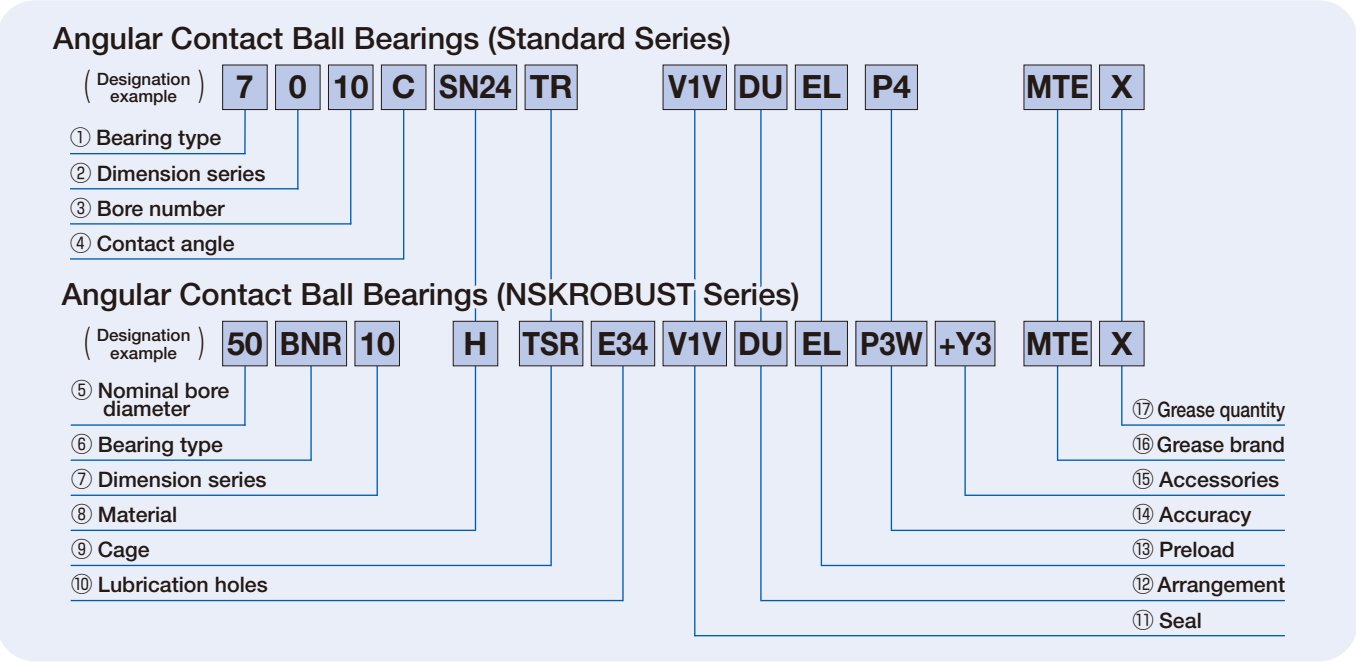


1. Angular Contact Ball Bearings

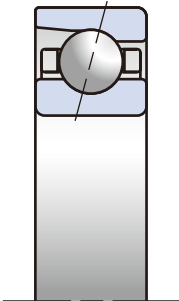
Numbering System



16 Bearing Type Page 20, 22-23

7: High-Accuracy Angular Contact Ball Bearings (Standard Series)

The high-performance standard NSKHPS Series features a high basic dynamic load rating and is suitable for low to medium speed operation and high-load applications. NSK's original material evaluation technology ensures only high purity materials are used, which has the most influence on bearing life. Superior steel materials have led to a 15% extension of rolling fatigue life.



6 High-Speed Angular Contact Ball Bearings (NSKROBUST Series)

BNR,BER: BASIC Series
BNRD,BERD: ROBUSTDYNA
BSR: MINI Series

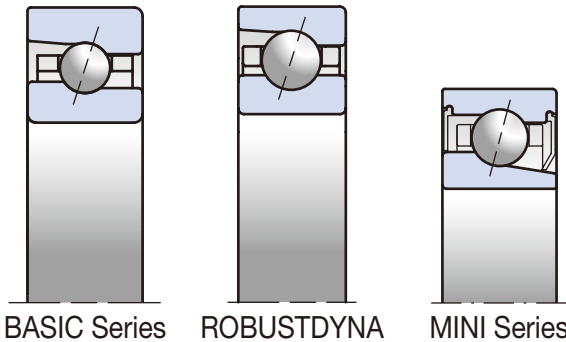
NSKROBUST high performance ACBBs with high rigidity and low heat generation. The results of temperature rise simulations undertaken to evaluate rolling element slip were used to optimize the design of this series.

NSKROBUST bearings are available as S, E, H, J or X types with different combinations of materials such as high-accuracy ceramic balls and heat-resistant high-speed SHX Steel, enabling the most suitable bearing for each application.

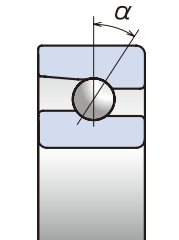
Sealed bearings are generally available for bore diameters up to 120mm. Optimization of the space between the seal

and cage and minimization of the seal labyrinth help to prevent grease leakage. Wide-width bearings (Series 29 & 20) are designed to hold more grease inside the bearing, helping to limit temperature rise and extend grease life.

MINI Series series bearings retain high radial rigidity even in high-speed operation with constant pressure preload. This makes them ideal for grinders and similar applications.



4 Contact Angle 6 Bearing Type Page 44-45



- 4 Standard Series
C: 15° A5: 25° A: 30°
- 6 NSKROBUST Series
BNR,BNRD: 18°
BER,BERD: 25°
BSR: 15°

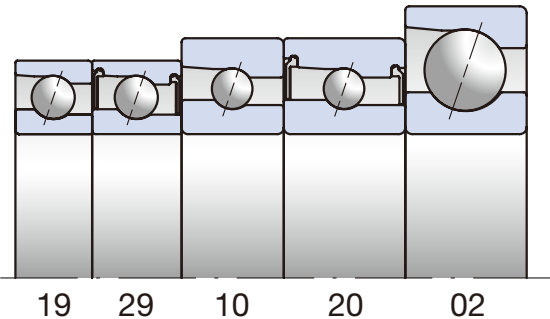
27 Dimension Series

2 Standard Series

9: 19 Series, 0: 10 Series, 2: 02 Series

7 NSKROBUST Series

19: 19 Series, 29: 29 Series, 10: 10 Series, 20: 20 Series, 02: 02 Series



The figure above shows how bearing outside diameter and width increase for dimension series with identical bore diameters (from smallest to largest: Series 19, 29, 10, 20, 02).

Please note the 29 and 20 Series are only available as BASIC Series and MINI Series sealed ultra-high-speed angular contact ball bearings.

3 Bore Number 5 Nominal Bore Diameter

3 Standard Series

Up to 3: Bore diameter 00: 10mm, 01: 12mm, 02: 15mm, 03: 17mm
4 and above: Bore diameter = Bore number x 5 (mm)

5 ROBUST Series

Nominal bore diameter = Bore dimension (mm)

9 Cage

	Code	Material	Guiding	Features	Limiting Speed (d _m n value)	Availability
	TYN	Polyamide resin	Ball guided	Excellent wear and noise characteristics, especially effective with grease lubrication	Oil: 1.4 million Grease: 1.2 million	Standard Series NSKROBUST Series (not available for 19 Series sealed type)
	TR T TX TA	Phenolic resin	Outer ring guided	Stable cage rotation in high-speed operation	2.8 million	TR: Standard Series, ROBUSTDYNA T: BASIC Series, MINI Series TX: BASIC Series (With 19Series sealed type) TA: MINI Series (sealed type)
	TSR	PPS resin	Outer ring guided	Reduction of non-repeatable run-out (NRRO). Low temperature rise in ultra-high-speed operation due to unique design with enhanced oil drain	3.0 million	BASIC Series
	MY	Brass	Ball guided	Excellent noise and temperature rise characteristics. Extended grease life.	Oil: 0.8 million Grease: 0.7 million	Standard Series NSKROBUST Series only for large bearings not equipped with TYN cages

8 Material

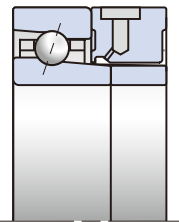
Page 14-17, 22

Standard Series

No code: Steel ball SN24: Ceramic ball

NSKROBUST Series

Type	Material	
	Inner and outer ring	Balls
S	Bearing steel (SUJ2)	Bearing steel (SUJ2)
E	Bearing steel (SUJ2)	Ultra long life rolling elements (EQTF)
H	Bearing steel (SUJ2)	Ceramic (Si ₃ N ₄)
J	Ultra Long life steel (SUJ7)	Ceramic (Si ₃ N ₄)
X	Heat resistant steel for high-speed operation (SHX)	Ceramic (Si ₃ N ₄)
XE (Spinshot™ II)	Heat resistant steel for high-speed operation (SHX)	Ceramic (Si ₃ N ₄)



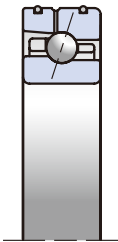
Spinshot™ II

The Spinshot type has been designed for noise reduction and greater reliability of oil-air lubrication during ultra-high-speed operation.

10 Lubrication Holes

No code: No lubrication holes E34: Direct lubrication bearing

Page 22



10 NSKROBUST Series

E34: Direct lubrication bearing
Space-saving bearings designed specifically for oil-air lubrication, equipped with a lubrication groove, lubrication holes, and an O-ring groove on the outer ring.
Available for NSKROBUST Series only.

1. Angular Contact Ball Bearings

Numbering System

Angular Contact Ball Bearings (Standard Series)

Designation example

7010C SN24 TR V1V DU EL P4 MTE X

1 Bearing type

2 Dimension series

3 Bore number

4 Contact angle

Angular Contact Ball Bearings (NSKROBUST Series)

Designation example

50BNR10H TSR E34 V1V DU EL P3W +Y3 MTE X

5 Nominal bore diameter

6 Bearing type

7 Dimension series

8 Material

9 Cage

10 Lubrication holes

11 Seal

12 Arrangement

13 Preload

14 Accuracy

15 Accessories

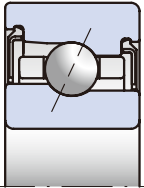
16 Grease brand

17 Grease quantity

11 Seal

No code: Open type V1V: Non-contact rubber seal

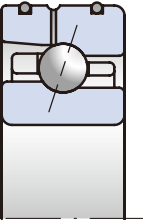
Page 23



Non-contact rubber seals on both sides of the bearing prevent entry of foreign matter and grease scatter, thereby ensuring high reliability and longer grease life.

15 Accessories

+Y3: O-ring on bearing outside surface Available for NSKROBUST direct lubrication bearings (E34) only.



12 Arrangement

Page 205

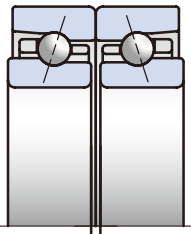
Universal arrangement	Arrangement example
SU Single row	
DU 2 row	DB DF DT
DUD 3 row	DBD DFD DTD
QU 4 row	DBB DFB DTT

Universal arrangement bearings SU, DU, DUD, and QU are controlled during production to ensure front face stand out is the same as back face stand out.

In addition, if the designation indicates two or more rows (DU, DUD and QU), tolerances for the bore and outside diameter are controlled for the set of bearings.

13 Preload

Page 206-212



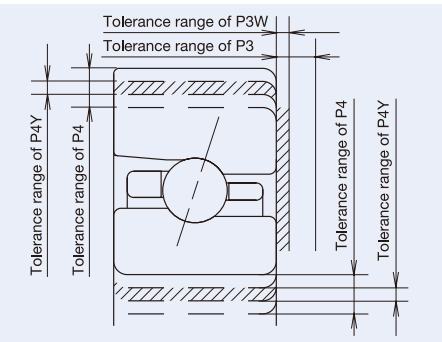
Measured (+) Axial Clearance

Measured (-) Axial Clearance

EL: Extra Light Preload L: Light Preload
M: Medium Preload H: Heavy Preload

CP: Special Measured (-) Axial Clearance
CA: Special Measured (+) Axial Clearance

14 Accuracy Page 222-225



P2: ISO Class 2 P4: ISO Class 4 P5: ISO Class 5
P3W: Special class (Special tolerances for deviation of inner/outer ring width, others are P3)
P3: Special class (ISO Class 4 dimensional tolerances and ISO Class 2 running accuracy)
P4Y: Special class (Special bore and outside diameter tolerances, others are ISO Class 4. See figure on left.)

16 Grease Brand Page 219

Grease typically used in machine tool spindles:
MTR: ROBUSTGRD MTS: MTS grease

17 Grease Quantity Page 256

X: 15% of internal space K: 20% of internal space L: 30% of internal space

Available Specifications by Bearing

Standard Series		Dimension Series	Bore diameter																																							
			10	12	15	17	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	120	130	140	150	160	170	180	190	200	220	240	260	280	300			
① Bearing Type	NSKHPS	19																																								
		10																																								
		02																																								
⑧ Material	SN24	19																																								
		10																																								
		02																																								
⑨ Cage	TYN	19																																								
		02																																								
	TR	19																																								
		02																																								
⑪ Seal	V1V	19																																								
		10																																								
		02																																								

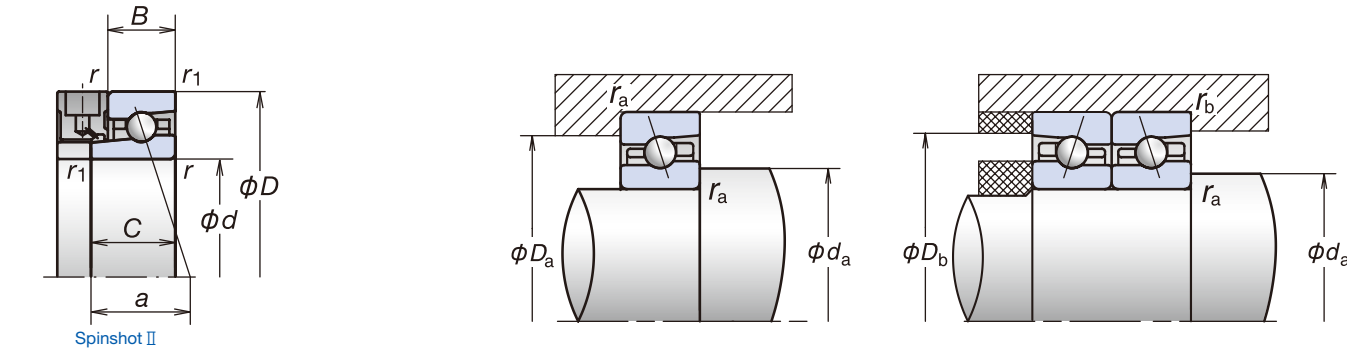
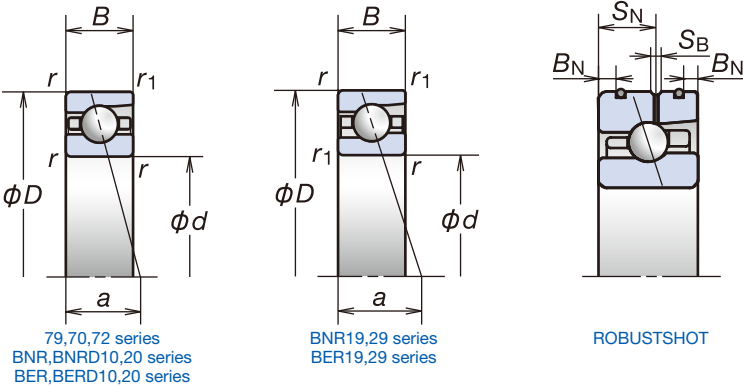
MINI Series BASIC Series		Dimension Series	Bore diameter																																				
			6	7	8	10	12	15	17	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	120	130	140	150	160	170	180	190	200		
Available Sizes	BSR	19 10 02																																					
	BNR, BER	19 10 02																																					
⑧Material	H, X	19 10 02																																					
	E	19 10 02																																					
⑨Cage	TYN	19 10 02																																					
	T	19 10 02																																					
	TSR	19 10 02																																					
⑪Seal	V1V	19 10 02				Only for TX cage																																	

ROBUSTDYNA		Dimension	Bore diameter																																				
		Series	6	7	8	10	12	15	17	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	120	130	140	150	160	170	180	190	200		
Available Sizes		10																																					
⑧Material	J, X	10																																					
⑨Cage	TYN	10																																					
	TR	10																																					
⑪Seal	V1V	10																																					

For designations not listed in the tables, please contact NSK for details.

1. Angular Contact Ball Bearings

Bore Diameter 40mm



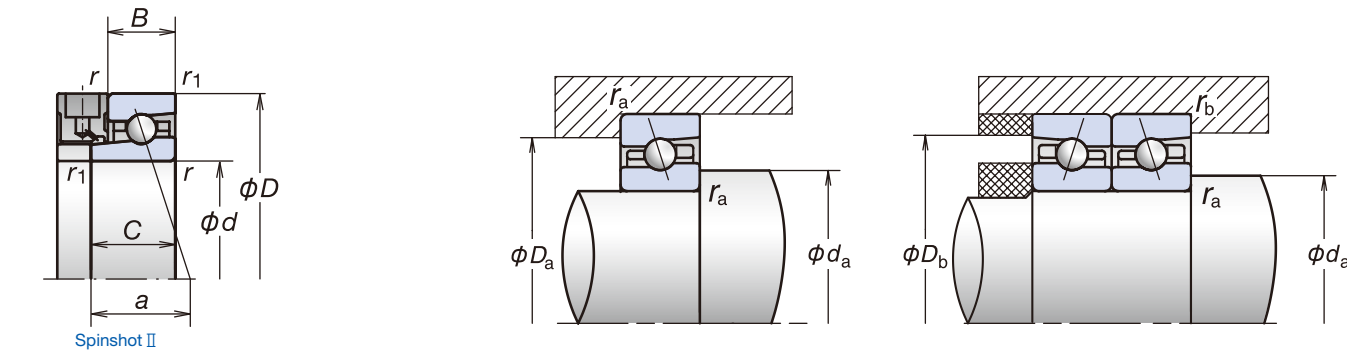
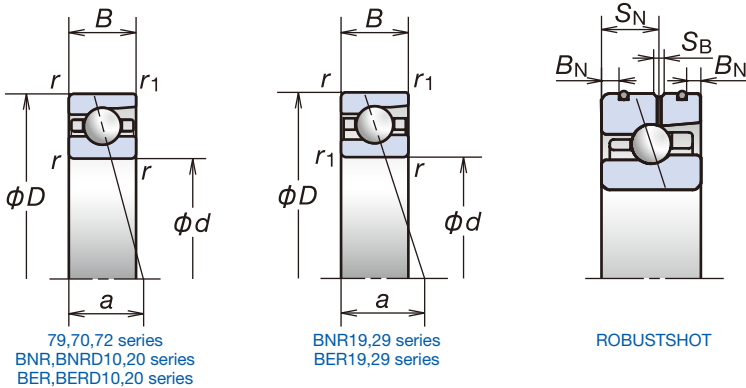
Designation (°)	Boundary Dimensions (°) (mm)									Basic Load Ratings (kN)		Permissible Axial Load (°) (kN)	Contact Angle (°)	Factor f _o	Effective Load Center (mm) a	Limiting Speeds (°) (min ⁻¹)	
	d	D	B	C	B _N	S _N	S _B	r (min.)	r ₁ (min.)	C _r (Dynamic)	C _{or} (Static)					Grease	Oil
* 7908C	40	62	12	—	—	—	—	0.6	0.3	19.1	11.7	8.40	15	15.7	12.8	22 600	34 400
* 7908CSN24	40	62	12	—	—	—	—	0.6	0.3	19.0	11.2	9.97	15	15.7	12.8	29 500	44 800
* 7908A5	40	62	12	—	—	—	—	0.6	0.3	18.1	11.2	8.90	25	—	17.9	19 700	29 500
* 7908A5SN24	40	62	12	—	—	—	—	0.6	0.3	18.0	10.6	10.5	25	—	17.9	25 500	38 300
* 40BNR19S	40	62	12	—	—	—	—	0.6	0.3	14.5	7.65	10.8	18	10.4	14.3	27 500	39 300
* 40BNR19H	40	62	12	—	2.2	7.0	1.4	0.6	0.3	14.5	7.30	7.10	18	10.4	14.3	35 300	55 000
* 40BNR19X	40	62	12	17	2.2	7.0	1.4	0.6	0.3	22.9	7.30	7.10	18	10.4	14.3	41 200	64 800
* 40BER19S	40	62	12	—	—	—	—	0.6	0.3	13.9	7.35	12.8	25	—	17.9	23 600	33 400
* 40BER19H	40	62	12	—	2.2	7.0	1.4	0.6	0.3	13.9	7.05	8.65	25	—	17.9	31 400	49 100
* 40BER19X	40	62	12	17	2.2	7.0	1.4	0.6	0.3	22.0	7.05	8.65	25	—	17.9	37 300	58 900
* 40BNR29SV1V	40	62	14	—	—	—	—	0.6	0.3	14.5	7.65	10.8	18	10.4	15.3	27 500	—
* 40BNR29HV1V	40	62	14	—	—	—	—	0.6	0.3	14.5	7.30	7.10	18	10.4	15.3	35 300	—
* 40BNR29XV1V	40	62	14	—	—	—	—	0.6	0.3	22.9	7.30	7.10	18	10.4	15.3	41 200	—
* 40BER29SV1V	40	62	14	—	—	—	—	0.6	0.3	13.9	7.35	12.8	25	—	18.9	23 600	—
* 40BER29HV1V	40	62	14	—	—	—	—	0.6	0.3	13.9	7.05	8.65	25	—	18.9	31 400	—
* 40BER29XV1V	40	62	14	—	—	—	—	0.6	0.3	22.0	7.05	8.65	25	—	18.9	37 300	—
* 7008C	40	68	15	—	—	—	—	1	0.6	25.9	15.9	10.6	15	15.4	14.7	21 300	32 500
* 7008CSN24	40	68	15	—	—	—	—	1	0.6	25.8	15.1	12.5	15	15.4	14.7	27 800	42 300
* 7008A5	40	68	15	—	—	—	—	1	0.6	24.6	15.1	12.0	25	—	20.1	18 600	27 800
* 7008A5SN24	40	68	15	—	—	—	—	1	0.6	24.4	14.3	14.2	25	—	20.1	24 100	36 200
* 7008A	40	68	15	—	—	—	—	1	0.6	23.7	14.6	9.15	30	—	23.1	13 900	18 600
* 40BNR10S	40	68	15	—	—	—	—	1	0.6	13.3	7.95	11.5	18	10.7	16.2	26 000	37 100
* 40BNR10H	40	68	15	—	2.8	8.8	1.4	1	0.6	13.3	7.60	7.50	18	10.7	16.2	33 400	51 900
* 40BNR10X	40	68	15	20	2.8	8.8	1.4	1	0.6	21.2	7.60	7.50	18	10.7	16.2	38 900	61 200
* 40BER10S	40	68	15	—	—	—	—	1	0.6	12.8	7.65	13.5	25	—	19.9	22 300	31 500
* 40BER10H	40	68	15	—	2.8	8.8	1.4	1	0.6	12.8	7.30	9.10	25	—	19.9	29 700	46 300
* 40BER10X	40	68	15	20	2.8	8.8	1.4	1	0.6	20.3	7.30	9.10	25	—	19.9	35 200	55 600
* 40BNRD10J	40	68	15	—	2.8	8.8	1.4	1	0.6	22.6	8.00	7.70	18	7.9	16.3	33 400	51 900
* 40BNRD10X	40	68	15	20	2.8	8.8	1.4	1	0.6	28.5	8.00	7.70	18	7.9	16.3	38 900	61 200
* 40BERD10J	40	68	15	—	2.8	8.8	1.4	1	0.6	21.8	7.70	9.45	25	—	20.1	29 700	46 300
* 40BERD10X	40	68	15	20	2.8	8.8	1.4	1	0.6	27.4	7.70	9.45	25	—	20.1	35 200	55 600
* 40BNR20SV1V	40	68	18	—	—	—	—	1	0.6	13.3	7.95	11.5	18	10.7	17.7	26 000	—
* 40BNR20HV1V	40	68	18	—	—	—	—	1	0.6	13.3	7.60	7.50	18	10.7	17.7	33 400	—
* 40BNR20XV1V	40	68	18	—	—	—	—	1	0.6	21.2	7.60	7.50	18	10.7	17.7	38 900	—
* 40BER20SV1V	40	68	18	—	—	—	—	1	0.6	12.8	7.65	13.5	25	—	21.4	22 300	—
* 40BER20HV1V	40	68	18	—	—	—	—	1	0.6	12.8	7.30	9.10	25	—	21.4	29 700	—
* 40BER20XV1V	40	68	18	—	—	—	—	1	0.6	20.3	7.30	9.10	25	—	21.4	35 200	—
7208C	40	80	18	—	—	—	—	1.1	0.6	46.0	25.2	17.6	15	14.1	17.0	19 200	29 200
7208CSN24	40	80	18	—	—	—	—	1.1	0.6	46.0	24.2	20.9	15	14.1	17.0	25 000	38 000
7208A5	40	80	18	—	—	—	—	1.1	0.6	44.0	24.1	20.6	25	—	23.0	16 700	25 000
7208A5SN24	40	80	18	—	—	—	—	1.1	0.6	44.0	23.1	24.4	25	—	23.0	21 700	32 500
7208A	40	80	18	—	—	—	—	1.1	0.6	42.5	23.4	15.8	30	—	26.3	12 500	16 700

(*) Bearings denoted by an asterisk (*) are available with seals. Series 20 and 29 are comprised exclusively of sealed bearings.
(*) Spinshot II bearings are available for designations with values in the C column, and ROBUSTSHOT bearings are available for designations with values in the B_N, S_N, and S_B columns.
(*) For details on permissible axial load, refer to Page 199.
(*) For details on limiting speeds, refer to Page 216. See Page 51 for cage differences and their impact on d_{gr}n values.

Abutment and Fillet Dimensions (mm)					Preload (DB and DF Arrangement) (N)				Axial Rigidity (DB and DF Arrangement) (N/μm)				Measured Axial Clearance (μm)				Mass (kg) (approx.)
d _a (min.)	D _a (max.)	D _b (max.)	r _a (max.)	r _b (max.)	EL	L	M	H	EL	L	M	H	EL	L	M	H	
45	57	59.5	0.6	0.3	41	78	196	384	32	42	63	88	1	− 3	− 12	− 22	0.109
45	57	59.5	0.6	0.3	40	81	215	432	35	47	72	101	1	− 3	− 12	− 22	0.096
45	57	59.5	0.6	0.3	68	113	291	572	81	97	139	182	− 1	− 3	− 9	− 16	0.110
45	57	59.5	0.6	0.3	71	121	327	655	92	111	161	213	− 1	− 3	− 9	− 16	0.097
45	57	59.5	0.6	0.3	49	145	277	—	38	57	74	—	0	− 8	− 16	—	0.105
45	57	59.5	0.6	0.3	49	158	310	—	43	66	86	—	0	− 8	− 16	—	0.092
45	57	59.5	0.6	0.3	49	158	310	—	43	66	86	—	0	− 8	− 16	—	0.092
45	57	59.5	0.6	0.3	49	221	434	—	63	106	137	—	0	− 8	− 15	—	0.105
45	57	59.5	0.6	0.3	49	246	494	—	71	123	160	—	0	− 8	− 15	—	0.092
45	57	59.5	0.6	0.3	49	246	494	—	71	123	160	—	0	− 8	− 15	—	0.092
45	57	59.5	0.6	0.3	49	145	277	—	38	57	74	—	0	− 8	− 16	—	0.120
45	57	59.5	0.6	0.3	49	158	310	—	43	66	86	—	0	− 8	− 16	—	0.107
45	57	59.5	0.6	0.3	49	158	310	—	43	66	86	—	0	− 8	− 16	—	0.107
45	57	59.5	0.6	0.3	49	221	434	—	63	106	137	—	0	− 8	− 15	—	0.120
45	57	59.5	0.6	0.3	49	246	494	—	71	123	160	—	0	− 8	− 15	—	0.107
45	57	59.5	0.6	0.3	49	246	494	—	71	123	160	—	0	− 8	− 15	—	0.107
46	62	63	1	0.5	58	114	291	594	39	51	77	110	− 1	− 6	− 17	− 30	0.189
46	62	63	1	0.5	59	123	325	676	43	58	89	128	− 1	− 6	− 17	− 30	0.168
46	62	63	1	0.5	92	203	424	864	95	127	167	223	− 2	− 6	− 12	− 21	0.188
46	62	63	1	0.5	98	225	483	998	108	147	195	262	− 2	− 6	− 12	− 21	0.167
46	62	63	1	0.5	49	219	463	768	101	168	221	267	0	− 5	− 10	− 15	0.191
46	62	63	1	0.5	49	114	216	—	44	60	77	—	0	− 5	− 11	—	0.204
46	62	63	1	0.5	49	122	240	—	49	68	89	—	0	− 5	− 11	—	0.193
46	62	63	1	0.5	49	122	240	—	49	68	89	—	0	− 5	− 11	—	0.193
46	62	63	1	0.5	49	252	510	—	72	128	167	—	0	− 8	− 15	—	0.204
46	62	63	1	0.5	49	282	583	—	81	148	195	—	0	− 8	− 15	—	0.193
46	62	63	1	0.5	49	282	583	—	81	148	195	—	0	− 8	− 15	—	0.193
46	62	63	1	0.5	49	148	304	—	45	67	88	—	0	− 7	− 15	—	0.173
46	62	63	1	0.5	49	148	304	—	45	67	88	—	0	− 7	− 15	—	0.173
46	62	63	1	0.5	49	197	405	—	74	120	156	—	0	− 6	− 12	—	0.173
46	62	63	1	0.5	49	197	405	—	74	120	156	—	0	− 6	− 12	—	0.173
46	62	63	1	0.5	49	114	216	—	44	60	77	—	0	− 5	− 11	—	0.242
46	62	63	1	0.5	49	122	240	—	49	68	89	—	0	− 5	− 11	—	0.231
46	62	63	1	0.5	49	122	240	—	49	68	89	—	0	− 5	− 11	—	0.231
46	62	63	1	0.5	49	252	510	—	72	128	167	—	0	− 8	− 15	—	0.242
46	62	63	1	0.5	49	282	583	—	81	148	195	—	0	− 8	− 15	—	0.231
46	62	63	1	0.5	49	282	583	—	81	148	195	—	0	− 8	− 15	—	0.231
47	73	75	1	0.6	98	202	501	985	44	60	90	125	− 5	− 13	− 29	− 47	0.366
47	73	75	1	0.6	104	223	570	1 133	50	69	104	147	− 5	− 13	− 29	− 47	0.313
47	73	75	1	0.6	138	290	750	1 490	105	137	196	259	− 4	− 9	− 20	− 33	0.362
47	73	75	1	0.6	151	326	864	1 734	121	159	230	305	− 4	− 9	− 20	− 33	0.309
47	73	75	1	0.6	49	438	721	1 428	97	205	246	318	0	− 10	− 15	− 25	0.370

1. Angular Contact Ball Bearings

Bore Diameter 45mm

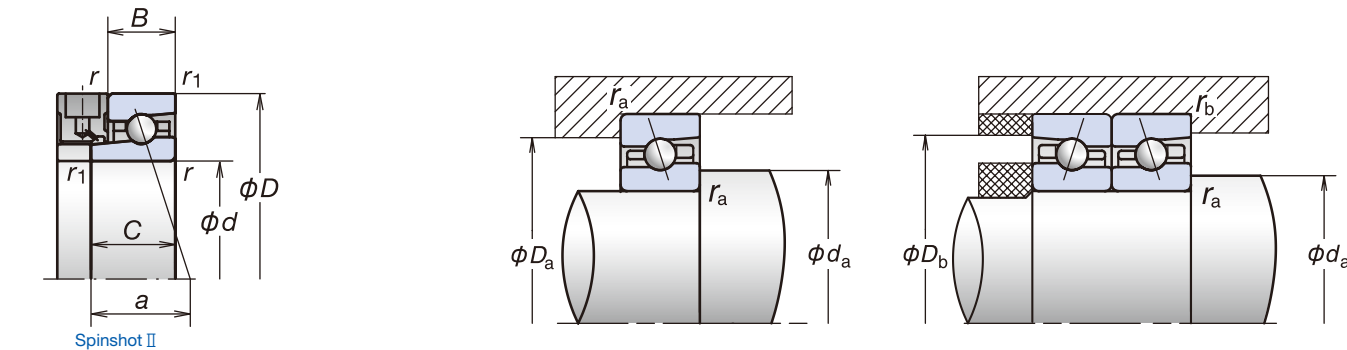
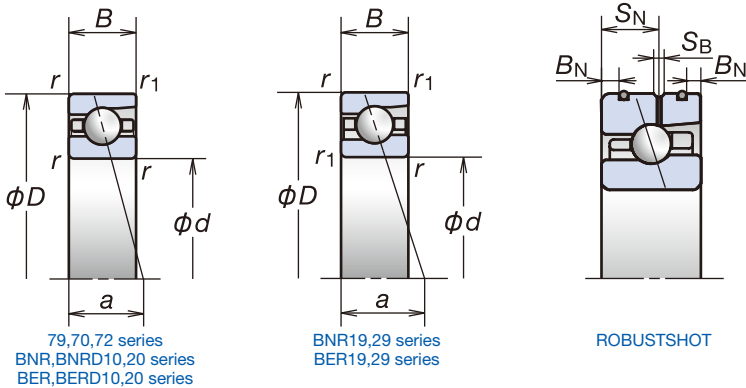


Designation (*)	Boundary Dimensions (*) (mm)								Basic Load Ratings (kN)		Permissible Axial Load (*) (kN)	Contact Angle (°)	Factor f _o	Effective Load Center (mm) a	Limiting Speeds (*) (min ⁻¹)	
	d	D	B	C	B _N	S _N	S _B	r (min.)	r ₁ (min.)	C _r (Dynamic)	C _{or} (Static)				Grease	Oil
*7909C	45	68	12	—	—	—	—	0.6	0.3	20.2	13.4	8.55	15	16.0	13.6	20 400
*7909CSN24	45	68	12	—	—	—	—	0.6	0.3	20.1	12.7	10.1	15	16.0	13.6	26 600
*7909A5	45	68	12	—	—	—	—	0.6	0.3	19.1	12.7	9.95	25	—	19.2	17 700
*7909A5SN24	45	68	12	—	—	—	—	0.6	0.3	19.0	12.1	11.8	25	—	19.2	23 100
*45BNR19S	45	68	12	—	—	—	—	0.6	0.3	15.3	8.70	12.4	18	10.6	15.2	24 800
*45BNR19H	45	68	12	—	2.2	7.0	1.4	0.6	0.3	15.3	8.30	8.10	18	10.6	15.2	31 900
*45BNR19X	45	68	12	17	2.2	7.0	1.4	0.6	0.3	24.3	8.30	8.10	18	10.6	15.2	37 200
*45BER19S	45	68	12	—	—	—	—	0.6	0.3	14.7	8.35	14.6	25	—	19.2	21 300
*45BER19H	45	68	12	—	2.2	7.0	1.4	0.6	0.3	14.7	8.00	9.85	25	—	19.2	28 400
*45BER19X	45	68	12	17	2.2	7.0	1.4	0.6	0.3	23.3	8.00	9.85	25	—	19.2	33 700
*45BNR29SV1V	45	68	14	—	—	—	—	0.6	0.3	15.3	8.70	12.4	18	10.6	16.2	24 800
*45BNR29HV1V	45	68	14	—	—	—	—	0.6	0.3	15.3	8.30	8.10	18	10.6	16.2	31 900
*45BNR29XV1V	45	68	14	—	—	—	—	0.6	0.3	24.3	8.30	8.10	18	10.6	16.2	37 200
*45BER29SV1V	45	68	14	—	—	—	—	0.6	0.3	14.7	8.35	14.6	25	—	20.2	21 300
*45BER29HV1V	45	68	14	—	—	—	—	0.6	0.3	14.7	8.00	9.85	25	—	20.2	28 400
*45BER29XV1V	45	68	14	—	—	—	—	0.6	0.3	23.3	8.00	9.85	25	—	20.2	33 700
*7009C	45	75	16	—	—	—	—	1	0.6	30.5	19.3	12.4	15	15.4	16.0	19 200
*7009CSN24	45	75	16	—	—	—	—	1	0.6	30.5	18.4	14.7	15	15.4	16.0	25 000
*7009A5	45	75	16	—	—	—	—	1	0.6	29.1	18.3	14.5	25	—	22.0	16 700
*7009A5SN24	45	75	16	—	—	—	—	1	0.6	29.1	17.5	17.2	25	—	22.0	21 700
*7009A	45	75	16	—	—	—	—	1	0.6	28.0	17.7	11.1	30	—	25.3	12 500
*45BNR10E	45	75	16	—	—	—	—	1	0.6	14.7	9.00	12.7	18	10.6	17.6	25 000
*45BNR10H	45	75	16	—	3.4	9.3	1.4	1	0.6	14.7	8.60	8.35	18	10.6	17.6	30 000
*45BNR10X	45	75	16	21	3.4	9.3	1.4	1	0.6	23.4	8.60	8.35	18	10.6	17.6	35 000
*45BER10E	45	75	16	—	—	—	—	1	0.6	14.1	8.60	15.0	25	—	21.8	21 500
*45BER10H	45	75	16	—	3.4	9.3	1.4	1	0.6	14.1	8.25	10.1	25	—	21.8	26 700
*45BER10X	45	75	16	21	3.4	9.3	1.4	1	0.6	22.4	8.25	10.1	25	—	21.8	31 700
*45BNRD10J	45	75	16	—	3.4	9.3	1.4	1	0.6	26.9	9.75	9.40	18	7.9	17.8	30 000
*45BNRD10X	45	75	16	21	3.4	9.3	1.4	1	0.6	34.0	9.75	9.40	18	7.9	17.8	35 000
*45BERD10J	45	75	16	—	3.4	9.3	1.4	1	0.6	25.9	9.35	11.5	25	—	22.0	26 700
*45BERD10X	45	75	16	21	3.4	9.3	1.4	1	0.6	32.5	9.35	11.5	25	—	22.0	31 700
*45BNR20EV1V	45	75	19	—	—	—	—	1	0.6	14.7	9.00	12.7	18	10.6	19.1	25 000
*45BNR20HV1V	45	75	19	—	—	—	—	1	0.6	14.7	8.60	8.35	18	10.6	19.1	30 000
*45BNR20XV1V	45	75	19	—	—	—	—	1	0.6	23.4	8.60	8.35	18	10.6	19.1	35 000
*45BER20EV1V	45	75	19	—	—	—	—	1	0.6	14.1	8.60	15.0	25	—	23.3	21 500
*45BER20HV1V	45	75	19	—	—	—	—	1	0.6	14.1	8.25	10.1	25	—	23.3	26 700
*45BER20XV1V	45	75	19	—	—	—	—	1	0.6	22.4	8.25	10.1	25	—	23.3	31 700
7209C	45	85	19	—	—	—	—	1.1	0.6	51.5	28.8	19.6	15	14.2	18.2	17 700
7209CSN24	45	85	19	—	—	—	—	1.1	0.6	51.5	27.8	23.3	15	14.2	18.2	23 100
7209A5	45	85	19	—	—	—	—	1.1	0.6	49.0	27.6	23.3	25	—	24.7	15 400
7209A5SN24	45	85	19	—	—	—	—	1.1	0.6	49.5	26.6	27.7	25	—	24.7	20 000
7209A	45	85	19	—	—	—	—	1.1	0.6	47.5	26.7	18.0	30	—	28.3	11 600

Abutment and Fillet Dimensions (mm)					Preload (DB and DF Arrangement) (N)				Axial Rigidity (DB and DF Arrangement) (N/μm)				Measured Axial Clearance (μm)				Mass (kg) (approx.)
d _a (min.)	D _a (max.)	D _b (max.)	r _a (max.)	r _b (max.)	EL	L	M	H	EL	L	M	H	EL	L	M	H	
50	63	65.5	0.6	0.3	49	104	192	391	37	51	66	93	0	− 5	− 11	− 21	0.129
50	63	65.5	0.6	0.3	49	111	211	440	41	57	76	108	0	− 5	− 11	− 21	0.115
50	63	65.5	0.6	0.3	70	146	353	676	88	115	160	208	− 1	− 4	− 10	− 17	0.130
50	63	65.5	0.6	0.3	72	159	399	776	99	132	187	243	− 1	− 4	− 10	− 17	0.116
50	63	65.5	0.6	0.3	49	153	298	—	41	63	82	—	0	− 8	− 16	—	0.125
50	63	65.5	0.6	0.3	49	168	335	—	46	72	95	—	0	− 8	− 16	—	0.111
50	63	65.5	0.6	0.3	49	168	335	—	46	72	95	—	0	− 8	− 16	—	0.111
50	63	65.5	0.6	0.3	49	237	473	—	68	117	151	—	0	− 8	− 15	—	0.125
50	63	65.5	0.6	0.3	49	265	539	—	76	136	177	—	0	− 8	− 15	—	0.111
50	63	65.5	0.6	0.3	49	265	539	—	76	136	177	—	0	− 8	− 15	—	0.111
50	63	65.5	0.6	0.3	49	153	298	—	41	63	82	—	0	− 8	− 16	—	0.143
50	63	65.5	0.6	0.3	49	168	335	—	46	72	95	—	0	− 8	− 16	—	0.128
50	63	65.5	0.6	0.3	49	168	335	—	46	72	95	—	0	− 8	− 16	—	0.128
50	63	65.5	0.6	0.3	49	237	473	—	68	117	151	—	0	− 8	− 15	—	0.143
50	63	65.5	0.6	0.3	49	265	539	—	76	136	177	—	0	− 8	− 15	—	0.128
50	63	65.5	0.6	0.3	49	265	539	—	76	136	177	—	0	− 8	− 15	—	0.128
51	69	70	1	0.5	80	144	338	695	45	57	84	120	− 3	− 8	− 19	− 33	0.238
51	69	70	1	0.5	84	156	380	794	51	66	97	140	− 3	− 8	− 19	− 33	0.211
51	69	70	1	0.5	94	210	485	958	99	132	181	238	− 2	− 6	− 13	− 22	0.250
51	69	70	1	0.5	99	233	553	1 107	113	153	212	280	− 2	− 6	− 13	− 22	0.223
51	69	70	1	0.5	49	227	482	1 178	105	176	231	324	0	− 5	− 10	− 20	0.241
51	69	70	1	0.5	49	114	218	—	44	60	77	—	0	− 5	− 11	—	0.259
51	69	70	1	0.5	49	123	242	—	50	69	89	—	0	− 5	− 11	—	0.246
51	69	70	1	0.5	49	123	242	—	50	69	89	—	0	− 5	− 11	—	0.246
51	69	70	1	0.5	49	255	516	—	73	129	168	—	0	− 8	− 15	—	0.259
51	69	70	1	0.5	49	285	590	—	82	150	197	—	0	− 8	− 15	—	0.246
51	69	70	1	0.5	49	285	590	—	82	150	197	—	0	− 8	− 15	—	0.246
51	69	70	1	0.5	49	169	361	—	46	73	97	—	0	− 8	− 17	—	0.215
51	69	70	1	0.5	49	169	361	—	46	73	97	—	0	− 8	− 17	—	0.215
51	69	70	1	0.5	49	235	504	—	77	132	174	—	0	− 7	− 14	—	0.215
51	69	70	1	0.5	49	235	504	—	77	132	174	—	0	− 7	− 14	—	0.215
51	69	70	1	0.5	49	114	218	—	44	60	77	—	0	− 5	− 11	—	0.305
51	69	70	1	0.5	49	123	242	—	50	69	89	—	0	− 5	− 11	—	0.291
51	69	70	1	0.5	49	123	242	—	50	69	89	—	0	− 5	− 11	—	0.291
51	69	70	1	0.5	49	255	516	—	73	129	168	—	0	− 8	− 15	—	0.305
51	69	70	1	0.5	49	285	590	—	82	150	197	—	0	− 8	− 15	—	0.291
51	69	70	1	0.5	49	285	590	—	82	150	197	—	0	− 8	− 15	—	0.291
52	78	80	1	0.6	123	254	534	1 067	49	67	94	131	− 7	− 16	− 30	− 49	0.406
52	78	80	1	0.6	132	283	608	1 230	56	77	109	154	− 7	− 16	− 30	− 49	0.341
52	78	80	1	0.6	169	333	875	1 738	115	147	212	281	− 5	− 10	− 22	− 36	0.402
52	78	80	1	0.6	186	377	1 011	2 026	133	171	249	330	− 5	− 10	− 22	− 36	0.337
52	78	80	1	0.6	49	450	1 084	1 905	100	212	292	363	0	− 10	− 20	− 30	0.410

1. Angular Contact Ball Bearings

Bore Diameter 50mm



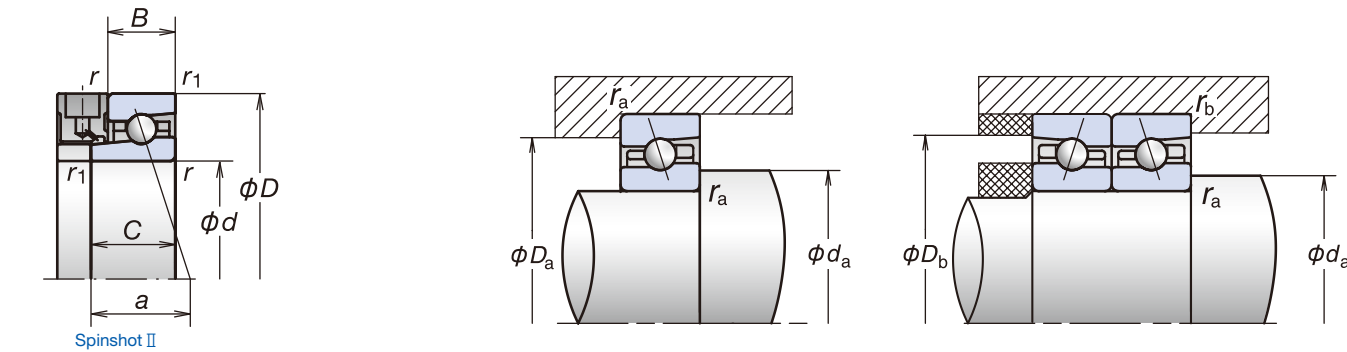
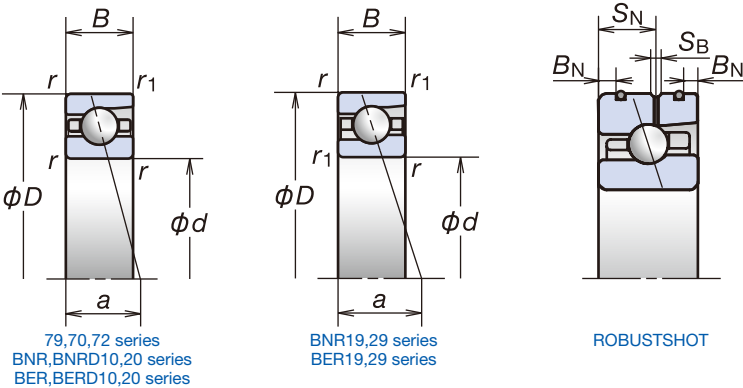
Designation (*)	Boundary Dimensions (*) (mm)								Basic Load Ratings (kN)		Permissible Axial Load (*) (kN)	Contact Angle (°)	Factor f _o	Effective Load Center (mm) a	Limiting Speeds (*) (min ⁻¹)	
	d	D	B	C	B _N	S _N	S _B	r (min.)	r ₁ (min.)	C _r (Dynamic)	C _{or} (Static)				Grease	Oil
*7910C	50	72	12	—	—	—	—	0.6	0.3	21.3	15.0	9.45	15	16.2	14.2	18 900
*7910CSN24	50	72	12	—	—	—	—	0.6	0.3	21.2	14.3	11.2	15	16.2	14.2	24 600
*7910A5	50	72	12	—	—	—	—	0.6	0.3	20.1	14.2	11.0	25	—	20.2	16 400
*7910A5SN24	50	72	12	—	—	—	—	0.6	0.3	20.0	13.5	13.1	25	—	20.2	21 400
*50BNR19S	50	72	12	—	—	—	—	0.6	0.3	16.1	9.75	13.9	18	10.7	15.9	23 000
*50BNR19H	50	72	12	—	2.2	7.0	1.4	0.6	0.3	16.1	9.30	9.10	18	10.7	15.9	29 600
*50BNR19X	50	72	12	17	2.2	7.0	1.4	0.6	0.3	25.6	9.30	9.10	18	10.7	15.9	34 500
*50BER19S	50	72	12	—	—	—	—	0.6	0.3	15.4	9.35	16.3	25	—	20.2	19 700
*50BER19H	50	72	12	—	2.2	7.0	1.4	0.6	0.3	15.4	8.95	11.0	25	—	20.2	26 300
*50BER19X	50	72	12	17	2.2	7.0	1.4	0.6	0.3	24.5	8.95	11.0	25	—	20.2	31 200
*50BNR29SV1V	50	72	14	—	—	—	—	0.6	0.3	16.1	9.75	13.9	18	10.7	16.9	23 000
*50BNR29HV1V	50	72	14	—	—	—	—	0.6	0.3	16.1	9.30	9.10	18	10.7	16.9	29 600
*50BNR29XV1V	50	72	14	—	—	—	—	0.6	0.3	25.6	9.30	9.10	18	10.7	16.9	34 500
*50BER29SV1V	50	72	14	—	—	—	—	0.6	0.3	15.4	9.35	16.3	25	—	21.2	19 700
*50BER29HV1V	50	72	14	—	—	—	—	0.6	0.3	15.4	8.95	11.0	25	—	21.2	26 300
*50BER29XV1V	50	72	14	—	—	—	—	0.6	0.3	24.5	8.95	11.0	25	—	21.2	31 200
*7010C	50	80	16	—	—	—	—	1	0.6	32.5	21.9	13.9	15	15.7	16.7	17 700
*7010CSN24	50	80	16	—	—	—	—	1	0.6	32.5	21.0	16.5	15	15.7	16.7	23 100
*7010A5	50	80	16	—	—	—	—	1	0.6	31.0	20.8	16.2	25	—	23.2	15 400
*7010A5SN24	50	80	16	—	—	—	—	1	0.6	31.0	19.9	19.3	25	—	23.2	20 000
*7010A	50	80	16	—	—	—	—	1	0.6	29.8	20.1	12.5	30	—	26.8	11 600
*50BNR10E	50	80	16	—	—	—	—	1	0.6	15.3	9.90	14.0	18	10.8	18.4	23 100
*50BNR10H	50	80	16	—	3.4	9.3	1.4	1	0.6	15.3	9.50	9.20	18	10.8	18.4	27 700
*50BNR10X	50	80	16	21	3.4	9.3	1.4	1	0.6	24.3	9.50	9.20	18	10.8	18.4	32 400
*50BER10E	50	80	16	—	—	—	—	1	0.6	14.7	9.50	16.5	25	—	23.0	19 900
*50BER10H	50	80	16	—	3.4	9.3	1.4	1	0.6	14.7	9.10	11.1	25	—	23.0	24 700
*50BER10X	50	80	16	21	3.4	9.3	1.4	1	0.6	23.3	9.10	11.1	25	—	23.0	29 300
*50BNRD10J	50	80	16	—	3.4	9.3	1.4	1	0.6	28.7	11.1	10.7	18	8.1	18.6	27 700
*50BNRD10X	50	80	16	21	3.4	9.3	1.4	1	0.6	36.0	11.1	10.7	18	8.1	18.6	32 400
*50BERD10J	50	80	16	—	3.4	9.3	1.4	1	0.6	27.6	10.6	13.1	25	—	23.2	24 700
*50BERD10X	50	80	16	21	3.4	9.3	1.4	1	0.6	35.0	10.6	13.1	25	—	23.2	29 300
*50BNR20EV1V	50	80	19	—	—	—	—	1	0.6	15.3	9.90	14.0	18	10.8	19.9	23 100
*50BNR20HV1V	50	80	19	—	—	—	—	1	0.6	15.3	9.50	9.20	18	10.8	19.9	27 700
*50BNR20XV1V	50	80	19	—	—	—	—	1	0.6	24.3	9.50	9.20	18	10.8	19.9	32 400
*50BER20EV1V	50	80	19	—	—	—	—	1	0.6	14.7	9.50	16.5	25	—	24.5	19 900
*50BER20HV1V	50	80	19	—	—	—	—	1	0.6	14.7	9.10	11.1	25	—	24.5	24 700
*50BER20XV1V	50	80	19	—	—	—	—	1	0.6	23.3	9.10	11.1	25	—	24.5	29 300
7210C	50	90	20	—	—	—	—	1.1	0.6	54.0	31.5	21.1	15	14.5	19.4	16 500
7210CSN24	50	90	20	—	—	—	—	1.1	0.6	54.5	30.5	25.0	15	14.5	19.4	20 600
7210A5	50	90	20	—	—	—	—	1.1	0.6	51.5	30.5	25.2	25	—	26.3	14 300
7210A5SN24	50	90	20	—	—	—	—	1.1	0.6	52.0	29.3	29.9	25	—	26.3	17 900
7210A	50	90	20	—	—	—	—	1.1	0.6	49.5	29.3	19.4	30	—	30.2	10 800

(*) Bearings denoted by an asterisk (*) are available with seals. Series 20 and 29 are comprised exclusively of sealed bearings.
(*) Spinshot II bearings are available for designations with values in the C column, and ROBUSTSHOT bearings are available for designations with values in the B_N, S_N, and S_B columns.
(*) For details on permissible axial load, refer to Page 199.
(*) For details on limiting speeds, refer to Page 216. See Page 51 for cage differences and their impact on d_{gr}n values.

Abutment and Fillet Dimensions (mm)					Preload (DB and DF Arrangement) (N)				Axial Rigidity (DB and DF Arrangement) (N/μm)				Measured Axial Clearance (μm)				Mass (kg) (approx.)
d _a (min.)	D _a (max.)	D _b (max.)	r _a (max.)	r _b (max.)	EL	L	M	H	EL	L	M	H	EL	L	M	H	
55	67	69.5	0.6	0.3	49	95	240	499	40	51	78	111	0	− 4	− 13	− 24	0.130
55	67	69.5	0.6	0.3	49	100	266	565	44	58	89	129	0	− 4	− 13	− 24	0.114
55	67	69.5	0.6	0.3	71	154	379	791	94	124	175	235	− 1	− 4	− 10	− 18	0.132
55	67	69.5	0.6	0.3	74	168	430	911	107	143	204	276	− 1	− 4	− 10	− 18	0.116
55	67	69.5	0.6	0.3	49	162	319	—	44	68	89	—	0	− 8	− 16	—	0.127
55	67	69.5	0.6	0.3	49	177	359	—	49	78	103	—	0	− 8	− 16	—	0.111
55	67	69.5	0.6	0.3	49	177	359	—	49	78	103	—	0	− 8	− 16	—	0.111
55	67	69.5	0.6	0.3	49	253	511	—	73	128	166	—	0	− 8	− 15	—	0.127
55	67	69.5	0.6	0.3	49	283	584	—	81	149	194	—	0	− 8	− 15	—	0.111
55	67	69.5	0.6	0.3	49	283	584	—	81	149	194	—	0	− 8	− 15	—	0.111
55	67	69.5	0.6	0.3	49	162	319	—	44	68	89	—	0	− 8	− 16	—	0.144
55	67	69.5	0.6	0.3	49	177	359	—	49	78	103	—	0	− 8	− 16	—	0.128
55	67	69.5	0.6	0.3	49	177	359	—	49	78	103	—	0	− 8	− 16	—	0.128
55	67	69.5	0.6	0.3	49	253	511	—	73	128	166	—	0	− 8	− 15	—	0.144
55	67	69.5	0.6	0.3	49	283	584	—	81	149	194	—	0	− 8	− 15	—	0.128
55	67	69.5	0.6	0.3	49	283	584	—	81	149	194	—	0	− 8	− 15	—	0.128
56	74	75	1	0.5	70	152	388	791	46	63	95	135	− 2	− 8	− 20	− 34	0.259
56	74	75	1	0.5	73	165	438	906	51	72	110	158	− 2	− 8	− 20	− 34	0.228
56	74	75	1	0.5	125	262	580	1 189	118	154	208	278	− 3	− 7	− 14	− 24	0.270
56	74	75	1	0.5	136	293	664	1 379	135	179	244	327	− 3	− 7	− 14	− 24	0.239
56	74	75	1	0.5	49	243	525	1 299	113	194	256	360	0	− 5	− 10	− 20	0.262
56	74	75	1	0.5	49	119	250	—	47	64	86	—	0	− 5	− 12	—	0.281
56	74	75	1	0.5	49	128	280	—	52	74	100	—	0	− 5	− 12	—	0.266
56	74	75	1	0.5	49	128	280	—	52	74	100	—	0	− 5	− 12	—	0.266
56	74	75	1	0.5	49	270	552	—	78	140	182	—	0	− 8	− 15	—	0.281
56	74	75	1	0.5	49	303	633	—	87	162	213	—	0	− 8	− 15	—	0.266
56	74	75	1	0.5	49	303	633	—	87	162	213	—	0	− 8	− 15	—	0.266
56	74	75	1	0.5	49	200	418	—	50	83	110	—	0	− 9	− 18	—	0.234
56	74	75	1	0.5	49	200	418	—	50	83	110	—	0	− 9	− 18	—	0.234
56	74	75	1	0.5	49	290	551	—	83	153	193	—	0	− 8	− 14	—	0.234
56	74	75	1	0.5	49	290	551	—	83	153	193	—	0	− 8	− 14	—	0.234
56	74	75	1	0.5	49	119	250	—	47	64	86	—	0	− 5	− 12	—	0.330
56	74	75	1	0.5	49	128	280	—	52	74	100	—	0	− 5	− 12	—	0.315
56	74	75	1	0.5	49	128	280	—	52	74	100	—	0	− 5	− 12	—	0.315
56	74	75	1	0.5	49	270	552	—	78	140	182	—	0	− 8	− 15	—	0.330
56	74	75	1	0.5	49	303	633	—	87	162	213	—	0	− 8	− 15	—	0.315
56	74	75	1	0.5	49	303	633	—	87	162	213	—	0	− 8	− 15	—	0.315
57	83	85	1	0.6	127	248	590	1 171	52	69	102	143	− 7	− 15	− 31	− 50	0.457
57	83	85	1	0.6	137	277	674	1 351	60	80	119	167	− 7	− 15	− 31	− 50	0.387
57	83	85	1	0.6	208	391	989	1 934	130	164	233	306	− 6	− 11	− 23	− 37	0.453
57	83	85	1	0.6	231	445	1 145	2 257	150	191	274	361	− 6	− 11	− 23	− 37	0.383
57	83	85	1	0.6	49	477	1 156	2 038	105	227	314	390	0	− 10	− 20	− 30	0.462

1. Angular Contact Ball Bearings

Bore Diameter 55mm



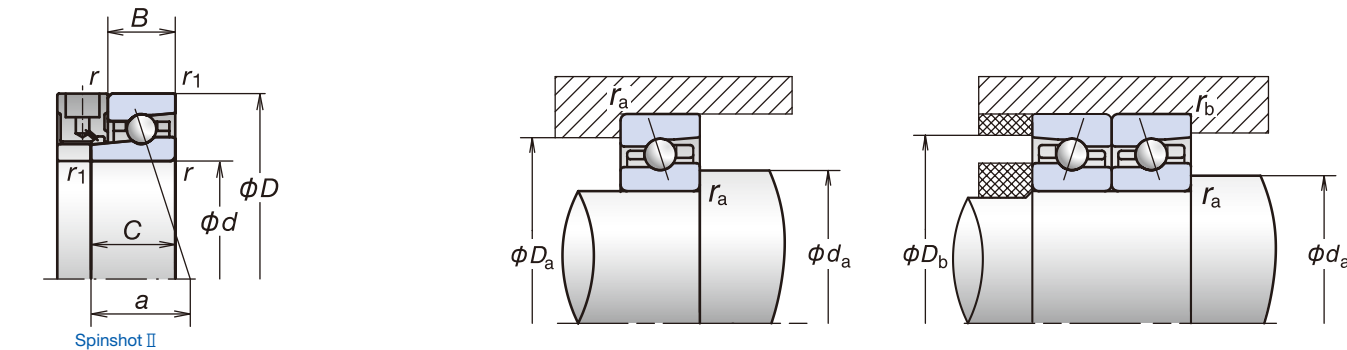
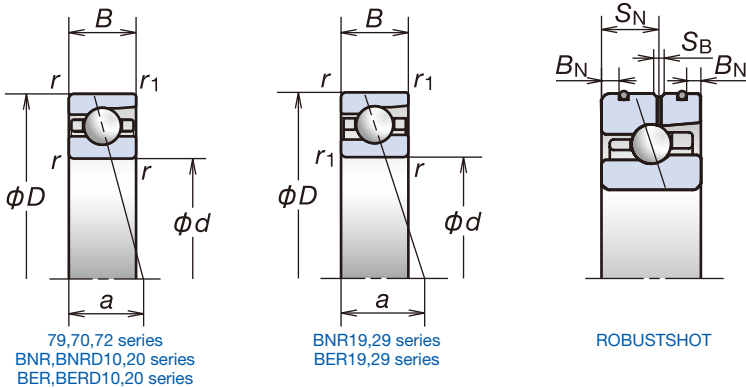
Designation (*)	Boundary Dimensions (*) (mm)									Basic Load Ratings (kN)		Permissible Axial Load (*) (kN)	Contact Angle (°)	Factor f ₀	Effective Load Center (mm) a	Limiting Speeds (*) (min ⁻¹)	
	d	D	B	C	B _N	S _N	S _B	r (min.)	r ₁ (min.)	C _r (Dynamic)	C _{or} (Static)					Grease	Oil
*7911C	55	80	13	—	—	—	—	1	0.6	24.1	17.7	11.0	15	16.3	15.5	17 100	26 000
*7911CSN24	55	80	13	—	—	—	—	1	0.6	24.5	17.3	13.0	15	16.3	15.5	22 300	33 800
*7911A5	55	80	13	—	—	—	—	1	0.6	22.8	16.8	12.5	25	—	22.2	14 900	22 300
*7911A5SN24	55	80	13	—	—	—	—	1	0.6	23.1	16.4	14.8	25	—	22.2	19 300	28 900
*55BNR19E	55	80	13	—	—	—	—	1	0.6	18.1	11.4	16.2	18	10.7	17.5	22 300	31 800
*55BNR19H	55	80	13	—	2.8	7.5	1.4	1	0.6	18.1	10.9	10.6	18	10.7	17.5	26 700	41 500
*55BNR19X	55	80	13	18	2.8	7.5	1.4	1	0.6	28.8	10.9	10.6	18	10.7	17.5	31 200	48 900
*55BER19E	55	80	13	—	—	—	—	1	0.6	17.3	10.9	16.1	25	—	22.2	19 200	27 000
*55BER19H	55	80	13	—	2.8	7.5	1.4	1	0.6	17.3	10.4	12.9	25	—	22.2	23 800	37 100
*55BER19X	55	80	13	18	2.8	7.5	1.4	1	0.6	27.5	10.4	12.9	25	—	22.2	28 200	44 500
*55BNR29EV1V	55	80	16	—	—	—	—	1	0.6	18.1	11.4	16.2	18	10.7	19.0	22 300	—
*55BNR29HV1V	55	80	16	—	—	—	—	1	0.6	18.1	10.9	10.6	18	10.7	19.0	26 700	—
*55BNR29XV1V	55	80	16	—	—	—	—	1	0.6	28.8	10.9	10.6	18	10.7	19.0	31 200	—
*55BER29EV1V	55	80	16	—	—	—	—	1	0.6	17.3	10.9	16.1	25	—	23.7	19 200	—
*55BER29HV1V	55	80	16	—	—	—	—	1	0.6	17.3	10.4	12.9	25	—	23.7	23 800	—
*55BER29XV1V	55	80	16	—	—	—	—	1	0.6	27.5	10.4	12.9	25	—	23.7	28 200	—
*7011C	55	90	18	—	—	—	—	1.1	0.6	43.0	28.6	18.9	15	15.5	18.7	15 900	24 200
*7011CSN24	55	90	18	—	—	—	—	1.1	0.6	42.5	27.1	22.4	15	15.5	18.7	20 700	31 500
*7011A5	55	90	18	—	—	—	—	1.1	0.6	41.0	27.2	21.8	25	—	25.9	13 800	20 700
*7011A5SN24	55	90	18	—	—	—	—	1.1	0.6	40.5	25.7	25.8	25	—	25.9	18 000	26 900
*7011A	55	90	18	—	—	—	—	1.1	0.6	39.0	26.3	16.6	30	—	29.9	10 400	13 800
*55BNR10E	55	90	18	—	—	—	—	1.1	0.6	19.0	12.5	17.8	18	10.8	20.6	20 700	29 600
*55BNR10H	55	90	18	—	4.3	10.0	1.4	1.1	0.6	19.0	12.0	11.7	18	10.8	20.6	24 900	38 700
*55BNR10X	55	90	18	23	4.3	10.0	1.4	1.1	0.6	30.0	12.0	11.7	18	10.8	20.6	29 000	45 600
*55BER10E	55	90	18	—	—	—	—	1.1	0.6	18.1	12.0	21.0	25	—	25.7	17 800	25 200
*55BER10H	55	90	18	—	4.3	10.0	1.4	1.1	0.6	18.1	11.5	14.1	25	—	25.7	22 100	34 500
*55BER10X	55	90	18	23	4.3	10.0	1.4	1.1	0.6	28.8	11.5	14.1	25	—	25.7	26 300	41 400
*55BNRD10J	55	90	18	—	4.3	10	1.4	1.1	0.6	37.5	14.5	13.9	18	8.0	20.8	24 900	38 700
*55BNRD10X	55	90	18	23	4.3	10	1.4	1.1	0.6	47.5	14.5	13.9	18	8.0	20.8	29 000	45 600
*55BERD10J	55	90	18	—	4.3	10	1.4	1.1	0.6	36.0	13.9	17.1	25	—	25.9	22 100	34 500
*55BERD10X	55	90	18	23	4.3	10	1.4	1.1	0.6	45.5	13.9	17.1	25	—	25.9	26 300	41 400
*55BNR20EV1V	55	90	22	—	—	—	—	1.1	0.6	19.0	12.5	17.8	18	10.8	22.6	20 700	—
*55BNR20HV1V	55	90	22	—	—	—	—	1.1	0.6	19.0	12.0	11.7	18	10.8	22.6	24 900	—
*55BNR20XV1V	55	90	22	—	—	—	—	1.1	0.6	30.0	12.0	11.7	18	10.8	22.6	29 000	—
*55BER20EV1V	55	90	22	—	—	—	—	1.1	0.6	18.1	12.0	21.0	25	—	27.7	17 800	—
*55BER20HV1V	55	90	22	—	—	—	—	1.1	0.6	18.1	11.5	14.1	25	—	27.7	22 100	—
*55BER20XV1V	55	90	22	—	—	—	—	1.1	0.6	28.8	11.5	14.1	25	—	27.7	26 300	—
7211C	55	100	21	—	—	—	—	1.5	1	66.5	40.0	27.6	15	14.5	20.9	14 900	22 600
7211CSN24	55	100	21	—	—	—	—	1.5	1	66.5	38.0	32.8	15	14.5	20.9	19 400	29 500
7211A5	55	100	21	—	—	—	—	1.5	1	63.5	38.0	32.5	25	—	28.6	13 000	19 400
7211A5SN24	55	100	21	—	—	—	—	1.5	1	63.5	36.5	38.6	25	—	28.6	16 800	25 200
7211A	55	100	21	—	—	—	—	1.5	1	61.5	37.0	25.0	30	—	32.9	9 700	13 000

(*) Bearings denoted by an asterisk (*) are available with seals. Series 20 and 29 are comprised exclusively of sealed bearings.
(°) Spinshot II bearings are available for designations with values in the C column, and ROBUSTSHOT bearings are available for designations with values in the B_N, S_N, and S_B columns.
(°) For details on permissible axial load, refer to Page 199.
(°) For details on limiting speeds, refer to Page 216. See Page 51 for cage differences and their impact on d_{gr}n values.

Abutment and Fillet Dimensions (mm)					Preload (DB and DF Arrangement) (N)				Axial Rigidity (DB and DF Arrangement) (N/μm)				Measured Axial Clearance (μm)				Mass (kg) (approx.)
d _a (min.)	D _a (max.)	D _b (max.)	r _a (max.)	r _b (max.)	EL	L	M	H	EL	L	M	H	EL	L	M	H	
61	74	75	1	0.5	60	111	296	593	45	58	90	126	− 1	− 5	− 15	− 26	0.182
61	74	75	1	0.5	61	119	331	675	50	66	104	147	− 1	− 5	− 15	− 26	0.163
61	74	75	1	0.5	99	196	454	917	113	144	198	264	− 2	− 5	− 11	− 19	0.184
61	74	75	1	0.5	106	217	517	1 059	129	167	232	309	− 2	− 5	− 11	− 19	0.165
61	74	75	1	0.5	49	167	333	—	46	72	94	—	0	− 8	− 16	—	0.178
61	74	75	1	0.5	49	184	375	—	51	82	109	—	0	− 8	− 16	—	0.158
61	74	75	1	0.5	49	184	375	—	51	82	109	—	0	− 8	− 16	—	0.158
61	74	75	1	0.5	49	264	538	—	76	136	176	—	0	− 8	− 15	—	0.178
61	74	75	1	0.5	49	296	615	—	85	158	206	—	0	− 8	− 15	—	0.158
61	74	75	1	0.5	49	296	615	—	85	158	206	—	0	− 8	− 15	—	0.158
61	74	75	1	0.5	49	167	333	—	46	72	94	—	0	− 8	− 16	—	0.213
61	74	75	1	0.5	49	184	375	—	51	82	109	—	0	− 8	− 16	—	0.194
61	74	75	1	0.5	49	184	375	—	51	82	109	—	0	− 8	− 16	—	0.194
61	74	75	1	0.5	49	264	538	—	76	136	176	—	0	− 8	− 15	—	0.213
61	74	75	1	0.5	49	296	615	—	85	158	206	—	0	− 8	− 15	—	0.194
61	74	75	1	0.5	49	296	615	—	85	158	206	—	0	− 8	− 15	—	0.194
62	83	85	1	0.6	95	200	479	971	51	69	102	144	− 4	− 11	− 24	− 40	0.380
62	83	85	1	0.6	100	221	544	1 118	58	80	119	169	− 4	− 11	− 24	− 40	0.332
62	83	85	1	0.6	157	345	804	1 552	129	171	236	307	− 4	− 9	− 18	− 29	0.383
62	83	85	1	0.6	172	391	928	1 807	148	199	277	362	− 4	− 9	− 18	− 29	0.335
62	83	85	1	0.6	49	246	887	1 307	115	196	311	360	0	− 5	− 15	− 20	0.385
62	83	85	1	0.6	49	121	305	—	49	67	95	—	0	− 5	− 14	—	0.414
62	83	85	1	0.6	49	131	343	—	54	77	111	—	0	− 5	− 14	—	0.393
62	83	85	1	0.6	49	131	343	—	54	77	111	—	0	− 5	− 14	—	0.393
62	83	85	1	0.6	49	356	725	—	81	160	208	—	0	− 10	− 18	—	0.414
62	83	85	1	0.6	49	404	836	—	90	186	244	—	0	− 10	− 18	—	0.393
62	83	85	1	0.6	49	404	836	—	90	186	244	—	0	− 10	− 18	—	0.393
62	83	85	1	0.6	49	268	567	—	50	93	124	—	0	− 12	− 23	—	0.338
62	83	85	1	0.6	49	268	567	—	50	93	124	—	0	− 12	− 23	—	0.338
62	83	85	1	0.6	49	376	766	—	84	170	219	—	0	− 10	− 18	—	0.338
62	83	85	1	0.6	49	376	766	—	84	170	219	—	0	− 10	− 18	—	0.338
62	83	85	1	0.6	49	121	305	—	49	67	95	—	0	− 5	− 14	—	0.501
62	83	85	1	0.6	49	131	343	—	54	77	111	—	0	− 5	− 14	—	0.480
62	83	85	1	0.6	49	131	343	—	54	77	111	—	0	− 5	− 14	—	0.480
62	83	85	1	0.6	49	356	725	—	81	160	208	—	0	− 10	− 18	—	0.501
62	83	85	1	0.6	49	404	836	—	90	186	244	—	0	− 10	− 18	—	0.480
62	83	85	1	0.6	49	404	836	—	90	186	244	—	0	− 10	− 18	—	0.480
64	91	94	1.5	0.8	142	289	788	1 554	56	74	116	163	− 8	− 17	− 38	− 60	0.601
64	91	94	1.5	0.8	155	323	906	1 802	64	86	136	191	− 8	− 17	− 38	− 60	0.502
64	91	94	1.5	0.8	248	491	1 206	2 397	142	182	256	338	− 7	− 13	− 26	− 42	0.596
64	91	94	1.5	0.8	277	562	1 401	2 804	165	213	301	399	− 7	− 13	− 26	− 42	0.497
64	91	94	1.5	0.8	49	494	1 722	2 635	108	236	372	438	0	− 10	− 26	− 35	0.609

1. Angular Contact Ball Bearings

Bore Diameter 60mm

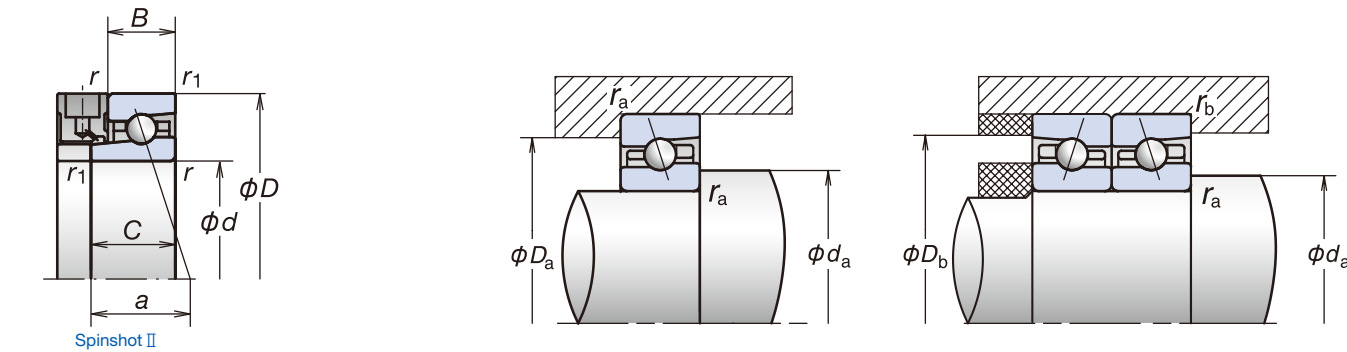
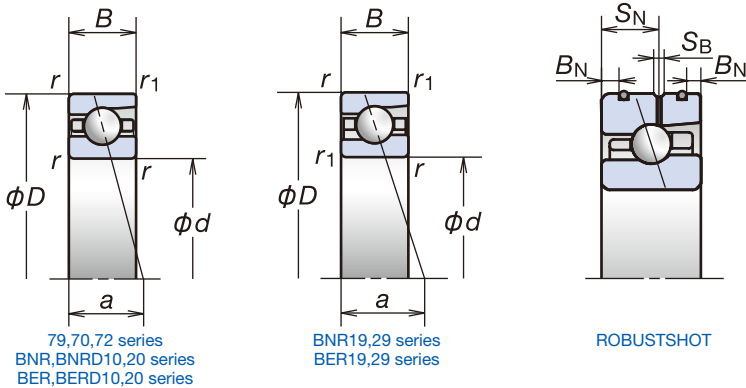


Designation (*)	Boundary Dimensions (*) (mm)									Basic Load Ratings (kN)		Permissible Axial Load (*) (kN)	Contact Angle (°)	Factor f ₀	Effective Load Center (mm) a	Limiting Speeds (*) (min ⁻¹)	
	d	D	B	C	B _N	S _N	S _B	r (min.)	r ₁ (min.)	C _r (Dynamic)	C _{or} (Static)					Grease	Oil
*7912C	60	85	13	—	—	—	—	1	0.6	24.5	18.7	11.5	15	16.5	16.2	15 900	24 200
*7912CSN24	60	85	13	—	—	—	—	1	0.6	24.8	18.3	13.6	15	16.5	16.2	20 700	31 500
*7912A5	60	85	13	—	—	—	—	1	0.6	23.1	17.7	13.0	25	—	23.4	13 800	20 700
*7912A5SN24	60	85	13	—	—	—	—	1	0.6	23.4	17.3	15.5	25	—	23.4	18 000	26 900
*60BNR19E	60	85	13	—	—	—	—	1	0.6	18.4	12.0	17.1	18	10.7	18.3	20 700	29 600
*60BNR19H	60	85	13	—	2.8	7.5	1.4	1	0.6	18.4	11.5	11.2	18	10.7	18.3	24 900	38 700
*60BNR19X	60	85	13	18	2.8	7.5	1.4	1	0.6	29.2	11.5	11.2	18	10.7	18.3	29 000	45 600
*60BER19E	60	85	13	—	—	—	—	1	0.6	17.6	11.5	20.1	25	—	23.4	17 800	25 200
*60BER19H	60	85	13	—	2.8	7.5	1.4	1	0.6	17.6	11.0	13.6	25	—	23.4	22 100	34 500
*60BER19X	60	85	13	18	2.8	7.5	1.4	1	0.6	27.9	11.0	13.6	25	—	23.4	26 300	41 400
*60BNR29EV1V	60	85	16	—	—	—	—	1	0.6	18.4	12.0	17.1	18	10.7	19.8	20 700	—
*60BNR29HV1V	60	85	16	—	—	—	—	1	0.6	18.4	11.5	11.2	18	10.7	19.8	24 900	—
*60BNR29XV1V	60	85	16	—	—	—	—	1	0.6	29.2	11.5	11.2	18	10.7	19.8	29 000	—
*60BER29EV1V	60	85	16	—	—	—	—	1	0.6	17.6	11.5	20.1	25	—	24.9	17 800	—
*60BER29HV1V	60	85	16	—	—	—	—	1	0.6	17.6	11.0	13.6	25	—	24.9	22 100	—
*60BER29XV1V	60	85	16	—	—	—	—	1	0.6	27.9	11.0	13.6	25	—	24.9	26 300	—
*7012C	60	95	18	—	—	—	—	1.1	0.6	44.0	30.5	19.9	15	15.7	19.4	14 900	22 600
*7012CSN24	60	95	18	—	—	—	—	1.1	0.6	44.0	29.0	23.6	15	15.7	19.4	19 400	29 500
*7012A5	60	95	18	—	—	—	—	1.1	0.6	42.0	29.1	23.0	25	—	27.1	13 000	19 400
*7012A5SN24	60	95	18	—	—	—	—	1.1	0.6	41.5	27.5	27.3	25	—	27.1	16 800	25 200
*7012A	60	95	18	—	—	—	—	1.1	0.6	40.0	28.1	17.6	30	—	31.4	9 700	13 000
*60BNR10E	60	95	18	—	—	—	—	1.1	0.6	19.7	13.7	19.5	18	10.8	21.5	19 400	27 700
*60BNR10H	60	95	18	—	4.3	10	1.4	1.1	0.6	19.7	13.1	12.8	18	10.8	21.5	23 300	36 200
*60BNR10X	60	95	18	23	4.3	10	1.4	1.1	0.6	31.5	13.1	12.8	18	10.8	21.5	27 100	42 600
*60BER10E	60	95	18	—	—	—	—	1.1	0.6	18.8	13.1	22.9	25	—	26.9	16 700	23 500
*60BER10H	60	95	18	—	4.3	10	1.4	1.1	0.6	18.8	12.5	15.5	25	—	26.9	20 700	32 300
*60BER10X	60	95	18	23	4.3	10	1.4	1.1	0.6	29.9	12.5	15.5	25	—	26.9	24 600	38 800
*60BNRD10J	60	95	18	—	4.3	10	1.4	1.1	0.6	39.0	15.5	14.9	18	8.1	21.6	23 300	36 200
*60BNRD10X	60	95	18	23	4.3	10	1.4	1.1	0.6	49.0	15.5	14.9	18	8.1	21.6	27 100	42 600
*60BERD10J	60	95	18	—	4.3	10	1.4	1.1	0.6	37.5	14.9	18.3	25	—	27.1	20 700	32 300
*60BERD10X	60	95	18	23	4.3	10	1.4	1.1	0.6	47.0	14.9	18.3	25	—	27.1	24 600	38 800
*60BNR20EV1V	60	95	22	—	—	—	—	1.1	0.6	19.7	13.7	19.5	18	10.8	23.5	19 400	—
*60BNR20HV1V	60	95	22	—	—	—	—	1.1	0.6	19.7	13.1	12.8	18	10.8	23.5	23 300	—
*60BNR20XV1V	60	95	22	—	—	—	—	1.1	0.6	31.5	13.1	12.8	18	10.8	23.5	27 100	—
*60BER20EV1V	60	95	22	—	—	—	—	1.1	0.6	18.8	13.1	22.9	25	—	28.9	16 700	—
*60BER20HV1V	60	95	22	—	—	—	—	1.1	0.6	18.8	12.5	15.5	25	—	28.9	20 700	—
*60BER20XV1V	60	95	22	—	—	—	—	1.1	0.6	29.9	12.5	15.5	25	—	28.9	24 600	—
7212C	60	110	22	—	—	—	—	1.5	1	80.5	49.0	34.0	15	14.4	22.4	13 600	20 600
7212CSN24	60	110	22	—	—	—	—	1.5	1	80.0	46.5	40.6	15	14.4	22.4	17 700	26 900
7212A5	60	110	22	—	—	—	—	1.5	1	77.0	47.0	40.0	25	—	30.8	11 800	17 700
7212A5SN24	60	110	22	—	—	—	—	1.5	1	76.5	44.5	47.3	25	—	30.8	15 300	23 000
7212A	60	110	22	—	—	—	—	1.5	1	74.5	45.5	30.5	30	—	35.5	8 900	11 800

Abutment and Fillet Dimensions (mm)					Preload (DB and DF Arrangement) (N)				Axial Rigidity (DB and DF Arrangement) (N/μm)				Measured Axial Clearance (μm)				Mass (kg) (approx.)
d _a (min.)	D _a (max.)	D _b (max.)	r _a (max.)	r _b (max.)	EL	L	M	H	EL	L	M	H	EL	L	M	H	
66	79	80	1	0.5	60	113	305	581	46	60	93	128	− 1	− 5	− 15	− 25	0.195
66	79	80	1	0.5	61	122	341	661	52	68	108	149	− 1	− 5	− 15	− 25	0.175
66	79	80	1	0.5	101	201	419	884	117	150	198	267	− 2	− 5	− 10	− 18	0.198
66	79	80	1	0.5	108	223	477	1 021	133	173	231	313	− 2	− 5	− 10	− 18	0.175
66	79	80	1	0.5	49	171	343	—	47	74	97	—	0	− 8	− 16	—	0.190
66	79	80	1	0.5	49	189	388	—	53	86	113	—	0	− 8	− 16	—	0.170
66	79	80	1	0.5	49	189	388	—	53	86	113	—	0	− 8	− 16	—	0.170
66	79	80	1	0.5	49	272	557	—	78	141	183	—	0	− 8	− 15	—	0.190
66	79	80	1	0.5	49	306	638	—	88	164	215	—	0	− 8	− 15	—	0.170
66	79	80	1	0.5	49	306	638	—	88	164	215	—	0	− 8	− 15	—	0.170
66	79	80	1	0.5	49	171	343	—	47	74	97	—	0	− 8	− 16	—	0.228
66	79	80	1	0.5	49	189	388	—	53	86	113	—	0	− 8	− 16	—	0.208
66	79	80	1	0.5	49	189	388	—	53	86	113	—	0	− 8	− 16	—	0.208
66	79	80	1	0.5	49	272	557	—	78	141	183	—	0	− 8	− 15	—	0.228
66	79	80	1	0.5	49	306	638	—	88	164	215	—	0	− 8	− 15	—	0.208
66	79	80	1	0.5	49	306	638	—	88	164	215	—	0	− 8	− 15	—	0.208
67	88	90	1	0.6	96	189	526	1 092	53	70	110	157	− 4	− 10	− 25	− 42	0.405
67	88	90	1	0.6	102	208	598	1 259	60	80	128	184	− 4	− 10	− 25	− 42	0.354
67	88	90	1	0.6	162	359	780	1 549	134	179	241	317	− 4	− 9	− 17	− 28	0.408
67	88	90	1	0.6	178	407	900	1 803	155	209	283	373	− 4	− 9	− 17	− 28	0.357
67	88	90	1	0.6	49	255	929	1 371	119	206	328	379	0	− 5	− 15	− 20	0.410
67	88	90	1	0.6	49	126	348	—	51	71	105	—	0	− 5	− 15	—	0.443
67	88	90	1	0.6	49	136	393	—	57	82	123	—	0	− 5	− 15	—	0.419
67	88	90	1	0.6	49	136	393	—	57	82	123	—	0	− 5	− 15	—	0.419
67	88	90	1	0.6	49	378	775	—	85	172	224	—	0	− 10	− 18	—	0.443
67	88	90	1	0.6	49	429	894	—	95	200	263	—	0	− 10	− 18	—	0.419
67	88	90	1	0.6	49	429	894	—	95	200	263	—	0	− 10	− 18	—	0.419
67	88	90	1	0.6	49	278	592	—	52	97	130	—	0	− 12	− 23	—	0.361
67	88	90	1	0.6	49	278	592	—	52	97	130	—	0	− 12	− 23	—	0.361
67	88	90	1	0.6	49	391	801	—	87	178	231	—	0	− 10	− 18	—	0.361
67	88	90	1	0.6	49	391	801	—	87	178	231	—	0	− 10	− 18	—	0.361
67	88	90	1	0.6	49	126	348	—	51	71	105	—	0	− 5	− 15	—	0.535
67	88	90	1	0.6	49	136	393	—	57	82	123	—	0	− 5	− 15	—	0.512
67	88	90	1	0.6	49	136	393	—	57	82	123	—	0	− 5	− 15	—	0.512
67	88	90	1	0.6	49	378	775	—	85	172	224	—	0	− 10	− 18	—	0.535
67	88	90	1	0.6	49	429	894	—	95	200	263	—	0	− 10	− 18	—	0.512
67	88	90	1	0.6	49	429	894	—	95	200	263	—	0	− 10	− 18	—	0.512
69	101	104	1.5	0.8	190	397	928	1 878	64	86	126	178	− 11	− 22	− 42	− 67	0.780
69	101	104	1.5	0.8	210	449	1 069	2 183	73	100	148	209	− 11	− 22	− 42	− 67	0.644
69	101	104	1.5	0.8	293	607	1 458	2 937	155	202	282	374	− 8	− 15	− 29	− 47	0.773
69	101	104	1.5	0.8	331	698	1 697	3 441	181	237	332	441	− 8	− 15	− 29	− 47	0.637
69	101	104	1.5	0.8	49	513	1 697	2 743	112	246	380	456	0	− 10	− 25	− 35	0.789

1. Angular Contact Ball Bearings

Bore Diameter 65mm

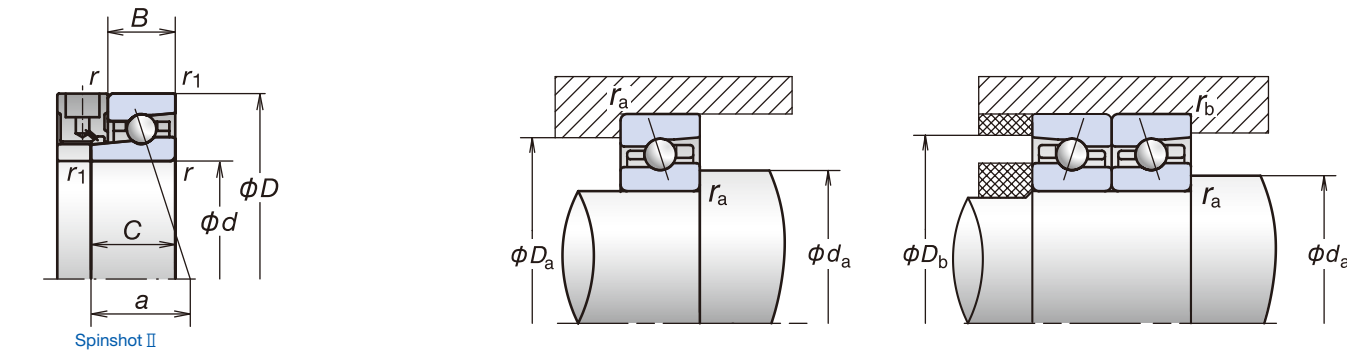
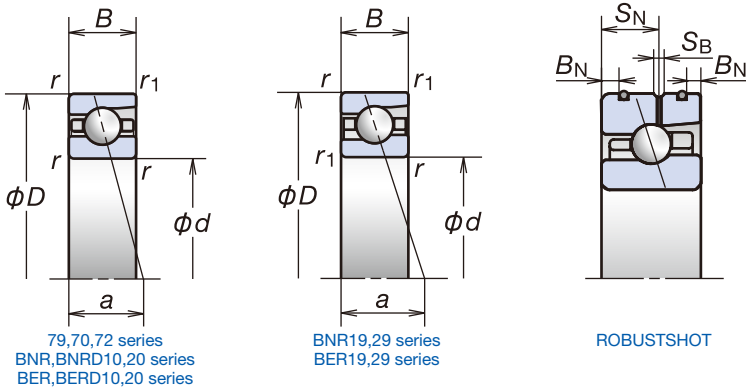


Designation (*)	Boundary Dimensions (*) (mm)									Basic Load Ratings (kN)		Permissible Axial Load (*) (kN)	Contact Angle (°)	Factor f ₀	Effective Load Center (mm) a	Limiting Speeds (*) (min ⁻¹)	
	d	D	B	C	B _N	S _N	S _B	r (min.)	r ₁ (min.)	C _r (Dynamic)	C _{or} (Static)					Grease	Oil
*7913C	65	90	13	—	—	—	—	1	0.6	25.5	20.5	12.5	15	16.7	16.9	14 900	22 600
*7913CSN24	65	90	13	—	—	—	—	1	0.6	25.9	20.1	14.8	15	16.7	16.9	19 400	29 500
*7913A5	65	90	13	—	—	—	—	1	0.6	24.0	19.4	14.2	25	—	24.6	13 000	19 400
*7913A5SN24	65	90	13	—	—	—	—	1	0.6	24.4	19.0	16.8	25	—	24.6	16 800	25 200
*65BNR19E	65	90	13	—	—	—	—	1	0.6	19.2	13.2	18.7	18	10.8	19.1	19 400	27 700
*65BNR19H	65	90	13	—	2.8	7.5	1.4	1	0.6	19.2	12.6	12.3	18	10.8	19.1	23 300	36 200
*65BNR19X	65	90	13	18	2.8	7.5	1.4	1	0.6	30.5	12.6	12.3	18	10.8	19.1	27 100	42 600
*65BER19E	65	90	13	—	—	—	—	1	0.6	18.3	12.6	22.1	25	—	24.6	16 700	23 500
*65BER19H	65	90	13	—	2.8	7.5	1.4	1	0.6	18.3	12.1	14.9	25	—	24.6	20 700	32 300
*65BER19X	65	90	13	18	2.8	7.5	1.4	1	0.6	29.1	12.1	14.9	25	—	24.6	24 600	38 800
*65BNR29EV1V	65	90	16	—	—	—	—	1	0.6	19.2	13.2	18.7	18	10.8	20.6	19 400	—
*65BNR29HV1V	65	90	16	—	—	—	—	1	0.6	19.2	12.6	12.3	18	10.8	20.6	23 300	—
*65BNR29XV1V	65	90	16	—	—	—	—	1	0.6	30.5	12.6	12.3	18	10.8	20.6	27 100	—
*65BER29EV1V	65	90	16	—	—	—	—	1	0.6	18.3	12.6	22.1	25	—	26.1	16 700	—
*65BER29HV1V	65	90	16	—	—	—	—	1	0.6	18.3	12.1	14.9	25	—	26.1	20 700	—
*65BER29XV1V	65	90	16	—	—	—	—	1	0.6	29.1	12.1	14.9	25	—	26.1	24 600	—
*7013C	65	100	18	—	—	—	—	1.1	0.6	47.0	34.5	22.0	15	15.9	20.0	14 000	21 300
*7013CSN24	65	100	18	—	—	—	—	1.1	0.6	46.5	32.5	26.1	15	15.9	20.0	18 200	27 700
*7013A5	65	100	18	—	—	—	—	1.1	0.6	44.0	32.5	25.4	25	—	28.2	12 200	18 200
*7013A5SN24	65	100	18	—	—	—	—	1.1	0.6	44.0	31.0	30.2	25	—	28.2	15 800	23 700
*7013A	65	100	18	—	—	—	—	1.1	0.6	42.5	31.5	19.5	30	—	32.8	9 100	12 200
*65BNR10E	65	100	18	—	—	—	—	1.1	0.6	20.4	14.8	21.1	18	10.9	22.3	18 200	26 000
*65BNR10H	65	100	18	—	4.0	10.4	1.4	1.1	0.6	20.4	14.2	13.9	18	10.9	22.3	21 900	34 000
*65BNR10X	65	100	18	23	4.0	10.4	1.4	1.1	0.6	32.5	14.2	13.9	18	10.9	22.3	25 500	40 000
*65BER10E	65	100	18	—	—	—	—	1.1	0.6	19.5	14.2	24.9	25	—	28.0	15 700	22 100
*65BER10H	65	100	18	—	4.0	10.4	1.4	1.1	0.6	19.5	13.6	16.8	25	—	28.0	19 400	30 400
*65BER10X	65	100	18	23	4.0	10.4	1.4	1.1	0.6	31.0	13.6	16.8	25	—	28.0	23 100	36 400
*65BNRD10J	65	100	18	—	4.0	10.4	1.4	1.1	0.6	41.0	17.3	16.7	18	8.1	22.4	21 900	34 000
*65BNRD10X	65	100	18	23	4.0	10.4	1.4	1.1	0.6	52.0	17.3	16.7	18	8.1	22.4	25 500	40 000
*65BERD10J	65	100	18	—	4.0	10.4	1.4	1.1	0.6	39.5	16.7	20.5	25	—	28.2	19 400	30 400
*65BERD10X	65	100	18	23	4.0	10.4	1.4	1.1	0.6	50.0	16.7	20.5	25	—	28.2	23 100	36 400
*65BNR20EV1V	65	100	22	—	—	—	—	1.1	0.6	20.4	14.8	21.1	18	10.9	24.3	18 200	—
*65BNR20HV1V	65	100	22	—	—	—	—	1.1	0.6	20.4	14.2	13.9	18	10.9	24.3	21 900	—
*65BNR20XV1V	65	100	22	—	—	—	—	1.1	0.6	32.5	14.2	13.9	18	10.9	24.3	25 500	—
*65BER20EV1V	65	100	22	—	—	—	—	1.1	0.6	19.5	14.2	24.9	25	—	30.0	15 700	—
*65BER20HV1V	65	100	22	—	—	—	—	1.1	0.6	19.5	13.6	16.8	25	—	30.0	19 400	—
*65BER20XV1V	65	100	22	—	—	—	—	1.1	0.6	31.0	13.6	16.8	25	—	30.0	23 100	—
7213C	65	120	23	—	—	—	—	1.5	1	92.0	58.5	40.0	15	14.6	23.9	12 500	19 000
7213CSN24	65	120	23	—	—	—	—	1.5	1	92.0	56.0	47.5	15	14.6	23.9	16 300	24 700
7213A5	65	120	23	—	—	—	—	1.5	1	88.0	56.0	46.5	25	—	33.1	10 900	16 300
7213A5SN24	65	120	23	—	—	—	—	1.5	1	87.5	53.5	55.4	25	—	33.1	14 100	21 100
7213A	65	120	23	—	—	—	—	1.5	1	85.0	54.0	36.0	30	—	38.2	8 200	10 900

Abutment and Fillet Dimensions (mm)					Preload (DB and DF Arrangement) (N)				Axial Rigidity (DB and DF Arrangement) (N/μm)				Measured Axial Clearance (μm)				Mass (kg) (approx.)
d _a (min.)	D _a (max.)	D _b (max.)	r _a (max.)	r _b (max.)	EL	L	M	H	EL	L	M	H	EL	L	M	H	
71	84	85	1	0.5	74	151	348	690	53	71	104	145	− 2	− 7	− 16	− 27	0.208
71	84	85	1	0.5	76	164	391	787	59	81	120	169	− 2	− 7	− 16	− 27	0.186
71	84	85	1	0.5	104	212	500	948	124	161	223	288	− 2	− 5	− 11	− 18	0.211
71	84	85	1	0.5	112	235	572	1 096	142	186	261	338	− 2	− 5	− 11	− 18	0.189
71	84	85	1	0.5	49	179	364	—	50	80	105	—	0	− 8	− 16	—	0.204
71	84	85	1	0.5	49	198	412	—	56	92	122	—	0	− 8	− 16	—	0.181
71	84	85	1	0.5	49	198	412	—	56	92	122	—	0	− 8	− 16	—	0.181
71	84	85	1	0.5	49	288	595	—	83	152	198	—	0	− 8	− 15	—	0.204
71	84	85	1	0.5	49	324	683	—	93	177	232	—	0	− 8	− 15	—	0.181
71	84	85	1	0.5	49	324	683	—	93	177	232	—	0	− 8	− 15	—	0.181
71	84	85	1	0.5	49	179	364	—	50	80	105	—	0	− 8	− 16	—	0.245
71	84	85	1	0.5	49	198	412	—	56	92	122	—	0	− 8	− 16	—	0.223
71	84	85	1	0.5	49	198	412	—	56	92	122	—	0	− 8	− 16	—	0.223
71	84	85	1	0.5	49	288	595	—	83	152	198	—	0	− 8	− 15	—	0.245
71	84	85	1	0.5	49	324	683	—	93	177	232	—	0	− 8	− 15	—	0.223
71	84	85	1	0.5	49	324	683	—	93	177	232	—	0	− 8	− 15	—	0.223
72	93	95	1	0.6	130	260	537	1 062	64	85	117	163	− 6	− 13	− 24	− 39	0.435
72	93	95	1	0.6	141	290	612	1 224	73	98	136	191	− 6	− 13	− 24	− 39	0.379
72	93	95	1	0.6	209	386	915	1 781	157	196	272	356	− 5	− 9	− 18	− 29	0.455
72	93	95	1	0.6	232	439	1 059	2 077	182	229	320	420	− 5	− 9	− 18	− 29	0.399
72	93	95	1	0.6	49	272	1 012	1 498	127	225	360	418	0	− 5	− 15	− 20	0.441
72	93	95	1	0.6	49	130	367	—	54	76	113	—	0	− 5	− 15	—	0.472
72	93	95	1	0.6	49	141	415	—	60	87	131	—	0	− 5	− 15	—	0.447
72	93	95	1	0.6	49	141	415	—	60	87	131	—	0	− 5	− 15	—	0.447
72	93	95	1	0.6	49	399	824	—	89	184	240	—	0	− 10	− 18	—	0.472
72	93	95	1	0.6	49	454	952	—	100	215	282	—	0	− 10	− 18	—	0.447
72	93	95	1	0.6	49	454	952	—	100	215	282	—	0	− 10	− 18	—	0.447
72	93	95	1	0.6	49	325	642	—	56	110	143	—	0	− 13	− 23	—	0.386
72	93	95	1	0.6	49	325	642	—	56	110	143	—	0	− 13	− 23	—	0.386
72	93	95	1	0.6	49	422	872	—	93	195	254	—	0	− 10	− 18	—	0.386
72	93	95	1	0.6	49	422	872	—	93	195	254	—	0	− 10	− 18	—	0.386
72	93	95	1	0.6	49	130	367	—	54	76	113	—	0	− 5	− 15	—	0.570
72	93	95	1	0.6	49	141	415	—	60	87	131	—	0	− 5	− 15	—	0.545
72	93	95	1	0.6	49	141	415	—	60	87	131	—	0	− 5	− 15	—	0.545
72	93	95	1	0.6	49	399	824	—	89	184	240	—	0	− 10	− 18	—	0.570
72	93	95	1	0.6	49	454	952	—	100	215	282	—	0	− 10	− 18	—	0.545
72	93	95	1	0.6	49	454	952	—	100	215	282	—	0	− 10	− 18	—	0.545
74	111	114	1.5	0.8	219	448	1 069	2 175	71	95	141	200	− 12	− 23	− 44	− 70	1.01
74	111	114	1.5	0.8	243	509	1 235	2 533	82	111	165	235	− 12	− 23	− 44	− 70	0.842
74	111	114	1.5	0.8	357	657	1 664	3 307	177	221	314	414	− 9	− 15	− 30	− 48	1.00
74	111	114	1.5	0.8	405	755	1 941	3 877	207	259	370	489	− 9	− 15	− 30	− 48	0.832
74	111	114	1.5	0.8	49	553	1 851	2 998	120	269	416	499	0	− 10	− 25	− 35	1.02

1. Angular Contact Ball Bearings

Bore Diameter 70mm



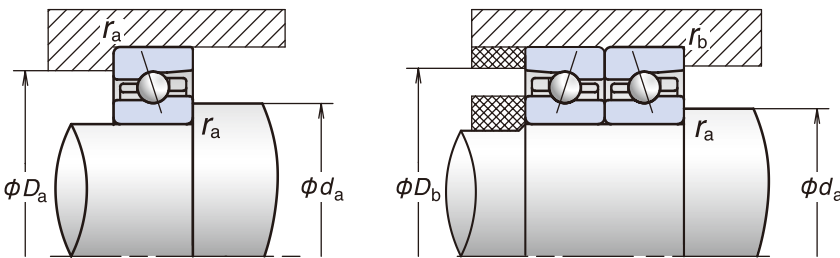
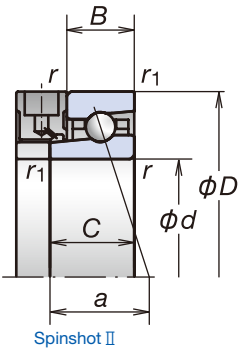
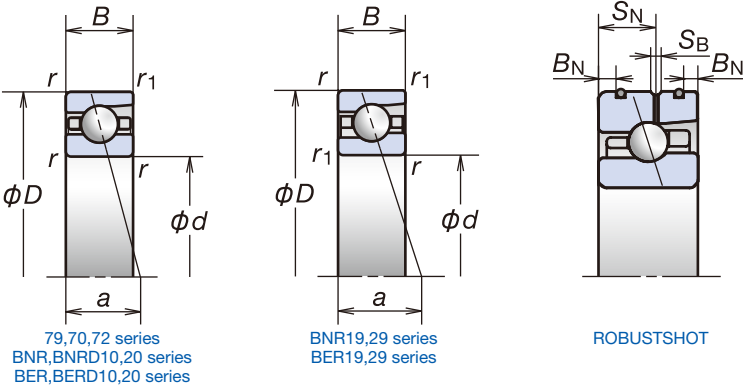
Designation (*)	Boundary Dimensions (*) (mm)									Basic Load Ratings (kN)		Permissible Axial Load (*) (kN)	Contact Angle (°)	Factor f ₀	Effective Load Center (mm) a	Limiting Speeds (*) (min ⁻¹)	
	d	D	B	C	B _N	S _N	S _B	r (min.)	r ₁ (min.)	C _r (Dynamic)	C _{or} (Static)					Grease	Oil
*7914C	70	100	16	—	—	—	—	1	0.6	35.5	27.8	17.3	15	16.4	19.4	13 600	20 600
*7914CSN24	70	100	16	—	—	—	—	1	0.6	35.5	26.6	20.5	15	16.4	19.4	17 700	26 900
*7914A5	70	100	16	—	—	—	—	1	0.6	33.5	26.3	20.3	25	—	27.8	11 800	17 700
*7914A5SN24	70	100	16	—	—	—	—	1	0.6	33.5	25.2	24.1	25	—	27.8	15 300	23 000
*70BNR19E	70	100	16	—	—	—	—	1	0.6	26.8	18.1	26.1	18	10.8	21.8	17 700	25 200
*70BNR19H	70	100	16	—	3.1	9.3	1.4	1	0.6	26.8	17.3	17.1	18	10.8	21.8	21 200	33 000
*70BNR19X	70	100	16	21	3.1	9.3	1.4	1	0.6	42.5	17.3	17.1	18	10.8	21.8	24 800	38 900
*70BER19E	70	100	16	—	—	—	—	1	0.6	25.7	17.3	30.5	25	—	27.8	15 200	21 500
*70BER19H	70	100	16	—	3.1	9.3	1.4	1	0.6	25.7	16.6	20.7	25	—	27.8	18 900	29 500
*70BER19X	70	100	16	21	3.1	9.3	1.4	1	0.6	41.0	16.6	20.7	25	—	27.8	22 400	35 300
*70BNR29EV1V	70	100	19	—	—	—	—	1	0.6	26.8	18.1	26.1	18	10.8	23.3	17 700	—
*70BNR29HV1V	70	100	19	—	—	—	—	1	0.6	26.8	17.3	17.1	18	10.8	23.3	21 200	—
*70BNR29XV1V	70	100	19	—	—	—	—	1	0.6	42.5	17.3	17.1	18	10.8	23.3	24 800	—
*70BER29EV1V	70	100	19	—	—	—	—	1	0.6	25.7	17.3	30.5	25	—	29.3	15 200	—
*70BER29HV1V	70	100	19	—	—	—	—	1	0.6	25.7	16.6	20.7	25	—	29.3	18 900	—
*70BER29XV1V	70	100	19	—	—	—	—	1	0.6	41.0	16.6	20.7	25	—	29.3	22 400	—
*7014C	70	110	20	—	—	—	—	1.1	0.6	59.0	43.0	26.8	15	15.7	22.1	12 800	19 500
*7014CSN24	70	110	20	—	—	—	—	1.1	0.6	59.0	41.5	31.8	15	15.7	22.1	16 700	25 400
*7014A5	70	110	20	—	—	—	—	1.1	0.6	56.0	41.0	32.0	25	—	31.0	11 200	16 700
*7014A5SN24	70	110	20	—	—	—	—	1.1	0.6	56.0	39.0	38.0	25	—	31.0	14 500	21 700
*7014A	70	110	20	—	—	—	—	1.1	0.6	53.5	39.5	24.6	30	—	36.0	8 400	11 200
*70BNR10E	70	110	20	—	—	—	—	1.1	0.6	28.1	19.8	28.6	18	10.9	24.5	16 700	23 800
*70BNR10H	70	110	20	—	4.0	11.6	1.4	1.1	0.6	28.1	18.9	18.8	18	10.9	24.5	20 000	31 200
*70BNR10X	70	110	20	25	4.0	11.6	1.4	1.1	0.6	44.5	18.9	18.8	18	10.9	24.5	23 400	36 700
*70BER10E	70	110	20	—	—	—	—	1.1	0.6	26.9	18.9	33.5	25	—	30.8	14 400	20 300
*70BER10H	70	110	20	—	4.0	11.6	1.4	1.1	0.6	26.9	18.1	22.6	25	—	30.8	17 800	27 800
*70BER10X	70	110	20	25	4.0	11.6	1.4	1.1	0.6	42.5	18.1	22.6	25	—	30.8	21 200	33 400
*70BNRD10J	70	110	20	—	4.0	11.6	1.4	1.1	0.6	52.0	21.8	21.1	18	8.1	24.6	20 000	31 200
*70BNRD10X	70	110	20	25	4.0	11.6	1.4	1.1	0.6	65.5	21.8	21.1	18	8.1	24.6	23 400	36 700
*70BERD10J	70	110	20	—	4.0	11.6	1.4	1.1	0.6	50.0	20.9	25.9	25	—	31.0	17 800	27 800
*70BERD10X	70	110	20	25	4.0	11.6	1.4	1.1	0.6	63.0	20.9	25.9	25	—	31.0	21 200	33 400
*70BNR20EV1V	70	110	24	—	—	—	—	1.1	0.6	28.1	19.8	28.6	18	10.9	26.5	16 700	—
*70BNR20HV1V	70	110	24	—	—	—	—	1.1	0.6	28.1	18.9	18.8	18	10.9	26.5	20 000	—
*70BNR20XV1V	70	110	24	—	—	—	—	1.1	0.6	44.5	18.9	18.8	18	10.9	26.5	23 400	—
*70BER20EV1V	70	110	24	—	—	—	—	1.1	0.6	26.9	18.9	33.5	25	—	32.8	14 400	—
*70BER20HV1V	70	110	24	—	—	—	—	1.1	0.6	26.9	18.1	22.6	25	—	32.8	17 800	—
*70BER20XV1V	70	110	24	—	—	—	—	1.1	0.6	42.5	18.1	22.6	25	—	32.8	21 200	—
7214C	70	125	24	—	—	—	—	1.5	1	100	64.5	43.0	15	14.6	25.1	11 800	18 000
7214CSN24	70	125	24	—	—	—	—	1.5	1	100	61.5	51.3	15	14.6	25.1	15 400	23 400
7214A5	70	125	24	—	—	—	—	1.5	1	95.5	61.5	49.5	25	—	34.7	10 300	15 400
7214A5SN24	70	125	24	—	—	—	—	1.5	1	95.5	59.0	59.0	25	—	34.7	13 400	20 000
7214A	70	125	24	—	—	—	—	1.5	1	92.0	59.5	38.0	30	—	40.1	7 700	10 300

(*) Bearings denoted by an asterisk (*) are available with seals. Series 20 and 29 are comprised exclusively of sealed bearings.
(°) Spinshot II bearings are available for designations with values in the C column, and ROBUSTSHOT bearings are available for designations with values in the B_N, S_N, and S_B columns.
(°) For details on permissible axial load, refer to Page 199.
(°) For details on limiting speeds, refer to Page 216. See Page 51 for cage differences and their impact on d_{gr}n values.

Abutment and Fillet Dimensions (mm)					Preload (DB and DF Arrangement) (N)				Axial Rigidity (DB and DF Arrangement) (N/μm)				Measured Axial Clearance (μm)				Mass (kg) (approx.)
d _a (min.)	D _a (max.)	D _b (max.)	r _a (max.)	r _b (max.)	EL	L	M	H	EL	L	M	H	EL	L	M	H	
76	94	95	1	0.5	101	205	503	1 004	59	79	119	168	− 4	− 10	− 22	− 36	0.338
76	94	95	1	0.5	108	227	571	1 155	67	91	138	196	− 4	− 10	− 22	− 36	0.301
76	94	95	1	0.5	137	298	676	1 404	138	182	248	334	− 3	− 7	− 14	− 24	0.341
76	94	95	1	0.5	150	336	777	1 633	158	212	291	392	− 3	− 7	− 14	− 24	0.304
76	94	95	1	0.5	49	181	367	—	51	80	105	—	0	− 8	− 16	—	0.328
76	94	95	1	0.5	49	200	415	—	57	93	122	—	0	− 8	− 16	—	0.292
76	94	95	1	0.5	49	200	415	—	57	93	122	—	0	− 8	− 16	—	0.292
76	94	95	1	0.5	49	292	604	—	84	154	201	—	0	− 8	− 15	—	0.328
76	94	95	1	0.5	49	329	693	—	94	180	235	—	0	− 8	− 15	—	0.292
76	94	95	1	0.5	49	329	693	—	94	180	235	—	0	− 8	− 15	—	0.292
76	94	95	1	0.5	49	181	367	—	51	80	105	—	0	− 8	− 16	—	0.381
76	94	95	1	0.5	49	200	415	—	57	93	122	—	0	− 8	− 16	—	0.344
76	94	95	1	0.5	49	200	415	—	57	93	122	—	0	− 8	− 16	—	0.344
76	94	95	1	0.5	49	292	604	—	84	154	201	—	0	− 8	− 15	—	0.381
76	94	95	1	0.5	49	329	693	—	94	180	235	—	0	− 8	− 15	—	0.344
76	94	95	1	0.5	49	329	693	—	94	180	235	—	0	− 8	− 15	—	0.344
77	103	105	1	0.6	148	285	732	1 460	68	89	135	190	− 7	− 14	− 30	− 48	0.606
77	103	105	1	0.6	161	319	839	1 692	78	103	158	222	− 7	− 14	− 30	− 48	0.525
77	103	105	1	0.6	255	500	1 080	2 196	172	220	294	391	− 6	− 11	− 20	− 33	0.625
77	103	105	1	0.6	285	572	1 252	2 566	200	257	346	461	− 6	− 11	− 20	− 33	0.544
77	103	105	1	0.6	49	278	1 038	2 106	130	231	370	482	0	− 5	− 15	− 25	0.613
77	103	105	1	0.6	49	235	509	—	53	93	126	—	0	− 10	− 20	—	0.645
77	103	105	1	0.6	49	262	582	—	60	108	147	—	0	− 10	− 20	—	0.605
77	103	105	1	0.6	49	262	582	—	60	108	147	—	0	− 10	− 20	—	0.605
77	103	105	1	0.6	49	396	815	—	89	181	236	—	0	− 10	− 18	—	0.645
77	103	105	1	0.6	49	451	942	—	100	212	278	—	0	− 10	− 18	—	0.605
77	103	105	1	0.6	49	451	942	—	100	212	278	—	0	− 10	− 18	—	0.605
77	103	105	1	0.6	49	387	840	—	57	118	160	—	0	− 15	− 28	—	0.534
77	103	105	1	0.6	49	387	840	—	57	118	160	—	0	− 15	− 28	—	0.534
77	103	105	1	0.6	49	533	1 089	—	94	215	278	—	0	− 12	− 21	—	0.534
77	103	105	1	0.6	49	533	1 089	—	94	215	278	—	0	− 12	− 21	—	0.534
77	103	105	1	0.6	49	235	509	—	53	93	126	—	0	− 10	− 20	—	0.764
77	103	105	1	0.6	49	262	582	—	60	108	147	—	0	− 10	− 20	—	0.724
77	103	105	1	0.6	49	262	582	—	60	108	147	—	0	− 10	− 20	—	0.724
77	103	105	1	0.6	49	396	815	—	89	181	236	—	0	− 10	− 18	—	0.764
77	103	105	1	0.6	49	451	942	—	100	212	278	—	0	− 10	− 18	—	0.724
77	103	105	1	0.6	49	451	942	—	100	212	278	—	0	− 10	− 18	—	0.724
79	116	119	1.5	0.8	243	484	1 164	2 368	75	100	148	209	− 9	− 20	− 42	− 69	1.09
79	116	119	1.5	0.8	262	539	1 329	2 734	86	115	172	245	− 9	− 20	− 42	− 69	0.898
79	116	119	1.5	0.8	406	781	1 856	3 690	188	239	332	438	− 8	− 15	− 30	− 49	1.08
79	116	119	1.5	0.8	451	887	2 147	4 304	218	279	390	517	− 8	− 15	− 30	− 49	0.888
79	116	119	1.5	0.8	98	1 067	2 626	3 932	153	346	481	562	0	− 15	− 30	− 40	1.10

1. Angular Contact Ball Bearings

Bore Diameter 75mm

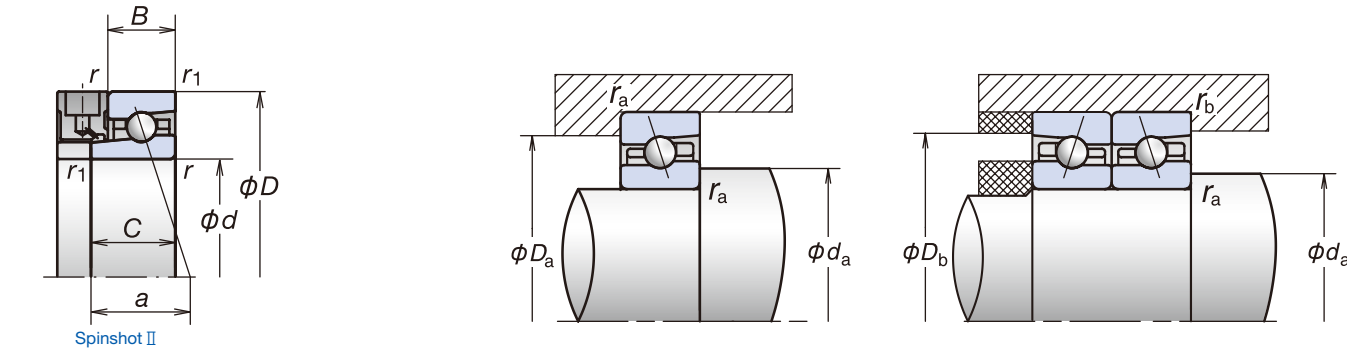
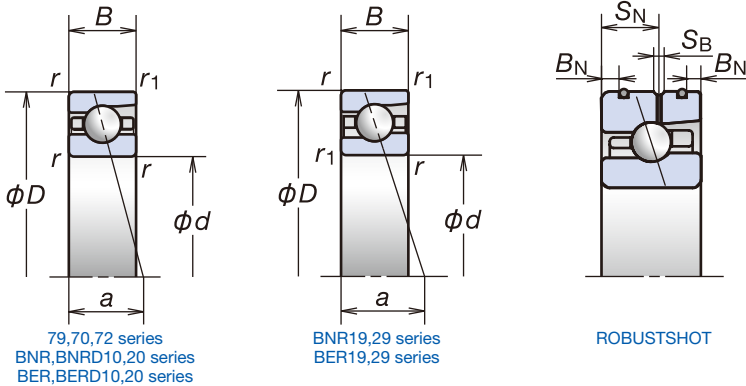


Designation (*)	Boundary Dimensions (*) (mm)									Basic Load Ratings (kN)		Permissible Axial Load (*) (kN)	Contact Angle (°)	Factor f ₀	Effective Load Center (mm) a	Limiting Speeds (*) (min ⁻¹)	
	d	D	B	C	B _N	S _N	S _B	r (min.)	r ₁ (min.)	C _r (Dynamic)	C _{or} (Static)					Grease	Oil
*7915C	75	105	16	—	—	—	—	1	0.6	36.0	29.3	18.0	15	16.6	20.1	12 800	19 500
*7915CSN24	75	105	16	—	—	—	—	1	0.6	36.0	28.0	21.3	15	16.6	20.1	16 700	25 400
*7915A5	75	105	16	—	—	—	—	1	0.6	34.0	27.7	21.2	25	—	29.0	11 200	16 700
*7915A5SN24	75	105	16	—	—	—	—	1	0.6	34.0	26.5	25.1	25	—	29.0	14 500	21 700
*75BNR19E	75	105	16	—	—	—	—	1	0.6	27.3	19.0	27.5	18	10.9	22.6	16 700	23 800
*75BNR19H	75	105	16	—	3.1	9.3	1.4	1	0.6	27.3	18.2	18.0	18	10.9	22.6	20 000	31 200
*75BNR19X	75	105	16	21	3.1	9.3	1.4	1	0.6	43.5	18.2	18.0	18	10.9	22.6	23 400	36 700
*75BER19E	75	105	16	—	—	—	—	1	0.6	26.1	18.2	32.5	25	—	29.0	14 400	20 300
*75BER19H	75	105	16	—	3.1	9.3	1.4	1	0.6	26.1	17.4	21.7	25	—	29.0	17 800	27 800
*75BER19X	75	105	16	21	3.1	9.3	1.4	1	0.6	41.5	17.4	21.7	25	—	29.0	21 200	33 400
*75BNR29EV1V	75	105	19	—	—	—	—	1	0.6	27.3	19.0	27.5	18	10.9	24.1	16 700	—
*75BNR29HV1V	75	105	19	—	—	—	—	1	0.6	27.3	18.2	18.0	18	10.9	24.1	20 000	—
*75BNR29XV1V	75	105	19	—	—	—	—	1	0.6	43.5	18.2	18.0	18	10.9	24.1	23 400	—
*75BER29EV1V	75	105	19	—	—	—	—	1	0.6	26.1	18.2	32.5	25	—	30.5	14 400	—
*75BER29HV1V	75	105	19	—	—	—	—	1	0.6	26.1	17.4	21.7	25	—	30.5	17 800	—
*75BER29XV1V	75	105	19	—	—	—	—	1	0.6	41.5	17.4	21.7	25	—	30.5	21 200	—
*7015C	75	115	20	—	—	—	—	1.1	0.6	60.5	45.5	28.1	15	15.9	22.7	12 200	18 500
*7015CSN24	75	115	20	—	—	—	—	1.1	0.6	60.5	44.0	33.3	15	15.9	22.7	15 800	24 000
*7015A5	75	115	20	—	—	—	—	1.1	0.6	57.0	43.5	33.5	25	—	32.1	10 600	15 800
*7015A5SN24	75	115	20	—	—	—	—	1.1	0.6	57.5	41.5	40.0	25	—	32.1	13 700	20 600
*7015A	75	115	20	—	—	—	—	1.1	0.6	55.0	41.5	25.9	30	—	37.4	7 900	10 600
*75BNR10E	75	115	20	—	—	—	—	1.1	0.6	28.5	20.7	30.0	18	11.0	25.3	15 800	22 600
*75BNR10H	75	115	20	—	4.0	11.6	1.4	1.1	0.6	28.5	19.8	19.7	18	11.0	25.3	19 000	29 500
*75BNR10X	75	115	20	27	4.0	11.6	1.4	1.1	0.6	45.0	19.8	19.7	18	11.0	25.3	22 200	34 800
*75BER10E	75	115	20	—	—	—	—	1.1	0.6	27.2	19.8	35.0	25	—	31.9	13 600	19 200
*75BER10H	75	115	20	—	4.0	11.6	1.4	1.1	0.6	27.2	19.0	23.7	25	—	31.9	16 900	26 400
*75BER10X	75	115	20	27	4.0	11.6	1.4	1.1	0.6	43.0	19.0	23.7	25	—	31.9	20 000	31 600
*75BNRD10J	75	115	20	—	4.0	11.6	1.4	1.1	0.6	53.5	23.1	22.4	18	8.2	25.4	19 000	29 500
*75BNRD10X	75	115	20	27	4.0	11.6	1.4	1.1	0.6	67.0	23.1	22.4	18	8.2	25.4	22 200	34 800
*75BERD10J	75	115	20	—	4.0	11.6	1.4	1.1	0.6	51.5	22.2	27.4	25	—	32.2	16 900	26 400
*75BERD10X	75	115	20	27	4.0	11.6	1.4	1.1	0.6	64.5	22.2	27.4	25	—	32.2	20 000	31 600
*75BNR20EV1V	75	115	24	—	—	—	—	1.1	0.6	28.5	20.7	30.0	18	11.0	27.3	15 800	—
*75BNR20HV1V	75	115	24	—	—	—	—	1.1	0.6	28.5	19.8	19.7	18	11.0	27.3	19 000	—
*75BNR20XV1V	75	115	24	—	—	—	—	1.1	0.6	45.0	19.8	19.7	18	11.0	27.3	22 200	—
*75BER20EV1V	75	115	24	—	—	—	—	1.1	0.6	27.2	19.8	35.0	25	—	33.9	13 600	—
*75BER20HV1V	75	115	24	—	—	—	—	1.1	0.6	27.2	19.0	23.7	25	—	33.9	16 900	—
*75BER20XV1V	75	115	24	—	—	—	—	1.1	0.6	43.0	19.0	23.7	25	—	33.9	20 000	—
7215C	75	130	25	—	—	—	—	1.5	1	104	70.0	46.0	15	14.8	26.2	11 300	17 100
7215CSN24	75	130	25	—	—	—	—	1.5	1	104	67.0	54.9	15	14.8	26.2	14 700	22 300
7215A5	75	130	25	—	—	—	—	1.5	1	99.5	66.5	53.0	25	—	36.4	9 800	14 700
7215A5SN24	75	130	25	—	—	—	—	1.5	1	99.5	63.5	62.7	25	—	36.4	12 700	19 100
7215A	75	130	25	—	—	—	—	1.5	1	95.5	64.5	40.5	30	—	42.1	7 400	9 800

Abutment and Fillet Dimensions (mm)					Preload (DB and DF Arrangement) (N)				Axial Rigidity (DB and DF Arrangement) (N/μm)				Measured Axial Clearance (μm)				Mass (kg) (approx.)
<i>d_a</i> (min.)	<i>D_a</i> (max.)	<i>D_b</i> (max.)	<i>r_a</i> (max.)	<i>r_b</i> (max.)	EL	L	M	H	EL	L	M	H	EL	L	M	H	
81	99	100	1	0.5	103	190	489	997	61	79	120	171	− 4	− 9	− 21	− 35	0.358
81	99	100	1	0.5	109	210	555	1 147	70	91	140	199	− 4	− 9	− 21	− 35	0.319
81	99	100	1	0.5	140	307	765	1 458	142	189	268	347	− 3	− 7	− 15	− 24	0.355
81	99	100	1	0.5	153	346	882	1 696	164	220	314	409	− 3	− 7	− 15	− 24	0.316
81	99	100	1	0.5	49	185	464	—	52	83	118	—	0	− 8	− 19	—	0.348
81	99	100	1	0.5	49	205	528	—	58	96	138	—	0	− 8	− 19	—	0.310
81	99	100	1	0.5	49	205	528	—	58	96	138	—	0	− 8	− 19	—	0.310
81	99	100	1	0.5	49	301	625	—	87	160	209	—	0	− 8	− 15	—	0.348
81	99	100	1	0.5	49	339	718	—	97	187	245	—	0	− 8	− 15	—	0.310
81	99	100	1	0.5	49	339	718	—	97	187	245	—	0	− 8	− 15	—	0.310
81	99	100	1	0.5	49	185	464	—	52	83	118	—	0	− 8	− 19	—	0.403
81	99	100	1	0.5	49	205	528	—	58	96	138	—	0	− 8	− 19	—	0.365
81	99	100	1	0.5	49	205	528	—	58	96	138	—	0	− 8	− 19	—	0.365
81	99	100	1	0.5	49	301	625	—	87	160	209	—	0	− 8	− 15	—	0.403
81	99	100	1	0.5	49	339	718	—	97	187	245	—	0	− 8	− 15	—	0.365
81	99	100	1	0.5	49	339	718	—	97	187	245	—	0	− 8	− 15	—	0.365
82	108	110	1	0.6	151	294	796	1 573	70	92	144	202	− 7	− 14	− 31	− 49	0.643
82	108	110	1	0.6	165	330	915	1 824	81	107	168	236	− 7	− 14	− 31	− 49	0.557
82	108	110	1	0.6	263	519	1 204	2 399	179	230	316	418	− 6	− 11	− 21	− 34	0.652
82	108	110	1	0.6	295	594	1 398	2 806	209	269	372	493	− 6	− 11	− 21	− 34	0.566
82	108	110	1	0.6	49	288	1 083	2 202	135	241	387	506	0	− 5	− 15	− 25	0.650
82	108	110	1	0.6	49	240	525	—	55	96	131	—	0	− 10	− 20	—	0.679
82	108	110	1	0.6	49	269	600	—	61	112	153	—	0	− 10	− 20	—	0.638
82	108	110	1	0.6	49	269	600	—	61	112	153	—	0	− 10	− 20	—	0.638
82	108	110	1	0.6	49	506	1 034	—	91	203	265	—	0	− 12	− 21	—	0.679
82	108	110	1	0.6	49	579	1 199	—	103	238	311	—	0	− 12	− 21	—	0.638
82	108	110	1	0.6	49	579	1 199	—	103	238	311	—	0	− 12	− 21	—	0.638
82	108	110	1	0.6	49	432	875	—	58	127	167	—	0	− 16	− 28	—	0.557
82	108	110	1	0.6	49	432	875	—	58	127	167	—	0	− 16	− 28	—	0.557
82	108	110	1	0.6	49	554	1 137	—	97	225	291	—	0	− 12	− 21	—	0.557
82	108	110	1	0.6	49	554	1 137	—	97	225	291	—	0	− 12	− 21	—	0.557
82	108	110	1	0.6	49	240	525	—	55	96	131	—	0	− 10	− 20	—	0.806
82	108	110	1	0.6	49	269	600	—	61	112	153	—	0	− 10	− 20	—	0.764
82	108	110	1	0.6	49	269	600	—	61	112	153	—	0	− 10	− 20	—	0.764
82	108	110	1	0.6	49	506	1 034	—	91	203	265	—	0	− 12	− 21	—	0.806
82	108	110	1	0.6	49	579	1 199	—	103	238	311	—	0	− 12	− 21	—	0.764
82	108	110	1	0.6	49	579	1 199	—	103	238	311	—	0	− 12	− 21	—	0.764
84	121	124	1.5	0.8	270	530	1 224	2 445	81	108	157	220	− 10	− 21	− 42	− 68	1.19
84	121	124	1.5	0.8	293	593	1 398	2 825	93	124	182	257	− 10	− 21	− 42	− 68	0.983
84	121	124	1.5	0.8	422	819	1 961	3 911	199	253	353	467	− 8	− 15	− 30	− 49	1.18
84	121	124	1.5	0.8	469	932	2 270	4 565	231	296	415	550	− 8	− 15	− 30	− 49	0.973
84	121	124	1.5	0.8	98	1 123	2 780	4 170	159	367	512	598	0	− 15	− 30	− 40	1.20

1. Angular Contact Ball Bearings

Bore Diameter 80mm



Designation (*)	Boundary Dimensions (*) (mm)									Basic Load Ratings (kN)		Permissible Axial Load (*) (kN)	Contact Angle (°)	Factor f ₀	Effective Load Center (mm) a	Limiting Speeds (*) (min ⁻¹)	
	d	D	B	C	B _N	S _N	S _B	r (min.)	r ₁ (min.)	C _r (Dynamic)	C _{or} (Static)					Grease	Oil
*7916C	80	110	16	—	—	—	—	1	0.6	36.5	30.5	18.7	15	16.7	20.7	12 200	18 500
*7916CSN24	80	110	16	—	—	—	—	1	0.6	36.5	29.4	22.2	15	16.7	20.7	15 800	24 000
*7916A5	80	110	16	—	—	—	—	1	0.6	34.5	29.0	22.1	25	—	30.2	10 600	15 800
*7916A5SN24	80	110	16	—	—	—	—	1	0.6	34.5	27.8	26.2	25	—	30.2	13 700	20 600
*80BNR19E	80	110	16	—	—	—	—	1	0.6	27.7	19.9	28.9	18	11.0	23.4	15 800	22 600
*80BNR19H	80	110	16	—	3.1	9.3	1.4	1	0.6	27.7	19.1	18.9	18	11.0	23.4	19 000	29 500
*80BNR19X	80	110	16	21	3.1	9.3	1.4	1	0.6	44.0	19.1	18.9	18	11.0	23.4	22 200	34 800
*80BER19E	80	110	16	—	—	—	—	1	0.6	26.5	19.1	34.0	25	—	30.2	13 600	19 200
*80BER19H	80	110	16	—	3.1	9.3	1.4	1	0.6	26.5	18.3	22.8	25	—	30.2	16 900	26 400
*80BER19X	80	110	16	21	3.1	9.3	1.4	1	0.6	42.0	18.3	22.8	25	—	30.2	20 000	31 600
*80BNR29EV1V	80	110	19	—	—	—	—	1	0.6	27.7	19.9	28.9	18	11.0	24.9	15 800	—
*80BNR29HV1V	80	110	19	—	—	—	—	1	0.6	27.7	19.1	18.9	18	11.0	24.9	19 000	—
*80BNR29XV1V	80	110	19	—	—	—	—	1	0.6	44.0	19.1	18.9	18	11.0	24.9	22 200	—
*80BER29EV1V	80	110	19	—	—	—	—	1	0.6	26.5	19.1	34.0	25	—	31.7	13 600	—
*80BER29HV1V	80	110	19	—	—	—	—	1	0.6	26.5	18.3	22.8	25	—	31.7	16 900	—
*80BER29XV1V	80	110	19	—	—	—	—	1	0.6	42.0	18.3	22.8	25	—	31.7	20 000	—
*7016C	80	125	22	—	—	—	—	1.1	0.6	74.0	55.5	34.5	15	15.7	24.7	11 300	17 100
*7016CSN24	80	125	22	—	—	—	—	1.1	0.6	73.5	52.5	40.9	15	15.7	24.7	14 700	22 300
*7016A5	80	125	22	—	—	—	—	1.1	0.6	70.0	52.5	41.0	25	—	34.9	9 800	14 700
*7016A5SN24	80	125	22	—	—	—	—	1.1	0.6	69.5	50.0	48.3	25	—	34.9	12 700	19 100
*7016A	80	125	22	—	—	—	—	1.1	0.6	67.5	50.5	31.5	30	—	40.6	7 400	9 800
*80BNR10E	80	125	22	—	—	—	—	1.1	0.6	33.5	24.5	35.5	18	10.9	27.5	14 700	20 900
*80BNR10H	80	125	22	—	4.7	12.2	2.2	1.1	0.6	33.5	23.5	23.4	18	10.9	27.5	17 600	27 400
*80BNR10X	80	125	22	27	4.7	12.2	2.2	1.1	0.6	53.0	23.5	23.4	18	10.9	27.5	20 500	32 200
*80BER10E	80	125	22	—	—	—	—	1.1	0.6	32.0	23.5	42.0	25	—	34.6	12 600	17 800
*80BER10H	80	125	22	—	4.7	12.2	2.2	1.1	0.6	32.0	22.5	28.2	25	—	34.6	15 700	24 400
*80BER10X	80	125	22	27	4.7	12.2	2.2	1.1	0.6	50.5	22.5	28.2	25	—	34.6	18 600	29 300
*80BNRD10J	80	125	22	—	4.7	12.2	2.2	1.1	0.6	65.0	28.0	27.3	18	8.1	27.7	17 600	27 400
*80BNRD10X	80	125	22	27	4.7	12.2	2.2	1.1	0.6	82.0	28.0	27.3	18	8.1	27.7	20 500	32 200
*80BERD10J	80	125	22	—	4.7	12.2	2.2	1.1	0.6	62.5	27.0	33.5	25	—	34.9	15 700	24 400
*80BERD10X	80	125	22	27	4.7	12.2	2.2	1.1	0.6	79.0	27.0	33.5	25	—	34.9	18 600	29 300
*80BNR20EV1V	80	125	27	—	—	—	—	1.1	0.6	33.5	24.5	35.5	18	10.9	30.0	14 700	—
*80BNR20HV1V	80	125	27	—	—	—	—	1.1	0.6	33.5	23.5	23.4	18	10.9	30.0	17 600	—
*80BNR20XV1V	80	125	27	—	—	—	—	1.1	0.6	53.0	23.5	23.4	18	10.9	30.0	20 500	—
*80BER20EV1V	80	125	27	—	—	—	—	1.1	0.6	32.0	23.5	42.0	25	—	37.1	12 600	—
*80BER20HV1V	80	125	27	—	—	—	—	1.1	0.6	32.0	22.5	28.2	25	—	37.1	15 700	—
*80BER20XV1V	80	125	27	—	—	—	—	1.1	0.6	50.5	22.5	28.2	25	—	37.1	18 600	—
7216C	80	140	26	—	—	—	—	2	1	117	77.5	54.5	15	14.7	27.7	10 500	16 000
7216CSN24	80	140	26	—	—	—	—	2	1	117	73.5	64.5	15	14.7	27.7	13 700	20 800
7216A5	80	140	26	—	—	—	—	2	1	111	74.0	62.0	25	—	38.6	9 100	13 700
7216A5SN24	80	140	26	—	—	—	—	2	1	111	70.5	73.5	25	—	38.6	11 900	17 800
7216A	80	140	26	—	—	—	—	2	1	107	71.5	47.5	30	—	44.8	6 900	9 100

Abutment and Fillet Dimensions (mm)					Preload (DB and DF Arrangement) (N)				Axial Rigidity (DB and DF Arrangement) (N/μm)				Measured Axial Clearance (μm)				Mass (kg) (approx.)
d _a (min.)	D _a (max.)	D _b (max.)	r _a (max.)	r _b (max.)	EL	L	M	H	EL	L	M	H	EL	L	M	H	
86	104	105	1	0.5	104	195	503	986	63	81	125	173	− 4	− 9	− 21	− 34	0.377
86	104	105	1	0.5	111	215	573	1 136	72	94	145	202	− 4	− 9	− 21	− 34	0.337
86	104	105	1	0.5	182	366	792	1 603	160	207	278	370	− 4	− 8	− 15	− 25	0.381
86	104	105	1	0.5	201	415	913	1 867	186	242	326	436	− 4	− 8	− 15	− 25	0.341
86	104	105	1	0.5	49	190	478	—	53	86	123	—	0	− 8	− 19	—	0.366
86	104	105	1	0.5	49	210	545	—	60	99	143	—	0	− 8	− 19	—	0.326
86	104	105	1	0.5	49	210	545	—	60	99	143	—	0	− 8	− 19	—	0.326
86	104	105	1	0.5	49	309	646	—	89	166	217	—	0	− 8	− 15	—	0.366
86	104	105	1	0.5	49	349	743	—	100	194	254	—	0	− 8	− 15	—	0.326
86	104	105	1	0.5	49	349	743	—	100	194	254	—	0	− 8	− 15	—	0.326
86	104	105	1	0.5	49	190	478	—	53	86	123	—	0	− 8	− 19	—	0.425
86	104	105	1	0.5	49	210	545	—	60	99	143	—	0	− 8	− 19	—	0.385
86	104	105	1	0.5	49	210	545	—	60	99	143	—	0	− 8	− 19	—	0.385
86	104	105	1	0.5	49	309	646	—	89	166	217	—	0	− 8	− 15	—	0.425
86	104	105	1	0.5	49	349	743	—	100	194	254	—	0	− 8	− 15	—	0.385
86	104	105	1	0.5	49	349	743	—	100	194	254	—	0	− 8	− 15	—	0.385
87	118	120	1	0.6	202	382	921	1 880	78	102	151	215	− 6	− 14	− 31	− 52	0.855
87	118	120	1	0.6	215	422	1 045	2 162	89	118	176	251	− 6	− 14	− 31	− 52	0.736
87	118	120	1	0.6	345	624	1 513	2 903	198	246	345	448	− 6	− 11	− 23	− 37	0.880
87	118	120	1	0.6	381	704	1 744	3 377	229	286	404	528	− 6	− 11	− 23	− 37	0.761
87	118	120	1	0.6	98	752	1 762	3 060	170	340	464	573	0	− 10	− 20	− 30	0.864
87	118	120	1	0.6	98	327	611	—	72	111	141	—	0	− 10	− 19	—	0.921
87	118	120	1	0.6	98	359	688	—	80	127	164	—	0	− 10	− 19	—	0.867
87	118	120	1	0.6	98	359	688	—	80	127	164	—	0	− 10	− 19	—	0.867
87	118	120	1	0.6	98	623	1 272	—	118	225	292	—	0	− 12	− 22	—	0.921
87	118	120	1	0.6	98	704	1 461	—	133	262	343	—	0	− 12	− 22	—	0.867
87	118	120	1	0.6	98	704	1 461	—	133	262	343	—	0	− 12	− 22	—	0.867
87	118	120	1	0.6	98	499	1 051	—	75	135	180	—	0	− 15	− 29	—	0.748
87	118	120	1	0.6	98	499	1 051	—	75	135	180	—	0	− 15	− 29	—	0.748
87	118	120	1	0.6	98	663	1 437	—	125	242	319	—	0	− 12	− 23	—	0.748
87	118	120	1	0.6	98	663	1 437	—	125	242	319	—	0	− 12	− 23	—	0.748
87	118	120	1	0.6	98	327	611	—	72	111	141	—	0	− 10	− 19	—	1.12
87	118	120	1	0.6	98	359	688	—	80	127	164	—	0	− 10	− 19	—	1.06
87	118	120	1	0.6	98	359	688	—	80	127	164	—	0	− 10	− 19	—	1.06
87	118	120	1	0.6	98	623	1 272	—	118	225	292	—	0	− 12	− 22	—	1.12
87	118	120	1	0.6	98	704	1 461	—	133	262	343	—	0	− 12	− 22	—	1.06
87	118	120	1	0.6	98	704	1 461	—	133	262	343	—	0	− 12	− 22	—	1.06
90	130	134	2	1	305	595	1 367	2 752	83	110	159	224	− 12	− 24	− 47	− 76	1.43
90	130	134	2	1	333	667	1 566	3 185	96	127	186	262	− 12	− 24	− 47	− 76	1.18
90	130	134	2	1	463	925	2 161	4 345	201	259	357	473	− 9	− 17	− 33	− 54	1.42
90	130	134	2	1	517	1 056	2 507	5 078	234	303	420	558	− 9	− 17	− 33	− 54	1.17
90	130	134	2	1	98	1 095	2 696	4 035	156	356	494	576	0	− 15	− 30	− 40	1.45