

# 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



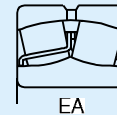
## DESIGN, TYPES, AND FEATURES

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.

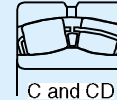
An oil groove and holes are provided in the outer ring to supply lubricant and the bearing numbers are suffixed with E4.

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.



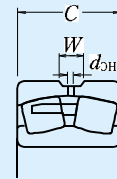
EA



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.

**Table 1 Dimensions of Oil Grooves and Holes**  
Units : mm

Nominal Outer Ring Width C	Oil Groove		Hole Diameter
	over	incl.	Width W
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**

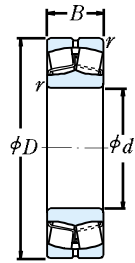
Nominal Outer Ring Dia. D (mm)	Number of Holes	
	over	incl.
—	180	4
180	250	6
250	315	6
315	400	6
400	500	6
500	630	8
630	800	8
800	1000	8
1000	1250	8
1250	1600	8
1600	2000	8

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.

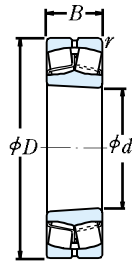
If very small bearing loads are expected, please contact NSK for selection of an appropriate bearing.

# SPHERICAL ROLLER BEARINGS

Bore Diameter 20 – 55 mm



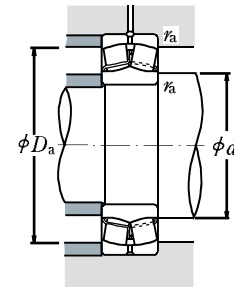
Cylindrical Bore



Tapered Bore



Without an Oil Groove or Holes



### 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.

Boundary Dimensions (mm)				Basic Load Ratings				Limiting Speeds (min <sup>-1</sup> )		Bearing
$d$	$D$	$B$	$r_{min.}$	(N)		(kgf)		Grease	Oil	
				$C_r$	$C_{0r}$	$C_r$	$C_{0r}$			Cylindrical Bore
20	52	15	1.1	29 300	26 900	2 980	2 740	6 300	8 200	<b>21304CDE4</b>
25	52	18	1	37 500	37 000	3 850	3 800	7 100	9 000	<b>22205CE4</b>
	62	17	1.1	43 000	40 500	4 350	4 150	5 300	6 700	<b>21305CDE4</b>
30	62	20	1	50 000	50 000	5 100	5 100	6 000	7 500	<b>22206CE4</b>
	72	19	1.1	55 000	54 000	5 600	5 500	4 500	6 000	<b>21306CDE4</b>
35	72	23	1.1	69 000	71 000	7 050	7 200	5 300	6 700	<b>22207CE4</b>
	80	21	1.5	71 500	76 000	7 250	7 750	4 000	5 300	<b>21307CDE4</b>
40	80	23	1.1	113 000	99 500	11 500	10 100	6 700	8 500	<b>*22208EAE4</b>
	90	23	1.5	118 000	111 000	12 000	11 300	6 000	7 500	<b>*21308EAE4</b>
	90	33	1.5	170 000	153 000	17 300	15 600	5 300	6 700	<b>*22308EAE4</b>
45	85	23	1.1	118 000	111 000	12 000	11 300	6 000	7 500	<b>*22209EAE4</b>
	100	25	1.5	149 000	144 000	15 200	14 600	5 000	6 300	<b>*21309EAE4</b>
	100	36	1.5	207 000	195 000	21 100	19 900	4 500	5 600	<b>*22309EAE4</b>
50	90	23	1.1	124 000	119 000	12 600	12 100	5 600	7 100	<b>*22210EAE4</b>
	110	27	2	178 000	174 000	18 100	17 800	4 500	5 600	<b>*21310EAE4</b>
	110	40	2	246 000	234 000	25 100	23 900	4 300	5 300	<b>*22310EAE4</b>
55	100	25	1.5	149 000	144 000	15 200	14 600	5 300	6 700	<b>*22211EAE4</b>
	120	29	2	178 000	174 000	18 100	17 800	4 500	5 600	<b>*21311EAE4</b>
	120	43	2	292 000	292 000	29 800	29 800	3 800	4 800	<b>*22311EAE4</b>

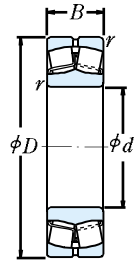
Note (1) The suffix K represents bearings with tapered bores (taper 1 : 12).

Numbers	Abutment and Fillet Dimensions (mm)					Constant $e$	Axial Load Factors			Mass (kg) approx.
	Tapered Bore <sup>(1)</sup>						$Y_2$	$Y_3$	$Y_0$	
	min. $d_a$	max. $d_a$	max. $D_a$	min. $r_a$	max. $r_a$					
<b>21304CDKE4</b>	27	28	45	42	1	0.31	3.2	2.1	2.1	0.17
<b>22205CKE4</b> <b>21305CDKE4</b>	31	31	46	45	1	0.35	2.9	1.9	1.9	0.17
	32	34	55	51	1	0.29	3.4	2.3	2.3	0.26
<b>22206CKE4</b> <b>21306CDKE4</b>	36	37	56	54	1	0.33	3.1	2.1	2.0	0.27
	37	40	65	59	1	0.28	3.6	2.4	2.3	0.39
<b>22207CKE4</b> <b>21307CDKE4</b>	42	43	65	63	1	0.32	3.1	2.1	2.0	0.42
	44	47	71	67	1.5	0.28	3.6	2.4	2.4	0.53
<b>*22208EAKE4</b> <b>*21308EAKE4</b> <b>*22308EAKE4</b>	47	49	73	70	1	0.28	3.6	2.4	2.4	0.50
	49	54	81	75	1.5	0.25	3.9	2.7	2.6	0.73
	49	52	81	77	1.5	0.35	2.8	1.9	1.9	0.98
<b>*22209EAKE4</b> <b>*21309EAKE4</b> <b>*22309EAKE4</b>	52	54	78	75	1	0.25	3.9	2.7	2.6	0.55
	54	65	91	89	1.5	0.23	4.3	2.9	2.8	0.96
	54	59	91	86	1.5	0.34	2.9	2.0	1.9	1.34
<b>*22210EAKE4</b> <b>*21310EAKE4</b> <b>*22310EAKE4</b>	57	60	83	81	1	0.24	4.3	2.9	2.8	0.61
	60	72	100	98	2	0.23	4.4	3.0	2.9	1.21
	60	64	100	93	2	0.35	2.8	1.9	1.9	1.78
<b>*22211EAKE4</b> <b>*21311EAKE4</b> <b>*22311EAKE4</b>	64	65	91	89	1.5	0.23	4.3	2.9	2.8	0.81
	65	72	110	98	2	0.23	4.4	3.0	2.9	1.58
	65	73	110	103	2	0.34	2.9	2.0	1.9	2.3

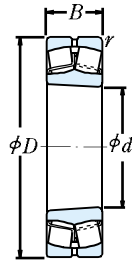
- Remarks**
- The bearings denoted by an asterisk (\*) are NSKHPS bearings and an oil groove and holes are standard for them.
  - When making a selection of the recommended fit (Tolerance of Shaft) on Page A84 of the NSK Rolling Bearings catalog, in case of NSKHPS bearings, the conditions are different.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

# SPHERICAL ROLLER BEARINGS

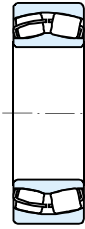
Bore Diameter 60 – 85 mm



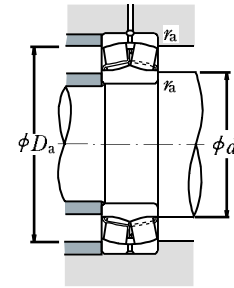
Cylindrical Bore



Tapered Bore



Without an Oil Groove or Holes



### 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.

Boundary Dimensions (mm)				Basic Load Ratings				Limiting Speeds		Bearing
$d$	$D$	$B$	$r$ min.	$C_r$	$C_{0r}$	{kgf}		Grease	Oil	
60	95	26	1.1	98 500	141 000	10 000	14 400	3 600	4 500	<b>23012CE4</b> <b>*22212EAE4</b> <b>*21312EAE4</b> <b>*22312EAE4</b>
	110	28	1.5	178 000	174 000	18 100	17 800	4 800	6 000	
	130	31	2.1	238 000	244 000	24 200	24 900	3 800	4 800	
	130	46	2.1	340 000	340 000	34 500	35 000	3 600	4 500	
65	120	31	1.5	221 000	230 000	22 500	23 500	4 300	5 300	<b>*22213EAE4</b> <b>*21313EAE4</b> <b>*22313EAE4</b>
	140	33	2.1	264 000	275 000	27 000	28 000	3 600	4 500	
	140	48	2.1	375 000	380 000	38 000	38 500	3 200	4 000	
70	125	31	1.5	225 000	232 000	22 900	23 600	4 000	5 300	<b>*22214EAE4</b> <b>*21314EAE4</b> <b>*22314EAE4</b>
	150	35	2.1	310 000	325 000	32 000	33 500	3 200	4 000	
	150	51	2.1	425 000	435 000	43 500	44 000	3 000	3 800	
75	130	31	1.5	238 000	244 000	24 200	24 900	4 000	5 000	<b>*22215EAE4</b> <b>*21315EAE4</b> <b>*22315EAE4</b>
	160	37	2.1	310 000	325 000	32 000	33 500	3 200	4 000	
	160	55	2.1	485 000	505 000	49 500	51 500	2 800	3 600	
80	140	33	2	264 000	275 000	27 000	28 000	3 600	4 500	<b>*22216EAE4</b> <b>*21316EAE4</b> <b>*22316EAE4</b>
	170	39	2.1	355 000	375 000	36 000	38 000	3 000	3 800	
	170	58	2.1	540 000	565 000	55 000	58 000	2 600	3 400	
85	150	36	2	310 000	325 000	32 000	33 500	3 400	4 300	<b>*22217EAE4</b> <b>*21317EAE4</b> <b>*22317EAE4</b>
	180	41	3	360 000	395 000	37 000	40 000	3 000	4 000	
	180	60	3	600 000	630 000	61 000	64 000	2 400	3 200	

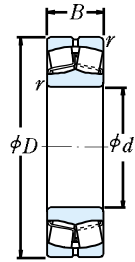
**Note** (1) The suffix K represents bearings with tapered bores (taper 1 : 12).

Numbers	Abutment and Fillet Dimensions (mm)						Constant	Axial Load Factors			Mass (kg)
	Tapered Bore <sup>(1)</sup>		$d_a$		$D_a$			$e$	$Y_2$	$Y_3$	
<b>23012CKE4</b> <b>*22212EAKE4</b> <b>*21312EAKE4</b> <b>*22312EAKE4</b>	min.	max.	min.	max.	min.	max.	0.26 0.23 0.22 0.34	3.9 4.4 4.5 3.0	2.6 3.0 3.0 2.0	2.5 2.9 3.0 1.9	0.68 1.1 1.98 2.89
	67	68	85	88	107	1					
	69	72	98	101	117	1.5					
	72	87	118	118	111	2					
<b>*22213EAKE4</b> <b>*21313EAKE4</b> <b>*22313EAKE4</b>	74	80	111	111	107	1.5	0.24 0.22 0.33	4.2 4.6 3.0	2.8 3.1 2.0	2.7 3.0 2.0	1.51 2.45 3.52
	77	94	128	128	126	2					
	77	84	128	128	119	2					
<b>*22214EAKE4</b> <b>*21314EAKE4</b> <b>*22314EAKE4</b>	79	84	116	116	111	1.5	0.23 0.22 0.33	4.3 4.6 3.0	2.9 3.1 2.0	2.8 3.0 2.0	1.58 3.0 4.28
	82	101	138	138	135	2					
	82	91	138	138	129	2					
<b>*22215EAKE4</b> <b>*21315EAKE4</b> <b>*22315EAKE4</b>	84	87	121	121	117	1.5	0.22 0.22 0.33	4.5 4.6 3.0	3.0 3.1 2.0	3.0 3.0 2.0	1.64 3.64 5.26
	87	101	148	148	134	2					
	87	97	148	148	137	2					
<b>*22216EAKE4</b> <b>*21316EAKE4</b> <b>*22316EAKE4</b>	90	94	130	130	126	2	0.22 0.23 0.33	4.6 4.4 3.0	3.1 3.0 2.0	3.0 2.9 2.0	2.01 4.32 6.23
	92	109	158	158	146	2					
	92	103	158	158	145	2					
<b>*22217EAKE4</b> <b>*21317EAKE4</b> <b>*22317EAKE4</b>	95	101	140	140	135	2	0.22 0.24 0.33	4.6 4.3 3.1	3.1 2.9 2.1	3.0 2.8 2.0	2.54 5.2 7.23
	99	108	166	166	142	2.5					
	99	110	166	166	155	2.5					

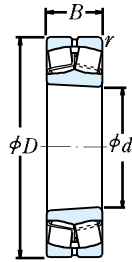
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The segmentations are: Light Loads ( $\leq 0.05C_r$ ); Normal Loads (0.05 to 0.10 $C_r$ ); and Heavy Loads ( $>0.10C_r$ ).
  - For the dimensions of adapters and withdrawal sleeves, refer to Pages B359 – B361, and B366.

# SPHERICAL ROLLER BEARINGS

Bore Diameter 90 – 110 mm



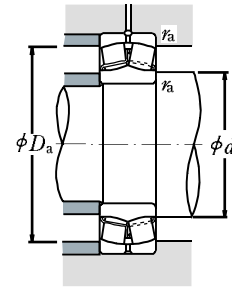
Cylindrical Bore



Tapered Bore



Without an Oil Groove or Holes



**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.

Boundary Dimensions (mm)				Basic Load Ratings				Limiting Speeds (min <sup>-1</sup> )		Bearing
$d$	$D$	$B$	$r_{min.}$	$C_r$ (N)	$C_{0r}$ (N)	$C_r$ (kgf)	$C_{0r}$ (kgf)	Grease	Oil	
<b>90</b>	160	40	2	360 000	395 000	37 000	40 000	3 200	4 000	*22218AE4
	160	52.4	2	340 000	490 000	34 500	50 000	1 800	2 400	23218CE4
	190	43	3	415 000	450 000	42 000	46 000	2 800	3 600	*21318AE4
	190	64	3	665 000	705 000	68 000	72 000	2 400	3 000	*22318AE4
<b>95</b>	170	43	2.1	415 000	450 000	42 000	46 000	3 000	3 800	*22219AE4
	170	55.6	2.1	370 000	525 000	37 500	53 500	1 700	2 200	23219CE4
	200	45	3	345 000	435 000	35 000	44 500	1 500	2 000	21319CE4
	200	67	3	735 000	780 000	75 000	79 500	2 200	2 800	*22319AE4
<b>100</b>	150	37	1.5	212 000	335 000	21 600	34 500	2 200	2 800	23020CDE4
	150	50	1.5	276 000	470 000	28 100	48 000	1 800	2 400	24020CE4
	165	52	2	345 000	530 000	35 500	54 000	1 700	2 200	23120CE4
	165	65	2	345 000	535 000	35 000	55 000	1 700	2 200	24120CAE4
	180	46	2.1	455 000	490 000	46 500	50 000	2 800	3 600	*22220AE4
	180	60.3	2.1	420 000	605 000	42 500	61 500	1 600	2 200	23220CE4
	215	47	3	395 000	485 000	40 500	49 500	1 400	1 900	23012CE4
	215	73	3	860 000	930 000	88 000	94 500	2 000	2 600	*22320AE4
<b>110</b>	170	45	2	293 000	465 000	29 900	47 500	2 000	2 400	23022CDE4
	170	60	2	380 000	645 000	38 500	68 000	1 600	2 200	24022CE4
	180	56	2	385 000	630 000	39 500	64 000	1 600	2 000	23122CE4
	180	69	2	460 000	750 000	47 000	76 500	1 600	2 000	24122CE4
	200	53	2.1	605 000	645 000	61 500	66 000	2 600	3 200	*22222AE4
	200	69.8	2.1	515 000	760 000	52 500	77 500	1 500	1 900	23222CE4
	240	50	3	450 000	545 000	46 000	55 500	1 300	1 700	21322CAE4
	240	80	3	1030 000	1 120 000	105 000	115 000	1 900	2 400	*22322AE4

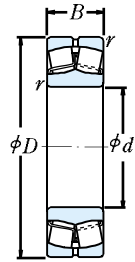
**Note** (1) The suffix K or K30 represents bearings with tapered bores (taper 1 : 12 or 1 : 30).

Numbers	Abutment and Fillet Dimensions (mm)						Constant $e$	Axial Load Factors			Mass (kg)
	Tapered Bore <sup>(1)</sup>		max. $D_a$		min. $r_a$			$Y_2$	$Y_3$	$Y_0$	
*22218AKE4	100	108	150	142	2	0.24	4.3	2.9	2.8	3.3	
23218CKE4	100	105	150	138	2	0.32	3.2	2.1	2.1	4.51	
*21318AKE4	104	115	176	152	2.5	0.24	4.3	2.9	2.8	6.1	
*22318AKE4	104	115	176	163	2.5	0.33	3.1	2.1	2.0	8.56	
*22219AKE4	107	115	158	152	2	0.24	4.3	2.9	2.8	4.04	
23219CAKE4	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	
*22319AKE4	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	
*22220AKE4	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	
23012CKE4	114	133	201	184	2.5	0.21	4.7	3.2	3.1	8.46	
*22320AKE4	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	
*22222AKE4	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	
*22322AKE4	124	145	226	206	2.5	0.33	3.1	2.1	2.0	17.6	

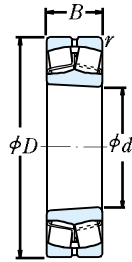
- Remarks**
- The bearings denoted by an asterisk (\*) are NSKHPS bearings and an oil groove and holes are standard for them.
  - When making a selection of the recommended fit (Tolerance of Shaft) on Page A84 of the NSK Rolling Bearings catalog, in case of NSKHPS bearings, the conditions are different.  
The segmentations are: Light Loads ( $\leq 0.05C_r$ ); Normal Loads (0.05 to 0.10 $C_r$ ); and Heavy Loads ( $> 0.10C_r$ ).
  - For the dimensions of adapters and withdrawal sleeves, refer to Pages B360 – B361, and B366 – B367.

# SPHERICAL ROLLER BEARINGS

Bore Diameter 120 – 150 mm



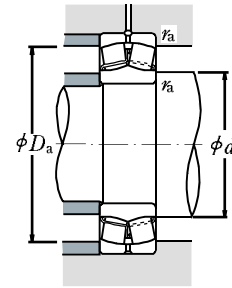
Cylindrical Bore



Tapered Bore



Without an Oil Groove or Holes



### 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.

Boundary Dimensions (mm)				Basic Load Ratings				Limiting Speeds		Bearing	
$d$	$D$	$B$	$r$ min.	(N)		(kgf)		(min <sup>-1</sup> )			
				$C_r$	$C_{0r}$	$C_r$	$C_{0r}$	Grease	Oil	Cylindrical Bore	
120	180	46	2	315 000	525 000	32 000	53 500	1 800	2 200	23024CDE4 24024CE4 23124CE4	
	180	60	2	395 000	705 000	40 500	72 000	1 500	2 000		
	200	62	2	465 000	720 000	47 500	73 500	1 400	1 800		
		200	80	2	575 000	950 000	58 500	96 500	1 400	1 800	24124CE4 *22224AE4 23224CE4 *22324AE4
		215	58	2.1	685 000	765 000	70 000	78 000	2 400	3 000	
		215	76	2.1	630 000	970 000	64 500	99 000	1 300	1 700	
		260	86	3	1 190 000	1 320 000	122 000	134 000	1 700	2 200	
	130	200	52	2	400 000	655 000	40 500	67 000	1 700	2 000	23026CDE4 24026CE4 23126CE4
		200	69	2	495 000	865 000	50 500	88 000	1 400	1 800	
		210	64	2	505 000	825 000	51 500	84 500	1 300	1 700	
		210	80	2	590 000	1 010 000	60 000	103 000	1 300	1 700	24126CE4 *22226AE4 23226CE4 23226CE4
		230	64	3	820 000	940 000	83 500	96 000	2 200	2 600	
		230	80	3	700 000	1 080 000	71 500	110 000	1 200	1 600	
		280	93	4	995 000	1 350 000	101 000	137 000	1 300	1 600	
140		210	53	2	420 000	715 000	43 000	73 000	1 600	1 900	23028CDE4 24028CE4 23128CE4
		210	69	2	525 000	945 000	53 500	96 500	1 300	1 700	
		225	68	2.1	580 000	945 000	59 000	96 500	1 200	1 600	
		225	85	2.1	670 000	1 160 000	68 500	118 000	1 200	1 600	24128CE4 22228CDE4 23228CE4 23228CE4
		250	68	3	645 000	930 000	65 500	95 000	1 400	1 700	
		250	88	3	835 000	1 300 000	85 000	133 000	1 100	1 500	
		300	102	4	1 160 000	1 590 000	118 000	162 000	1 200	1 500	
	150	225	56	2.1	470 000	815 000	48 000	83 000	1 400	1 800	23030CDE4 24030CE4 23130CE4
		225	75	2.1	590 000	1 090 000	60 500	111 000	1 200	1 500	
		250	80	2.1	725 000	1 180 000	74 000	121 000	1 100	1 400	
		250	100	2.1	890 000	1 530 000	91 000	156 000	1 100	1 400	24130CE4 23022CDE4 23230CE4 22330CAE4
		270	73	3	765 000	1 120 000	78 000	114 000	1 300	1 600	
		270	96	3	975 000	1 560 000	99 500	159 000	1 100	1 400	
		320	108	4	1 220 000	1 690 000	125 000	172 000	1 100	1 400	

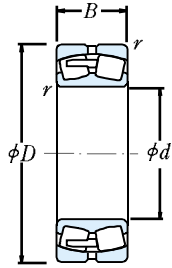
Note (1) The suffix K or K30 represents bearings with tapered bores (taper 1 : 12 or 1 : 30).

Numbers	Abutment and Fillet Dimensions (mm)						Constant	Axial Load Factors			Mass (kg)
	Tapered Bore <sup>(1)</sup>		$d_a$		$D_a$			$e$	$Y_2$	$Y_3$	
	min.	max.	min.	max.	min.	max.					approx.
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 *22224AKE4 23224CKE4 *22324AKE4	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
	140	146	200	180	2	0.35	2.9	1.9	1.9		10.7
24126CK30E4 *22226AKE4 23226CKE4 23226CKE4	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
	150	157	200	190	2	0.22	4.5	3.0	2.9		6.49
23028CDKE4 24028CK30E4 23128CKE4	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
	152	156	213	193	2	0.35	2.9	1.9	1.9		13
24128CK30E4 22228CDE4 23228CKE4 23228CKE4	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
	162	168	213	203	2	0.22	4.6	3.1	3.0		7.9
23030CDKE4 24030CK30E4 23130CKE4	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
	162	169	238	212	2	0.38	2.6	1.8	1.7		19.8
24130CK30E4 22230CDKE4 23230CKE4 22330CAE4	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
	168	—	302	270	3	0.35	2.9	1.9	1.9		41.5

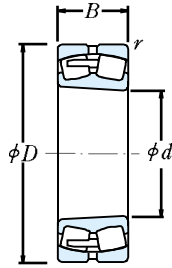
- Remarks
- The bearings denoted by an asterisk (\*) are NSKHPS bearings and an oil groove and holes are standard for them.
  - When making a selection of the recommended fit (Tolerance of Shaft) on Page A84 of the NSK Rolling Bearings catalog, in case of NSKHPS bearings, the conditions are different.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

# SPHERICAL ROLLER BEARINGS

Bore Diameter 160 – 190 mm



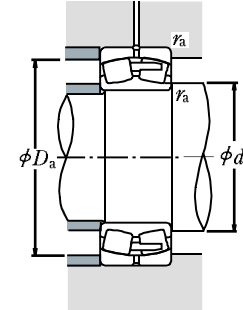
Cylindrical Bore



Tapered Bore



Without an Oil Groove and Holes



### 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

$$P_0 = F_r + Y_0 F_a$$

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

Boundary Dimensions (mm)				Basic Load Ratings				Limiting Speeds		Bearing		
$d$	$D$	$B$	$r$ min.	$C_r$ (N)	$C_{0r}$ (N)	$C_r$ (kgf)	$C_{0r}$ (kgf)	Grease	Oil			
160	220	45	2	360 000	675 000	37 000	69 000	1 400	1 800	23932CAE4 23032CDKE4 24032CK30E4  23132CE4 24132CE4 22232CDE4  23232CE4 22332CAE4		
	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			
	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			
	170	230	45	2	350 000	660 000	35 500	67 500	1 400		1 800	23934BCAE4 23034CDKE4 24034CE4  23134CE4 24134CE4 22234CDE4  23234CE4 22334CAE4
		260	67	2.1	640 000	1 090 000	65 000	112 000	1 200		1 600	
		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			
360		120	4	1 580 000	2 110 000	161 000	215 000	1 000	1 200			
180		250	52	2	470 000	890 000	48 000	90 500	1 200	1 600	23936CAE4 23036CDKE4 24036CE4  23136CE4 24136CE4 22236CDE4  23236CE4 22336CAE4	
		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		
	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			
	190	260	52	2	460 000	875 000	47 000	89 500	1 200	1 500		23938CAE4 23038CAE4 24038CE4  23138CE4 24138CE4 22238CDE4  23238CE4 22338CAE4
		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			
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			

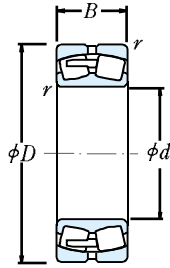
Note (1) The suffix K or K30 represents bearings with tapered bores (taper 1 : 12 or 1 : 30).

Numbers	Abutment and Fillet Dimensions (mm)						Constant	Axial Load Factors			Mass (kg)
	$d_a$		$D_a$		$r_a$			$e$	$Y_2$	$Y_3$	
Tapered Bore <sup>(1)</sup>	min.	max.	min.	max.	min.	max.					approx.
23932CAKE4 23032CDKE4 24032CK30E4	170	—	210	203	2	0.18	5.6	3.8	3.7	4.97	
	172	179	228	216	2	0.22	4.5	3.0	2.9	9.66	
	172	177	228	212	2	0.30	3.4	2.3	2.2	12.7	
23132CKE4 24132CK30E4 22232CDKE4	172	185	258	234	2	0.30	3.4	2.3	2.2	20.3	
	172	179	258	229	2	0.39	2.6	1.7	1.7	25.4	
	174	190	276	255	2.5	0.26	3.8	2.6	2.5	23.1	
23232CKE4 22332CAKE4	174	189	276	245	2.5	0.34	2.9	2.0	1.9	30.5	
	178	—	322	287	3	0.35	2.9	1.9	1.9	49.3	
	23934BCAKE4 23034CDKE4 24034CK30E4	180	—	220	213	2	0.17	5.8	3.9	3.8	5.38
182		191	248	233	2	0.23	4.3	2.9	2.8	13	
182		188	248	228	2	0.31	3.2	2.2	2.1	17.3	
23134CKE4 24134CK30E4 22234CDKE4	182	194	268	245	2	0.29	3.5	2.3	2.3	21.8	
	182	190	268	239	2	0.37	2.7	1.8	1.8	26.6	
	188	206	292	270	3	0.26	3.8	2.6	2.5	28.8	
23234CKE4 22334CAKE4	188	201	292	261	3	0.34	2.9	2.0	1.9	36.4	
	188	—	342	304	3	0.35	2.9	1.9	1.9	57.9	
	23936CAKE4 23036CDKE4 24036CK30E4	190	—	240	230	2	0.18	5.5	3.7	3.6	7.64
192		202	268	249	2	0.24	4.2	2.8	2.8	17.1	
192		200	268	245	2	0.32	3.1	2.1	2.0	22.7	
23136CKE4 24136CK30E4 22236CDKE4	194	206	286	260	2.5	0.30	3.4	2.3	2.2	27.5	
	194	202	286	255	2.5	0.37	2.7	1.8	1.8	33.1	
	198	212	302	278	3	0.26	3.9	2.6	2.6	30.2	
23236CKE4 22336CAKE4	198	211	302	274	3	0.33	3.0	2.0	2.0	38.9	
	198	—	362	322	3	0.34	2.9	2.0	1.9	67	
	23938CAKE4 23038CAE4 24038CK30E4	200	—	250	240	2	0.18	5.7	3.8	3.7	8.03
202		—	278	261	2	0.24	4.2	2.8	2.8	17.6	
202		210	278	253	2	0.31	3.2	2.2	2.1	24	
23138CKE4 24138CK30E4 22238CDE4	204	219	306	276	2.5	0.31	3.3	2.2	2.2	34.5	
	204	211	306	269	2.5	0.40	2.5	1.7	1.6	41.5	
	208	—	322	296	3	0.26	3.8	2.6	2.5	35.5	
23238CKE4 22338CAKE4	208	222	322	288	3	0.35	2.9	1.9	1.9	47.6	
	212	—	378	338	4	0.34	2.9	2.0	1.9	77.6	

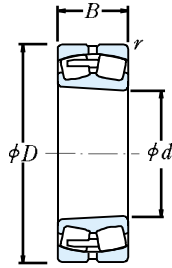
Remarks For the dimensions of adapters and withdrawal sleeves, refer to Pages B362 and B368.

# SPHERICAL ROLLER BEARINGS

Bore Diameter 200 – 260 mm



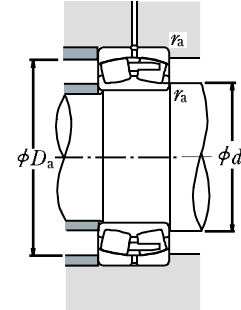
Cylindrical Bore



Tapered Bore



Without an Oil Groove and Holes



### 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.

Boundary Dimensions (mm)				Basic Load Ratings				Limiting Speeds (min <sup>-1</sup> )		Bearing	
$d$	$D$	$B$	$r_{min.}$	(N)		(kgf)		Grease	Oil		
				$C_r$	$C_{0r}$	$C_r$	$C_{0r}$			Cylindrical Bore	
200	280	60	2.1	570 000	1 060 000	58 000	108 000	1 100	1 400	<b>23940CAE4</b> <b>23040CAKE4</b> <b>24040CK30E4</b>	
	310	82	2.1	940 000	1 700 000	96 000	174 000	1 000	1 300		
	310	109	2.1	1 140 000	2 120 000	116 000	216 000	850	1 100		
	340	112	3	1 360 000	2 330 000	139 000	238 000	800	1 000	<b>24130CE4</b> <b>24140CE4</b> <b>22240CAE4</b>	
	340	140	3	1 570 000	2 670 000	160 000	272 000	800	1 000		
	360	98	4	1 300 000	2 010 000	133 000	204 000	950	1 200		
	360	128	4	1 660 000	2 750 000	169 000	281 000	750	1 000	<b>24032CE4</b> <b>22340CAE4</b>	
	420	138	5	2 000 000	2 990 000	204 000	305 000	850	1 000		
	220	300	60	2.1	625 000	1 240 000	64 000	126 000	1 000	1 300	<b>23944CAE4</b> <b>23044CAKE4</b> <b>24044CE4</b>
		340	90	3	1 090 000	1 980 000	111 000	202 000	950	1 200	
		340	118	3	1 360 000	2 600 000	138 000	265 000	750	1 000	
		370	120	4	1 570 000	2 710 000	160 000	276 000	710	950	<b>24134CE4</b> <b>24144CE4</b> <b>22244CAE4</b>
370		150	4	1 800 000	3 200 000	183 000	325 000	710	950		
400		108	4	1 570 000	2 430 000	160 000	247 000	850	1 000		
400		144	4	2 020 000	3 400 000	206 000	350 000	670	900	<b>23244CE4</b> <b>22344CAE4</b>	
460		145	5	2 350 000	3 400 000	240 000	345 000	750	950		
240		320	60	2.1	635 000	1 300 000	65 000	133 000	950	1 200	<b>23948CAE4</b> <b>23048CAKE4</b> <b>24048CE4</b>
		360	92	3	1 160 000	2 140 000	118 000	218 000	850	1 100	
		360	118	3	1 390 000	2 730 000	141 000	278 000	710	950	
		400	128	4	1 790 000	3 100 000	182 000	320 000	670	850	<b>24138CE4</b> <b>24148CE4</b> <b>22248CAE4</b>
	400	160	4	2 130 000	3 800 000	217 000	385 000	670	850		
	440	120	4	1 870 000	2 890 000	191 000	294 000	750	950		
	440	160	4	2 440 000	4 050 000	249 000	415 000	630	800	<b>23248CAE4</b> <b>23248CAE4</b>	
	500	155	5	2 600 000	3 800 000	265 000	385 000	670	850		
	260	360	75	2.1	930 000	1 870 000	95 000	191 000	850	1 000	<b>23952CAE4</b> <b>23052CAKE4</b> <b>24052CAK30E4</b>
		400	104	4	1 430 000	2 580 000	145 000	263 000	800	950	
		400	140	4	1 810 000	3 500 000	185 000	360 000	630	850	
		440	144	4	2 160 000	3 750 000	221 000	385 000	600	800	<b>23152CAE4</b> <b>24152CAE4</b> <b>22252CAE4</b>
440		180	4	2 560 000	4 700 000	261 000	480 000	600	800		
480		130	5	2 180 000	3 400 000	222 000	345 000	670	850		
480		174	5	2 740 000	4 550 000	279 000	460 000	560	750	<b>23252CAE4</b> <b>23252CAE4</b>	
540		165	6	3 100 000	4 600 000	320 000	470 000	630	800		

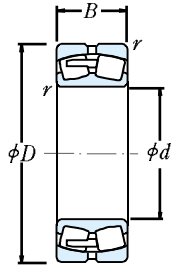
Note (1) The suffix K or K30 represents bearings with tapered bores (taper 1 : 12 or 1 : 30).

Numbers	Abutment and Fillet Dimensions (mm)						Constant	Axial Load Factors			Mass (kg)
	Tapered Bore <sup>(1)</sup>		$d_a$		$D_a$			$e$	$Y_2$	$Y_3$	
	min.	max.	min.	max.	min.	max.					approx.
<b>23940CAKE4</b> <b>23040CAKE4</b> <b>24040CK30E4</b>	212	—	268	258	2	0.20	5.1	3.4	3.3	11	
	212	—	298	279	2	0.25	4.0	2.7	2.6	22.6	
	212	223	298	271	2	0.32	3.1	2.1	2.0	30.4	
<b>23140CKE4</b> <b>24140CK30E4</b> <b>22240CAKE4</b>	214	232	326	293	2.5	0.31	3.2	2.2	2.1	42.7	
	214	226	326	290	2.5	0.39	2.6	1.8	1.7	51.3	
	218	—	342	315	3	0.26	3.8	2.6	2.5	42.6	
<b>23240CKE4</b> <b>22340CAKE4</b>	218	237	342	307	3	0.34	2.9	2.0	1.9	57.1	
	222	—	398	352	4	0.34	2.9	2.0	1.9	92.6	
<b>23944CAKE4</b> <b>23044CAKE4</b> <b>24044CK30E4</b>	232	—	288	278	2	0.18	5.7	3.8	3.7	12.2	
	234	—	326	302	2.5	0.24	4.1	2.8	2.7	29.7	
	234	244	326	296	2.5	0.31	3.2	2.1	2.1	40.5	
<b>23144CKE4</b> <b>24144CK30E4</b> <b>22244CAKE4</b>	238	254	352	320	3	0.30	3.3	2.2	2.2	53	
	238	248	352	313	3	0.39	2.6	1.7	1.7	66.7	
	238	—	382	348	3	0.27	3.7	2.5	2.4	59	
<b>23244CKE4</b> <b>22344CAKE4</b>	238	260	382	337	3	0.35	2.9	1.9	1.9	80.4	
	242	—	438	391	4	0.33	3.0	2.0	2.0	116	
<b>23948CAKE4</b> <b>23048CAKE4</b> <b>24048CK30E4</b>	252	—	308	298	2	0.17	6.0	4.0	3.9	13.3	
	254	—	346	324	2.5	0.24	4.2	2.8	2.7	32.6	
	254	265	346	317	2.5	0.29	3.4	2.3	2.2	43.4	
<b>23148CKE4</b> <b>24148CK30E4</b> <b>22248CAKE4</b>	258	275	382	347	3	0.30	3.3	2.2	2.2	66.9	
	258	268	382	341	3	0.38	2.7	1.8	1.8	79.5	
	258	—	422	383	3	0.27	3.7	2.5	2.4	80.2	
<b>23248CAKE4</b> <b>23248CAKE4</b>	258	—	422	372	3	0.37	2.7	1.8	1.8	106	
	262	—	478	423	4	0.32	3.2	2.1	2.1	147	
<b>23952CAKE4</b> <b>23052CAKE4</b> <b>24052CAK30E4</b>	272	—	348	333	2	0.19	5.4	3.6	3.5	23	
	278	—	382	356	3	0.25	4.1	2.7	2.7	46.6	
	278	—	382	348	3	0.32	3.1	2.1	2.1	62.6	
<b>23152CAKE4</b> <b>24152CAK30E4</b> <b>22252CAE4</b>	278	—	422	380	3	0.32	3.2	2.1	2.1	88.2	
	278	—	422	371	3	0.39	2.6	1.7	1.7	109	
	282	—	458	418	4	0.27	3.7	2.5	2.5	104	
<b>23252CAKE4</b> <b>23252CAKE4</b>	282	—	458	406	4	0.37	2.7	1.8	1.8	137	
	288	—	512	462	5	0.32	3.2	2.1	2.1	180	

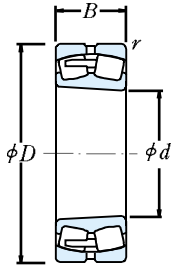
Remarks For the dimensions of adapters and withdrawal sleeves, refer to Pages B363 and B369.

# SPHERICAL ROLLER BEARINGS

Bore Diameter 280 – 340 mm



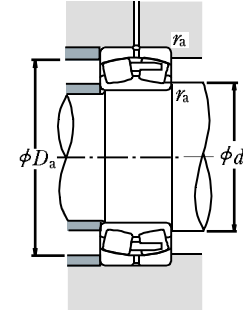
Cylindrical Bore



Tapered Bore



Without an Oil Groove and Holes



### 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

$$P_0 = F_r + Y_0 F_a$$

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

Boundary Dimensions (mm)				Basic Load Ratings				Limiting Speeds (min <sup>-1</sup> )		Bearing		
$d$	$D$	$B$	$r$ min.	(N)		(kgf)		Grease	Oil			
				$C_r$	$C_{0r}$	$C_r$	$C_{0r}$			Cylindrical Bore		
280	380	75	2.1	925 000	1 950 000	94 500	199 000	800	950	23956CAE4 23056CAE4 24056CAE4		
	420	106	4	1 540 000	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	23156CAE4 24156CAE4 22256CAE4	
		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	630	800		
		500	176	5	2 880 000	4 900 000	294 000	500 000	530	670	23256CAE4 23256CAE4	
		580	175	6	3 500 000	5 150 000	355 000	525 000	560	710		
	300	420	90	3	1 230 000	2 490 000	125 000	254 000	710	900	23960CAE4 23060CAE4 24060CAE4	
		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	23160CAE4 24160CAE4
		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	22260CAE4 23260CAE4	
		540	192	5	3 400 000	5 900 000	350 000	600 000	480	630		
320		440	90	3	1 300 000	2 750 000	132 000	281 000	670	850	23964CAE4 23064CAE4 24064CAE4	
		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	23164CAE4 24164CAE4
			540	218	5	3 550 000	6 650 000	360 000	670 000	480	600	
		580	150	5	2 990 000	4 850 000	305 000	495 000	530	670	22264CAE4 23264CAE4	
		580	208	5	3 900 000	6 900 000	395 000	700 000	450	600		
	340	460	90	3	1 330 000	2 840 000	136 000	289 000	630	800	23968CAE4 23068CAE4 24068CAE4	
		520	133	5	2 280 000	4 400 000	232 000	445 000	560	710		
		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	23168CAE4 24168CAE4
			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	23268CAE4	

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

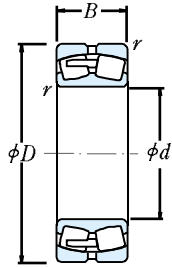
Numbers	Abutment and Fillet Dimensions (mm)				Constant	Axial Load Factors			Mass (kg)
	$d_a$ min.	$D_a$ max.	$d_a$ min.	$r_a$ max.		$e$	$Y_2$	$Y_3$	
Tapered Bore <sup>(1)</sup>									approx.
23956CAE4	292	368	351	2	0.18	5.7	3.9	3.8	24.5
23056CAE4	298	402	377	3	0.24	4.2	2.8	2.7	50.5
24056CAK30E4	298	402	369	3	0.31	3.3	2.2	2.2	66.4
23156CAE4	302	438	400	4	0.30	3.3	2.2	2.2	94.3
24156CAK30E4	302	438	392	4	0.37	2.7	1.8	1.8	115
22256CAE4	302	478	439	4	0.25	4.0	2.7	2.6	110
23256CAE4	302	478	425	4	0.35	2.9	1.9	1.9	147
23256CAE4	308	552	496	5	0.31	3.2	2.1	2.1	221
23960CAE4	314	406	386	2.5	0.19	5.2	3.5	3.4	38.2
23060CAE4	318	442	413	3	0.24	4.2	2.8	2.7	70.5
24060CAK30E4	318	442	400	3	0.32	3.1	2.1	2.0	93.6
23160CAE4	322	478	433	4	0.31	3.3	2.2	2.2	125
24160CAK30E4	322	478	423	4	0.38	2.6	1.8	1.7	152
22260CAE4	322	518	473	4	0.25	4.0	2.7	2.6	139
23260CAE4	322	518	458	4	0.35	2.9	1.9	1.9	189
23964CAE4	334	426	406	2.5	0.18	5.5	3.7	3.6	40.6
23064CAE4	338	462	432	3	0.24	4.2	2.8	2.8	75.6
24064CAK30E4	338	462	422	3	0.31	3.3	2.2	2.2	99.7
23164CAE4	342	518	466	4	0.31	3.2	2.1	2.1	162
24164CAK30E4	342	518	456	4	0.39	2.6	1.7	1.7	196
22264CAE4	342	558	508	4	0.26	3.9	2.6	2.6	174
23264CAE4	342	558	488	4	0.36	2.8	1.9	1.8	239
23968CAE4	354	446	427	2.5	0.18	5.7	3.8	3.7	42.4
23068CAE4	362	498	465	4	0.24	4.2	2.8	2.8	101
24068CAK30E4	362	498	454	4	0.32	3.2	2.1	2.1	135
23168CAE4	362	558	499	4	0.31	3.2	2.1	2.1	206
24168CAK30E4	362	558	489	4	0.40	2.5	1.7	1.7	257
23268CAE4	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.

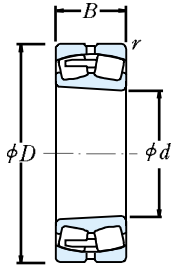


# SPHERICAL ROLLER BEARINGS

Bore Diameter 360 – 440 mm



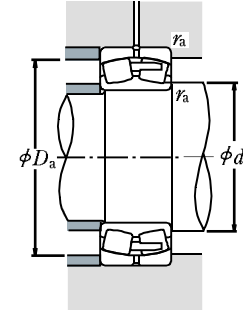
Cylindrical Bore



Tapered Bore



Without an Oil Groove and Holes



### 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

$$P_0 = F_r + Y_0 F_a$$

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

Boundary Dimensions (mm)				Basic Load Ratings				Limiting Speeds (min <sup>-1</sup> )		Bearing Cylindrical Bore
$d$	$D$	$B$	$r_{min.}$	(N)		(kgf)		Grease	Oil	
				$C_r$	$C_{0r}$	$C_r$	$C_{0r}$			
<b>360</b>	480	90	3	1 390 000	3 050 000	142 000	315 000	600	750	<b>23972CAE4</b>
	540	134	5	2 390 000	4 700 000	244 000	480 000	530	670	<b>23072CAE4</b>
	540	180	5	2 930 000	6 100 000	299 000	625 000	450	600	<b>24072CAE4</b>
	600	192	5	3 800 000	7 100 000	390 000	725 000	400	530	<b>23172CAE4</b>
	600	243	5	4 200 000	8 000 000	430 000	815 000	400	530	<b>24172CAE4</b>
	650	232	6	4 800 000	8 550 000	490 000	870 000	380	500	<b>23272CAE4</b>
	<b>380</b>	520	106	4	1 870 000	4 100 000	190 000	420 000	530	670
560		135	5	2 500 000	5 100 000	255 000	520 000	530	630	<b>23076CAE4</b>
560		180	5	3 050 000	6 600 000	315 000	670 000	430	560	<b>24076CAE4</b>
	620	194	5	4 000 000	7 600 000	405 000	775 000	400	500	<b>23176CAE4</b>
	620	243	5	4 350 000	8 450 000	440 000	865 000	400	500	<b>24176CAE4</b>
	680	240	6	5 150 000	9 200 000	525 000	940 000	360	480	<b>23276CAE4</b>
<b>400</b>	540	106	4	1 890 000	4 250 000	193 000	435 000	530	630	<b>23980CAE4</b>
	600	148	5	2 970 000	5 900 000	305 000	605 000	480	600	<b>23080CAE4</b>
	600	200	5	3 600 000	7 000 000	370 000	775 000	400	500	<b>24080CAE4</b>
	650	200	6	4 150 000	7 900 000	420 000	805 000	380	480	<b>23180CAE4</b>
	650	250	6	4 950 000	10 100 000	505 000	1 030 000	380	480	<b>24180CAE4</b>
	720	256	6	5 800 000	10 400 000	590 000	1 060 000	340	450	<b>23280CAE4</b>
<b>420</b>	560	106	4	1 870 000	4 250 000	191 000	430 000	500	600	<b>23984CAE4</b>
	620	150	5	2 910 000	5 850 000	297 000	595 000	450	560	<b>23084CAE4</b>
	620	200	5	3 750 000	8 100 000	380 000	825 000	380	480	<b>24084CAE4</b>
	700	224	6	5 000 000	9 400 000	510 000	960 000	340	450	<b>23184CAE4</b>
	700	280	6	6 000 000	12 000 000	610 000	1 220 000	340	450	<b>24184CAE4</b>
	760	272	7.5	6 450 000	11 700 000	660 000	1 190 000	320	430	<b>23284CAE4</b>
<b>440</b>	600	118	4	2 190 000	4 800 000	223 000	490 000	450	560	<b>23988CAE4</b>
	650	157	6	3 150 000	6 350 000	320 000	645 000	430	530	<b>23088CAE4</b>
	650	212	6	4 150 000	9 100 000	425 000	930 000	360	450	<b>24088CAE4</b>
	720	226	6	5 300 000	10 300 000	540 000	1 060 000	320	430	<b>23188CAE4</b>
	720	280	6	6 000 000	12 100 000	610 000	1 230 000	320	430	<b>24188CAE4</b>
	790	280	7.5	6 900 000	12 800 000	705 000	1 300 000	300	400	<b>23288CAE4</b>

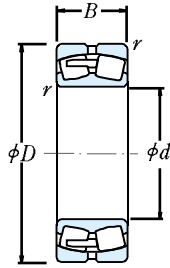
**Note** (1) The suffix K or K30 represents bearings with tapered bores (taper 1 : 12 or 1 : 30).

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

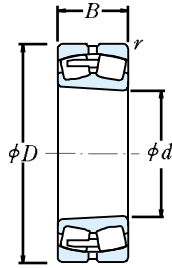
**Remarks** For the dimensions of adapters and withdrawal sleeves, refer to Pages B364, and B370 – B371.

# SPHERICAL ROLLER BEARINGS

Bore Diameter 460 – 560 mm



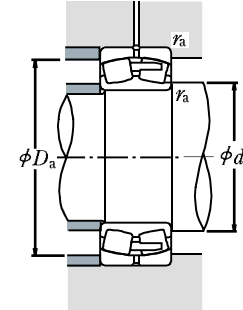
Cylindrical Bore



Tapered Bore



Without an Oil Groove and Holes



### 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

$$P_0 = F_r + Y_0 F_a$$

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

Boundary Dimensions (mm)				Basic Load Ratings				Limiting Speeds (min <sup>-1</sup> )		Bearing
$d$	$D$	$B$	$r$ min.	(N)		(kgf)		Grease	Oil	
				$C_r$	$C_{0r}$	$C_r$	$C_{0r}$			Cylindrical Bore
<b>460</b>	620	118	4	2 220 000	4 950 000	227 000	505 000	430	530	<b>23992CAE4</b>
	680	163	6	3 450 000	7 100 000	355 000	725 000	400	500	<b>23092CAE4</b>
	680	218	6	4 500 000	9 950 000	460 000	1 010 000	340	430	<b>24092CAE4</b>
	760	240	7.5	5 700 000	10 900 000	580 000	1 110 000	300	400	<b>23192CAE4</b>
	760	300	7.5	6 300 000	12 400 000	640 000	1 270 000	300	400	<b>24192CAE4</b>
	830	296	7.5	7 350 000	13 700 000	750 000	1 400 000	280	380	<b>23292CAE4</b>
<b>480</b>	650	128	5	2 580 000	5 850 000	263 000	595 000	400	500	<b>23996CAE4</b>
	700	165	6	3 800 000	7 950 000	385 000	810 000	400	480	<b>23096CAE4</b>
	700	218	6	4 600 000	10 200 000	470 000	1 040 000	320	430	<b>24096CAE4</b>
	790	248	7.5	6 050 000	11 700 000	620 000	1 200 000	300	380	<b>23196CAE4</b>
	790	308	7.5	7 150 000	14 600 000	730 000	1 490 000	300	380	<b>24196CAE4</b>
	870	310	7.5	7 850 000	14 400 000	805 000	1 470 000	260	360	<b>23296CAE4</b>
<b>500</b>	670	128	5	2 460 000	5 550 000	250 000	565 000	400	500	<b>239/500CAE4</b>
	720	167	6	3 750 000	8 100 000	385 000	825 000	380	480	<b>230/500CAE4</b>
	720	218	6	4 450 000	9 900 000	450 000	1 010 000	300	400	<b>240/500CAE4</b>
	830	264	7.5	6 850 000	13 400 000	700 000	1 360 000	280	360	<b>231/500CAE4</b>
	830	325	7.5	8 000 000	16 000 000	815 000	1 630 000	280	360	<b>241/500CAE4</b>
	920	336	7.5	9 000 000	16 600 000	915 000	1 690 000	260	320	<b>232/500CAE4</b>
<b>530</b>	710	136	5	2 930 000	6 800 000	299 000	695 000	360	450	<b>239/530CAE4</b>
	780	185	6	4 400 000	9 200 000	450 000	940 000	340	430	<b>230/530CAE4</b>
	780	250	6	5 400 000	11 800 000	550 000	1 210 000	280	360	<b>240/530CAE4</b>
	870	272	7.5	7 150 000	14 100 000	730 000	1 440 000	260	340	<b>231/530CAE4</b>
	870	335	7.5	8 500 000	17 500 000	870 000	1 790 000	260	340	<b>241/530CAE4</b>
	980	355	9.5	10 100 000	18 800 000	1 030 000	1 920 000	240	300	<b>232/530CAE4</b>
<b>560</b>	750	140	5	3 100 000	7 250 000	320 000	740 000	340	430	<b>239/560CAE4</b>
	820	195	6	5 000 000	10 700 000	510 000	1 090 000	320	400	<b>230/560CAE4</b>
	820	258	6	5 950 000	13 300 000	605 000	1 360 000	260	340	<b>240/560CAE4</b>
	920	280	7.5	7 850 000	15 500 000	800 000	1 580 000	240	320	<b>231/560CAE4</b>
	920	355	7.5	9 400 000	19 600 000	960 000	2 000 000	240	320	<b>241/560CAE4</b>
	1 030	365	9.5	10 900 000	20 500 000	1 110 000	2 090 000	220	280	<b>232/560CAE4</b>

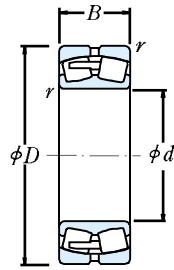
**Note** (1) The suffix K or K30 represents bearings with tapered bores (taper 1 : 12 or 1 : 30).

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

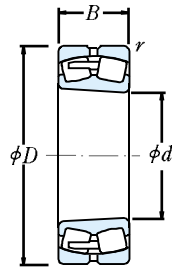
**Remarks** For the dimensions of adapters and withdrawal sleeves, refer to Pages B365 and B371.

# SPHERICAL ROLLER BEARINGS

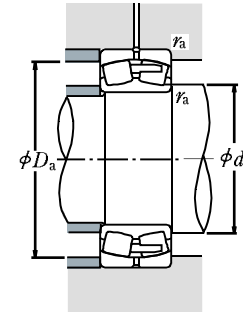
Bore Diameter 600 – 800 mm



Cylindrical Bore



Tapered Bore



### 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

$$P_0 = F_r + Y_0 F_a$$

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

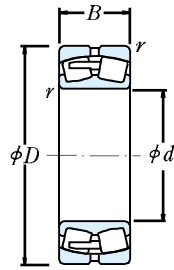
Boundary Dimensions (mm)				Basic Load Ratings (N)				Limiting Speeds (min <sup>-1</sup> )		Bearing
$d$	$D$	$B$	$r$ min.	$C_r$	$C_{0r}$	(kgf)		Grease	Oil	
<b>600</b>	800	150	5	3 450 000	8 100 000	350 000	830 000	320	400	<b>239/600CAE4</b>
	870	200	6	5 450 000	12 200 000	555 000	1 240 000	300	360	<b>230/600CAE4</b>
	870	272	6	6 600 000	15 100 000	675 000	1 540 000	240	320	<b>240/600CAE4</b>
	980	300	7.5	8 750 000	17 500 000	895 000	1 790 000	220	280	<b>231/600CAE4</b>
	980	375	7.5	10 400 000	21 900 000	1 060 000	2 230 000	220	280	<b>241/600CAE4</b>
1 090	388	9.5	12 700 000	24 900 000	1 300 000	2 540 000	200	260	<b>232/600CAE4</b>	
<b>630</b>	850	165	6	4 000 000	9 350 000	405 000	950 000	300	360	<b>239/630CAE4</b>
	920	212	7.5	5 900 000	12 700 000	600 000	1 300 000	280	340	<b>230/630CAE4</b>
	920	290	7.5	7 550 000	17 700 000	770 000	1 810 000	220	300	<b>240/630CAE4</b>
	1 030	315	7.5	9 600 000	19 400 000	980 000	1 970 000	200	260	231/630CAE4
	1 030	400	7.5	11 300 000	23 900 000	1 160 000	2 440 000	200	260	<b>241/630CAE4</b>
1 150	412	12	13 400 000	25 600 000	1 370 000	2 610 000	180	240	<b>232/630CAE4</b>	
<b>670</b>	900	170	6	4 350 000	10 300 000	445 000	1 050 000	260	340	<b>239/670CAE4</b>
	980	230	7.5	6 850 000	15 000 000	700 000	1 530 000	240	320	<b>230/670CAE4</b>
	980	308	7.5	8 450 000	19 500 000	860 000	1 990 000	200	260	<b>240/670CAE4</b>
	1 090	336	7.5	10 600 000	21 600 000	1 080 000	2 200 000	190	240	231/670CAE4
	1 090	412	7.5	12 400 000	26 500 000	1 270 000	2 700 000	190	240	<b>241/670CAE4</b>
1 220	438	12	14 900 000	28 700 000	1 520 000	2 920 000	170	220	<b>232/670CAE4</b>	
<b>710</b>	950	180	6	4 800 000	11 700 000	490 000	1 200 000	240	300	<b>239/710CAE4</b>
	1 030	236	7.5	7 100 000	15 800 000	725 000	1 610 000	240	280	<b>230/710CAE4</b>
	1 030	315	7.5	8 850 000	20 700 000	905 000	2 110 000	190	240	<b>240/710CAE4</b>
	1 150	438	9.5	13 900 000	30 500 000	1 410 000	3 100 000	170	220	<b>241/710CAE4</b>
1 280	450	12	15 700 000	33 500 000	1 600 000	3 100 000	160	200	<b>232/710CAE4</b>	
<b>750</b>	1 000	185	6	5 250 000	12 800 000	535 000	1 310 000	220	280	<b>239/750CAE4</b>
	1 090	250	7.5	7 750 000	17 200 000	790 000	1 750 000	220	260	<b>230/750CAE4</b>
	1 090	335	7.5	10 100 000	24 000 000	1 030 000	2 450 000	180	220	<b>240/750CAE4</b>
	1 360	475	15	17 700 000	35 000 000	1 800 000	3 600 000	140	190	<b>232/750CAE4</b>
<b>800</b>	1 060	195	6	5 600 000	13 700 000	570 000	1 400 000	220	260	<b>239/800CAE4</b>
	1 150	258	7.5	8 350 000	19 100 000	850 000	1 950 000	200	240	<b>230/800CAE4</b>
	1 150	345	7.5	10 900 000	26 300 000	1 110 000	2 680 000	160	200	<b>240/800CAE4</b>
	1 280	375	9.5	13 800 000	29 200 000	1 410 000	2 970 000	150	190	231/800CAE4
	1 420	488	15	20 300 000	41 000 000	2 070 000	4 150 000	130	170	<b>232/800CAE4</b>

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

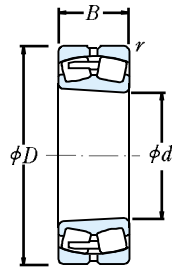
Numbers	Abutment and Fillet Dimensions (mm)					Constant	Axial Load Factors			Mass (kg)
	$d_a$ min.	$d_a$ max.	$D_a$ min.	$D_a$ max.	$r_a$ max.		$e$	$Y_2$	$Y_3$	
<b>239/600CAKE4</b> <b>230/600CAKE4</b> <b>240/600CAK30E4</b> <b>231/600CAKE4</b>	622	778	745	4	0.17	5.9	3.9	3.9	205	
	628	842	794	5	0.21	4.8	3.3	3.2	389	
	628	842	772	5	0.30	3.3	2.2	2.2	529	
	636	944	856	6	0.30	3.4	2.3	2.2	898	
	636	944	836	6	0.39	2.6	1.8	1.7	1 050	
<b>241/600CAK30E4</b> <b>232/600CAKE4</b>	644	1 046	923	8	0.36	2.8	1.9	1.8	1 590	
<b>239/630CAKE4</b> <b>230/630CAKE4</b> <b>240/630CAK30E4</b>	658	822	786	5	0.18	5.6	3.8	3.7	259	
	666	884	835	6	0.22	4.7	3.1	3.1	468	
	666	884	815	6	0.30	3.3	2.2	2.2	637	
	666	994	900	6	0.30	3.4	2.3	2.2	1 040	
	666	994	876	6	0.38	2.7	1.8	1.7	1 250	
<b>232/630CAKE4</b>	684	1 096	970	10	0.36	2.8	1.9	1.8	1 850	
<b>239/670CAKE4</b> <b>230/670CAKE4</b> <b>240/670CAK30E4</b> <b>231/670CAKE4</b>	698	872	836	5	0.17	5.8	3.9	3.8	300	
	706	944	891	6	0.22	4.7	3.1	3.1	571	
	706	944	868	6	0.30	3.3	2.2	2.2	773	
	706	1 054	952	6	0.30	3.3	2.2	2.2	1 230	
	706	1 054	934	6	0.37	2.7	1.8	1.8	1 440	
<b>241/670CAK30E4</b> <b>232/670CAKE4</b>	724	1 166	1 024	10	0.37	2.7	1.8	1.8	2 210	
<b>239/710CAKE4</b> <b>230/710CAKE4</b> <b>240/710CAK30E4</b>	738	922	883	5	0.17	5.8	3.9	3.8	352	
	746	994	936	6	0.22	4.6	3.1	3.0	647	
	746	994	916	6	0.29	3.4	2.3	2.2	861	
	754	1 106	981	8	0.38	2.6	1.8	1.7	1 730	
<b>241/710CAK30E4</b> <b>232/710CAKE4</b>	764	1 226	1 080	10	0.36	2.8	1.9	1.8	2 470	
<b>239/750CAKE4</b> <b>230/750CAKE4</b>	778	972	931	5	0.17	6.0	4.1	4.0	398	
	786	1 054	990	6	0.22	4.6	3.1	3.0	768	
	786	1 054	969	6	0.29	3.4	2.3	2.2	1 030	
	814	1 296	1 148	12	0.36	2.8	1.9	1.8	2 980	
<b>240/750CAK30E4</b> <b>232/750CAKE4</b>	828	1 032	987	5	0.17	6.0	4.0	3.9	462	
	836	1 114	1 045	6	0.21	4.7	3.2	3.1	870	
	836	1 114	1 029	6	0.27	3.7	2.5	2.5	1 130	
	844	1 236	1 127	8	0.28	3.6	2.4	2.3	1 870	
<b>231/800CAKE4</b> <b>232/800CAKE4</b>	864	1 356	1 208	12	0.35	2.8	1.9	1.9	3 250	

# SPHERICAL ROLLER BEARINGS

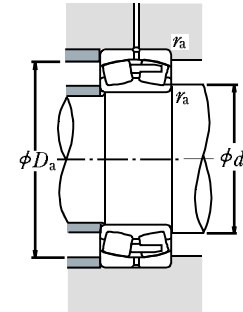
Bore Diameter 850 – 1400 mm



Cylindrical Bore



Tapered Bore



### 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

$$P_0 = F_r + Y_0 F_a$$

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

Boundary Dimensions (mm)	Basic Load Ratings				Limiting Speeds		Bearing			
	$d$	$D$	$B$	$r$ min.	(N) $C_r$	(kgf) $C_{0r}$		( $\text{min}^{-1}$ ) Grease Oil		
<b>850</b>	1 120	200	6	6 100 000	15 200 000	620 000	1 550 000	190	240	<b>239/850CAE4</b> <b>230/850CAE4</b>
	1 220	272	7.5	9 300 000	21 400 000	945 000	2 190 000	180	220	
	1 220	365	7.5	11 600 000	28 300 000	1 180 000	2 890 000	150	190	<b>240/850CAE4</b> <b>232/850CAE4</b>
	1 500	515	15	22 300 000	45 500 000	2 270 000	4 650 000	120	160	
<b>900</b>	1 180	206	6	6 600 000	16 700 000	670 000	1 700 000	180	220	<b>239/900CAE4</b> <b>230/900CAE4</b>
	1 280	280	7.5	9 850 000	22 800 000	1 000 000	2 330 000	160	200	
	1 280	375	7.5	12 800 000	31 500 000	1 300 000	3 250 000	140	180	<b>240/900CAE4</b> <b>232/900CAE4</b>
	1 580	515	15	23 400 000	47 500 000	2 380 000	4 850 000	110	140	
<b>950</b>	1 250	224	7.5	7 600 000	19 900 000	775 000	2 030 000	160	200	<b>239/950CAE4</b> <b>239/500CAE4</b>
	1 360	300	7.5	11 300 000	26 500 000	1 160 000	2 710 000	150	190	
	1 360	412	7.5	14 500 000	36 500 000	1 480 000	3 700 000	120	160	<b>240/950CAE4</b> <b>232/950CAE4</b>
	1 660	530	15	24 700 000	50 500 000	2 520 000	5 150 000	100	130	
<b>1 000</b>	1 320	236	7.5	8 200 000	21 700 000	835 000	2 210 000	150	190	239/1000CAE4 230/1000CAE4 <b>240/1000CAE4</b>
	1 420	308	7.5	11 900 000	28 100 000	1 210 000	2 860 000	140	170	
	1 420	412	7.5	15 300 000	38 500 000	1 560 000	3 950 000	110	150	
<b>1 060</b>	1 400	250	7.5	9 300 000	24 400 000	950 000	2 490 000	130	170	<b>239/1060CAE4</b> <b>230/1060CAE4</b> 240/1060CAE4
	1 500	325	9.5	13 000 000	31 500 000	1 330 000	3 200 000	120	160	
	1 500	438	9.5	16 800 000	43 000 000	1 720 000	4 350 000	100	130	
<b>1 120</b>	1 580	345	9.5	15 400 000	38 000 000	1 570 000	3 850 000	110	140	230/1120CAE4 <b>240/1120CAE4</b>
	1 580	462	9.5	18 700 000	49 500 000	1 910 000	5 050 000	95	120	
<b>1 180</b>	1 660	475	9.5	20 200 000	52 500 000	2 060 000	5 350 000	85	110	240/1180CAE4
<b>1 250</b>	1 750	500	9.5	21 000 000	59 500 000	2 140 000	6 050 000	75	100	<b>240/1250CAE4</b>
<b>1 320</b>	1 850	530	12	22 600 000	63 500 000	2 310 000	6 500 000	67	85	<b>240/1320CAE4</b>
<b>1 400</b>	1 950	545	12	24 500 000	65 000 000	2 500 000	6 650 000	60	75	<b>240/1400CAE4</b>

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

Numbers	Abutment and Fillet Dimensions (mm)					Constant $e$	Axial Load Factors			Mass (kg) approx.
	Tapered Bore <sup>(1)</sup>	$d_a$ min.	max.	$D_a$ min.	$r_a$ max.		$Y_2$	$Y_3$	$Y_0$	
<b>239/850CAKE4</b> <b>230/850CAKE4</b>		878	1 092	1 046	5	0.16	6.2	4.2	4.1	523
		886	1 184	1 109	6	0.21	4.8	3.2	3.1	1 020
<b>240/850CAK30E4</b> <b>232/850CAKE4</b>		886	1 184	1 093	6	0.28	3.6	2.4	2.4	1 350
		914	1 436	1 274	12	0.35	2.8	1.9	1.9	3 890
<b>239/900CAKE4</b> <b>230/900CAKE4</b>		928	1 152	1 103	5	0.16	6.4	4.3	4.2	591
		936	1 244	1 169	6	0.20	4.9	3.3	3.2	1 160
<b>240/900CAK30E4</b> <b>232/900CAKE4</b>		936	1 244	1 147	6	0.28	3.6	2.4	2.4	1 520
		964	1 516	1 354	12	0.33	3.0	2.0	2.0	4 300
<b>239/950CAKE4</b> <b>239/500CAKE4</b>		986	1 214	1 169	6	0.16	6.3	4.2	4.1	732
		986	1 324	1 241	6	0.21	4.8	3.2	3.2	1 400
<b>240/950CAK30E4</b> <b>232/950CAKE4</b>		986	1 324	1 219	6	0.28	3.6	2.4	2.3	1 880
		1 014	1 596	1 428	12	0.32	3.1	2.1	2.1	4 800
239/1000CAKE4 230/1000CAKE4 <b>240/1000CAK30E4</b>		1 036	1 284	1 229	6	0.16	6.4	4.3	4.2	881
		1 036	1 384	1 298	6	0.20	4.9	3.3	3.2	1 560
		1 036	1 384	1 275	6	0.27	3.7	2.5	2.4	2 010
<b>239/1060CAKE4</b> <b>230/1060CAKE4</b> 240/1060CAK30E4		1 096	1 364	1 302	6	0.16	6.1	4.1	4.0	1 030
		1 104	1 456	1 368	8	0.21	4.9	3.3	3.2	1 790
		1 104	1 456	1 346	8	0.28	3.6	2.4	2.4	2 410
230/1120CAKE4 <b>240/1120CAK30E4</b>		1 164	1 536	1 444	8	0.20	5.0	3.4	3.3	2 120
		1 164	1 536	1 421	8	0.27	3.7	2.5	2.5	2 790
240/1180CAK30E4		1 224	1 616	1 494	8	0.27	3.7	2.5	2.4	3 180
<b>240/1250CAK30E4</b>		1 294	1 706	1 579	8	0.25	4.0	2.7	2.6	3 700
<b>240/1320CAK30E4</b>		1 374	1 796	1 656	10	0.26	3.9	2.6	2.6	4 400
<b>240/1400CAK30E4</b>		1 454	1 896	1 767	10	0.25	4.0	2.7	2.6	4 900