

Cylindrical bore

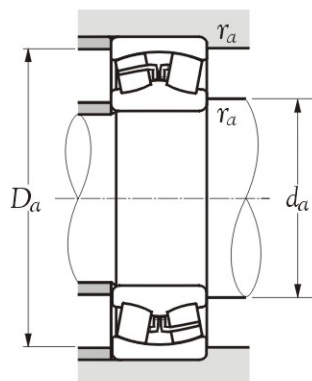


Tapered bore

Inner bore <i>d</i> mm	Bearing numbers	Boundary dimensions			Basic load ratings				Limiting speeds	
		<i>D</i>	<i>B</i>	<i>γs min</i> ³⁾	dynamic <i>C_r</i>	static <i>C_{or}</i>	dynamic <i>C_r</i>	static <i>C_{or}</i>	grease	oil
			mm		kN		kgf		min ⁻¹	
20	21304 MB W33	52	15	1.1	41	33.0	4182	3366	9700	15000
20	21304 MB/K W33	52	15	1.1	41	33.0	4182	3366	9700	15000
25	21305 MB W33	62	17	1.1	53	43.5	5406	4437	8400	13000
25	21305 MB/K W33	62	17	1.1	53	43.5	5406	4437	8400	13000
30	21306 MB W33	72	19	1.1	72	63.0	7344	6426	7300	11000
30	21306 MB/K W33	72	19	1.1	72	63.0	7344	6426	7300	11000
35	21307 MB W33	80	21	1.5	83	74.0	8466	7548	6800	9500
35	21307 MB/K W33	80	21	1.5	83	74.0	8466	7548	6800	9500
40	21308 MB W33	90	23	1.5	88	90.0	8950	9150	4900	6400
40	21308 MB/K W33	90	23	1.5	88	90.0	8950	9150	4900	6400
45	21309 MB W33	100	25	1.5	102	106.0	10400	10800	4400	5700
45	21309 MB/K W33	100	25	1.5	102	106.0	10400	10800	4400	5700
50	21310 MB W33	110	27	2.0	118	127.0	12000	12900	4000	5200
50	21310 MB/K W33	110	27	2.0	118	127.0	12000	12900	4000	5200
55	21311 MB W33	120	29	2.0	145	163.0	14800	16600	3700	4800
55	21311 MB/K W33	120	29	2.0	145	163.0	14800	16600	3700	4800
60	21312 MB W33	130	31	2.1	167	191.0	17100	19500	3400	4400
60	21312 MB/K W33	130	31	2.1	167	191.0	17100	19500	3400	4400
65	21313 MB W33	140	33	2.1	194	228.0	19800	23200	3100	4000
65	21313 MB/K W33	140	33	2.1	194	228.0	19800	23200	3100	4000
70	21314 MB W33	150	35	2.1	220	262.0	22400	26800	2900	3800
70	21314 MB/K W33	150	35	2.1	220	262.0	22400	26800	2900	3800
75	21315 MB W33	160	37	2.1	239	287.0	24300	29300	2700	3500
75	21315 MB/K W33	160	37	2.1	239	287.0	24300	29300	2700	3500

 Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Technical supplement			
	Cages	Precision	Grease
	Steel - ☒		
	Polymid - ☒		
	Brass - MB	Normal (ISO)	Nil


**Equivalent radial load
dynamic**

$$Pr = XFr + YFa$$

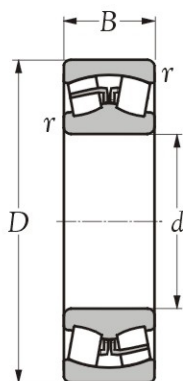
$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y1	0.67	Y2

Static

$$Pr = Fr + YoFa$$

For values of e , $Y2$ and Yo
see the table below.

Abutment and fillet dimensions			Constant e	Axial load factors			Weight	
d_a mm	D_a max mm	r_{as} max		$Y1$	$Y2$	$Y0$	cylindrical bore	tapered bore
							kg(s).	
27.0	45.0	1.0	0.30	2.25	3.34	2.20	0.160	-
27.0	45.0	1.0	0.30	2.25	3.34	2.20	-	0.155
32.0	55.0	1.0	0.28	2.43	3.61	2.37	0.254	-
32.0	55.0	1.0	0.28	2.43	3.61	2.37	-	0.247
37.0	65.0	1.0	0.27	2.49	3.71	2.43	0.386	-
37.0	65.0	1.0	0.27	2.49	3.71	2.43	-	0.375
44.0	71.0	1.5	0.26	2.55	3.80	2.50	0.503	-
44.0	71.0	1.5	0.26	2.55	3.80	2.50	-	0.488
48.5	81.5	1.5	0.26	2.55	3.80	2.50	0.705	-
48.5	81.5	1.5	0.26	2.55	3.80	2.50	-	0.694
53.5	91.5	1.5	0.26	2.60	3.87	2.54	0.927	-
53.5	91.5	1.5	0.26	2.60	3.87	2.54	-	0.912
60.0	100.0	2.0	0.26	2.64	3.93	2.58	1.210	-
60.0	100.0	2.0	0.26	2.64	3.93	2.58	-	1.190
65.0	110.0	2.0	0.25	2.69	4.01	2.63	1.710	-
65.0	110.0	2.0	0.25	2.69	4.01	2.63	-	1.690
72.0	118.0	2.0	0.25	2.69	4.00	2.63	2.100	-
72.0	118.0	2.0	0.25	2.69	4.00	2.63	-	2.070
77.0	128.0	2.0	0.25	2.69	4.00	2.63	2.550	-
77.0	128.0	2.0	0.25	2.69	4.00	2.63	-	2.510
82.0	138.0	2.0	0.25	2.69	4.00	2.63	3.180	-
82.0	138.0	2.0	0.25	2.69	4.00	2.63	-	3.140
87.0	148.0	2.0	0.24	2.84	4.23	2.78	3.810	-
87.0	148.0	2.0	0.24	2.84	4.23	2.78	-	3.760



Cylindrical bore

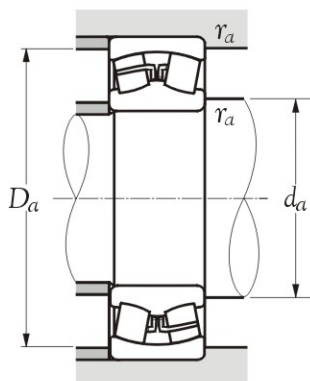


Tapered bore

Inner bore <i>d</i> mm	Bearing numbers	Boundary dimensions			dynamic <i>C_r</i> kN	Basic load ratings			Limiting speeds	
		<i>D</i>	<i>B</i> mm	<i>n</i> s min ⁻³⁾		static <i>C_{0r}</i>	dynamic <i>C_r</i>	static <i>C_{0r}</i>		
						kgf	kgf	grease	oil	
80	21316 MB W33	170	39	2.1	260	315	26500	32000	2500	3300
80	21316 MB/K W33	170	39	2.1	260	315	26500	32000	2500	3300
85	21317 MB W33	180	41	3.0	289	355	29500	36000	2400	3100
85	21317 MB/K W33	180	41	3.0	289	355	29500	36000	2400	3100
90	21318 MB W33	190	43	3.0	320	400	32500	40500	2300	3000
90	21318 MB/K W33	190	43	3.0	320	400	32500	40500	2300	3000
95	21319 MB W33	200	45	3.0	335	420	34000	43000	2100	2700
95	21319 MB/K W33	200	45	3.0	335	420	34000	43000	2100	2700
100	21320 MB W33	215	47	3.0	370	465	37500	47500	2000	2600
100	21320 MB/K W33	215	47	3.0	370	465	37500	47500	2000	2600
110	21322 MB W33	240	50	3.0	495	615	50500	62500	1800	2300
110	21322 MB/K W33	240	50	3.0	495	615	50500	62500	1800	2300

 Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Technical supplement			
	Cages	Precision	Grease
	Steel - ☒		
	Polymid - ☒		
	Brass - MB	Normal (ISO)	Nil


Equivalent radial load dynamic

$$Pr = XFr + YFa$$

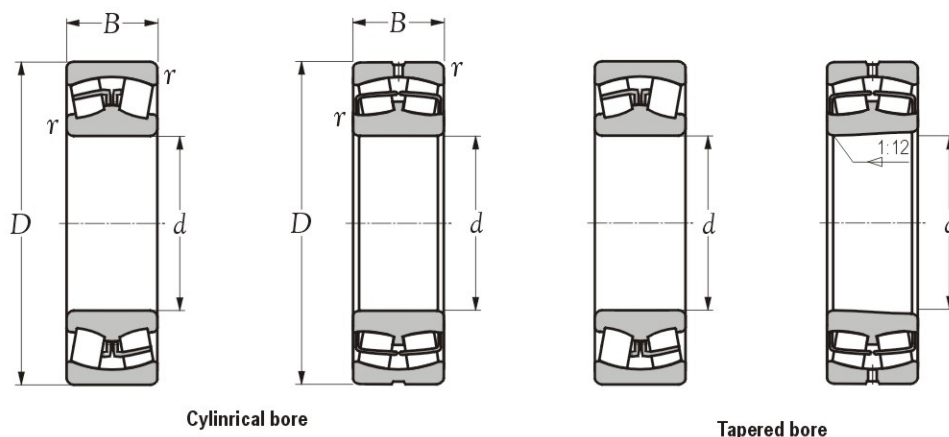
$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y1	0.67	Y2

Static

$$Pr = Fr + YoFa$$

For values of e , $Y2$ and Yo see the table below.

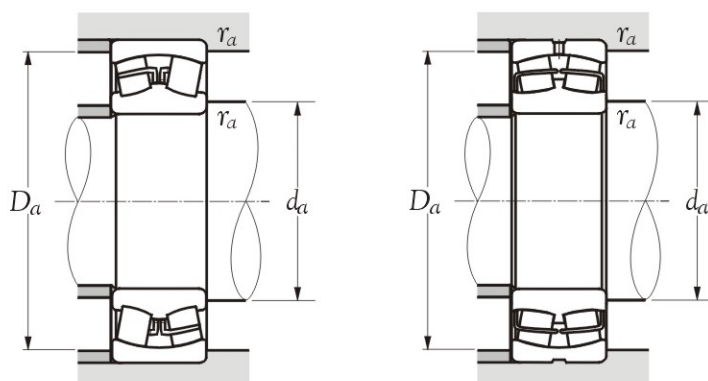
Abutment and fillet dimensions			Constant e	Axial load factors			Weight	
d_a mm	D_a max mm	r_{as} max		$Y1$	$Y2$	$Y0$	cylindrical bore	tapered bore
							kgs.	
92	158	2.0	0.23	2.95	4.39	2.88	4.53	-
92	158	2.0	0.23	2.95	4.39	2.88	-	4.47
99	166	2.5	0.25	2.69	4.00	2.63	5.35	-
99	166	2.5	0.25	2.69	4.00	2.63	-	5.28
104	176	2.5	0.24	2.83	4.22	2.77	6.30	-
104	176	2.5	0.24	2.83	4.22	2.77	-	6.21
109	186	2.5	0.23	3.00	4.46	2.93	7.10	-
109	186	2.5	0.23	3.00	4.46	2.93	-	7.00
114	201	2.5	0.22	3.01	4.48	2.94	8.89	-
114	201	2.5	0.22	3.01	4.48	2.94	-	8.78
124	226	2.5	0.21	3.20	4.77	3.13	11.20	-
124	226	2.5	0.21	3.20	4.77	3.13	-	11.10



Inner bore <i>d</i> mm	Bearing numbers	Boundary dimensions			Basic load ratings				Limiting speeds	
		<i>D</i>	<i>B</i>	$\gamma_s \text{ min}^{3)}$	dynamic <i>C_r</i>	static <i>C_{or}</i>	dynamic <i>C_r</i>	static <i>C_{or}</i>	grease	oil
		mm			kN		kgf		min ⁻¹	
25	22205 MB W33	52	18	1.0	36.5	36.0	3750	3650	8500	11000
25	22205 MB/K W33	52	18	1.0	36.5	36.0	3750	3650	8500	11000
25	22205 CC W33	52	18	1.0	36.5	36.0	3750	3650	8500	11000
25	22205 CC/K W33	52	18	1.0	36.5	36.0	3750	3650	8500	11000
30	22206 MB W33	62	20	1.0	49.0	49.0	5000	5000	7500	9500
30	22206 MB/K W33	62	20	1.0	49.0	49.0	5000	5000	7500	9500
30	22206 CC W33	62	20	1.0	49.0	49.0	5000	5000	7500	9500
30	22206 CC/K W33	62	20	1.0	49.0	49.0	5000	5000	7500	9500
35	22207 MB W33	72	23	1.1	69.5	71.0	7050	7200	6500	8500
35	22207 MB/K W33	72	23	1.1	69.5	71.0	7050	7200	6500	8500
35	22207 CC W33	72	23	1.1	69.5	71.0	7050	7200	6500	8500
35	22207 CC/K W33	72	23	1.1	69.5	71.0	7050	7200	6500	8500
40	22208 MB W33	80	23	1.1	79.0	88.5	8050	9000	6000	7600
40	22208 MB/K W33	80	23	1.1	79.0	88.5	8050	9000	6000	7600
40	22208 CC W33	80	23	1.1	79.0	88.5	8050	9000	6000	7600
40	22208 CC/K W33	80	23	1.1	79.0	88.5	8050	9000	6000	7600
45	22209 MB W33	85	23	1.1	82.5	95.0	8400	9700	5300	6800
45	22209 MB/K W33	85	23	1.1	82.5	95.0	8400	9700	5300	6800
45	22209 CC W33	85	23	1.1	82.5	95.0	8400	9700	5300	6800
45	22209 CC/K W33	85	23	1.1	82.5	95.0	8400	9700	5300	6800
50	22210 MB W33	90	23	1.1	86.0	102.0	8750	10400	4900	6300
50	22210 MB/K W33	90	23	1.1	86.0	102.0	8750	10400	4900	6300
50	22210 CC W33	90	23	1.1	86.0	102.0	8750	10400	4900	6300
50	22210 CC/K W33	90	23	1.1	86.0	102.0	8750	10400	4900	6300

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Technical supplement			
	Cages	Precision	Grease
	Steel - CC		
	Polymid - X	Normal (ISO)	Nil
	Brass - MB		


Equivalent radial load
dynamic

$$P_r = X F_r + Y F_a$$

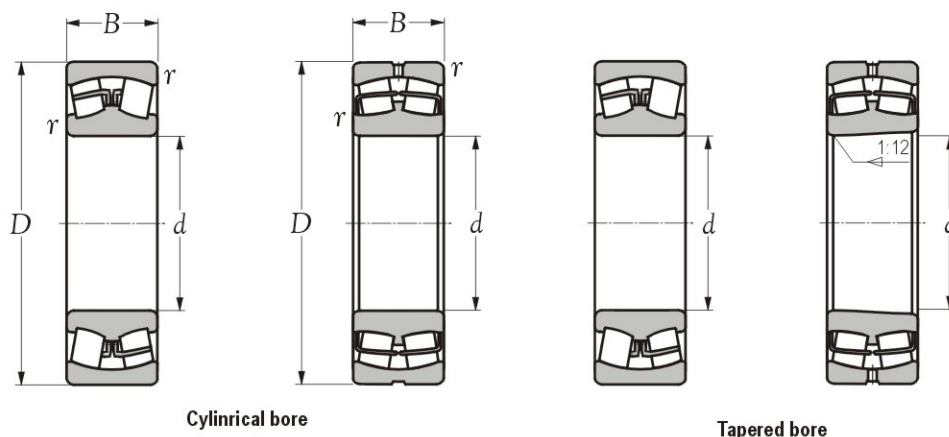
$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y ₁	0.67	Y ₂

Static

$$P_r = F_r + Y_0 F_a$$

For values of e , Y_2 and Y_0
see the table below.

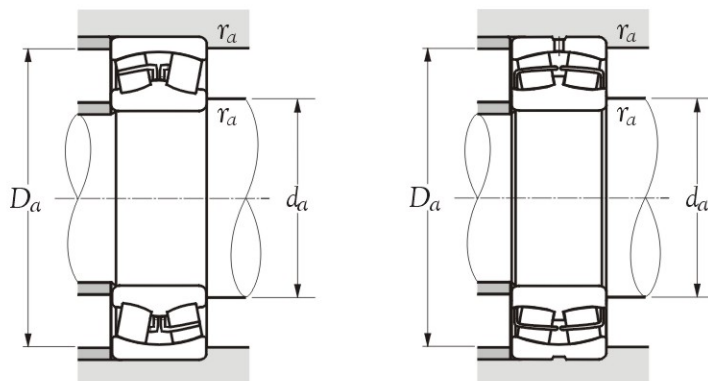
Abutment and fillet dimensions			Constant e	Axial load factors			Weight	
d_a mm	D_a max mm	r_{as} max		Y_1	Y_2	Y_0	cylindrical bore	tapered bore
							kg.	
31	46	1	0.35	1.92	2.86	1.88	0.186	-
31	46	1	0.35	1.92	2.86	1.88	-	0.182
31	46	1	0.35	1.92	2.86	1.88	0.186	-
31	46	1	0.35	1.92	2.86	1.88	-	0.182
36	56	1	0.33	2.07	3.09	2.03	0.287	-
36	56	1	0.33	2.07	3.09	2.03	-	0.282
36	56	1	0.33	2.07	3.09	2.03	0.287	-
36	56	1	0.33	2.07	3.09	2.03	-	0.282
42	65	1	0.32	2.09	3.11	2.04	0.446	-
42	65	1	0.32	2.09	3.11	2.04	-	0.437
42	65	1	0.32	2.09	3.11	2.04	0.446	-
42	65	1	0.32	2.09	3.11	2.04	-	0.437
47	73	1	0.29	2.35	3.50	2.30	0.526	-
47	73	1	0.29	2.35	3.50	2.30	-	0.515
47	73	1	0.29	2.35	3.50	2.30	0.526	-
47	73	1	0.29	2.35	3.50	2.30	-	0.515
52	78	1	0.27	2.50	3.72	2.44	0.584	-
52	78	1	0.27	2.50	3.72	2.44	-	0.572
52	78	1	0.27	2.50	3.72	2.44	0.584	-
52	78	1	0.27	2.50	3.72	2.44	-	0.572
57	83	1	0.25	2.69	4.01	2.63	0.630	-
57	83	1	0.25	2.69	4.01	2.63	-	0.616
57	83	1	0.25	2.69	4.01	2.63	0.630	-
57	83	1	0.25	2.69	4.01	2.63	-	0.616



Inner bore <i>d</i> mm	Bearing numbers	Boundary dimensions			Basic load ratings				Limiting speeds	
		<i>D</i>	<i>B</i>	$\gamma_s \text{ min}^{3)}$	dynamic <i>C_r</i>	static <i>C_{or}</i>	dynamic <i>C_r</i>	static <i>C_{or}</i>	grease	oil
		mm			kN		kgf		min ⁻¹	
55	22211 MB W33	100	25	1.5	93.5	110.0	9500	11200	4500	5800
55	22211 MB/K W33	100	25	1.5	93.5	110.0	9500	11200	4500	5800
55	22211 CC W33	100	25	1.5	93.5	110.0	9500	11200	4500	5800
55	22211 CC/K W33	100	25	1.5	93.5	110.0	9500	11200	4500	5800
60	22212 MB W33	110	28	1.5	115.0	147.0	11700	15000	4100	5300
60	22212 MB/K W33	110	28	1.5	115.0	147.0	11700	15000	4100	5300
60	22212 CC W33	110	28	1.5	115.0	147.0	11700	15000	4100	5300
60	22212 CC/K W33	110	28	1.5	115.0	147.0	11700	15000	4100	5300
65	22213 MB W33	120	31	1.5	143.0	179.0	14600	18300	3900	5000
65	22213 MB/K W33	120	31	1.5	143.0	179.0	14600	18300	3900	5000
65	22213 CC W33	120	31	1.5	143.0	179.0	14600	18300	3900	5000
65	22213 CC/K W33	120	31	1.5	143.0	179.0	14600	18300	3900	5000
70	22214 MB W33	125	31	1.5	154.0	201.0	15700	20500	3500	4600
70	22214 MB/K W33	125	31	1.5	154.0	201.0	15700	20500	3500	4600
70	22214 CC W33	125	31	1.5	154.0	201.0	15700	20500	3500	4600
70	22214 CC/K W33	125	31	1.5	154.0	201.0	15700	20500	3500	4600
75	22215 MB W33	130	31	1.5	166.0	223.0	16900	22800	3200	4200
75	22215 MB/K W33	130	31	1.5	166.0	223.0	16900	22800	3200	4200
75	22215 CC W33	130	31	1.5	166.0	223.0	16900	22800	3200	4200
75	22215 CC/K W33	130	31	1.5	166.0	223.0	16900	22800	3200	4200
80	22216 MB W33	140	33	2.0	179.0	239.0	18300	24400	3100	4000
80	22216 MB/K W33	140	33	2.0	179.0	239.0	18300	24400	3100	4000
80	22216 CC W33	140	33	2.0	179.0	239.0	18300	24400	3100	4000
80	22216 CC/K W33	140	33	2.0	179.0	239.0	18300	24400	3100	4000

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Technical supplement			
	Cages	Precision	Grease
	Steel - CC		
	Polymid - X		
	Brass - MB	Normal (ISO)	Nil


**Equivalent radial load
dynamic**

$$P_r = X F_r + Y F_a$$

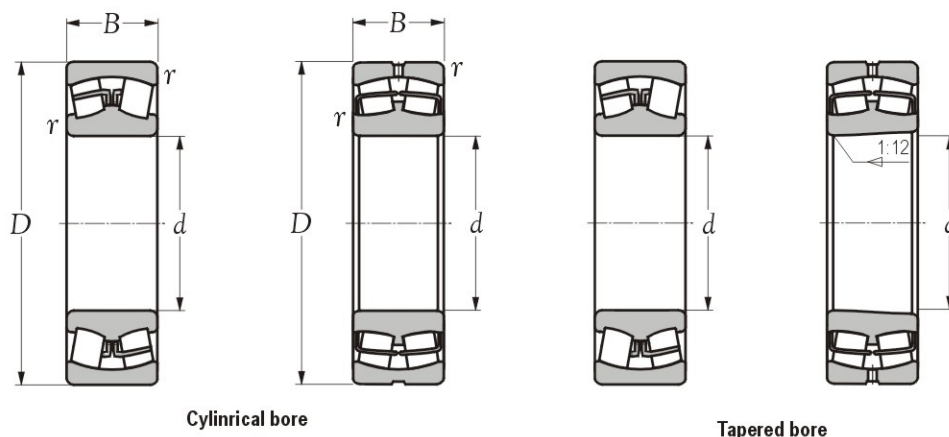
$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y ₁	0.67	Y ₂

Static

$$P_r = F_r + Y_0 F_a$$

For values of e , Y_2 and Y_0
see the table below.

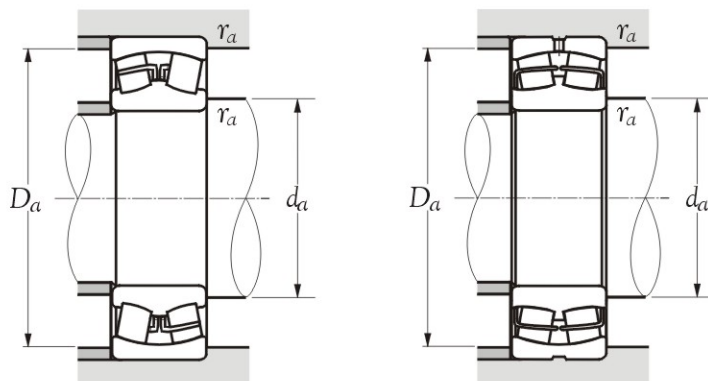
Abutment and fillet dimensions			Constant e	Axial load factors			Weight	
d_a mm	D_a max mm	r_{as} max		Y_1	Y_2	Y_0	cylindrical bore	tapered bore
							kgs.	
63.5	91.5	1.5	0.28	2.42	3.61	2.37	0.85	-
63.5	91.5	1.5	0.28	2.42	3.61	2.37	-	0.832
63.5	91.5	1.5	0.28	2.42	3.61	2.37	0.85	-
63.5	91.5	1.5	0.28	2.42	3.61	2.37	-	0.832
68.5	101.5	1.5	0.27	2.49	3.71	2.44	1.15	-
68.5	101.5	1.5	0.27	2.49	3.71	2.44	-	1.130
68.5	101.5	1.5	0.27	2.49	3.71	2.44	1.15	-
68.5	101.5	1.5	0.27	2.49	3.71	2.44	-	1.130
73.5	111.5	1.5	0.28	2.42	3.60	2.37	1.50	-
73.5	111.5	1.5	0.28	2.42	3.60	2.37	-	1.470
73.5	111.5	1.5	0.28	2.42	3.60	2.37	1.50	-
73.5	111.5	1.5	0.28	2.42	3.60	2.37	-	1.470
78.5	116.5	1.5	0.26	2.55	3.80	2.50	1.55	-
78.5	116.5	1.5	0.26	2.55	3.80	2.50	-	1.520
78.5	116.5	1.5	0.26	2.55	3.80	2.50	1.55	-
78.5	116.5	1.5	0.26	2.55	3.80	2.50	-	1.520
83.5	121.5	1.5	0.24	2.81	4.19	2.75	1.65	-
83.5	121.5	1.5	0.24	2.81	4.19	2.75	-	1.610
83.5	121.5	1.5	0.24	2.81	4.19	2.75	1.65	-
83.5	121.5	1.5	0.24	2.81	4.19	2.75	-	1.610
90.0	130.0	2.0	0.26	2.64	3.93	2.58	2.15	-
90.0	130.0	2.0	0.26	2.64	3.93	2.58	-	2.110
90.0	130.0	2.0	0.26	2.64	3.93	2.58	2.15	-
90.0	130.0	2.0	0.26	2.64	3.93	2.58	-	2.110



Inner bore <i>d</i> mm	Bearing numbers	Boundary dimensions			Basic load ratings				Limiting speeds	
		<i>D</i>	<i>B</i>	$\gamma_s \text{ min}^{3)}$	dynamic <i>C_r</i>	static <i>C_{or}</i>	dynamic <i>C_r</i>	static <i>C_{or}</i>	grease	oil
		mm			kN				min ⁻¹	
85	22217 MB W33	150	36	2.0	206.0	272.0	21000	27800	2900	3800
85	22217 MB/K W33	150	36	2.0	206.0	272.0	21000	27800	2900	3800
85	22217 CC W33	150	36	2.0	206.0	272.0	21000	27800	2900	3800
85	22217 CC/K W33	150	36	2.0	206.0	272.0	21000	27800	2900	3800
90	22218 MB W33	160	40	2.0	256.0	345.0	26200	35000	2700	3500
90	22218 MB/K W33	160	40	2.0	256.0	345.0	26200	35000	2700	3500
90	22218 CC W33	160	40	2.0	256.0	345.0	26200	35000	2700	3500
90	22218 CC/K W33	160	40	2.0	256.0	345.0	26200	35000	2700	3500
95	22219 MB W33	170	43	2.1	294.0	390.0	30000	39500	2500	3300
95	22219 MB/K W33	170	43	2.1	294.0	390.0	30000	39500	2500	3300
100	22220 MB W33	180	46	2.1	315.0	415.0	32000	42500	2400	3200
100	22220 MB/K W33	180	46	2.1	315.0	415.0	32000	42500	2400	3200
110	22222 MB W33	200	53	2.1	410.0	570.0	42000	58000	2200	2800
110	22222 MB/K W33	200	53	2.1	410.0	570.0	42000	58000	2200	2800
120	22224 MB W33	215	58	2.1	485.0	700.0	49500	71500	2000	2600
120	22224 MB/K W33	215	58	2.1	485.0	700.0	49500	71500	2000	2600
130	22226 MB W33	230	64	3.0	570.0	790.0	58000	80500	1800	2400
130	22226 MB/K W33	230	64	3.0	570.0	790.0	58000	80500	1800	2400
140	22228 MB W33	250	68	3.0	685.0	975.0	70000	99500	1700	2200
140	22228 MB/K W33	250	68	3.0	685.0	975.0	70000	99500	1700	2200
150	22230 MB W33	270	73	3.0	775.0	1160.0	79000	119000	1600	2000
150	22230 MB/K W33	270	73	3.0	775.0	1160.0	79000	119000	1600	2000

Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Technical supplement			
	Cages	Precision	Grease
	Steel - CC		
	Polymid - X	Normal (ISO)	Nil
	Brass - MB		


Equivalent radial load
dynamic

$$P_r = X F_r + Y F_a$$

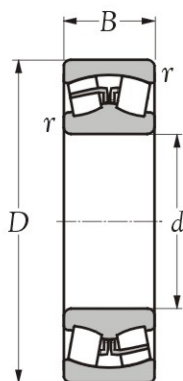
$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y ₁	0.67	Y ₂

Static

$$P_r = F_r + Y_0 F_a$$

For values of e , Y_2 and Y_0
see the table below.

Abutment and fillet dimensions			Constant e	Axial load factors			Weight	
d_a mm	D_a max mm	r_{as} max		Y_1	Y_2	Y_0	cylindrical bore	tapered bore
							kgs.	
95	140	2.0	0.26	2.60	3.88	2.55	2.66	-
95	140	2.0	0.26	2.60	3.88	2.55	-	2.61
95	140	2.0	0.26	2.60	3.88	2.55	2.66	-
95	140	2.0	0.26	2.60	3.88	2.55	-	2.61
100	150	2.0	0.26	2.55	3.80	2.49	3.50	-
100	150	2.0	0.26	2.55	3.80	2.49	-	3.42
100	150	2.0	0.26	2.55	3.80	2.49	3.50	-
100	150	2.0	0.26	2.55	3.80	2.49	-	3.42
107	158	2.0	0.26	2.63	3.92	2.57	4.20	-
107	158	2.0	0.26	2.63	3.92	2.57	-	2.80
112	168	2.0	0.26	2.55	3.80	2.49	4.95	-
112	168	2.0	0.26	2.55	3.80	2.49	-	4.84
122	188	2.0	0.27	2.51	3.74	2.46	7.20	-
122	188	2.0	0.27	2.51	3.74	2.46	-	7.04
132	203	2.0	0.27	2.47	3.68	2.42	9.10	-
132	203	2.0	0.27	2.47	3.68	2.42	-	8.89
144	216	2.5	0.28	2.39	3.56	2.33	11.20	-
144	216	2.5	0.28	2.39	3.56	2.33	-	10.90
154	236	2.5	0.28	2.39	3.55	2.33	14.00	-
154	236	2.5	0.28	2.39	3.55	2.33	-	13.70
164	256	2.5	0.27	2.46	3.66	2.40	18.10	-
164	256	2.5	0.27	2.46	3.66	2.40	-	17.70



Cylindrical bore

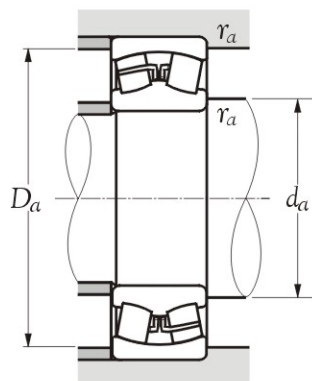


Tapered bore

Inner bore <i>d</i> mm	Bearing numbers	Boundary dimensions			Basic load ratings				Limiting speeds	
		<i>D</i>	<i>B</i>	<i>γs min</i> ³⁾	dynamic <i>C_r</i>	static <i>C_{or}</i>	dynamic <i>C_r</i>	static <i>C_{or}</i>	grease	oil
			mm		kN		kgf		min ⁻¹	
40	22308 MB W33	90	33	1.5	121	128	12300	13000	4500	5900
40	22308 MB/K W33	90	33	1.5	121	128	12300	13000	4500	5900
45	22309 MB W33	100	36	1.5	148	167	15100	17000	4100	5300
45	22309 MB/K W33	100	36	1.5	148	167	15100	17000	4100	5300
50	22310 MB W33	110	40	2.0	186	212	19000	21600	3700	4800
50	22310 MB/K W33	110	40	2.0	186	212	19000	21600	3700	4800
55	22311 MB W33	120	43	2.0	204	234	20800	23900	3400	4400
55	22311 MB/K W33	120	43	2.0	204	234	20800	23900	3400	4400
60	22312 MB W33	130	46	2.1	238	273	24300	27800	3100	4000
60	22312 MB/K W33	130	46	2.1	238	273	24300	27800	3100	4000
65	22313 MB W33	140	48	2.1	265	320	27100	32500	2800	3700
65	22313 MB/K W33	140	48	2.1	265	320	27100	32500	2800	3700
70	22314 MB W33	150	51	2.1	325	380	33000	39000	2700	3500
70	22314 MB/K W33	150	51	2.1	325	380	33000	39000	2700	3500
75	22315 MB W33	160	55	2.1	330	410	33500	42000	2500	3200
75	22315 MB/K W33	160	55	2.1	330	410	33500	42000	2500	3200
80	22316 MB W33	170	58	2.1	385	470	39500	48000	2300	3000
80	22316 MB/K W33	170	58	2.1	385	470	39500	48000	2300	3000
85	22317 MB W33	180	60	3.0	415	510	42500	52000	2200	2900
85	22317 MB/K W33	180	60	3.0	415	510	42500	52000	2200	2900
90	22318 MB W33	190	64	3.0	480	590	49000	60000	2100	2700
90	22318 MB/K W33	190	64	3.0	480	590	49000	60000	2100	2700
95	22319 MB W33	200	67	3.0	500	615	51000	63000	1900	2500
95	22319 MB/K W33	200	67	3.0	500	615	51000	63000	1900	2500

 Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Technical supplement			
	Cages	Precision	Grease
	Steel - ☒		
	Polymid - ☒		
	Brass - MB	Normal (ISO)	Nil


**Equivalent radial load
dynamic**

$$Pr = XFr + YFa$$

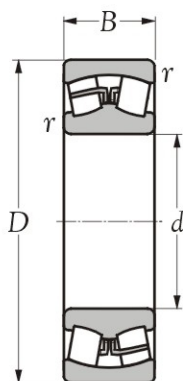
$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y1	0.67	Y2

Static

$$Pr = Fr + YoFa$$

For values of e , $Y2$ and Yo
see the table below.

Abutment and fillet dimensions			Constant <i>e</i>	Axial load factors			Weight	
<i>d_a</i> <i>mm</i>	<i>D_a</i> <i>max</i> <i>mm</i>	<i>r_{as}</i> <i>max</i>		<i>Y</i> ₁	<i>Y</i> ₂	<i>Y</i> ₀	cylindrical bore	tapered bore
							kg(s).	
48.5	81.5	1.5	0.38	1.76	2.62	1.72	0.97	-
48.5	81.5	1.5	0.38	1.76	2.62	1.72	-	0.95
53.5	91.5	1.5	0.36	1.86	2.77	1.82	1.33	-
53.5	91.5	1.5	0.36	1.86	2.77	1.82	-	1.30
60.0	100.0	2.0	0.37	1.80	2.69	1.76	1.79	-
60.0	100.0	2.0	0.37	1.80	2.69	1.76	-	1.75
65.0	110.0	2.0	0.40	1.68	2.50	1.64	2.30	-
65.0	110.0	2.0	0.40	1.68	2.50	1.64	-	2.25
72.0	118.0	2.0	0.42	1.62	2.42	1.59	2.90	-
72.0	118.0	2.0	0.42	1.62	2.42	1.59	-	2.83
77.0	128.0	2.0	0.38	1.79	2.67	1.75	3.45	-
77.0	128.0	2.0	0.38	1.79	2.67	1.75	-	3.37
82.0	138.0	2.0	0.37	1.81	2.70	1.77	4.22	-
82.0	138.0	2.0	0.37	1.81	2.70	1.77	-	4.12
87.0	148.0	2.0	0.37	1.80	2.69	1.76	5.25	-
87.0	148.0	2.0	0.37	1.80	2.69	1.76	-	5.13
92.0	158.0	2.0	0.37	1.80	2.69	1.76	6.05	-
92.0	158.0	2.0	0.37	1.80	2.69	1.76	-	5.91
99.0	166.0	2.5	0.37	1.82	2.71	1.78	7.10	-
99.0	166.0	2.5	0.37	1.82	2.71	1.78	-	6.94
104.0	176.0	2.5	0.37	1.80	2.69	1.76	8.35	-
104.0	176.0	2.5	0.37	1.80	2.69	1.76	-	8.16
109.0	186.0	2.5	0.37	1.80	2.69	1.76	9.76	-
109.0	186.0	2.5	0.37	1.80	2.69	1.76	-	9.54



Cylindrical bore

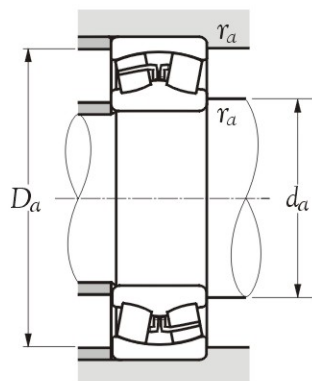


Tapered bore

Inner bore d mm	Bearing numbers	Boundary dimensions			Basic load ratings				Limiting speeds	
		D	B	$\gamma_s \text{ min}^{3)}$	dynamic C_r	static C_{or}	dynamic C_r	static C_{or}	grease	oil
			mm		kN		kgf		min^{-1}	
100	22320 MB W33	215	73	3	605	755	61500	77000	1800	2400
100	22320 MB/K W33	215	73	3	605	755	61500	77000	1800	2400
110	22322 MB W33	240	80	3	745	930	76000	95000	1700	2200
110	22322 MB/K W33	240	80	3	745	930	76000	95000	1700	2200
120	22324 MB W33	260	86	3	880	1120	89500	114000	1500	2000
120	22324 MB/K W33	260	86	3	880	1120	89500	114000	1500	2000

 Note: 1) These values are the allowable minimum dimensions of the chamfer dimension r .

Technical supplement			
	Cages	Precision	Grease
	Steel - ☒		
	Polymid - ☒		
	Brass - MB	Normal (ISO)	Nil


**Equivalent radial load
dynamic**

$$Pr = XFr + YFa$$

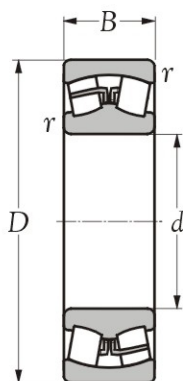
$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y1	0.67	Y2

Static

$$Pr = Fr + YoFa$$

For values of e , $Y2$ and Yo
see the table below.

Abutment and fillet dimensions			Constant e	Axial load factors			Weight	
d_a mm	D_a max mm	r_{as} max		$Y1$	$Y2$	$Y0$	cylindrical bore	tapered bore
114	201	2.5	0.37	1.80	2.69	1.76	12.40	-
114	201	2.5	0.37	1.80	2.69	1.76	-	12.10
124	226	2.5	0.36	1.87	2.79	1.83	17.10	-
124	226	2.5	0.36	1.87	2.79	1.83	-	16.70
134	246	2.5	0.37	1.80	2.69	1.76	21.50	-
134	246	2.5	0.37	1.80	2.69	1.76	-	21.00



Cylindrical bore

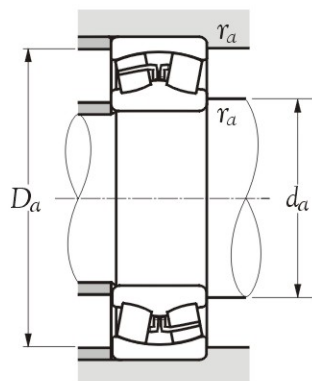


Tapered bore

Inner bore <i>d</i> mm	Bearing numbers	Boundary dimensions			Basic load ratings				Limiting speeds	
		<i>D</i>	<i>B</i> mm	$\gamma_s \min^{3)}$	dynamic <i>C_r</i> kN	static <i>C_{0r}</i>	dynamic <i>C_r</i> kgf	static <i>C_{0r}</i>	grease $\min^{-1}$	oil
110	23022 MB W33	170	45	2.0	282	455	28800	46500	2200	2800
110	23022 MB/K W33	170	45	2.0	282	455	28800	46500	2200	2800
120	23024 MB W33	180	46	2.0	296	495	30000	50500	2000	2600
120	23024 MB/K W33	180	46	2.0	296	495	30000	50500	2000	2600
130	23026 MB W33	200	52	2.0	375	620	38500	63500	1800	2300
130	23026 MB/K W33	200	52	2.0	375	620	38500	63500	1800	2300
140	23028 MB W33	210	53	2.0	405	690	41000	70500	1700	2200
140	23028 MB/K W33	210	53	2.0	405	690	41000	70500	1700	2200
150	23030 MB W33	225	56	2.1	445	775	45500	79000	1500	2000
150	23030 MB/K W33	225	56	2.1	445	775	45500	79000	1500	2000
160	23032 MB W33	240	60	2.1	505	885	51500	90000	1500	1900
160	23032 MB/K W33	240	60	2.1	505	885	51500	90000	1500	1900

 Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r* .

Technical supplement			
	Cages	Precision	Grease
	Steel - ☒		
	Polymid - ☒		
	Brass - MB	Normal (ISO)	Nil


**Equivalent radial load
dynamic**

$$Pr = XFr + YFa$$

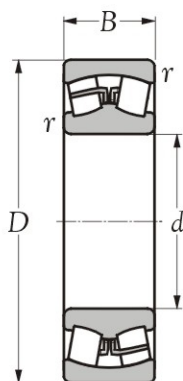
$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y1	0.67	Y2

Static

$$Pr = Fr + YoFa$$

For values of e , $Y2$ and Yo
see the table below.

Abutment and fillet dimensions			Constant e	Axial load factors			Weight	
d_a mm	D_a max mm	r_{as} max		$Y1$	$Y2$	$Y0$	cylindrical bore	tapered bore
							kgs.	
120	160	2	0.26	2.59	3.85	2.53	3.71	-
120	160	2	0.26	2.59	3.85	2.53	-	3.58
130	170	2	0.25	2.69	4.01	2.63	4.05	-
130	170	2	0.25	2.69	4.01	2.63	-	3.90
140	190	2	0.26	2.63	3.92	2.57	5.90	-
140	190	2	0.26	2.63	3.92	2.57	-	5.69
150	200	2	0.25	2.73	4.06	2.67	6.35	-
150	200	2	0.25	2.73	4.06	2.67	-	6.12
162	213	2	0.24	2.76	4.11	2.70	7.73	-
162	213	2	0.24	2.76	4.11	2.70	-	7.45
172	228	2	0.25	2.74	4.09	2.68	9.42	-
172	228	2	0.25	2.74	4.09	2.68	-	9.09



Cylindrical bore

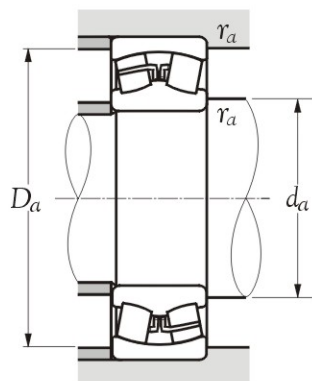


Tapered bore

Inner bore <i>d</i> mm	Bearing numbers	Boundary dimensions			Basic load ratings				Limiting speeds	
		<i>D</i>	<i>B</i>	$\gamma_s \min^{3)}$	dynamic <i>C_r</i>	static <i>C_{0r}</i>	dynamic <i>C_r</i>	static <i>C_{0r}</i>	grease	oil
			mm		kN		kgf		min ⁻¹	
100	23120 MB W33	165	52	2.0	310	470	31500	47500	2000	2600
100	23120 MB/K W33	165	52	2.0	310	470	31500	47500	2000	2600
110	23122 MB W33	180	56	2.0	370	580	37500	59500	1800	2400
110	23122 MB/K W33	180	56	2.0	370	580	37500	59500	1800	2400
120	23124 MB W33	200	62	2.0	455	705	46500	71500	1600	2100
120	23124 MB/K W33	200	62	2.0	455	705	46500	71500	1600	2100
130	23126 MB W33	210	64	2.0	495	795	50500	81000	1500	2000
130	23126 MB/K W33	210	64	2.0	495	795	50500	81000	1500	2000
140	23128 MB W33	225	68	2.1	540	895	55000	91000	1400	1800
140	23128 MB/K W33	225	68	2.1	540	895	55000	91000	1400	1800
150	23130 MB W33	250	80	2.1	730	1190	74500	121000	1300	1700
150	23130 MB/K W33	250	80	2.1	730	1190	74500	121000	1300	1700
160	23132 MB W33	270	86	2.1	840	1370	85500	140000	1200	1600
160	23132 MB/K W33	270	86	2.1	840	1370	85500	140000	1200	1600

 Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r* .

Technical supplement			
	Cages	Precision	Grease
	Steel - ☒		
	Polymid - ☒		
	Brass - MB	Normal (ISO)	Nil


**Equivalent radial load
dynamic**

$$Pr = XFr + YFa$$

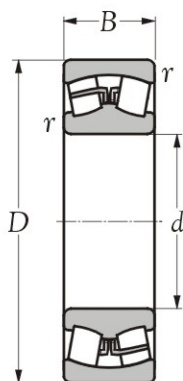
$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y1	0.67	Y2

Static

$$Pr = Fr + YoFa$$

For values of e , $Y2$ and Yo
see the table below.

Abutment and fillet dimensions			Constant e	Axial load factors			Weight	
d_a mm	D_a max mm	r_{as} max		$Y1$	$Y2$	$Y0$	cylindrical bore	tapered bore
							kgs.	
110	155	2	0.32	2.12	3.15	2.07	4.30	-
110	155	2	0.32	2.12	3.15	2.07	-	4.16
120	170	2	0.31	2.17	3.24	2.13	5.40	-
120	170	2	0.31	2.17	3.24	2.13	-	5.22
130	190	2	0.31	2.17	3.24	2.13	7.70	-
130	190	2	0.31	2.17	3.24	2.13	-	7.46
140	200	2	0.30	2.23	3.32	2.18	8.47	-
140	200	2	0.30	2.23	3.32	2.18	-	8.20
152	213	2	0.30	2.25	3.35	2.20	10.20	-
152	213	2	0.30	2.25	3.35	2.20	-	9.86
162	238	2	0.32	2.11	3.15	2.06	15.60	-
162	238	2	0.32	2.11	3.15	2.06	-	15.10
172	258	2	0.32	2.11	3.15	2.07	19.80	-
172	258	2	0.32	2.11	3.15	2.07	-	19.20



Cylindrical bore

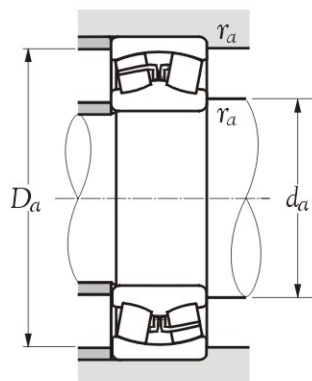


Tapered bore

Inner bore <i>d</i> mm	Bearing numbers	Boundary dimensions			Basic load ratings				Limiting speeds	
		<i>D</i>	<i>B</i>	<i>r</i> s min ³⁾	dynamic <i>C_r</i>	static <i>C_{0r}</i>	dynamic <i>C_r</i>	static <i>C_{0r}</i>	grease	oil
			mm		kN		kgf		min ⁻¹	
90	23218 MB W33	160	52.4	2.0	315	455	32500	46500	2200	2800
90	23218 MB/K W33	160	52.4	2.0	315	455	32500	46500	2200	2800
100	23220 MB W33	180	60.3	2.1	405	580	41500	59000	1900	2500
100	23220 MB/K W33	180	60.3	2.1	405	580	41500	59000	1900	2500
110	23222 MB W33	200	69.8	2.1	515	760	52500	77500	1700	2200
110	23222 MB/K W33	200	69.8	2.1	515	760	52500	77500	1700	2200
120	23224 MB W33	215	76.0	2.1	585	880	59500	89500	1500	2000
120	23224 MB/K W33	215	76.0	2.1	585	880	59500	89500	1500	2000
130	23226 MB W33	230	80.0	3.0	685	1060	70000	108000	1500	1900
130	23226 MB/K W33	230	80.0	3.0	685	1060	70000	108000	1500	1900
140	23228 MB W33	250	88.0	3.0	805	1270	82000	129000	1300	1700
140	23228 MB/K W33	250	88.0	3.0	805	1270	82000	129000	1300	1700

 Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r*.

Technical supplement			
	Cages	Precision	Grease
	Steel - ☒		
	Polymid - ☒		
	Brass - MB	Normal (ISO)	Nil


**Equivalent radial load
dynamic**

$$Pr = XFr + YFa$$

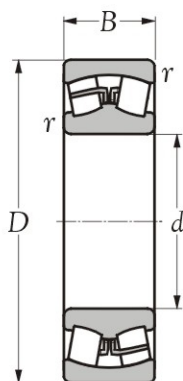
$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y1	0.67	Y2

Static

$$Pr = Fr + YoFa$$

For values of e , $Y2$ and Yo
see the table below.

Abutment and fillet dimensions			Constant e	Axial load factors			Weight	
d_a mm	D_a max mm	r_{as} max		$Y1$	$Y2$	$Y0$	cylindrical bore	tapered bore
							kgs.	
100	150	2.0	0.33	2.04	3.03	1.99	4.45	-
100	150	2.0	0.33	2.04	3.03	1.99	-	4.32
112	168	2.0	0.34	1.98	2.94	1.93	6.47	-
112	168	2.0	0.34	1.98	2.94	1.93	-	6.28
122	188	2.0	0.35	1.91	2.84	1.86	9.71	-
122	188	2.0	0.35	1.91	2.84	1.86	-	9.43
132	203	2.0	0.36	1.89	2.82	1.85	12.10	-
132	203	2.0	0.36	1.89	2.82	1.85	-	11.70
144	216	2.5	0.35	1.92	2.86	1.88	14.30	-
144	216	2.5	0.35	1.92	2.86	1.88	-	13.90
154	236	2.5	0.36	1.90	2.83	1.86	18.80	-
154	236	2.5	0.36	1.90	2.83	1.86	-	18.20



Cylindrical bore

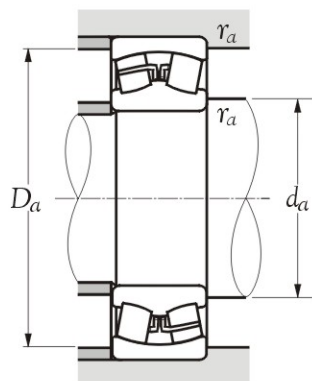


Tapered bore

Inner bore <i>d</i> mm	Bearing numbers	Boundary dimensions			Basic load ratings				Limiting speeds	
		<i>D</i>	<i>B</i>	$\gamma_s \min^{3)}$	dynamic <i>C_r</i>	static <i>C_{0r}</i>	dynamic <i>C_r</i>	static <i>C_{0r}</i>	grease	oil
			mm		kN		kgf		$\min^{-1}$	
110	24022 MB W33	170	60	1.2	415	620	42330	63240	2400	3600
110	24022 MB/K W33	170	60	1.2	415	620	42330	63240	2400	3600
120	24024 MB W33	180	60	2.0	390	670	39500	68500	1800	2300
120	24024 MB/K W33	180	60	2.0	390	670	39500	68500	1800	2300
130	24026 MB W33	200	69	2.0	505	895	51500	91000	1600	2100
130	24026 MB/K W33	200	69	2.0	505	895	51500	91000	1600	2100
140	24028 MB W33	210	69	2.0	510	945	52000	96500	1500	1900
140	24028 MB/K W33	210	69	2.0	510	945	52000	96500	1500	1900
150	24030 MB W33	225	75	2.1	585	1060	59500	108000	1400	1800
150	24030 MB/K W33	225	75	2.1	585	1060	59500	108000	1400	1800
160	24032 MB W33	240	80	2.1	650	1200	66500	122000	1300	1700
160	24032 MB/K W33	240	80	2.1	650	1200	66500	122000	1300	1700

 Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r* .

Technical supplement			
	Cages	Precision	Grease
	Steel - ☒		
	Polymid - ☒		
	Brass - MB	Normal (ISO)	Nil


**Equivalent radial load
dynamic**

$$Pr = XFr + YFa$$

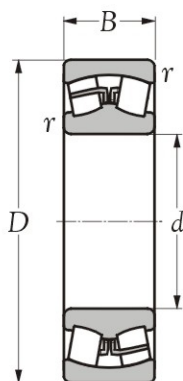
$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y1	0.67	Y2

Static

$$Pr = Fr + YoFa$$

For values of e , $Y2$ and Yo
see the table below.

Abutment and fillet dimensions			Constant e	Axial load factors			Weight	
d_a mm	D_a max mm	r_{as} max		$Y1$	$Y2$	$Y0$	cylindrical bore	tapered bore
							kgs.	
119	161	2	0.33	2.00	3.00	2.00	5.00	-
119	161	2	0.33	2.00	3.00	2.00	-	4.90
130	170	2	0.33	2.06	3.07	2.02	5.48	-
130	170	2	0.33	2.06	3.07	2.02	-	5.39
140	190	2	0.34	1.98	2.95	1.94	8.08	-
140	190	2	0.34	1.98	2.95	1.94	-	7.95
150	200	2	0.32	2.09	3.12	2.05	8.57	-
150	200	2	0.32	2.09	3.12	2.05	-	8.43
162	213	2	0.33	2.06	3.07	2.02	10.70	-
162	213	2	0.33	2.06	3.07	2.02	-	10.50
172	228	2	0.32	2.10	3.13	2.06	13.00	-
172	228	2	0.32	2.10	3.13	2.06	-	12.80



Cylindrical bore

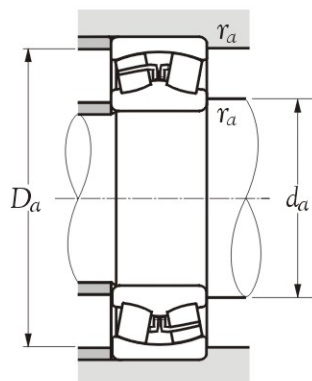


Tapered bore

Inner bore <i>d</i> mm	Bearing numbers	Boundary dimensions			Basic load ratings				Limiting speeds	
		<i>D</i>	<i>B</i>	$\gamma_s \min^{3)}$	dynamic <i>C_r</i>	static <i>C_{0r}</i>	dynamic <i>C_r</i>	static <i>C_{0r}</i>	grease	oil
			mm		kN		kgf		$\min^{-1}$	
110	24122 MB W33	180	69	2.0	450	755	46000	77000	1800	2400
110	24122 MB/K W33	180	69	2.0	450	755	46000	77000	1800	2400
120	24124 MB W33	200	80	2.0	575	945	58500	96500	1600	2100
120	24124 MB/K W33	200	80	2.0	575	945	58500	96500	1600	2100
130	24126 MB W33	210	80	2.0	585	995	60000	102000	1500	2000
130	24126 MB/K W33	210	80	2.0	585	995	60000	102000	1500	2000
140	24128 MB W33	225	85	2.1	670	1150	68500	117000	1400	1800
140	24128 MB/K W33	225	85	2.1	670	1150	68500	117000	1400	1800
150	24130 MB W33	250	100	2.1	885	1520	90500	155000	1300	1700
150	24130 MB/K W33	250	100	2.1	885	1520	90500	155000	1300	1700
160	24132 MB W33	270	109	2.1	1040	1780	106000	181000	1200	1600
160	24132 MB/K W33	270	109	2.1	1040	1780	106000	181000	1200	1600

 Note: 1) These values are the allowable minimum dimensions of the chamfer dimension *r* .

Technical supplement			
	Cages	Precision	Grease
	Steel - ☒		
	Polymid - ☒		
	Brass - MB	Normal (ISO)	Nil


**Equivalent radial load
dynamic**

$$Pr = XFr + YFa$$

$\frac{Fa}{Fr} \leq e$		$\frac{Fa}{Fr} > e$	
X	Y	X	Y
1	Y1	0.67	Y2

Static

$$Pr = Fr + YoFa$$

For values of e , $Y2$ and Yo
see the table below.

Abutment and fillet dimensions			Constant e	Axial load factors			Weight	
d_a mm	D_a max mm	r_{as} max		$Y1$	$Y2$	$Y0$	cylindrical bore	tapered bore
							kgs.	
120	170	2	0.38	1.76	2.63	1.73	7.07	-
120	170	2	0.38	1.76	2.63	1.73	-	6.96
130	190	2	0.40	1.68	2.50	1.64	10.30	-
130	190	2	0.40	1.68	2.50	1.64	-	10.10
140	200	2	0.38	1.78	2.65	1.74	11.00	-
140	200	2	0.38	1.78	2.65	1.74	-	10.80
152	213	2	0.38	1.80	2.68	1.76	13.30	-
152	213	2	0.38	1.80	2.68	1.76	-	13.10
162	238	2	0.40	1.69	2.51	1.65	20.20	-
162	238	2	0.40	1.69	2.51	1.65	-	20.00
172	258	2	0.40	1.67	2.48	1.63	26.00	-
172	258	2	0.40	1.67	2.48	1.63	-	25.60