

R.K. AGRO ENGINEERING

BALL & ROLLER BEARINGS



Deep groove ball bearings

Deep groove ball bearings are available in a variety of sizes, and are the most popular of all rolling bearings. This type of bearing supports radial load and a certain degree of axial load in both directions simultaneously.

Shielded/Sealed Type

- Simplifies sealing structure of applications.
- Greasing is not necessary because bearings are pre-lubricated.
- Table 1 on the next page lists major shielded and sealed bearing types and compares their performance.

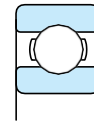
With locating snap ring

- Bearings with a locating snap ring can be fit to the housing easily, as the locating snap ring facilitates axial positioning.

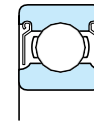
Extra-small ball bearings and miniature ball bearings

- The open type is widely used. Also available are the shielded / sealed type and the flanged type; the latter is easily positioned in the axial direction.

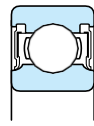
Single-row deep groove ball bearings



Open type

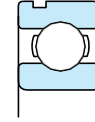


Shielded type



Sealed type

Bore diameter **10 – 200 mm**



With snap ring groove With locating snap ring

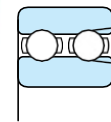


Bore diameter **10 – 130 mm**

Extra-small ball bearings and miniature ball bearings



Bore diameter **3 – 9 mm**



Double-row deep groove ball bearings

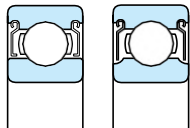
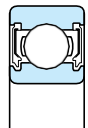
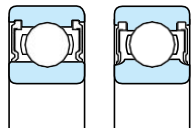
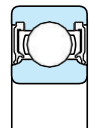
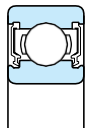


(with filling slot)

Bore diameter **15 – 75 mm**

Deep groove ball bearings

Table 1 Comparison of shielded and sealed bearing performance

Type	Shielded		Sealed				
	Non-contact type		Non-contact type	Contact type		Extremely light contact type	
	ZZ		2RU	2RS	2RK	2RD	
							
Characteristics	(a) ¹⁾	(b)	(c)	(d) ²⁾	(e)	(f)	(g)
Friction torque	Small		Small	Large		Large	Small
High speed performance	Good		Good	Limited because of contact			Good
Grease sealing property	Good		Better than ZZ type	Better than 2RU type for low-speed applications	Excellent		Excellent
Dirt resistance	Good		Better than ZZ type	Better than 2RU type	Excellent		Excellent
Water resistance	Economical		Better than ZZ type but inferior to 2RS, 2RK and 2RD types	Good	Excellent		Better than ZZ and 2RU types
Operating temperature ³⁾	-30 to 110°C			-30 to 100°C		-30 to 110°C	

Notes)

- 1) Illustration (a) of the ZZ type shows the relatively small size bearing.
- 2) Illustration (d) of the 2RS type shows the relatively small size bearing.
- 3) The operating temperature range listed is for the standard type. It can be widened by using a different type of grease or sealing material. Consult Koyo for details.

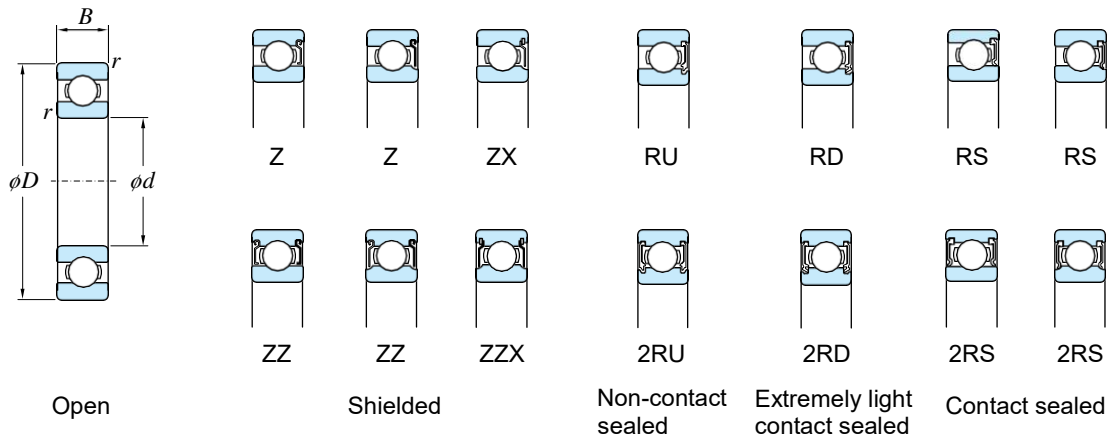
Handling instructions

- 1) The shielded / sealed type deep groove ball bearing and the deep groove ball bearing with a locating snap ring are designed for use with the inner ring rotating.
Consult koyo on use with the outer ring rotating.
- 2) When the axial load is large, make the shaft shoulder and housing shoulder larger than usual. (Referring to the specification table, make the mounting dimension d_a larger and make D_a smaller.)

Boundary dimensions	The dimensions of standard series are as specified in JIS B 1512. For extra-small and miniature ball bearings, special series (ML) are specified together with those described above.						
Tolerances	As specified in JIS B 1514.						
Radial internal clearance	Deep groove ball bearings (except extra-small ball bearings and miniature ball bearings) as specified in JIS B 1520 (refer to Table 2-1 on p. A11.) Extra-small ball bearings and miniature ball bearings (refer to Table 2-2 on p. A11.) Deep groove ball bearings for motors (refer to Table 2-6 on p. A14.)						
Standard cages	<ul style="list-style-type: none"> Pressed steel cage (supplementary code : //) Copper alloy machined cage (supplementary code : FY) <p>Remark : For certain applications, stainless steel sheet pressed cages (YS) and polyamide molded cages (MG) may also be used.</p>	Application of standard cages					
		Bearing series	Pressed cage	Machined cage			
		68	683 – 689	–			
		69	693 – 699	–			
		60	603 – 609	–			
		62	623 – 629	–			
		63	633 – 639	–			
		68	6800 – 6838	6840 – 68/600			
		69	6900 – 6918	6920 – 6980			
		160	16001 – 16028	16030 – 16072			
		60	6000 – 6034	6036 – 6084			
		62	6200 – 6230	6232 – 6248			
		63	6300 – 6328	6330 – 6340			
		64	6403 – 6418	–			
		42	4200 – 4215	–			
		43	4302 – 4315	–			
Allowable misalignment	0.002 3 – 0.003 4 rad (8' – 12')						
Equivalent radial load (Single / double-row)	Dynamic equivalent radial load $P_r = XF_r + YF_a$ (Refer to the table on the Right for values X and Y)	$\frac{F_a}{C_{Or}}$	e	$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
				X	Y	X	Y
		0.014	0.19				2.30
		0.028	0.22				1.99
		0.056	0.26				1.71
		0.084	0.28	1	0	0.56	1.55
		0.11	0.30				1.45
		0.17	0.34				1.31
		0.28	0.38				1.15
	Static equivalent radial load $P_{Or} = 0.6F_r + 0.5F_a$ when the value of ($P_{Or} < F_r$, $P_{Or} = F_r$)	0.42	0.42				1.04
		0.56	0.44				1.00

Single Row Deep Groove Ball Bearings.

d 10 – 20 mm



Boundary dimensions (mm)	Basic load ratings (kN)		Limiting speeds (min ⁻¹)				Bearing No.					(Refer.) Mass Open type (kg)			
			Grease lub.		Oil lub.		Open	Shielded ZZ	Sealed 2RU	2RD	2RS				
d D B r min.	C_r	C_{0r}	(Open) (Z, ZZ) (RU, 2RU)	(Shielded) (RD, 2RD)	(Sealed) (RS, 2RS)	(Open) (Z)									
10	19	5	0.3	1.70	0.84	37 000	-	-	43 000	6800	ZZ	-	-	-	0.005
	22	6	0.3	2.70	1.25	34 000	-	-	41 000	6900	ZZ	-	-	-	0.010
	26	8	0.3	4.55	1.95	31 000	-	19 000	36 000	6000	ZZ	2RU	-	2RS	0.019
	30	9	0.6	5.10	2.40	24 000	-	16 000	29 000	6200	ZZ	2RU	-	2RS	0.032
	35	11	0.6	8.10	3.45	22 000	-	16 000	27 000	6300	ZZ	2RU	-	2RS	0.053
12	21	5	0.3	1.90	1.05	33 000	-	-	39 000	6801	ZZ	2RU	-	-	0.006
	24	6	0.3	2.90	1.45	31 000	-	-	36 000	6901	ZZ	2RU	-	-	0.011
	28	7	0.3	5.10	2.40	27 000	-	-	32 000	16001	-	-	-	-	0.024
	28	8	0.3	5.10	2.40	27 000	-	17 000	32 000	6001	ZZ	2RU	-	2RS	0.022
	32	10	0.6	6.80	3.05	22 000	20 000	15 000	27 000	6201	ZZ	2RU	2RD	2RS	0.037
15	37	12	1	9.70	4.20	20 000	18 000	15 000	25 000	6301	ZZ	2RU	2RD	2RS	0.060
	24	5	0.3	2.10	1.25	28 000	-	-	33 000	6802	ZZ	2RU	-	-	0.007
	28	7	0.3	4.30	2.25	26 000	-	-	30 000	6902	ZZ	2RU	-	-	0.017
	32	8	0.3	5.60	2.85	23 000	-	-	28 000	16002	-	-	-	-	0.025
	32	9	0.3	5.60	2.85	23 000	-	14 000	27 000	6002	ZZ	2RU	-	2RS	0.030
17	35	11	0.6	7.65	3.75	20 000	18 000	13 000	24 000	6202	ZZ	2RU	2RD	2RS	0.045
	42	13	1	11.4	5.45	17 000	15 000	12 000	20 000	6302	ZZ	2RU	2RD	2RS	0.082
	26	5	0.3	2.60	1.55	26 000	-	-	30 000	6803	ZZ	2RU	-	-	0.008
	30	7	0.3	4.60	2.55	23 000	-	-	28 000	6903	ZZ	2RU	-	-	0.018
	35	8	0.3	6.00	3.25	21 000	-	-	25 000	16003	-	-	-	-	0.032
20	35	10	0.3	6.00	3.25	21 000	-	12 000	25 000	6003	ZZ	2RU	-	2RS	0.039
	40	12	0.6	9.55	4.80	17 000	15 000	12 000	21 000	6203	ZZ	2RU	2RD	2RS	0.065
	47	14	1	13.6	6.65	15 000	14 000	10 000	18 000	6303	ZZ	2RU	2RD	2RS	0.115
	62	17	1.1	20.7	9.85	13 000	-	-	15 000	6403	-	-	-	-	0.270
	32	7	0.3	4.00	2.45	21 000	-	-	25 000	6804	ZZ	2RU	-	-	0.018
20	37	9	0.3	6.35	3.70	19 000	-	-	23 000	6904	ZZ	2RU	-	-	0.036
	42	8	0.3	7.95	4.50	17 000	-	-	21 000	16004	-	-	-	-	0.050
	42	12	0.6	9.40	5.05	17 000	-	10 000	21 000	6004	ZZ	2RU	-	2RS	0.069
	47	14	1	12.8	6.65	15 000	14 000	9 700	17 000	6204	ZZ	2RU	2RD	2RS	0.106
	52	15	1.1	15.9	7.85	14 000	13 000	9 500	17 000	6304	ZZ	2RU	2RD	2RS	0.144
72	19	1.1	31.0	15.2	11 000	-	-	13 000	6404	-	-	-	-	0.400	

Remark) Standard cage types used for the above bearings are described earlier in this section.

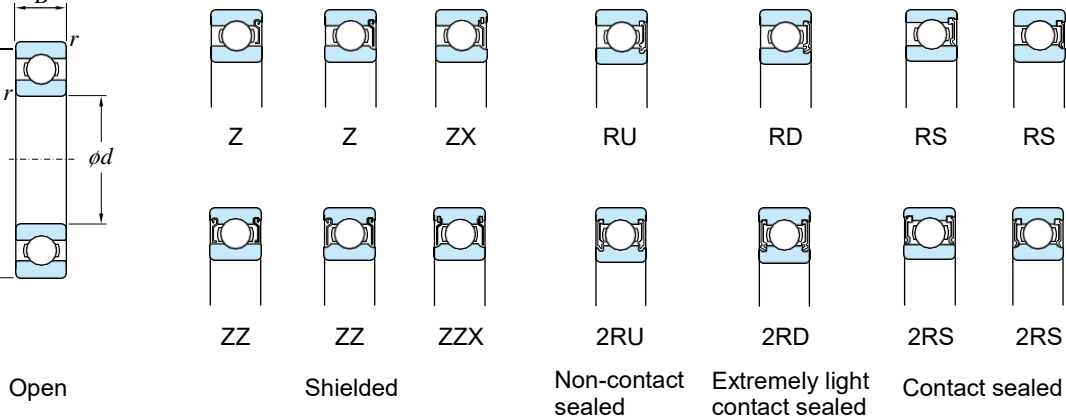
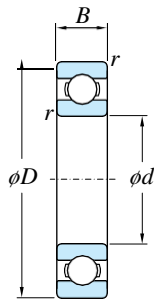
d 22 – 45 mm

	Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min ⁻¹)				Bearing No.					(Refer.) Mass Open type (kg)
	d	D	B	r min.	C _r	C _{0r}	Grease lub.		Oil lub.		Open	Shielded ZZ	Sealed 2RU	2RD	2RS	
							(Open) (Z, ZZ) (RU, 2RU)	(Shielded) (RD, 2RD)	(Sealed) (RS, 2RS)	(Open) (Z)						
22	44	12	0.6	9.40	5.15	17 000	–	9 900	20 000	60/22	–	–	–	2RS	0.073	
	50	14	1	12.8	6.65	15 000	–	9 700	17 000	62/22	–	–	–	2RS	0.118	
	56	16	1.1	18.5	9.40	13 000	–	8 600	15 000	63/22	–	–	–	2RS	0.201	
25	37	7	0.3	4.30	2.95	18 000	–	–	21 000	6805	ZZ	2RU	–	–	0.022	
	42	9	0.3	7.00	4.55	16 000	–	–	19 000	6905	ZZ	2RU	–	–	0.041	
	47	8	0.3	8.85	5.60	15 000	–	–	18 000	16005	–	–	–	–	0.060	
	47	12	0.6	10.1	5.85	15 000	–	9 000	18 000	6005	ZZ	2RU	–	2RS	0.080	
	52	15	1	14.0	7.85	13 000	12 000	8 400	15 000	6205	ZZ	2RU	2RD	2RS	0.128	
	62	17	1.1	20.6	11.3	11 000	9 900	7 500	13 000	6305	ZZ	2RU	2RD	2RS	0.232	
28	80	21	1.5	36.1	19.4	9 100	–	–	11 000	6405	–	–	–	–	0.530	
	52	12	0.6	12.4	7.40	14 000	–	–	16 000	60/28	ZZ	–	–	–	0.097	
	58	16	1	17.9	9.75	12 000	–	7 600	14 000	62/28	ZZ	–	–	2RS	0.173	
	68	18	1.1	23.5	13.1	10 000	–	6 900	12 000	63/28	ZZ	–	–	2RS	0.328	
	30	42	7	0.3	4.55	3.40	15 000	–	–	18 000	6806	ZZ	2RU	–	–	0.026
		47	9	0.3	7.25	5.00	14 000	–	–	17 000	6906	ZZ	2RU	–	–	0.045
55		9	0.3	11.2	7.35	13 000	–	–	15 000	16006	–	–	–	–	0.085	
	55	13	1	13.2	8.25	13 000	–	7 500	15 000	6006	ZZ	2RU	–	2RS	0.116	
	62	16	1	19.5	11.3	11 000	9 900	7 000	13 000	6206	ZZ	2RU	2RD	2RS	0.199	
	72	19	1.1	26.7	15.0	9 600	8 600	6 400	12 000	6306	ZZ	2RU	2RD	2RS	0.346	
32	90	23	1.5	43.4	23.9	8 100	–	–	9 700	6406	–	–	–	–	0.735	
	58	13	1	15.0	9.15	12 000	–	7 200	14 000	60/32	ZZ	–	–	2RS	0.127	
	65	17	1	23.5	13.1	10 000	–	6 900	12 000	62/32	ZZ	–	–	2RS	0.228	
	75	20	1.1	30.1	16.2	9 300	–	6 400	11 000	63/32	ZZ	–	–	2RS	0.437	
	35	47	7	0.3	4.75	3.85	13 000	–	–	16 000	6807	ZZ	2RU	–	–	0.030
		55	10	0.6	10.9	7.75	12 000	–	–	14 000	6907	ZZ	2RU	–	–	0.073
62		9	0.3	12.2	8.85	11 000	–	–	13 000	16007	–	–	–	–	0.110	
	62	14	1	15.9	10.3	11 000	–	6 500	13 000	6007	ZZ	2RU	–	2RS	0.155	
	72	17	1.1	25.7	15.4	9 200	8 300	6 000	11 000	6207	ZZ	2RU	2RD	2RS	0.288	
	80	21	1.5	33.4	19.3	8 500	7 700	5 700	10 000	6307	ZZ	2RU	2RD	2RS	0.457	
40	100	25	1.5	55.0	31.0	7 200	–	–	8 600	6407	–	–	–	–	0.952	
	52	7	0.3	4.95	4.20	12 000	–	–	14 000	6808	ZZ	2RU	–	–	0.033	
	62	12	0.6	13.7	9.95	11 000	–	–	13 000	6908	ZZ	2RU	–	–	0.112	
	68	9	0.3	12.6	9.65	9 800	–	–	12 000	16008	–	–	–	–	0.125	
	68	15	1	16.7	11.5	10 000	–	5 800	12 000	6008	ZZ	2RU	–	2RS	0.192	
	80	18	1.1	29.1	17.8	8 300	7 500	5 400	10 000	6208	ZZ	2RU	2RD	2RS	0.366	
	90	23	1.5	40.7	24.0	7 700	6 900	5 100	9 200	6308	ZZ	2RU	2RD	2RS	0.633	
	45	110	27	2	63.7	36.6	6 600	–	–	7 900	6408	–	–	–	–	1.23
		58	7	0.3	6.20	5.40	11 000	–	–	13 000	6809	ZZ	2RU	–	–	0.040
68		12	0.6	14.1	10.9	9 700	–	–	11 000	6909	ZZ	2RU	–	–	0.132	
	75	10	0.6	15.5	12.3	8 900	–	–	10 000	16009	–	–	–	–	0.170	
	75	16	1	21.0	15.1	9 200	–	5 300	11 000	6009	ZZ	2RU	–	2RS	0.245	
	85	19	1.1	32.7	20.3	7 700	6 900	5 100	9 200	6209	ZZ	2RU	2RD	2RS	0.407	
	100	25	1.5	48.9	29.5	6 800	6 100	4 500	8 100	6309	ZZ	2RU	2RD	2RS	0.833	
	120	29	2	77.2	45.1	6 000	–	–	7 200	6409	–	–	–	–	1.53	

Remark) Standard cage types used for the above bearings are described earlier in this section.

Single Row Deep Groove Ball Bearings.

d 50 – (70) mm



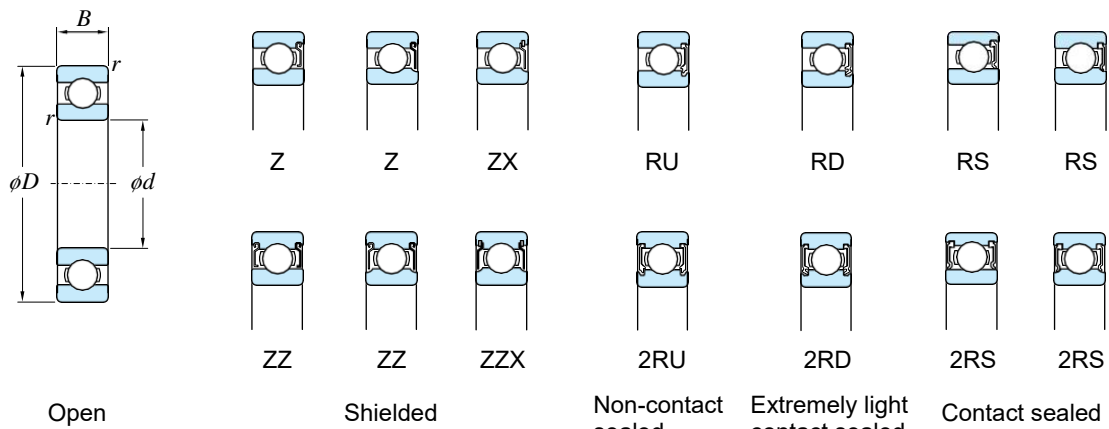
Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min ⁻¹)				Bearing No.					(Refer.) Mass Open type (kg)
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> min.	<i>C_r</i>	<i>C_{0r}</i>	Grease lub.		Oil lub.	Open	Shielded	Sealed	2RD	2RS		
						(Open)	(Shielded)	(Sealed)	(Open)						
						(Z, ZZ)	(RD, 2RD)	(RS, 2RS)	(Z)						
						(RU, 2RU)									
50	65	7	0.3	6.60	6.10	9 600	–	–	11 000	6810	ZZ	2RU	–	–	0.052
	72	12	0.6	14.5	11.7	9 000	–	–	11 000	6910	ZZ	2RU	–	–	0.133
	80	10	0.6	16.0	13.3	8 200	–	–	9 700	16010	–	–	–	–	0.180
	80	16	1	21.8	16.6	8 400	–	4 800	9 900	6010	ZZ	2RU	–	2RS	0.261
	90	20	1.1	35.1	23.3	7 100	6 400	4 600	8 500	6210	ZZ	2RU	2RD	2RS	0.463
	110	27	2	62.0	38.3	6 100	5 500	4 100	7 300	6310	ZZ	2RU	2RD	2RS	1.07
	130	31	2.1	83.0	49.5	5 500	–	–	6 600	6410	–	–	–	–	1.88
55	72	9	0.3	8.80	8.10	8 700	–	–	10 000	6811	ZZ	2RU	–	–	0.083
	80	13	1	16.6	14.1	8 100	–	–	9 600	6911	ZZ	2RU	–	–	0.185
	90	11	0.6	19.3	16.3	7 400	–	–	8 800	16011	–	–	–	–	0.260
	90	18	1.1	28.3	21.2	7 600	–	4 300	8 900	6011	ZZ	2RU	–	2RS	0.385
	100	21	1.5	43.4	29.4	6 300	–	4 100	7 600	6211	ZZ	2RU	–	2RS	0.607
	120	29	2	71.6	45.0	5 600	–	3 700	6 700	6311	ZZ	2RU	–	2RS	1.37
	140	33	2.1	100	62.3	5 000	–	–	6 000	6411	–	–	–	–	2.29
60	78	10	0.3	11.5	10.6	8 000	–	–	9 400	6812	ZZ	2RU	–	–	0.104
	85	13	1	20.2	17.3	7 500	–	–	8 900	6912	ZZ	2RU	–	–	0.192
	95	11	0.6	19.8	17.6	6 900	–	–	8 100	16012	–	–	–	–	0.280
	95	18	1.1	29.4	23.2	7 100	–	4 000	8 400	6012	ZZ	2RU	–	2RS	0.415
	110	22	1.5	52.4	36.2	5 700	–	3 700	6 900	6212	ZZ	2RU	–	2RS	0.783
	130	31	2.1	81.9	52.2	5 200	–	3 500	6 200	6312	ZZ	2RU	–	2RS	1.70
	150	35	2.1	110	70.8	4 600	–	–	5 500	6412	–	–	–	–	2.77
65	85	10	0.6	11.9	11.5	7 300	–	–	8 600	6813	ZZ	2RU	–	–	0.126
	90	13	1	17.4	16.1	7 100	–	–	8 400	6913	ZZ	2RU	–	–	0.211
	100	11	0.6	17.1	16.0	6 600	–	–	7 800	16013	–	–	–	–	0.300
	100	18	1.1	30.5	25.2	6 600	–	3 700	7 800	6013	ZZ	2RU	–	2RS	0.435
	120	23	1.5	57.2	40.1	5 400	–	3 500	6 400	6213	ZZ	2RU	–	2RS	0.990
	140	33	2.1	92.7	59.9	4 800	–	3 200	5 800	6313	ZZ	2RU	–	2RS	2.08
	160	37	2.1	118	79.2	4 300	–	–	5 200	6413	–	–	–	–	3.30
70	90	10	0.6	12.1	11.9	6 800	–	–	8 100	6814	ZZ	2RU	–	–	0.134
	100	16	1	23.7	21.2	6 400	–	–	7 600	6914	ZZ	2RU	–	–	0.342
	110	13	0.6	30.1	25.6	6 100	–	–	7 200	16014	–	–	–	–	0.433
	110	20	1.1	38.1	30.9	6 100	–	3 500	7 200	6014	ZZ	2RU	–	2RS	0.602

d (70) – 105 mm

Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min ⁻¹)				Bearing No.					(Refer.) Mass Open type (kg)	
d	D	B	r min.	C _r	C _{0r}	Grease lub.		Oil lub.		Open	Shielded ZZ	Sealed 2RU	2RD	2RS		
						(Open) (Z, ZZ) (RU, 2RU)	(Shielded) (RD, 2RD)	(Sealed) (RS, 2RS)	(Open) (Z)							
70	125	24	1.5	62.2	44.1	5 100	–	3 300	6 100	6214	ZZ	2RU	–	2RS	1.07	
	150	35	2.1	104	68.2	4 500	–	3 000	5 400	6314	ZZ	2RU	–	2RS	2.52	
	180	42	3	144	104	3 900	–	–	4 600	6414	–	–	–	–	4.83	
75	95	10	0.6	12.5	12.9	6 400	–	–	7 600	6815	ZZ	2RU	–	–	0.142	
	105	16	1	24.4	22.6	6 100	–	–	7 200	6915	ZZ	2RU	–	–	0.363	
	115	13	0.6	27.5	25.3	5 700	–	–	6 700	16015	–	–	–	–	0.457	
	115	20	1.1	39.6	33.5	5 700	–	3 300	6 800	6015	ZZ	2RU	–	2RS	0.638	
	130	25	1.5	67.4	48.3	4 800	–	3 100	5 800	6215	ZZ	2RU	–	2RS	1.18	
	160	37	2.1	113	77.2	4 200	–	2 800	5 000	6315	ZZ	2RU	–	2RS	3.02	
80	190	45	3	154	115	3 600	–	–	4 400	6415	–	–	–	–	5.87	
	100	10	0.6	12.7	13.3	6 100	–	–	7 200	6816	ZZ	2RU	–	–	0.150	
	110	16	1	25.0	24.0	5 700	–	–	6 800	6916	ZZ	2RU	–	–	0.382	
	125	14	0.6	31.7	29.7	5 200	–	–	6 100	16016	–	–	–	–	0.597	
	125	22	1.1	47.6	39.8	5 300	–	3 100	6 300	6016	ZZ	–	–	2RS	0.850	
	140	26	2	72.7	53.0	4 500	–	2 900	5 400	6216	ZZ	–	–	2RS	1.40	
	170	39	2.1	123	86.7	3 900	–	2 700	4 700	6316	ZZ	–	–	2RS	3.59	
	200	48	3	164	125	3 400	–	–	4 100	6416	–	–	–	–	6.84	
	85	110	13	1	18.7	19.0	5 600	–	–	6 600	6817	ZZ	2RU	–	–	0.266
120		18	1.1	31.9	29.6	5 300	–	–	6 300	6917	ZZ	2RU	–	–	0.535	
130		14	0.6	32.6	31.7	4 900	–	–	5 800	16017	–	–	–	–	0.626	
	130	22	1.1	49.5	43.1	5 000	–	2 900	5 900	6017	ZZ	–	–	2RS	0.890	
	150	28	2	84.0	61.9	4 200	–	2 700	5 000	6217	ZZ	–	–	2RS	1.79	
	180	41	3	133	96.8	3 700	–	2 500	4 400	6317	ZZX	–	–	2RS	4.23	
	210	52	4	173	136	3 300	–	–	3 900	6417	–	–	–	–	8.07	
	90	115	13	1	19.0	19.7	5 300	–	–	6 300	6818	ZZ	2RU	–	–	0.279
		125	18	1.1	32.8	31.6	5 100	–	–	6 000	6918	ZZ	2RU	–	–	0.565
140		16	1	39.9	37.0	4 700	–	–	5 600	16018	–	–	–	–	0.848	
	140	24	1.5	58.2	49.7	4 700	–	2 700	5 600	6018	ZZ	–	–	2RS	1.16	
	160	30	2	96.1	71.5	3 900	–	2 600	4 700	6218	ZZ	–	–	2RS	2.15	
	190	43	3	143	107	3 500	–	2 400	4 200	6318	ZZX	–	–	2RS	4.91	
	225	54	4	184	149	3 100	–	–	3 700	6418	–	–	–	–	9.78	
	95	130	18	1.1	33.7	33.5	4 800	–	–	5 700	6919	ZZ	2RU	–	–	0.705
		145	16	1	41.2	39.6	4 500	–	–	5 300	16019	–	–	–	–	0.885
145		24	1.5	60.4	53.9	4 400	–	2 500	5 200	6019	ZZX	2RU	–	2RS	1.21	
	170	32	2.1	109	81.9	3 700	–	2 400	4 400	6219	ZZX	–	–	2RS	2.62	
	200	45	3	153	119	3 300	–	2 200	4 000	6319	ZZX	–	–	2RS	5.67	
	100	125	13	1	19.6	21.2	4 800	–	–	5 700	6820	ZZ	2RU	–	–	0.309
140		20	1.1	45.0	41.9	4 500	–	–	5 300	6920	ZZ	2RU	–	–	0.960	
150		16	1	42.4	42.1	4 300	–	–	5 100	16020	–	–	–	–	0.910	
	150	24	1.5	60.2	54.2	4 300	–	2 500	5 100	6020	ZZ	–	–	2RS	1.25	
	180	34	2.1	122	93.1	3 500	–	2 300	4 200	6220	ZZX	–	–	2RS	3.14	
	215	47	3	173	141	3 000	–	2 100	3 600	6320	ZZX	–	–	2RS	7.00	
105	145	20	1.1	46.5	44.8	4 300	–	–	5 100	6921	ZZ	–	–	–	1.00	
	160	18	1	41.9	42.2	4 100	–	–	4 800	16021	–	–	–	–	1.20	
	160	26	2	72.3	65.8	4 000	–	2 300	4 700	6021	ZZX	–	–	2RS	1.59	
	190	36	2.1	133	105	3 300	–	2 200	3 900	6221	ZZX	–	–	2RS	3.70	
	225	49	3	184	153	2 900	–	2 000	3 500	6321	ZZX	–	–	2RS	8.05	

Single Row Deep Groove Ball Bearings

d 110 – (160) mm



Boundary dimensions (mm)	Basic load ratings (kN)		Limiting speeds (min ⁻¹)				Bearing No.					(Refer.) Mass Open type (kg)					
	d	D	B	r min.	C _r	C _{0r}	Grease lub.	Oil lub.	Open	Shielded ZZ	Sealed 2RU		2RD	2RS			
							(Open) (Z, ZZ) (RU, 2RU)	(Shielded) (RD, 2RD)	(Sealed) (RS, 2RS)	(Open) (Z)							
110	140	16	1	1	28.1	30.7	4 300	–	–	5 100	6822	ZZ	–	–	–	0.606	
	150	20	1.1	1.1	47.9	47.8	4 100	–	–	4 900	6922	ZZ	–	–	–	1.04	
	170	19	1	1	57.5	56.7	3 800	–	–	4 500	16022	–	–	–	–	1.46	
	170	28	2	2	82.0	73.0	3 800	–	2 200	4 500	6022	ZZX	–	–	–	2RS	1.96
	200	38	2.1	2.1	144	117	3 100	–	2 000	3 700	6222	ZZX	–	–	–	2RS	4.36
	240	50	3	3	205	180	2 700	–	1 900	3 200	6322	ZZX	–	–	–	2RS	9.54
120	150	16	1	1	29.0	33.0	4 000	–	–	4 700	6824	ZZ	–	–	–	0.655	
	165	22	1.1	1.1	57.2	56.9	3 800	–	–	4 400	6924	ZZ	–	–	–	1.41	
	180	19	1	1	63.2	63.3	3 600	–	–	4 200	16024	–	–	–	–	1.80	
	180	28	2	2	85.0	79.3	3 600	–	2 100	4 200	6024	ZZX	–	–	–	2RS	2.07
	215	40	2.1	2.1	155	131	2 900	–	1 900	3 400	6224	ZZX	–	–	–	2RS	5.15
	260	55	3	3	207	185	2 500	–	–	3 000	6324	ZZX	–	–	–	–	12.5
130	165	18	1.1	1.1	36.9	41.2	3 600	–	–	4 300	6826	–	–	–	–	0.939	
	180	24	1.5	1.5	69.6	70.0	3 400	–	–	4 100	6926	–	–	–	–	1.86	
	200	22	1.1	1.1	71.3	74.8	3 000	–	–	3 600	16026	–	–	–	–	2.69	
	200	33	2	2	106	101	3 200	–	1 900	3 800	6026	ZZX	–	–	–	2RS	3.16
	230	40	3	3	167	146	2 700	–	1 800	3 200	6226	ZZX	–	–	–	2RS	5.82
	280	58	4	4	229	214	2 300	–	–	2 700	6326	ZZX	–	–	–	–	15.1
140	175	18	1.1	1.1	38.2	44.4	3 400	–	–	4 000	6828	–	–	–	–	1.00	
	190	24	1.5	1.5	71.3	74.8	3 200	–	–	3 800	6928	–	–	–	–	1.98	
	210	22	1.1	1.1	65.8	71.1	2 900	–	–	3 400	16028	–	–	–	–	2.86	
	210	33	2	2	110	109	3 000	–	1 800	3 600	6028	ZZX	–	–	–	2RS	3.55
	250	42	3	3	166	150	2 400	–	1 600	2 900	6228	ZZX	–	–	–	2RS	7.45
	300	62	4	4	253	246	2 100	–	–	2 500	6328	ZZX	–	–	–	–	19.4
150	190	20	1.1	1.1	47.8	54.9	3 100	–	–	3 700	6830	–	–	–	–	1.40	
	210	28	2	2	93.4	94.3	2 900	–	–	3 400	6930	–	–	–	–	3.05	
	225	24	1.1	1.1	91.2	99.3	2 700	–	–	3 100	16030	–	–	–	–	3.58	
	225	35	2.1	2.1	125	126	2 800	–	1 600	3 300	6030	ZZX	–	–	–	2RS	4.22
	270	45	3	3	176	168	2 200	–	–	2 700	6230	ZZX	–	–	–	–	9.41
	320	65	4	4	275	284	1 900	–	–	2 300	6330	–	–	–	–	26.2	
160	200	20	1.1	1.1	48.4	56.9	2 900	–	–	3 400	6832	–	–	–	–	1.45	
	220	28	2	2	96.1	101	2 700	–	–	3 200	6932	–	–	–	–	3.20	
	240	25	1.5	1.5	98.8	108	2 600	–	–	3 100	16032	–	–	–	–	4.25	

Remark) Standard cage types used for the above bearings are described earlier in this section.

Single Row Deep Groove Ball Bearings

d (160) – 200 mm

Boundary dimensions (mm)	d	D	B	r min.	Basic load ratings (kN)		Limiting speeds (min ⁻¹)				Bearing No.					(Refer.) Mass Open type (kg)
					C_r	C_{0r}	Grease lub.		Oil lub.		Open	Shielded ZZ	Sealed 2RU	2RD	2RS	
							(Open) (Z, ZZ) (RU, 2RU)	(Shielded) (RD, 2RD)	(Sealed) (RS, 2RS)	(Open) (Z)						
160	240	38	2.1	136	135	2 600	–	1 500	3 000	6032	ZZX	–	–	2RS	5.22	
	290	48	3	185	186	2 100	–	–	2 500	6232	ZZX	–	–	–	14.3	
	340	68	4	278	286	1 800	–	–	2 200	6332	–	–	–	–	29.0	
170	215	22	1.1	59.8	70.5	2 700	–	–	3 200	6834	–	–	–	–	1.90	
	230	28	2	98.8	108	2 600	–	–	3 100	6934	–	–	–	–	3.35	
	260	28	1.5	114	127	2 300	–	–	2 700	16034	–	–	–	–	5.75	
	260	42	2.1	161	161	2 400	–	–	2 800	6034	ZZX	–	–	–	6.80	
	310	52	4	212	223	1 900	–	–	2 300	6234	ZZX	–	–	–	17.5	
	360	72	4	326	355	1 700	–	–	2 000	6334	–	–	–	–	38.6	
180	225	22	1.1	60.7	73.1	2 600	–	–	3 000	6836	–	–	–	–	2.00	
	250	33	2	123	129	2 400	–	–	2 800	6936	–	–	–	–	4.90	
	280	31	2	135	148	2 100	–	–	2 500	16036	–	–	–	–	7.55	
	280	46	2.1	182	194	2 200	–	–	2 600	6036	ZZX	–	–	–	10.3	
	320	52	4	227	241	1 800	–	–	2 200	6236	ZZX	–	–	–	18.3	
	380	75	4	354	407	1 600	–	–	1 900	6336	–	–	–	–	44.7	
190	240	24	1.5	73.1	88.1	2 400	–	–	2 800	6838	–	–	–	–	2.60	
	260	33	2	126	138	2 300	–	–	2 700	6938	–	–	–	–	5.20	
	290	31	2	139	158	2 000	–	–	2 400	16038	–	–	–	–	7.85	
	290	46	2.1	188	201	2 100	–	–	2 500	6038	ZZX	–	–	–	10.8	
	340	55	4	255	281	1 700	–	–	2 000	6238	–	–	–	–	23.0	
	400	78	5	355	415	1 500	–	–	1 800	6338	–	–	–	–	51.5	
200	250	24	1.5	78.0	93.6	2 300	–	–	2 700	6840	–	–	–	–	2.70	
	280	38	2.1	157	168	2 100	–	–	2 500	6940	–	–	–	–	7.30	
	310	34	2	161	180	1 900	–	–	2 300	16040	–	–	–	–	10.1	
	310	51	2.1	217	243	1 900	–	–	2 300	6040	ZZX	–	–	–	14.0	
	360	58	4	269	311	1 600	–	–	1 900	6240	ZZX	–	–	–	28.2	
	420	80	5	411	506	1 300	–	–	1 600	6340	–	–	–	–	58.0	

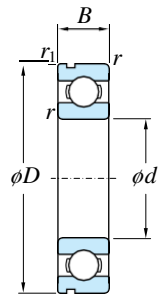
Remark) Standard cage types used for the above bearings are described earlier in this section.

Single Row Deep Groove Ball Bearings

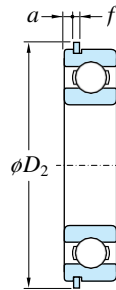
Snap Ring Groove Type

Locating Snap Ring Type

d 10 – 35 mm



N
With snap
ring groove



NR
With locating
snap ring



With locating snap
ring and one shield

d	Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min ⁻¹)		Bearing No.		Dimensions of locating snap ring (mm)			(Refer.) Mass (kg)
	D	B	r min.	r_1 min.	C_r	C_{0r}	Grease Lub.	Oil Lub.	With snap ring groove	With locating snap ring	D_2 max.	a max.	f ±0.05	
10	30	9	0.6	0.3	5.10	2.40	24 000	29 000	6200N	6200NR	34.7	2.06	1.07	0.032
	35	11	0.6	0.5	8.10	3.45	22 000	27 000	6300N	6300NR	39.7	2.06	1.07	0.053
12	32	10	0.6	0.3	6.80	3.05	22 000	27 000	6201N	6201NR	36.7	2.06	1.07	0.037
	37	12	1	0.5	9.70	4.20	20 000	25 000	6301N	6301NR	41.3	2.06	1.07	0.060
15	35	11	0.6	0.5	7.65	3.75	20 000	24 000	6202N	6202NR	39.7	2.06	1.07	0.045
	42	13	1	0.5	11.4	5.45	17 000	20 000	6302N	6302NR	46.3	2.06	1.07	0.082
17	40	12	0.6	0.5	9.55	4.80	17 000	21 000	6203N	6203NR	44.6	2.06	1.07	0.065
	47	14	1	0.5	13.6	6.65	15 000	18 000	6303N	6303NR	52.7	2.46	1.07	0.115
20	42	12	0.6	0.5	9.40	5.05	17 000	21 000	6004N	6004NR	46.3	2.06	1.07	0.069
	47	14	1	0.5	12.8	6.65	15 000	17 000	6204N	6204NR	52.7	2.46	1.07	0.106
	52	15	1.1	0.5	15.9	7.85	14 000	17 000	6304N	6304NR	57.9	2.46	1.07	0.144
22	44	12	0.6	0.5	9.40	5.15	17 000	20 000	60/22N	60/22NR	48.3	2.06	1.07	0.073
	50	14	1	0.5	12.8	6.65	15 000	17 000	62/22N	62/22NR	55.7	2.46	1.07	0.118
	56	16	1.1	0.5	18.5	9.40	13 000	15 000	63/22N	63/22NR	61.7	2.46	1.07	0.201
25	47	12	0.6	0.5	10.1	5.85	15 000	18 000	6005N	6005NR	52.7	2.06	1.07	0.080
	52	15	1	0.5	14.0	7.85	13 000	15 000	6205N	6205NR	57.9	2.46	1.07	0.128
	62	17	1.1	0.5	20.6	11.3	11 000	13 000	6305N	6305NR	67.7	3.28	1.65	0.232
28	52	12	0.6	0.5	12.4	7.40	14 000	16 000	60/28N	60/28NR	57.9	2.06	1.07	0.097
	58	16	1	0.5	17.9	9.75	12 000	14 000	62/28N	62/28NR	63.7	2.46	1.07	0.173
	68	18	1.1	0.5	23.5	13.1	10 000	12 000	63/28N	63/28NR	74.6	3.28	1.65	0.328
30	55	13	1	0.5	13.2	8.25	13 000	15 000	6006N	6006NR	60.7	2.08	1.07	0.116
	62	16	1	0.5	19.5	11.3	11 000	13 000	6206N	6206NR	67.7	3.28	1.65	0.199
	72	19	1.1	0.5	26.7	15.0	9 600	12 000	6306N	6306NR	78.6	3.28	1.65	0.346
32	58	13	1	0.5	15.0	9.15	12 000	14 000	60/32N	60/32NR	63.7	2.08	1.07	0.127
	65	17	1	0.5	23.5	13.1	10 000	12 000	62/32N	62/32NR	70.7	3.28	1.65	0.228
	75	20	1.1	0.5	30.1	16.2	9 300	11 000	63/32N	63/32NR	81.6	3.28	1.65	0.437
35	62	14	1	0.5	15.9	10.3	11 000	13 000	6007N	6007NR	67.7	2.08	1.65	0.155
	72	17	1.1	0.5	25.7	15.4	9 200	11 000	6207N	6207NR	78.6	3.28	1.65	0.288
	80	21	1.5	0.5	33.4	19.3	8 500	10 000	6307N	6307NR	86.6	3.28	1.65	0.457

Remark) Standard cage types used for the above bearings are described earlier in this section.

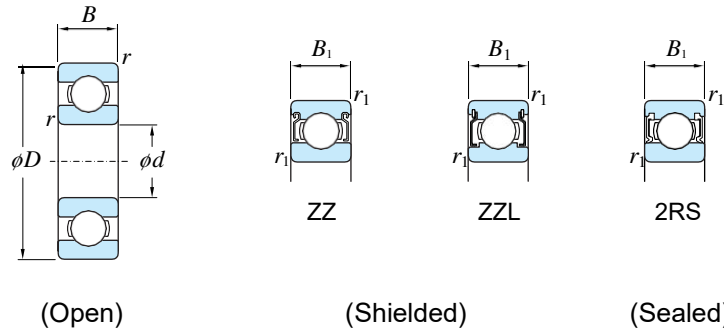
d 40 – 130 mm

d	Boundary dimensions (mm)				Basic load ratings (kN)		Limiting speeds (min ⁻¹)		Bearing No.		Dimensions of locating snap ring (mm)			(Refer.) Mass (kg)
	D	B	r	r ₁	C _r	C _{0r}	Grease Lub.	Oil Lub.	With snap ring groove	With locating snap ring	D ₂ max.	a max.	f ±0.05	
40	68	15	1	0.5	16.7	11.5	10 000	12 000	6008N	6008NR	74.6	2.49	1.65	0.192
	80	18	1.1	0.5	29.1	17.8	8 300	10 000	6208N	6208NR	86.6	3.28	1.65	0.366
	90	23	1.5	0.5	40.7	24.0	7 700	9 200	6308N	6308NR	96.5	3.28	2.41	0.633
45	75	16	1	0.5	21.0	15.1	9 200	11 000	6009N	6009NR	81.6	2.49	1.65	0.245
	85	19	1.1	0.5	32.7	20.3	7 700	9 200	6209N	6209NR	91.6	3.28	1.65	0.407
	100	25	1.5	0.5	48.9	29.5	6 800	8 100	6309N	6309NR	106.5	3.28	2.41	0.833
50	80	16	1	0.5	21.8	16.6	8 400	9 900	6010N	6010NR	86.6	2.49	1.65	0.261
	90	20	1.1	0.5	35.1	23.3	7 100	8 500	6210N	6210NR	96.5	3.28	2.41	0.463
	110	27	2	0.5	62.0	38.3	6 100	7 300	6310N	6310NR	116.6	3.28	2.41	1.07
55	90	18	1.1	0.5	28.3	21.2	7 600	8 900	6011N	6011NR	96.5	2.87	2.41	0.385
	100	21	1.5	0.5	43.4	29.4	6 300	7 600	6211N	6211NR	106.5	3.28	2.41	0.607
	120	29	2	0.5	71.6	45.0	5 600	6 700	6311N	6311NR	129.7	4.06	2.77	1.37
60	95	18	1.1	0.5	29.4	23.2	7 100	8 400	6012N	6012NR	101.6	2.87	2.41	0.415
	110	22	1.5	0.5	52.4	36.2	5 700	6 900	6212N	6212NR	116.6	3.28	2.41	0.783
	130	31	2.1	0.5	81.9	52.2	5 200	6 200	6312N	6312NR	139.7	4.06	2.77	1.70
65	100	18	1.1	0.5	30.5	25.2	6 600	7 800	6013N	6013NR	106.5	2.87	2.41	0.435
	120	23	1.5	0.5	57.2	40.1	5 400	6 400	6213N	6213NR	129.7	4.06	2.77	0.990
	140	33	2.1	0.5	92.7	59.9	4 800	5 800	6313N	6313NR	149.7	4.9	2.77	2.08
70	110	20	1.1	0.5	38.1	30.9	6 100	7 200	6014N	6014NR	116.6	2.87	2.41	0.602
	125	24	1.5	0.5	62.2	44.1	5 100	6 100	6214N	6214NR	134.7	4.06	2.77	1.07
	150	35	2.1	0.5	104	68.2	4 500	5 400	6314N	6314NR	159.7	4.9	2.77	2.52
75	115	20	1.1	0.5	39.6	33.5	5 700	6 800	6015N	6015NR	121.6	2.87	2.41	0.638
	130	25	1.5	0.5	67.4	48.3	4 800	5 800	6215N	6215NR	139.7	4.06	2.77	1.18
	160	37	2.1	0.5	113	77.2	4 200	5 000	6315N	6315NR	169.7	4.9	2.77	3.02
80	125	22	1.1	0.5	47.6	39.8	5 300	6 300	6016N	6016NR	134.7	2.87	2.77	0.850
	140	26	2	0.5	72.7	53.0	4 500	5 400	6216N	6216NR	149.7	4.9	2.77	1.40
	170	39	2.1	0.5	123	86.7	3 900	4 700	6316N	6316NR	182.9	5.69	3.05	3.59
85	130	22	1.1	0.5	49.5	43.1	5 000	5 900	6017N	6017NR	139.7	2.87	2.77	0.890
	150	28	2	0.5	84.0	61.9	4 200	5 000	6217N	6217NR	159.7	4.9	2.77	1.79
	180	41	3	0.5	133	96.8	3 700	4 400	6317N	6317NR	192.9	5.69	3.05	4.23
90	140	24	1.5	0.5	58.2	49.7	4 700	5 600	6018N	6018NR	149.7	3.71	2.77	1.16
	160	30	2	0.5	96.1	71.5	3 900	4 700	6218N	6218NR	169.7	4.9	2.77	2.15
	190	43	3	0.5	143	107	3 500	4 200	6318N	6318NR	202.9	5.69	3.05	4.91
95	145	24	1.5	0.5	60.4	53.9	4 400	5 200	6019N	6019NR	154.7	3.71	2.77	1.21
	170	32	2.1	0.5	109	81.9	3 700	4 400	6219N	6219NR	182.9	5.69	3.05	2.62
	200	45	3	0.5	153	119	3 300	4 000	6319N	6319NR	212.9	5.69	3.05	5.67
100	150	24	1.5	0.5	60.2	54.2	4 300	5 100	6020N	6020NR	159.7	3.71	2.77	1.25
	180	34	2.1	0.5	122	93.1	3 500	4 200	6220N	6220NR	192.9	5.69	3.05	3.14
105	160	26	2	0.5	72.3	65.8	4 000	4 700	6021N	6021NR	169.7	3.71	2.77	1.59
	190	36	2.1	0.5	133	105	3 300	3 900	6221N	6221NR	202.9	5.69	3.05	3.70
110	170	28	2	0.5	82.0	73.0	3 800	4 500	6022N	6022NR	182.9	3.71	3.05	1.96
	200	38	2.1	0.5	144	117	3 100	3 700	6222N	6222NR	212.9	5.69	3.05	4.36
120	180	28	2	0.5	85.0	79.3	3 600	4 200	6024N	6024NR	192.9	3.71	3.05	2.07
130	200	33	2	0.5	106	101	3 200	3 800	6026N	6026NR	212.9	5.69	3.05	3.16

Remark) Standard cage types used for the above bearings are described earlier in this section.

Extra Small Ball Bearings, Miniature ball bearings

d 3 – 9 mm



d	Boundary dimensions (mm)					Basic load ratings (kN)		Limiting speeds (min ⁻¹)			Bearing No.			Refer Mass (g)
	D	B	B ₁	r min.	r ₁ min.	C _r	C _{0r}	Grease lub. (Open) (ZZ, ZZL)	Oil lub. (Open) (Z, ZL)	2RS	Open	Shielded ZZ, ZZL	Sealed 2RS	
3	8	3	4	0.15	0.15	0.55	0.17	64 000	–	76 000	693	W693 ZZ	–	0.6
	10	4	4	0.15	0.15	0.64	0.23	52 000	44 000	63 000	623	623 ZZ	623 2RS	1.6
4	11	4	4	0.15	0.15	0.96	0.35	54 000	44 000	65 000	694	694 ZZ	694 2RS	1.8
	12	4	4	0.2	0.2	0.97	0.36	53 000	–	63 000	604	604 ZZ	–	2.1
	13	5	5	0.2	0.2	1.30	0.49	44 000	39 000	54 000	624	624 ZZ	624 2RS	2.9
5	16	5	5	0.3	0.3	1.75	0.67	40 000	–	49 000	634	634 ZZ	–	5.3
	8	2	2.5	0.08	0.05	0.26	0.12	59 000	–	70 000	ML5008	WML5008 ZZ	–	0.3
	9	2.5	3	0.1	0.08	0.47	0.19	56 000	–	67 000	ML5009	WML5009 ZZ	–	0.5
	10	3	4	0.1	0.1	0.50	0.21	55 000	–	65 000	ML5010	WML5010 ZZ	–	0.9
	11	3	5	0.15	0.15	0.97	0.36	53 000	–	63 000	685	W685 ZZ	–	1.0
	13	4	4	0.2	0.2	1.10	0.43	50 000	42 000	60 000	695	695 ZZ	695 2RS	2.2
	16	5	5	0.3	0.3	1.75	0.67	40 000	33 000	49 000	625	625 ZZ	625 2RS	5.0
6	19	6	6	0.3	0.3	2.60	1.05	35 000	27 000	43 000	635	635 ZZ	635 2RS	8.5
	13	3.5	5	0.15	0.15	1.10	0.44	48 000	36 000	57 000	686	W686 ZZ	W686 2RS	1.8
	15	5	5	0.2	0.2	1.75	0.67	45 000	32 000	54 000	696	696 ZZ	696 2RS	3.9
	17	6	6	0.3	0.3	1.95	0.74	43 000	–	51 000	606	606 ZZ	–	5.8
7	19	6	6	0.3	0.3	2.60	1.05	35 000	27 000	43 000	626	626 ZZ	626 2RS	8.1
	14	3.5	5	0.15	0.15	1.15	0.51	45 000	–	54 000	687	W687 ZZ	–	2.0
	19	6	6	0.3	0.3	2.60	1.05	40 000	27 000	47 000	607	607 ZZ	607 2RS	7.6
8	22	7	7	0.3	0.3	3.30	1.35	31 000	23 000	37 000	627	627 ZZ	627 2RS	13
	16	4	5	0.2	0.2	1.60	0.71	42 000	28 000	50 000	688	W688 ZZ	W688 2RS	3.2
	19	6	6	0.3	0.3	2.25	0.91	39 000	27 000	46 000	698	698 ZZ	698 2RS	7.2
	22	7	7	0.3	0.3	3.30	1.35	34 000	23 000	41 000	608	608 ZZ	608 2RS	12
	24	8	8	0.3	0.3	3.35	1.40	28 000	22 000	35 000	628	628 ZZ	628 2RS	18
9	28	9	9	0.3	0.3	4.55	1.95	26 000	–	32 000	638	638 ZZ	–	29
	17	4	5	0.2	0.2	1.35	0.66	39 000	–	46 000	689	W689 ZZ	–	3.5
	20	6	6	0.3	0.3	2.45	1.05	35 000	25 000	42 000	699	699 ZZ	699 2RS	7.5
	24	7	7	0.3	0.3	3.35	1.40	33 000	22 000	40 000	609	609 ZZ	609 2RS	15
	26	8	8	0.6	0.6	4.55	1.95	27 000	19 000	33 000	629	629 ZZ	629 2RS	20

