	18 100	17 800	4 800	6 000	*22212EAE4
	130	31	238 000	244 000	24 200	24 900	3 800	4 800	*21312EAE4
	130	46	340 000	340 000	34 500	35 000	3 600	4 500	*22312EAE4
65	120	31	221 000	230 000	22 500	23 500	4 300	5 300	*22213EAE4
	140	33	264 000	275 000	27 000	28 000	3 600	4 500	*21313EAE4
	140	48	375 000	380 000	38 000	38 500	3 200	4 000	*22313EAE4
70	125	31	225 000	232 000	22 900	23 600	4 000	5 300	*22214EAE4
	150	35	310 000	325 000	32 000	33 500	3 200	4 000	*21314EAE4
	150	51	425 000	435 000	43 500	44 000	3 000	3 800	*22314EAE4
75	130	31	238 000	244 000	24 200	24 900	4 000	5 000	*22215EAE4
	160	37	310 000	325 000	32 000	33 500	3 200	4 000	*21315EAE4
	160	55	485 000	505 000	49 500	51 500	2 800	3 600	*22315EAE4
80	140	33	264 000	275 000	27 000	28 000	3 600	4 500	*22216EAE4
	170	39	355 000	375 000	36 000	38 000	3 000	3 800	*21316EAE4
	170	58	540 000	565 000	55 000	58 000	2 600	3 400	*22316EAE4
85	150	36	310 000	325 000	32 000	33 500	3 400	4 300	*22217EAE4
	180	41	360 000	395 000	37 000	40 000	3 000	4 000	*21317EAE4
	180	60	600 000	630 000	61 000	64 000	2 400	3 200	*22317EAE4

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

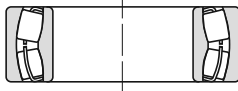
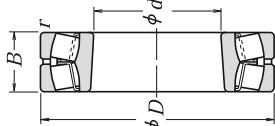
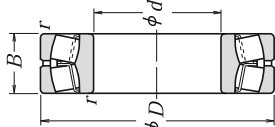


Numbers	Abutment and Fillet Dimensions (mm)					Constant	Axial Load Factors			Mass (kg)
	d _a min	d _a max	D _a min	D _a max	r _a max		Y ₂	Y ₃	Y ₀	
23012CKE4	67	68	85	88	1	0.26	3.9	2.6	2.5	0.68
*22212EAE4	69	72	98	101	1.5	0.23	4.4	3.0	2.9	1.1
*21312EAE4	72	87	117	118	2	0.22	4.5	3.0	3.0	1.98
*22312EAE4	72	79	111	118	2	0.34	3.0	2.0	1.9	2.89
*22213EAE4	74	80	111	111	1.5	0.24	4.2	2.8	2.7	1.51
*21313EAE4	77	94	128	128	2	0.22	4.6	3.1	3.0	2.45
*22313EAE4	77	84	119	128	2	0.33	3.0	2.0	2.0	3.52
*22214EAE4	79	84	116	116	1.5	0.23	4.3	2.9	2.8	1.58
*21314EAE4	82	101	138	138	2	0.22	4.6	3.1	3.0	3.0
*22314EAE4	82	91	138	138	2	0.33	3.0	2.0	2.0	4.28
*22215EAE4	84	87	121	121	1.5	0.22	4.5	3.0	3.0	1.64
*21315EAE4	87	101	148	148	2	0.22	4.6	3.1	3.0	3.64
*22315EAE4	87	97	137	148	2	0.33	3.0	2.0	2.0	5.26
*22216EAE4	90	94	130	130	2	0.22	4.6	3.1	3.0	2.01
*21316EAE4	92	109	158	158	2	0.23	4.4	3.0	2.9	4.32
*22316EAE4	92	103	145	158	2	0.33	3.0	2.0	2.0	6.23
*22217EAE4	95	101	140	140	2	0.22	4.6	3.1	3.0	2.54
*21317EAE4	99	108	166	166	2.5	0.24	4.3	2.9	2.8	5.2
*22317EAE4	99	110	166	166	2.5	0.33	3.1	2.1	2.0	7.23

Remarks

- The bearings denoted by an asterisk (*) are NSK/PS bearings and an oil groove and holes are standard for them.
- When making a selection of the recommended fit (Tolerance of Shaft) on Page A84 of the NSK Rolling Bearings catalog, in case of NSK/PS bearings, the conditions are different.
The segmentations are: Light Loads (≤0.05C_r); Normal Loads (0.05 to 0.10C_r); and Heavy Loads (>0.10C_r).
- For the dimensions of adapters and withdrawal sleeves, refer to Pages **B359 – B361**, and **B366**.

Bore Diameter 90 – 110 mm



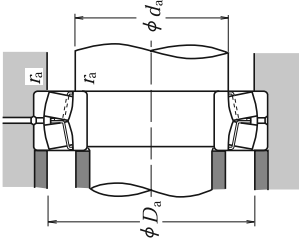
Cylindrical Bore

Tapered Bore

Without an Oil Groove or Holes

Boundary Dimensions (mm)			(N)			{kgf}		Limiting Speeds (min ⁻¹)		Bearing	
d	D	B	C _r	C _{0r}	C _{0r}	C _r	C _{0r}	Grease	Oil	Cylindrical Bore	
90	160	40	360 000	395 000	40 000	37 000	40 000	3 200	4 000	*22218EAE4	
	160	52.4	340 000	490 000	50 000	34 500	50 000	1 800	2 400	23218CE4	
	190	43	415 000	450 000	46 000	42 000	46 000	2 800	3 600	*24131EAE4	
	190	64	665 000	705 000	72 000	68 000	72 000	2 400	3 000	*22318EAE4	
95	170	43	415 000	450 000	46 000	42 000	46 000	3 000	3 800	*22219EAE4	
	170	55.6	370 000	525 000	53 500	37 500	53 500	1 700	2 200	23219CE4	
	200	45	345 000	435 000	44 500	35 000	44 500	1 500	2 000	21319CE4	
	200	67	735 000	780 000	79 500	75 000	79 500	2 200	2 800	*22319EAE4	
100	150	37	212 000	335 000	34 500	21 600	34 500	2 200	2 800	23020CE4	
	150	50	276 000	470 000	48 000	28 100	48 000	1 800	2 400	24020CE4	
	165	52	345 000	530 000	54 000	35 500	54 000	1 700	2 200	23120CE4	
110	165	65	345 000	535 000	55 000	35 000	55 000	1 700	2 200	24120CAE4	
	180	46	455 000	490 000	50 000	46 500	50 000	2 800	3 600	*22220EAE4	
	180	60.3	420 000	605 000	61 500	42 500	61 500	1 600	2 200	23220CE4	
110	170	45	293 000	465 000	47 500	29 900	47 500	2 000	2 400	23022CE4	
	170	60	380 000	645 000	66 000	38 500	66 000	1 600	2 200	24022CE4	
	180	56	385 000	630 000	64 000	39 500	64 000	1 600	2 000	23122CE4	
110	180	69	460 000	750 000	76 500	47 000	76 500	1 600	2 000	24122CE4	
	200	53	605 000	645 000	66 000	61 500	66 000	2 600	3 200	*22222EAE4	
	200	69.8	515 000	760 000	77 500	52 500	77 500	1 500	1 900	23222CE4	
Note	240	50	450 000	545 000	55 500	46 000	55 500	1 300	1 700	21322CAE4	
	240	80	1030 000	1 120 000	115 000	105 000	115 000	1 900	2 400	*22322EAE4	

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



Dynamic Equivalent Load

$P = XF_r + YF_a$

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

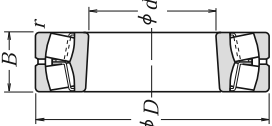
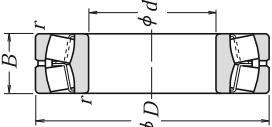
Static Equivalent Load

$P_0 = F_r + Y_0 F_a$

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.
*22218EAKE4	100	108	150	142	2	0.24	4.3	2.9	2.8	3.3
23218CEKE4	100	105	150	138	2	0.32	3.2	2.1	2.1	4.51
*21318EAKE4	104	115	176	152	2.5	0.24	4.3	2.9	2.8	6.1
*22318EAKE4	104	115	176	163	2.5	0.33	3.1	2.1	2.0	8.56
*22219EAKE4	107	115	158	152	2	0.24	4.3	2.9	2.8	4.04
23219CEAKE4	107	—	158	146	2	0.32	3.1	2.1	2.0	5.33
21319CKE4	109	127	186	172	2.5	0.22	4.6	3.1	3.0	6.92
*22319EAKE4	109	121	186	172	2.5	0.33	3.1	2.1	2.0	9.91
23020CDKE4	109	112	141	136	1.5	0.22	4.6	3.1	3.0	2.31
24020CK30E4	109	110	141	132	1.5	0.30	3.4	2.3	2.2	3.08
23120CKE4	110	113	155	144	2	0.30	3.4	2.3	2.2	4.38
24120CAK30E4	110	—	155	143	2	0.35	2.9	1.9	1.9	5.42
*22220EAKE4	112	119	168	160	2	0.24	4.3	2.9	2.8	4.84
23220CKE4	112	118	168	155	2	0.32	3.2	2.1	2.1	6.6
21320CKE4	114	133	201	184	2.5	0.21	4.7	3.2	3.1	8.46
*22320EAKE4	114	130	201	184	2.5	0.33	3.0	2.0	2.0	12.7
23022CDKE4	120	124	160	153	2	0.24	4.2	2.8	2.8	3.76
24022CK30E4	120	121	160	148	2	0.32	3.1	2.1	2.1	4.96
23122CKE4	120	127	170	158	2	0.28	3.5	2.4	2.3	5.7
24122CK30E4	120	123	170	154	2	0.36	2.8	1.9	1.8	6.84
*22222EAKE4	122	129	188	178	2	0.25	4.0	2.7	2.6	6.99
23222CKE4	122	130	188	170	2	0.34	3.0	2.0	1.9	9.54
21322CAKE4	124	—	226	206	2.5	0.22	4.6	3.1	3.0	11.2
*22322EAKE4	124	145	226	206	2.5	0.33	3.1	2.1	2.0	17.6

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 - For the dimensions of adapters and withdrawal sleeves, refer to Pages B360 – B361, and B366 – B367.

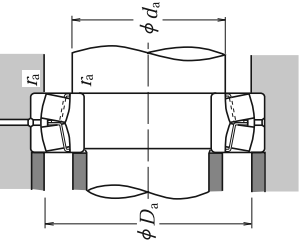


Cylindrical Bore

Tapered Bore

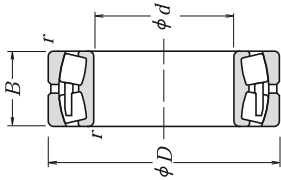
Without an Oil Groove or Holes

Boundary Dimensions (mm)				Basic Load Ratings (N)				Limiting Speeds (min ⁻¹)		Bearing
d	D	B	r _{min.}	C _r	C _{0r}	C _r	C _{0r}	Grease	Oil	Cylindrical Bore
120	180	46	2	315 000	525 000	32 000	53 500	1 800	2 200	23024CDE4
	180	60	2	395 000	705 000	40 500	72 000	1 500	2 000	24024CE4
	200	62	2	465 000	720 000	47 500	73 500	1 400	1 800	23124CE4
	200	80	2	575 000	950 000	58 500	96 500	1 400	1 800	24124CE4
130	215	58	2,1	685 000	765 000	70 000	78 000	2 400	3 000	*22224EAE4
	215	76	2,1	630 000	970 000	64 500	99 000	1 300	1 700	23224CE4
	260	86	3	1 190 000	1 320 000	122 000	134 000	1 700	2 200	*22324EAE4
	200	52	2	400 000	655 000	40 500	67 000	1 700	2 000	23026CDE4
140	210	69	2	495 000	865 000	50 500	88 000	1 400	1 800	24026CE4
	210	64	2	505 000	825 000	51 500	84 500	1 300	1 700	23126CE4
	210	80	2	590 000	1 010 000	60 000	103 000	1 300	1 700	24126CE4
	230	64	3	820 000	940 000	83 500	96 000	2 200	2 600	*22226EAE4
150	230	80	3	700 000	1 080 000	71 500	110 000	1 200	1 600	23226CE4
	280	93	4	995 000	1 350 000	101 000	137 000	1 300	1 600	22326CE4
	210	53	2	420 000	715 000	43 000	73 000	1 600	1 900	23028CDE4
	210	69	2	525 000	945 000	53 500	96 500	1 300	1 700	24028CE4
160	225	68	2,1	580 000	945 000	59 000	96 500	1 200	1 600	23128CE4
	225	85	2,1	670 000	1 160 000	68 500	118 000	1 200	1 600	24128CE4
	250	68	3	645 000	930 000	65 500	95 000	1 400	1 700	22228CDE4
	250	88	3	835 000	1 300 000	85 000	133 000	1 100	1 500	23228CE4
170	300	102	4	1 160 000	1 590 000	118 000	162 000	1 200	1 500	22328CE4
	225	56	2,1	470 000	815 000	48 000	83 000	1 400	1 800	23030CDE4
	225	75	2,1	590 000	1 090 000	60 500	111 000	1 200	1 500	24030CE4
	250	80	2,1	725 000	1 180 000	74 000	121 000	1 100	1 400	23130CE4
180	250	100	2,1	890 000	1 530 000	91 000	156 000	1 100	1 400	24130CE4
	270	73	3	765 000	1 120 000	78 000	114 000	1 300	1 600	22230CDE4
	270	96	3	975 000	1 560 000	99 500	159 000	1 100	1 400	23230CE4
	320	108	4	1 220 000	1 690 000	125 000	172 000	1 100	1 400	22330CAE4

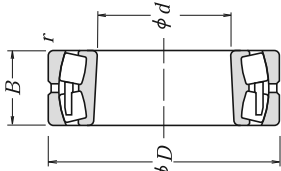


Numbers		Abutment and Fillet Dimensions (mm)					Constant	Axial Load Factors			Mass (kg)
Tapered Bore ⁽¹⁾		d_a		D_a		r_a	e	Y_2	Y_3	Y_0	approx.
		min.	max.	max.	min.	max.					
23024CDKE4 24024CK30E4 23124CKE4		130	134	170	163	2	0.22	4.5	3.0	2.9	4.11
		130	131	170	158	2	0.32	3.2	2.1	2.1	5.33
		130	138	190	175	2	0.29	3.5	2.4	2.3	7.85
24124CK30E4 *22224EAKE4 23224CKE4 *22324EAKE4		130	136	190	171	2	0.37	2.7	1.8	1.8	10
		132	142	203	190	2	0.25	3.9	2.7	2.6	8.8
		132	140	203	182	2	0.34	2.9	2.0	1.9	12.1
		134	157	246	222	2.5	0.32	3.1	2.1	2.0	22.2
23026CDKE4 24026CK30E4 23126CKE4		140	147	190	180	2	0.23	4.3	2.9	2.8	5.98
		140	143	190	175	2	0.31	3.2	2.2	2.1	7.84
		140	149	200	184	2	0.28	3.6	2.4	2.4	8.69
24126CK30E4 *22226EAKE4 23226CKE4 22326CKE4		140	146	200	180	2	0.35	2.9	1.9	1.9	10.7
		144	152	216	204	2.5	0.26	3.8	2.6	2.5	11
		144	150	216	196	2.5	0.34	2.9	2.0	1.9	14.3
		148	166	262	236	3	0.34	2.9	2.0	1.9	28.1
23028CDKE4 24028CK30E4 23128CKE4		150	157	200	190	2	0.22	4.5	3.0	2.9	6.49
		150	154	200	186	2	0.29	3.4	2.3	2.2	8.37
		152	158	213	198	2	0.28	3.6	2.4	2.3	10.5
24128CK30E4 22228CDKE4 23228CKE4 22328CKE4		152	156	213	193	2	0.35	2.9	1.9	1.9	13
		154	167	236	219	2.5	0.25	4.0	2.7	2.6	14.5
		154	163	236	213	2.5	0.35	2.9	1.9	1.9	18.8
		158	177	282	253	3	0.35	2.9	1.9	1.9	35.4
23030CDKE4 24030CK30E4 23130CKE4		162	168	213	203	2	0.22	4.6	3.1	3.0	7.9
		162	165	213	198	2	0.30	3.4	2.3	2.2	10.5
		162	174	238	218	2	0.30	3.4	2.3	2.2	15.8
24130CK30E4 22230CDKE4 23230CKE4 22330CAKE4		162	169	238	212	2	0.38	2.6	1.8	1.7	19.8
		164	179	256	236	2.5	0.26	3.9	2.6	2.5	18.4
		164	176	256	230	2.5	0.35	2.9	1.9	1.9	24.2
		168	—	302	270	3	0.35	2.9	1.9	1.9	41.5

- Remarks**
- The bearings denoted by an asterisk (*) are NSKHPS bearings and an oil groove and holes are standard for them.
 - When making a selection of the recommended fit (Tolerance of Shaft) on Page A84 of the NSK Rolling Bearings catalog, in case of NSKHPS bearings, the conditions are different.
The segmentations are: Light Loads (≤0.05C_r); Normal Loads (0.05 to 0.10C_r); and Heavy Loads (>0.10C_r).
 - For the dimensions of adapters and withdrawal sleeves, refer to Pages B361 – B362, and B367 – B368.

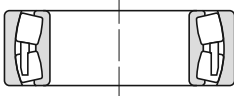


Cylindrical Bore



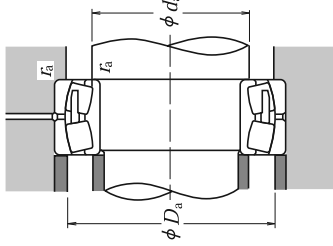
Tapered Bore

Without an Oil Groove and Holes



Boundary Dimensions (mm)		(N)		Basic Load Ratings {kgf}		Limiting Speeds (min ⁻¹)		Bearing	
d	D	B	r	C _r	C _{0r}	C _r	C _{0r}	Grease	Oil
160	220	45	2	360 000	675 000	37 000	69 000	1 400	1 800
	240	60	2.1	540 000	955 000	55 000	97 500	1 300	1 700
	240	80	2.1	680 000	1 260 000	69 000	128 000	1 100	1 400
	270	86	2.1	855 000	1 400 000	87 000	143 000	1 000	1 300
	270	109	2.1	1 040 000	1 760 000	106 000	179 000	1 000	1 300
170	290	80	3	910 000	1 320 000	93 000	135 000	1 200	1 500
	290	104	3	1 100 000	1 770 000	112 000	180 000	1 000	1 300
	340	114	4	1 360 000	1 900 000	139 000	193 000	1 100	1 300
	230	45	2	350 000	660 000	35 500	67 500	1 400	1 800
	260	67	2.1	640 000	1 090 000	65 000	112 000	1 200	1 600
180	260	90	2.1	825 000	1 520 000	84 000	155 000	1 000	1 300
	280	88	2.1	940 000	1 570 000	96 000	160 000	1 000	1 300
	280	109	2.1	1 080 000	1 860 000	110 000	190 000	1 000	1 300
	310	86	4	990 000	1 500 000	101 000	153 000	1 100	1 400
	310	110	4	1 200 000	1 910 000	122 000	195 000	900	1 200
190	360	120	4	1 580 000	2 110 000	161 000	215 000	1 000	1 200
	250	52	2	470 000	890 000	48 000	90 500	1 200	1 600
	280	74	2.1	750 000	1 270 000	76 000	129 000	1 200	1 400
	280	100	2.1	965 000	1 750 000	98 500	178 000	950	1 200
	300	96	3	1 050 000	1 760 000	108 000	180 000	900	1 200
190	300	118	3	1 190 000	2 040 000	121 000	208 000	900	1 200
	320	86	4	1 020 000	1 540 000	104 000	157 000	1 100	1 300
	320	112	4	1 300 000	2 110 000	133 000	215 000	850	1 100
	380	126	4	1 740 000	2 340 000	177 000	238 000	950	1 200
	260	52	2	460 000	875 000	47 000	89 500	1 200	1 500
190	290	75	2.1	775 000	1 350 000	79 000	138 000	1 100	1 400
	290	100	2.1	975 000	1 840 000	99 500	188 000	900	1 200
	320	104	3	1 190 000	2 020 000	121 000	206 000	850	1 100
	320	128	3	1 370 000	2 330 000	140 000	238 000	850	1 100
	340	92	4	1 140 000	1 730 000	116 000	176 000	1 000	1 200
Note	340	120	4	1 440 000	2 350 000	147 000	240 000	800	1 100
	400	132	5	1 890 000	2 590 000	193 000	264 000	900	1 100

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



Dynamic Equivalent Load

$P = XF_r + YF_a$

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

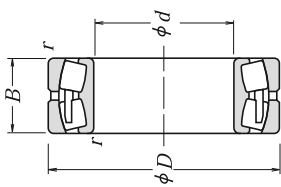
Static Equivalent Load

$P_0 = F_r + Y_0 F_a$

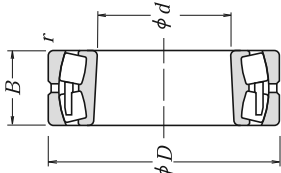
The values of e , Y_2 , Y_3 , and Y_0 are given in the table below.

Numbers	Abutment and Fillet Dimensions (mm)					Constant	Axial Load Factors			Mass (kg)
	d_a		D_a		r_a		Y_2	Y_3	Y_0	
Tapered Bore(I)	min.	max.	max.	min.	max.	e				
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
223232CKE4	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
223238CKE4	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

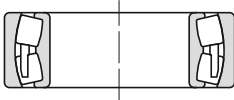
Remarks For the dimensions of adapters and withdrawal sleeves, refer to Pages B362 and B368.



Cylindrical Bore



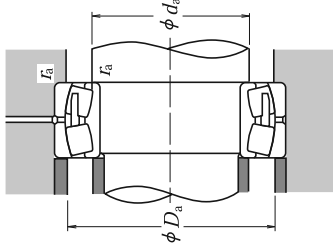
Tapered Bore



Without an Oil Groove and Holes

Boundary Dimensions (mm)		(N)		Basic Load Ratings {kgf}		Limiting Speeds (min ⁻¹)		Bearing	
d	D	B	r	C _r	C _{0r}	C _r	C _{0r}	Grease	Oil
280	380	75	2.1	925 000	1 950 000	94 500	199 000	800	950
	420	106	4	1 340 000	2 950 000	157 000	300 000	710	900
	420	140	4	1 880 000	3 800 000	191 000	385 000	600	800
	460	146	5	2 230 000	4 000 000	228 000	410 000	560	750
300	460	180	5	2 640 000	5 000 000	269 000	505 000	560	750
	500	130	5	2 280 000	3 650 000	233 000	370 000	800	
	500	176	5	2 880 000	4 900 000	294 000	500 000	530	670
	580	175	6	3 500 000	5 150 000	355 000	525 000	560	710
320	420	90	3	1 230 000	2 490 000	125 000	254 000	710	900
	460	118	4	1 920 000	3 700 000	196 000	375 000	670	850
	460	160	4	2 310 000	4 600 000	235 000	470 000	530	710
	500	160	5	2 670 000	4 800 000	273 000	490 000	500	670
340	500	200	5	3 100 000	5 800 000	315 000	595 000	500	670
	540	140	5	2 610 000	4 250 000	266 000	430 000	600	750
	540	192	5	3 400 000	5 900 000	350 000	600 000	480	630
	440	90	3	1 300 000	2 750 000	132 000	281 000	670	850
340	480	121	4	1 960 000	3 850 000	200 000	395 000	630	800
	480	160	4	2 440 000	5 050 000	249 000	515 000	500	670
	540	176	5	3 050 000	5 500 000	315 000	560 000	480	600
	540	218	5	3 550 000	6 650 000	360 000	675 000	480	600
340	580	150	5	2 990 000	4 850 000	305 000	495 000	530	670
	580	208	5	3 900 000	6 900 000	395 000	700 000	450	600
	460	90	3	1 330 000	2 840 000	136 000	289 000	630	800
	520	133	5	2 280 000	4 400 000	232 000	445 000	560	710
340	520	180	5	2 920 000	6 050 000	298 000	615 000	480	600
	580	190	5	3 600 000	6 600 000	370 000	670 000	430	560
	580	243	5	4 250 000	7 900 000	430 000	810 000	430	560
	620	224	6	4 400 000	7 800 000	450 000	795 000	400	530

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



Dynamic Equivalent Load

$P = XF_r + YF_a$

$F_a / F_r \leq e$		$F_a / F_r > e$	
X	Y	X	Y
1	Y ₃	0.67	Y ₂

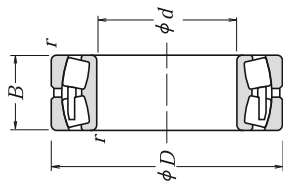
Static Equivalent Load

$P_0 = F_r + Y_0 F_a$

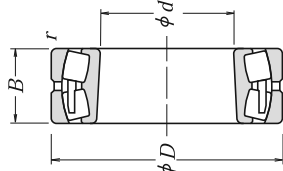
The values of e, Y₂, Y₃, and Y₀ are given in the table below.

Numbers Tapered Bore(1)	Abutment and Fillet Dimensions (mm)				Constant	Axial Load Factors				Mass (kg)
	d _a min,	d _a max,	D _a min,	r _a max,	e	Y ₂	Y ₃	Y ₀		approx.
23956CAKE4 23056CAKE4 24056CAK30E4	292	368	351	2	0.18	5.7	3.9	3.8		24.5
	298	402	377	3	0.24	4.2	2.8	2.7		50.5
	298	402	369	3	0.31	3.3	2.2	2.2		66.4
	302	438	400	4	0.30	3.3	2.2	2.2		94.3
23156CAKE4 24156CAK30E4 22256CAKE4	302	438	392	4	0.37	2.7	1.8	1.8		115
	302	478	439	4	0.25	4.0	2.7	2.6		110
	302	478	425	4	0.35	2.9	1.9	1.9		147
	308	552	496	5	0.31	3.2	2.1	2.1		221
23960CAKE4 23060CAKE4 24060CAK30E4	314	406	386	2.5	0.19	5.2	3.5	3.4		38.2
	318	442	413	3	0.24	4.2	2.8	2.7		70.5
	318	442	400	3	0.32	3.1	2.1	2.0		93.6
	322	478	433	4	0.31	3.3	2.2	2.2		125
23160CAKE4 24160CAK30E4	322	478	423	4	0.38	2.6	1.8	1.7		152
	322	518	473	4	0.25	4.0	2.7	2.6		139
	322	518	458	4	0.35	2.9	1.9	1.9		189
	334	426	406	2.5	0.18	5.5	3.7	3.6		40.6
23964CAKE4 23064CAKE4 24064CAK30E4	338	462	432	3	0.24	4.2	2.8	2.8		75.6
	338	462	422	3	0.31	3.3	2.2	2.2		99.7
	342	518	466	4	0.31	3.2	2.1	2.1		162
	342	518	456	4	0.39	2.6	1.7	1.7		196
22264CAKE4 23264CAKE4	342	558	508	4	0.26	3.9	2.6	2.6		174
	342	558	488	4	0.36	2.8	1.9	1.8		239
23968CAKE4 23068CAKE4 24068CAK30E4	354	446	427	2.5	0.18	5.7	3.8	3.7		42.4
	362	498	465	4	0.24	4.2	2.8	2.8		101
	362	498	454	4	0.32	3.2	2.1	2.1		135
	362	558	499	4	0.31	3.2	2.1	2.1		206
23168CAKE4 24168CAK30E4 23268CAKE4	362	558	489	4	0.40	2.5	1.7	1.7		257
	368	592	521	5	0.36	2.8	1.9	1.8		295

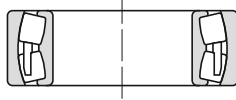
Remarks For the dimensions of adapters and withdrawal sleeves, refer to Pages B363 – B364, and B369 – B370.



Cylindrical Bore



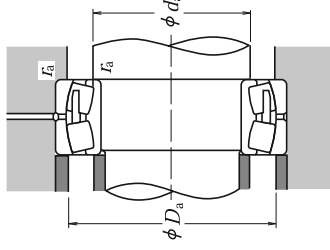
Tapered Bore



Without an Oil Groove and Holes

Boundary Dimensions (mm)			Basic Load Ratings (N)				Limiting Speeds (min ⁻¹)		Bearing	
d	D	B	C _r	C _{0r}	C _r	C _{0r}	Grease	Oil	Cylindrical Bore	
360	480	90	1 390 000	3 050 000	142 000	315 000	600	750	23972CAE4	
	540	134	2 390 000	4 700 000	244 000	480 000	530	670	23072CAE4	
	540	180	2 930 000	6 100 000	299 000	625 000	450	600	24072CAE4	
	600	192	3 800 000	7 100 000	390 000	725 000	400	530	23172CAE4	
	600	243	4 200 000	8 000 000	430 000	815 000	400	530	24172CAK30E4	
380	650	232	4 800 000	8 550 000	490 000	870 000	380	500	23272CAE4	
	520	106	1 870 000	4 100 000	190 000	420 000	530	670	23976CAE4	
	560	135	2 500 000	5 100 000	255 000	520 000	530	630	23076CAE4	
	560	180	3 050 000	6 600 000	315 000	670 000	430	560	24076CAK30E4	
	620	194	4 000 000	7 600 000	405 000	775 000	400	500	23176CAE4	
400	620	243	4 350 000	8 450 000	440 000	865 000	400	500	24176CAK30E4	
	680	240	5 150 000	9 200 000	525 000	940 000	360	480	23276CAE4	
	540	106	1 890 000	4 250 000	193 000	435 000	530	630	23980CAE4	
	600	148	2 970 000	5 900 000	305 000	605 000	480	600	23080CAE4	
	600	200	3 600 000	7 600 000	370 000	775 000	400	500	24080CAK30E4	
420	650	200	4 150 000	7 900 000	420 000	805 000	380	480	23180CAE4	
	650	250	4 950 000	10 100 000	505 000	1 030 000	380	480	24180CAK30E4	
	720	256	5 800 000	10 400 000	590 000	1 060 000	340	450	23280CAE4	
	560	106	1 870 000	4 250 000	191 000	430 000	500	600	23984CAE4	
	620	150	2 910 000	5 850 000	297 000	595 000	450	560	23084CAE4	
440	620	200	3 750 000	8 100 000	380 000	825 000	380	480	24084CAE4	
	700	224	5 000 000	9 400 000	510 000	960 000	340	450	23184CAE4	
	700	280	6 000 000	12 000 000	610 000	1 220 000	340	450	24184CAK30E4	
	760	272	6 450 000	11 700 000	660 000	1 190 000	320	430	23284CAE4	
	600	118	2 190 000	4 800 000	223 000	490 000	450	560	23988CAE4	
440	650	157	3 150 000	6 350 000	320 000	645 000	430	530	23088CAE4	
	650	212	4 150 000	9 100 000	425 000	930 000	360	450	24088CAE4	
	720	226	5 300 000	10 300 000	540 000	1 060 000	320	430	23188CAE4	
	720	280	6 000 000	12 100 000	610 000	1 230 000	320	430	24188CAK30E4	
	790	280	6 900 000	12 800 000	705 000	1 300 000	300	400	23288CAE4	

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



Dynamic Equivalent Load

$$P = X F_r + Y F_a$$

$F_a / F_r \leq e$		$F_a / F_r > e$	
X	Y	X	Y
1	Y ₃	0.67	Y ₂

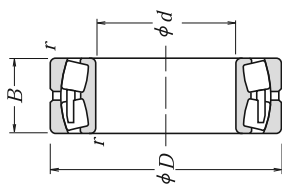
Static Equivalent Load

$$F_0 = F_r + Y_0 F_a$$

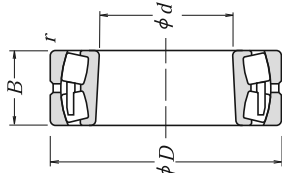
The values of e , Y_2 , Y_3 , and Y_0 are given in the table below.

Numbers Tapered Bore ⁽¹⁾	Abutment and Fillet Dimensions (mm)				Constant	Axial Load Factors				Mass (kg)
	d_a min,	d_a max,	D_a min,	r_a max,	e	Y_2	Y_3	Y_0		approx.
23972CAKE4	374	466	447	2.5	0.17	6.0	4.1	4.0		44.7
23072CAKE4	382	518	485	4	0.24	4.2	2.8	2.8		106
24072CAK30E4	382	518	476	4	0.32	3.2	2.1	2.1		139
23172CAKE4	382	578	520	4	0.31	3.2	2.2	2.1		217
24172CAK30E4	382	578	507	4	0.40	2.5	1.7	1.7		264
23272CAKE4	388	622	549	5	0.36	2.8	1.9	1.8		342
23976CAKE4	398	502	482	3	0.18	5.5	3.7	3.6		65.4
23076CAKE4	402	538	506	4	0.22	4.5	3.0	3.0		113
24076CAK30E4	402	538	496	4	0.29	3.4	2.3	2.3		148
23176CAKE4	402	598	540	4	0.30	3.3	2.2	2.2		229
24176CAK30E4	402	598	529	4	0.38	2.6	1.8	1.7		275
23276CAKE4	408	652	578	5	0.35	2.9	1.9	1.9		372
23980CAKE4	418	522	501	3	0.18	5.7	3.9	3.8		69.1
23080CAKE4	422	578	540	4	0.23	4.4	3.0	2.9		146
24080CAK30E4	422	578	527	4	0.31	3.3	2.2	2.2		193
23180CAKE4	428	622	569	5	0.29	3.4	2.3	2.3		257
24180CAK30E4	428	622	551	5	0.37	2.7	1.8	1.8		316
23280CAKE4	428	692	610	5	0.36	2.8	1.9	1.9		449
23984CAKE4	438	542	521	3	0.17	6.0	4.0	3.9		71.6
23084CAKE4	442	598	562	4	0.23	4.3	2.9	2.8		151
24084CAK30E4	442	598	549	4	0.31	3.2	2.2	2.1		199
23184CAKE4	448	672	607	5	0.31	3.3	2.2	2.2		341
24184CAK30E4	448	672	598	5	0.38	2.6	1.8	1.7		421
23284CAKE4	456	724	644	6	0.35	2.9	1.9	1.9		534
23988CAKE4	458	582	555	3	0.18	5.7	3.9	3.8		96.3
23088CAKE4	468	622	587	5	0.23	4.3	2.9	2.8		173
24088CAK30E4	468	622	576	5	0.31	3.2	2.1	2.1		237
23188CAKE4	468	692	627	5	0.3	3.3	2.2	2.2		360
24188CAK30E4	468	692	617	5	0.37	2.7	1.8	1.8		433
23288CAKE4	476	754	669	6	0.35	2.9	1.9	1.9		594

Remarks For the dimensions of adapters and withdrawal sleeves, refer to Pages **B364**, and **B370 – B371**.



Cylindrical Bore

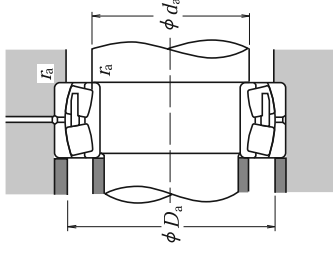


Tapered Bore

Without an Oil Groove and Holes

Boundary Dimensions (mm)		(N)		Basic Load Ratings {kgf}		Limiting Speeds (min ⁻¹)		Bearing	
d	D	B	r	C _r	C _{0r}	Grease	Oil	Cylindrical Bore	
460	620	118	4	2 220 000	4 950 000	430	530	23992CAE4	
	680	163	6	3 450 000	7 100 000	400	500	23092CAE4	
	680	218	6	4 500 000	9 950 000	340	430	24092CAE4	
	760	240	7.5	5 700 000	10 900 000	300	400	23192CAE4	
480	760	300	7.5	6 300 000	12 400 000	300	400	24192CAE4	
	830	296	7.5	7 350 000	13 700 000	280	380	23292CAE4	
	650	128	5	2 580 000	5 850 000	400	500	23996CAE4	
	700	165	6	3 800 000	7 950 000	400	480	23096CAE4	
500	700	218	6	4 600 000	10 200 000	320	430	24096CAE4	
	790	248	7.5	6 050 000	11 700 000	300	380	23196CAE4	
	790	308	7.5	7 150 000	14 600 000	300	380	24196CAE4	
	870	310	7.5	7 850 000	14 400 000	260	360	23296CAE4	
530	670	128	5	2 460 000	5 550 000	400	500	239/500CAE4	
	720	167	6	3 750 000	8 100 000	380	480	230/500CAE4	
	720	218	6	4 450 000	9 900 000	300	400	240/500CAE4	
	830	264	7.5	6 850 000	13 400 000	280	360	231/500CAE4	
530	830	325	7.5	8 000 000	16 000 000	280	360	241/500CAE4	
	920	336	7.5	9 000 000	16 600 000	260	320	232/500CAE4	
	710	136	5	2 930 000	6 800 000	360	450	239/530CAE4	
	780	185	6	4 400 000	9 200 000	340	430	230/530CAE4	
560	780	250	6	5 400 000	11 800 000	280	360	240/530CAE4	
	870	272	7.5	7 150 000	14 100 000	260	340	231/530CAE4	
	870	335	7.5	8 500 000	17 500 000	260	340	241/530CAE4	
	980	335	9.5	10 100 000	18 800 000	240	300	232/530CAE4	
560	750	140	5	3 100 000	7 250 000	340	430	239/560CAE4	
	820	195	6	5 000 000	10 700 000	320	400	230/560CAE4	
	820	238	6	5 950 000	13 300 000	260	340	240/560CAE4	
	920	280	7.5	7 850 000	15 500 000	240	320	231/560CAE4	
Note	920	355	7.5	9 400 000	19 600 000	240	320	241/560CAE4	
	1 030	365	9.5	10 900 000	20 500 000	220	280	232/560CAE4	

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



Dynamic Equivalent Load

$$P = X F_r + Y F_a$$

$F_r / F_t \leq e$		$F_r / F_t > e$	
X	Y	X	Y
1	Y ₃	0.67	Y ₂

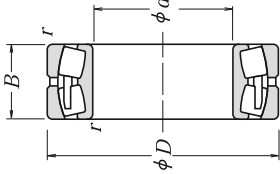
Static Equivalent Load

$$F_0 = F_r + Y_0 F_a$$

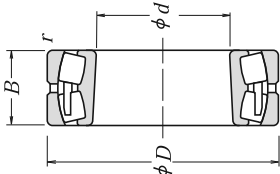
The values of e , Y_2 , Y_3 , and Y_0 are given in the table below.

Numbers	Abutment and Fillet Dimensions (mm)				Constant	Axial Load Factors			Mass (kg)	
	d_a min,	d_a max,	D_a min,	r_a max,		e	Y_2	Y_3		Y_0
Tapered Bore ⁽¹⁾									approx.	
	23992CAKE4	478	602	575	3	0.17	5.9	4.0	3.9	100
	23092CAKE4	488	652	615	5	0.22	4.6	3.1	3.0	201
	24092CAK30E4	488	652	604	5	0.29	3.4	2.3	2.3	266
	23192CAKE4	496	724	661	6	0.31	3.3	2.2	2.2	423
	24192CAK30E4	496	724	646	6	0.39	2.6	1.7	1.7	512
	23292CAKE4	496	794	702	6	0.36	2.8	1.9	1.8	691
	23996CAKE4	502	628	602	4	0.18	5.7	3.8	3.7	121
	23096CAKE4	508	672	633	5	0.22	4.6	3.1	3.0	211
	24096CAK30E4	508	672	625	5	0.30	3.4	2.3	2.2	270
	23196CAKE4	516	754	688	6	0.31	3.3	2.2	2.2	475
	24196CAK30E4	516	754	670	6	0.39	2.6	1.7	1.7	567
	23296CAKE4	516	834	733	6	0.36	2.8	1.9	1.8	795
	239/500CAKE4	522	648	622	4	0.17	6.0	4.0	3.9	124
	230/500CAKE4	528	692	655	5	0.21	4.8	3.2	3.1	220
	240/500CAK30E4	528	692	643	5	0.30	3.4	2.3	2.2	276
	231/500CAKE4	536	794	720	6	0.31	3.2	2.2	2.1	567
	241/500CAK30E4	536	794	703	6	0.39	2.6	1.7	1.7	666
	232/500CAKE4	536	884	773	6	0.38	2.7	1.8	1.8	969
	239/530CAKE4	552	688	659	4	0.17	6.0	4.0	3.9	149
	230/530CAKE4	558	752	706	5	0.22	4.6	3.1	3.0	298
	240/530CAK30E4	558	752	690	5	0.31	3.3	2.2	2.2	390
	231/530CAKE4	566	834	758	6	0.30	3.3	2.2	2.2	628
	241/530CAK30E4	566	834	740	6	0.38	2.6	1.8	1.7	773
	232/530CAKE4	574	936	824	8	0.38	2.7	1.8	1.7	1 170
	239/560CAKE4	582	728	697	4	0.16	6.1	4.1	4.0	172
	230/560CAKE4	588	792	742	5	0.22	4.5	3.0	2.9	344
	240/560CAK30E4	588	792	729	5	0.30	3.3	2.2	2.2	440
	231/560CAKE4	596	884	804	6	0.30	3.4	2.3	2.2	727
	241/560CAK30E4	596	884	782	6	0.39	2.6	1.8	1.7	886
	232/560CAKE4	604	986	870	8	0.36	2.8	1.9	1.8	1 320

Remarks For the dimensions of adapters and withdrawal sleeves, refer to Pages **B365** and **B371**.



Cylindrical Bore



Tapered Bore

Dynamic Equivalent Load

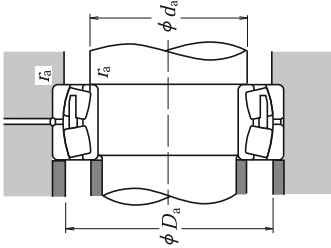
$P = XF_r + YF_a$

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

Static Equivalent Load

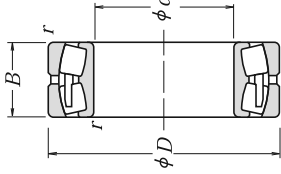
$F_0 = F_r + Y_0 F_a$

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

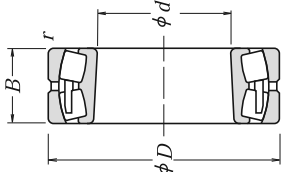


Boundary Dimensions (mm)		Basic Load Ratings (N)				Limiting Speeds (min ⁻¹)		Bearing
d	D	B	C _r	C _{0r}	C _r	C _{0r}	Grease	Oil
600	800	150	3 450 000	8 100 000	350 000	830 000	320	400
	870	200	5 450 000	12 200 000	555 000	1 240 000	300	360
	870	272	6 600 000	15 100 000	675 000	1 540 000	240	320
	980	300	8 750 000	17 500 000	895 000	1 790 000	220	280
	980	375	10 400 000	21 900 000	1 060 000	2 230 000	220	280
630	1 090	388	12 700 000	24 900 000	1 300 000	2 540 000	200	260
	850	165	4 000 000	9 350 000	405 000	950 000	300	360
	920	212	5 900 000	12 700 000	600 000	1 300 000	280	340
	920	290	7 550 000	17 700 000	770 000	1 810 000	220	300
	1 030	315	9 600 000	19 400 000	980 000	1 970 000	200	260
670	1 030	400	11 300 000	23 900 000	1 160 000	2 440 000	200	260
	1 150	412	13 400 000	25 600 000	1 370 000	2 610 000	180	240
	900	170	4 350 000	10 300 000	445 000	1 050 000	260	340
	980	230	6 850 000	15 000 000	700 000	1 530 000	240	320
	980	308	8 450 000	19 500 000	860 000	1 990 000	200	260
710	1 090	336	10 600 000	21 600 000	1 080 000	2 200 000	190	240
	1 090	412	12 400 000	26 500 000	1 270 000	2 700 000	190	240
	1 220	438	14 900 000	28 700 000	1 520 000	2 920 000	170	220
	950	180	4 800 000	11 700 000	490 000	1 200 000	240	300
	1 030	236	7 100 000	15 800 000	725 000	1 610 000	240	280
750	1 030	315	8 850 000	20 700 000	905 000	2 110 000	190	240
	1 150	438	13 900 000	30 500 000	1 410 000	3 100 000	170	220
	1 280	450	15 700 000	33 500 000	1 600 000	3 100 000	160	200
	1 000	185	5 250 000	12 800 000	535 000	1 310 000	220	280
	1 090	250	7 750 000	17 200 000	790 000	1 750 000	220	260
800	1 090	335	10 100 000	24 000 000	1 030 000	2 450 000	180	220
	1 360	475	17 700 000	35 500 000	1 800 000	3 600 000	140	190
	1 060	195	5 600 000	13 700 000	570 000	1 400 000	220	260
	1 150	258	8 350 000	19 100 000	850 000	1 950 000	200	240
	1 150	345	10 900 000	26 300 000	1 110 000	2 680 000	160	200
Note	1 280	375	13 800 000	29 200 000	1 410 000	2 970 000	150	190
	1 420	488	20 300 000	41 000 000	2 070 000	4 150 000	130	170
	(1) The suffix K or K30 represents bearings with tapered bores (taper 1 : 12 or 1 : 30).							

Numbers	Abutment and Fillet Dimensions (mm)				Constant <i>e</i>	Axial Load Factors			Mass (kg) approx.
	<i>d_a</i> min.	<i>d_a</i> max.	<i>D_a</i> min.	<i>r_a</i> max.		<i>Y₂</i>	<i>Y₃</i>	<i>Y₀</i>	
Tapered Bore ⁽¹⁾									
239/600CAKE4	622	778	745	4	0.17	5.9	3.9	3.9	205
230/600CAKE4	628	842	794	5	0.21	4.8	3.3	3.2	389
240/600CAK30E4	628	842	772	5	0.30	3.3	2.2	2.2	529
231/600CAKE4	636	944	856	6	0.30	3.4	2.3	2.2	898
241/600CAK30E4	636	944	836	6	0.39	2.6	1.8	1.7	1 050
232/600CAKE4	644	1 046	923	8	0.36	2.8	1.9	1.8	1 590
239/630CAKE4	658	822	786	5	0.18	5.6	3.8	3.7	259
230/630CAKE4	666	884	835	6	0.22	4.7	3.1	3.1	468
240/630CAK30E4	666	884	815	6	0.30	3.3	2.2	2.2	637
231/630CAKE4	666	994	900	6	0.30	3.4	2.3	2.2	1 040
241/630CAK30E4	666	994	876	6	0.38	2.7	1.8	1.7	1 250
232/630CAKE4	684	1 096	970	10	0.36	2.8	1.9	1.8	1 850
239/670CAKE4	698	872	836	5	0.17	5.8	3.9	3.8	300
230/670CAKE4	706	944	891	6	0.22	4.7	3.1	3.1	571
240/670CAK30E4	706	944	868	6	0.30	3.3	2.2	2.2	773
231/670CAKE4	706	1 054	952	6	0.30	3.3	2.2	2.2	1 230
241/670CAK30E4	706	1 054	934	6	0.37	2.7	1.8	1.8	1 440
232/670CAKE4	724	1 166	1 024	10	0.37	2.7	1.8	1.8	2 210
239/710CAKE4	738	922	883	5	0.17	5.8	3.9	3.8	352
230/710CAKE4	746	994	936	6	0.22	4.6	3.1	3.0	647
240/710CAK30E4	746	994	916	6	0.29	3.4	2.3	2.2	861
231/710CAKE4	754	1 106	981	8	0.38	2.6	1.8	1.7	1 730
232/710CAKE4	764	1 226	1 080	10	0.36	2.8	1.9	1.8	2 470
239/750CAKE4	778	972	931	5	0.17	6.0	4.1	4.0	398
230/750CAKE4	786	1 054	990	6	0.22	4.6	3.1	3.0	768
240/750CAK30E4	786	1 054	969	6	0.29	3.4	2.3	2.2	1 030
232/750CAKE4	814	1 296	1 148	12	0.36	2.8	1.9	1.8	2 980
239/800CAKE4	828	1 032	987	5	0.17	6.0	4.0	3.9	462
230/800CAKE4	836	1 114	1 045	6	0.21	4.7	3.2	3.1	870
240/800CAK30E4	836	1 114	1 029	6	0.27	3.7	2.5	2.5	1 130
231/800CAKE4	844	1 236	1 127	8	0.28	3.6	2.4	2.3	1 870
232/800CAKE4	864	1 356	1 208	12	0.35	2.8	1.9	1.9	3 250



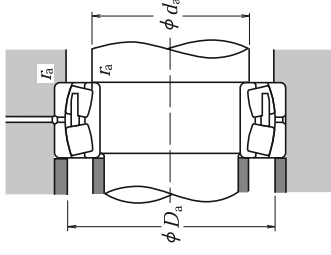
Cylindrical Bore



Tapered Bore

Boundary Dimensions (mm)			Basic Load Ratings (N)				Limiting Speeds (min ⁻¹)		Bearing Cylindrical Bore
d	D	B	C _r	C _{0r}	C _r	C _{0r}	Grease	Oil	
850	1 120	200	6	6 100 000	15 200 000	620 000	190	240	239/850CAE4 230/850CAE4
	1 220	272	7.5	9 300 000	21 400 000	945 000	180	220	
	1 220	365	7.5	11 600 000	28 300 000	1 180 000	150	190	
	1 500	515	15	22 300 000	45 500 000	2 270 000	120	160	
900	1 180	206	6	6 600 000	16 700 000	670 000	180	220	239/900CAE4 230/900CAE4
	1 280	280	7.5	9 850 000	22 800 000	1 000 000	160	200	
	1 280	375	7.5	12 800 000	31 500 000	1 300 000	140	180	
	1 580	515	15	23 400 000	47 500 000	2 380 000	110	140	
950	1 250	224	7.5	7 600 000	19 900 000	775 000	160	200	239/950CAE4 230/950CAE4
	1 360	300	7.5	11 300 000	26 500 000	1 160 000	150	190	
	1 360	412	7.5	14 500 000	36 500 000	1 480 000	120	160	
	1 660	530	15	24 700 000	50 500 000	2 520 000	100	130	
1 000	1 320	236	7.5	8 200 000	21 700 000	835 000	150	190	239/1000CAE4 230/1000CAE4
	1 420	308	7.5	11 900 000	28 100 000	1 210 000	140	170	
	1 420	412	7.5	15 300 000	38 500 000	1 560 000	110	150	
	1 420	412	7.5	15 300 000	38 500 000	1 560 000	110	150	
1 060	1 400	250	7.5	9 300 000	24 400 000	950 000	130	170	239/1060CAE4 230/1060CAE4
	1 500	325	9.5	13 000 000	31 500 000	1 330 000	120	160	
	1 500	438	9.5	16 800 000	43 000 000	1 720 000	100	130	
	1 500	438	9.5	16 800 000	43 000 000	1 720 000	100	130	
1 120	1 580	345	9.5	15 400 000	38 000 000	1 570 000	110	140	230/1120CAE4 240/1120CAE4
	1 580	462	9.5	18 700 000	49 500 000	1 910 000	95	120	
	1 580	462	9.5	18 700 000	49 500 000	1 910 000	95	120	
	1 580	462	9.5	18 700 000	49 500 000	1 910 000	95	120	
1 180	1 660	475	9.5	20 200 000	52 500 000	2 060 000	85	110	240/1180CAE4
1 250	1 750	500	9.5	21 000 000	59 500 000	2 140 000	75	100	240/1250CAE4
1 320	1 850	530	12	22 600 000	63 500 000	2 310 000	67	85	240/1320CAE4
1 400	1 950	545	12	24 500 000	65 000 000	2 500 000	60	75	240/1400CAE4

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



Dynamic Equivalent Load

$$P = XF_r + YF_a$$

$F_a / F_r \leq e$		$F_a / F_r > e$	
X	Y	X	Y
1	Y ₃	0.67	Y ₂

Static Equivalent Load

$$F_0 = F_r + Y_0 F_a$$

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) approx.
	d_a min,	d_a max,	D_a min,	r_a max,		Y_2	Y_3	Y_0		
Tapered Bore(!)					e					
239/850CAKE4 230/850CAKE4	878 886	1 092 1 184	1 046 1 109	5 6	0.16 0.21	6.2 4.8	4.2 3.2	4.1 3.1	523 1 020	
240/850CAK30E4 232/850CAKE4	886 914	1 184 1 436	1 093 1 274	6 12	0.28 0.35	3.6 2.8	2.4 1.9	2.4 1.9	1 350 3 890	
239/900CAKE4 230/900CAKE4	928 936	1 152 1 244	1 103 1 169	5 6	0.16 0.20	6.4 4.9	4.3 3.3	4.2 3.2	591 1 160	
240/900CAK30E4 232/900CAKE4	936 964	1 244 1 516	1 147 1 354	6 12	0.28 0.33	3.6 3.0	2.4 2.0	2.4 2.0	1 520 4 300	
239/950CAKE4 230/950CAKE4	986 986	1 214 1 324	1 169 1 241	6 6	0.16 0.21	6.3 4.8	4.2 3.2	4.1 3.2	732 1 400	
240/950CAK30E4 232/950CAKE4	986 1 014	1 324 1 596	1 219 1 428	6 12	0.28 0.32	3.6 3.1	2.4 2.1	2.3 2.1	1 880 4 800	
239/1000CAKE4 230/1000CAKE4 240/1000CAK30E4	1 036 1 036 1 036	1 284 1 384 1 384	1 229 1 298 1 275	6 6 6	0.16 0.20 0.27	6.4 4.9 3.7	4.3 3.3 2.5	4.2 3.2 2.4	881 1 560 2 010	
239/1060CAKE4 230/1060CAKE4 240/1060CAK30E4	1 096 1 104 1 104	1 364 1 456 1 456	1 302 1 368 1 346	6 8 8	0.16 0.21 0.28	6.1 4.9 3.6	4.1 3.3 2.4	4.0 3.2 2.4	1 030 1 790 2 410	
230/1120CAKE4 240/1120CAK30E4	1 164 1 164	1 536 1 536	1 444 1 421	8 8	0.20 0.27	5.0 3.7	3.4 2.5	3.3 2.5	2 120 2 790	
240/1180CAK30E4	1 224	1 616	1 494	8	0.27	3.7	2.5	2.4	3 180	
240/1250CAK30E4	1 294	1 706	1 579	8	0.25	4.0	2.7	2.6	3 700	
240/1320CAK30E4	1 374	1 796	1 656	10	0.26	3.9	2.6	2.6	4 400	
240/1400CAK30E4	1 454	1 896	1 767	10	0.25	4.0	2.7	2.6	4 900	