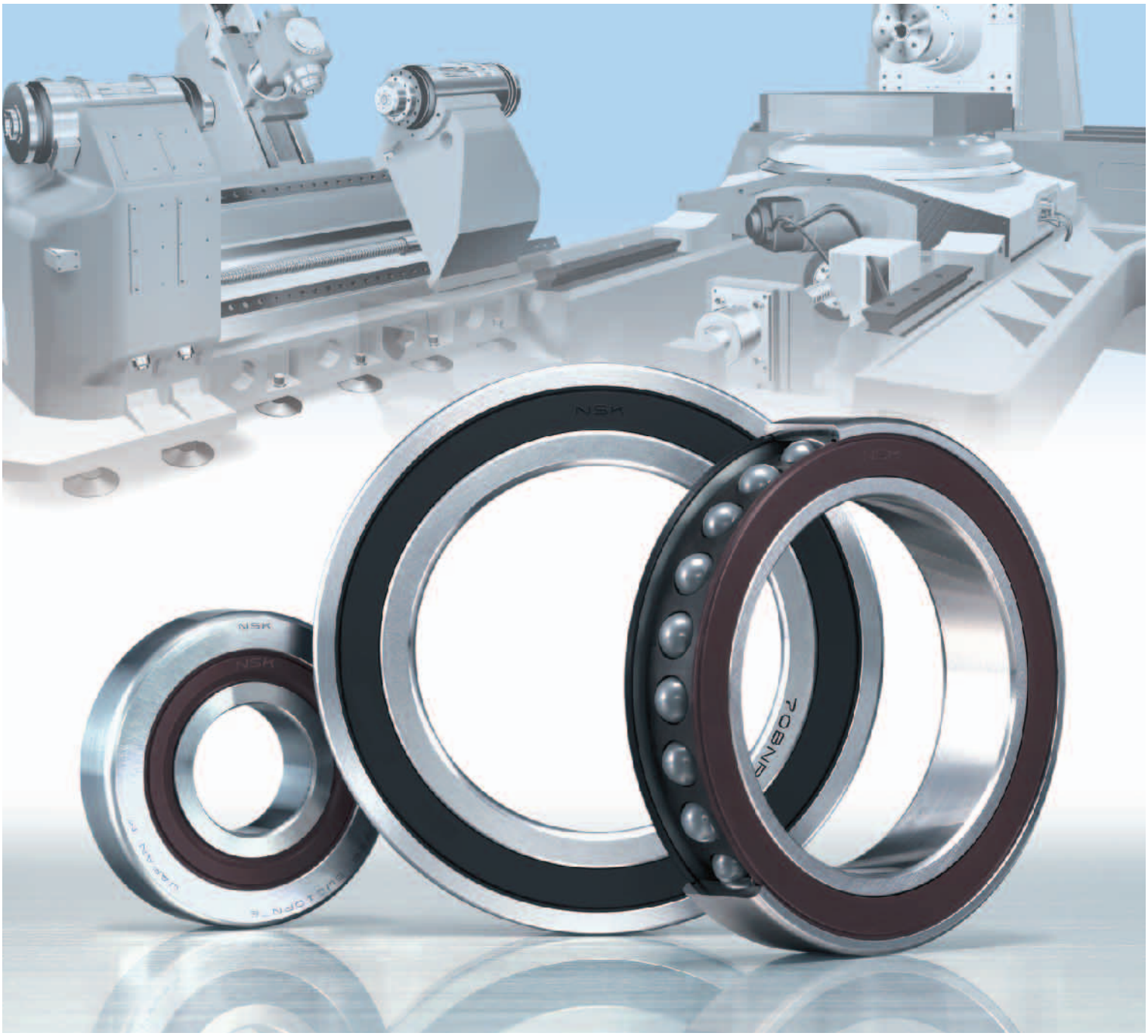
MOTION & CONTROL™

NSK

Super Precision Sealed Bearings

High-performance, long-life features enhance the value of industrial machinery while achieving environmental friendliness and energy conservation.



NSK Super Precision Sealed Bearings dramatically improve the value of industrial machinery.

NSK Super Precision Sealed Bearings deliver high performance while also delivering the benefits of improved efficiency on the manufacturing floor and environmental friendliness.
These bearings take advantage of NSK's unique technology and know-how and contribute to enhancing the quality of all industrial products, as well as conserving resources and energy.
NSK's advanced technology provides problem-solving solutions for mechanical industry applications and manufacturing operations.

Extensive product lineup

NSK Super Precision Sealed Bearings offer an extensive product lineup for various applications and are widely used in such parts as machine tool spindles, live centers, ball screw support, and motor spindle applications.

Considerably reduce assembly time

Bearings are packaged after washing and greasing. Therefore, the bearings can be mounted into machines immediately after unpacking, and this enables you to shorten the time required for assembly.

Contribute to clean manufacturing and the global environment

Unlike oil lubrication, grease lubrication requires no air and therefore saves energy, and since there is no contamination from oil mist, manufacturing environments can be kept clean.

Combine high reliability and long life

Sealed bearings prevent entry of foreign matter and grease scattering, and ensure high reliability and extended grease life.

SOLUTION-1

NSK Super Precision Sealed Bearings improve the performance of all the units of industrial machinery.

1 Super Precision Sealed Angular Contact Ball Bearings (Standard Series)

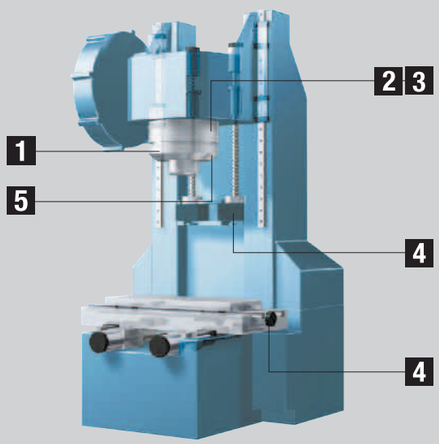
2 Super Precision Sealed Angular Contact Ball Bearings (ROBUST Series)

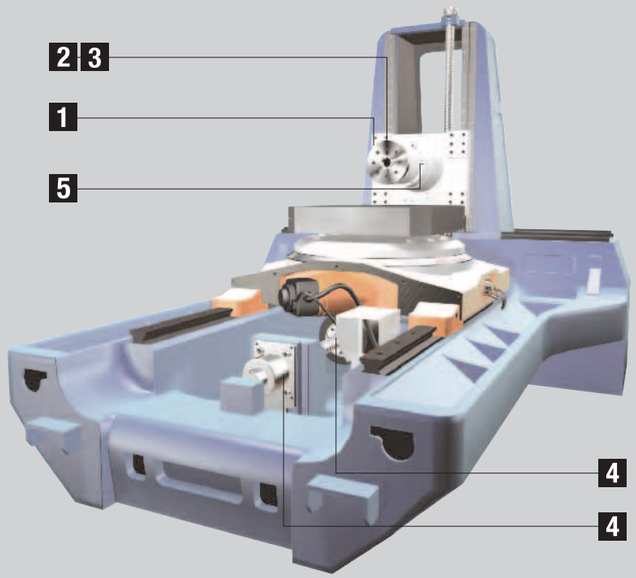
3 Super Precision Sealed Angular Contact Ball Bearings (ROBUST Wide Series)

4 Sealed Angular Contact Thrust Ball Bearings for Ball Screw Support

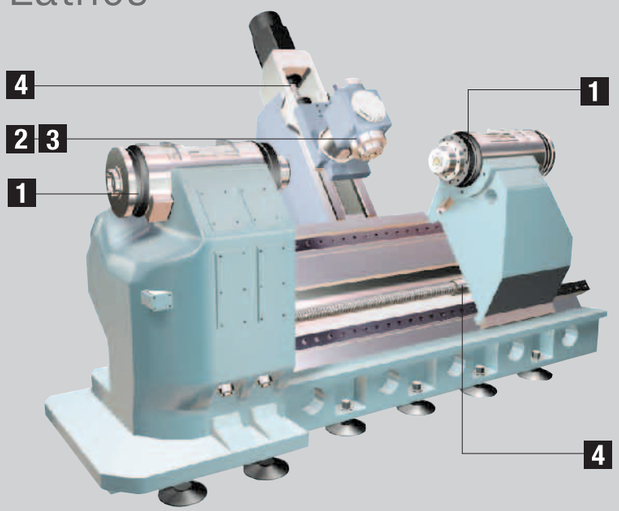
5 Sealed Precision Spacers

Machining Centers

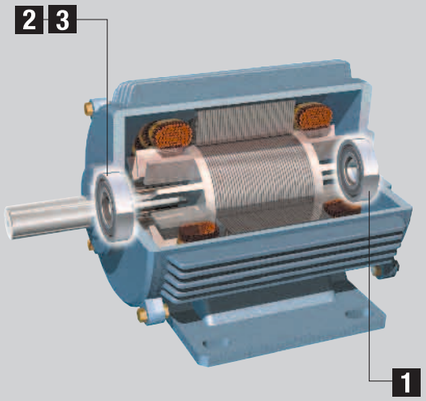




Lathes



Spindle Motors



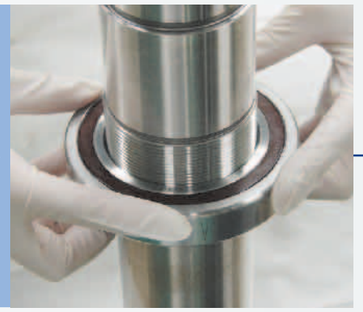
Other applications: centrifuges, semiconductor manufacturing equipment, etc.

SOLUTION-2

Packaging after washing and greasing dramatically reduces manufacturing lead times.

Sealed bearings:

Unpacking



Mounting to spindle

Approx.5 min

Can be mounted to a spindle immediately after unpacking because bearings are washed and greased.

NSK Super Precision Sealed Bearings are sealed and packaged after washing and greasing. Unlike open type bearings, no complicated degreasing, measuring, and regreasing are required before mounting. Consequently, the bearings can immediately be mounted after unpacking, leading to significantly reduced manufacturing lead times.

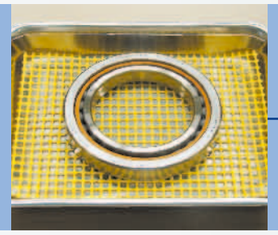
Bearing mounting time: Four times faster!

1/4

(Compared with NSK's conventional models)

Open type bearings:

Unpacking

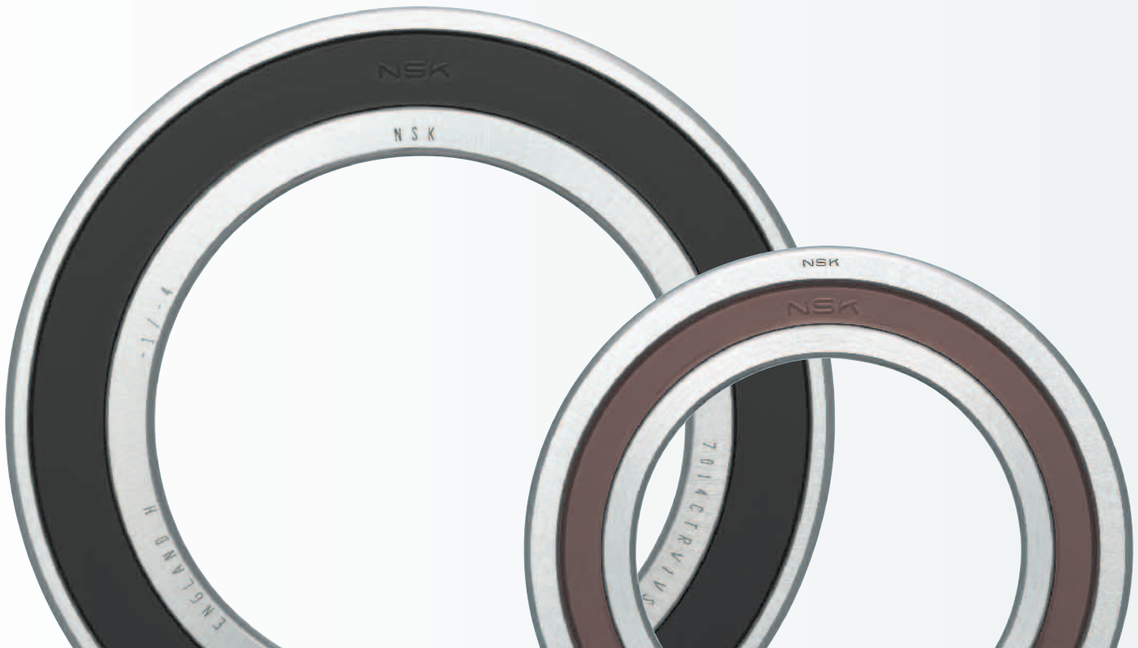


Degreasing

Greasing

Mounting to spindle

Approx.20 min



Advantage 1	Eliminating degreasing and greasing processes shortens the mounting time to 1/4 that required for NSK's conventional bearings.
Advantage 2	Degreasing in advance eliminates the necesity to control bearings afterward.
Advantage 3	Pre-packed grease eliminate the necesity to measure the weight of the grease and to rotate by hand.

SOLUTION-3

Grease lubrication contributes to a clean manufacturing environment while protecting the global environment.

Improve manufacturing environments

All NSK Super Precision Sealed Bearings use grease lubrication. Unlike oil lubrication, intermittent oil mist is not required, so manufacturing environments can be kept clean. In addition, no oil drops onto machining work during cutting.

Advantages of grease lubrication (compared with oil lubrication):

- No oil loss
- No oil mist
- No oil drops

Contribute to energy savings

1. Air consumption to be zero

For oil-air lubrication:
Air consumption for lubrication
20–30 NL/min
for each row of bearings

For grease lubrication:
Air consumption for lubrication
0 NL/min

2. Longer grease life

Grease life for sealed ROBUST wide series bearings is

1.7 times

longer than that of open type ROBUST series bearings.

Higher reliability and longer life for industrial machinery.

Features of Super Precision Sealed Angular Contact Ball Bearings

Standard Series

Grease life: 1.5 times | Long life | Interchangeable

ISO compliant, basic series of Super Precision Sealed Angular Contact Ball Bearings. Grease life is 1.5 times longer than that of open type bearings.

ROBUST Series

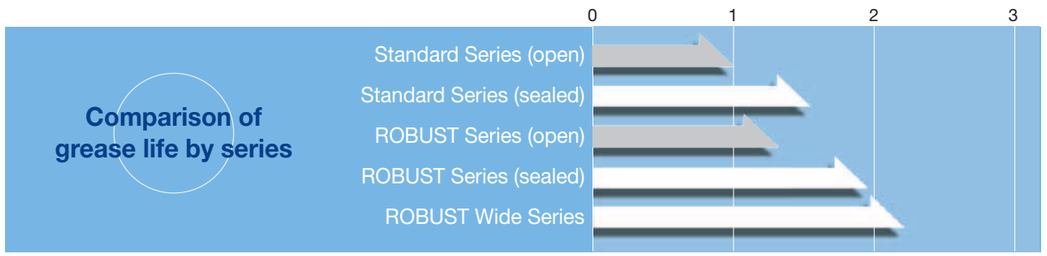
Grease life: 1.5 times | High speed | Long life | Interchangeable

Super Precision Sealed Angular Contact Ball Bearings ensure high performance, including high speed, low heat generation, and long life using NSK's optimized design technology. Grease life is 1.5 times longer than that of open type ROBUST Series bearings.

ROBUST Wide Series

Grease life: 1.7 times | High speed | Ultra-long life

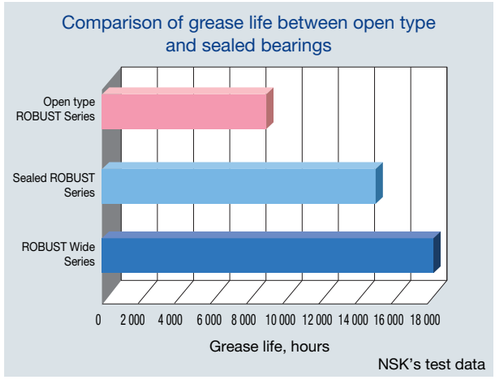
ROBUST Wide Series obtain 1.7 times longer grease life relative to sealed ROBUST Series, as it's possible to put more grease into ROBUST Wide Series.



Long life

Non-contact seals designed by NSK prevent grease loss and maintain bearing lubrication over long periods of time.

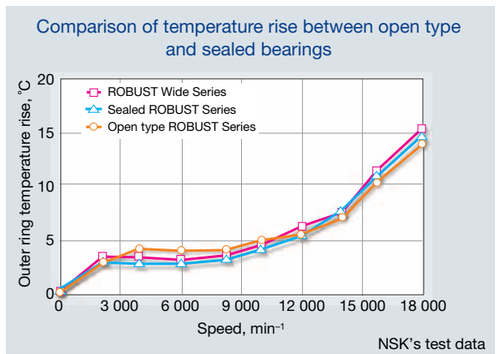
- Non-contact seals with limited clearance between the seal and inner ring facilitate high-speed operation.
- By preventing the entry of foreign matter and loss of grease in the bearings, sealed bearings maintain good lubrication and therefore ensure long life.



Test conditions
Bore diameter: 65 mm
Ceramic ball specification
Speed: 18 000 min^{-1} ($d_m n$ = 1 480 000)
Lubricant: MTE grease

Low heat generation

Sealed bearings deliver the same low heat generation as open type bearings due to the special internal design.



Test conditions
Test bearings: 70BER19HTXV1V
Grease: MTS (15 % of internal space)
Arrangement: DB
Preload at mounting: 140 N
Axial rigidity: 100 N/μm

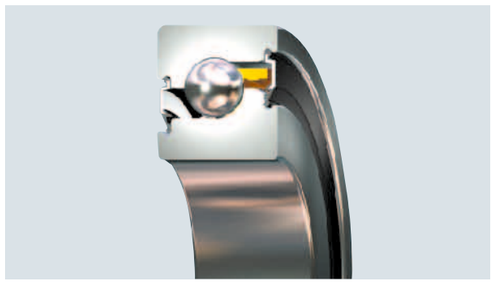
Features of Sealed Angular Contact Thrust Ball Bearings for Ball Screw Support

High seal performance Long life

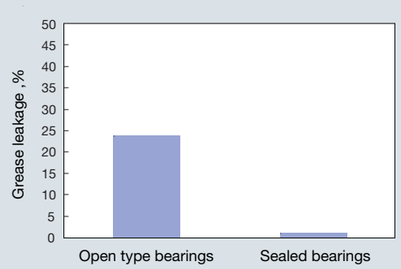
Low-contact seals are used to offer high-speed performance and dust resistance. Rings made of high purity steel (EP Steel) ensure long life.

Dust resistant

Low-contact seals prevent dust from entering the bearings. As the bearing is fitted with seals and prepacked with grease, grease loss is kept to a minimum.



Comparison of grease leakage



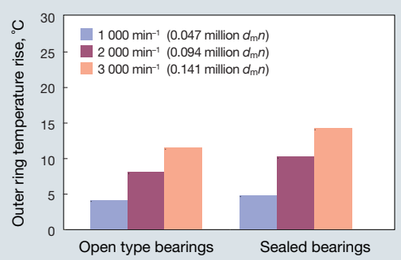
NSK's test data

Test conditions
Bearings: ø30 × ø62 × 15 mm, Arrangement: DFD, Preload: 4 500 N,
Temperature: ambient, Speed: 3 000 min^{-1}

Low heat generation

Adopts NSK's own low-contact DG seals for high-speed performance; minimizes temperature rise compared with open type bearings.

Comparison of bearing temperature



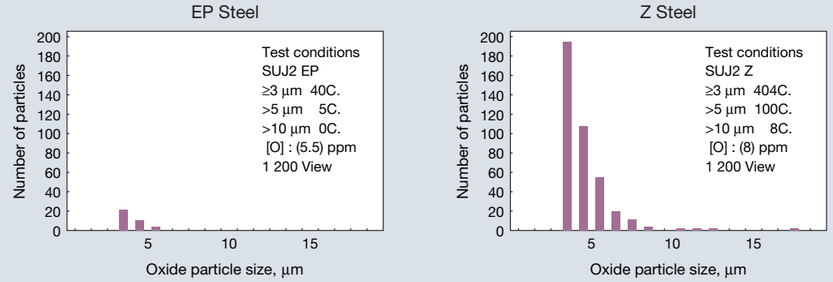
NSK's test data

Test conditions
Bearings: ø30 × ø62 × 15 mm, Arrangement: DFD, Preload: 4 500 N,
Temperature: ambient

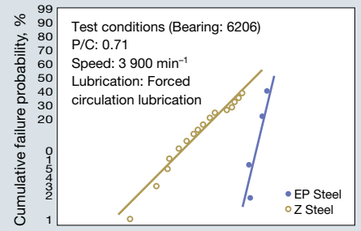
Long life

Sealed Angular Contact Thrust Ball Bearings achieve three times longer rolling fatigue life than that of SUJ2 steel (Z Steel) by using NSK's own high purity steel (EP Steel). EP Steel not only shows improved purity, but also exhibits reduced non-metallic inclusions to dramatically improve bearing reliability.

Purity comparison through image analysis



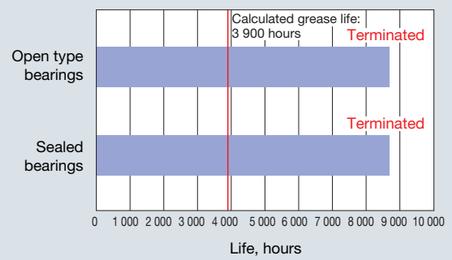
Fatigue life: subsurface originated flaking test



NSK's test data

Grease life of both sealed bearing and open type bearing are longer than that of calculated value.

Comparison of grease life between open type and sealed bearings



NSK's test data

Test conditions
Bearings: ø30 × ø62 × 15 mm, Arrangement: DBD, Preload: 4 500 N,
Temperature: room temperature, Speed: max 4 500 min^{-1}

Sealed Precision Spacers

High seal performance

NSK developed sealed precision spacers with a special double structure of a seal plus labyrinth. The labyrinth is designed with minimal clearance between inner and outer ring section. The double structure improves reliabilty against the entry of foreign matter.

Improved environmental responsiveness

By setting up sealed spacer in both sides of bearings, it prevents grease inside bearings from scattering to outside.

High reliability

The double structure of a seal plus labyrinth spacer provides superior resistance against dust and coolant from entry into the bearings.

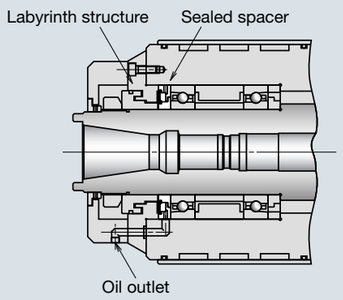
Numbering system

X 65 - MTV 10

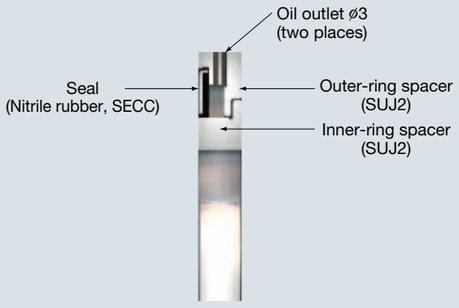
- X: Spacer symbol
- 65: Nominal bore diameter (10 Series: 30–120; 19 Series: 30–110)
- MTV: Type symbol
- 10: Dimension symbol (10: 10 Series; 19: 19 Series)

Configuration example

NSK suggests a triple-seal configuration—a labyrinth seal, which consists of a retaining cover and an inner-ring spacer, provides the first seal, followed by the sealed precision spacer with NSK's special double structure seal. This prevents the entry of foreign matter to realize higher reliability.



Structure of precision sealed spacers



Handling precautions
Note that an inner-ring spacer and an outer-ring spacer can be separated, so take care that rubber seal does not fall out or sustain damage during handling.

Special grease for Sealed Angular Contact Ball Bearings

Grease features

MTS: For high-speed operation. Contains urea thickener and exhibits high-heat insulating properties for machine tool spindles.

MTE: For high-speed operation. Formulated to handle high loads for machine tool spindles.

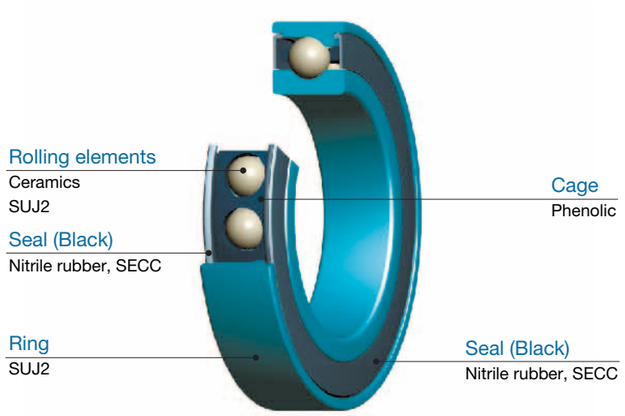
AS2: For low-speed and heavy load applications, such as bearings for ball screw supports.

Grease characteristics

Item	Test conditions	MTS	MTE	AS2	Test method
Thickener	—	Urea	Barium complex	Lithium soap	—
Base oil	—	Mixed synthetic oil	Ester oil	Mineral oil	—
Kinetic viscosity of base oil (mm^2/S)	40℃	22	20	130	JIS K 2220 5.19
Worked penetration	25℃, 60W	2-3	2	2	JIS K 2220 5.3
Dropping point (℃)	—	>220	>200	>185	JIS K 2220 5.4
Evaporation (mass %)	99℃ × 22H	0.3	0.4	0.24	JIS K 2220 5.6B
Oil separation (mass %)	100℃ × 24H	0.4	1.0	2.8	JIS K 2220 5.7
Application		Machine tool spindles	Machine tool spindles	Ball screw supports	

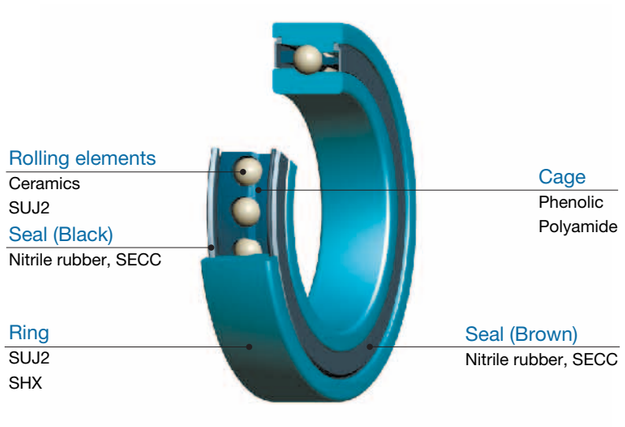
Configuration of Super Precision Sealed Angular Contact Ball Bearings

Super Precision Sealed Angular Contact Ball Bearings (Standard Series)



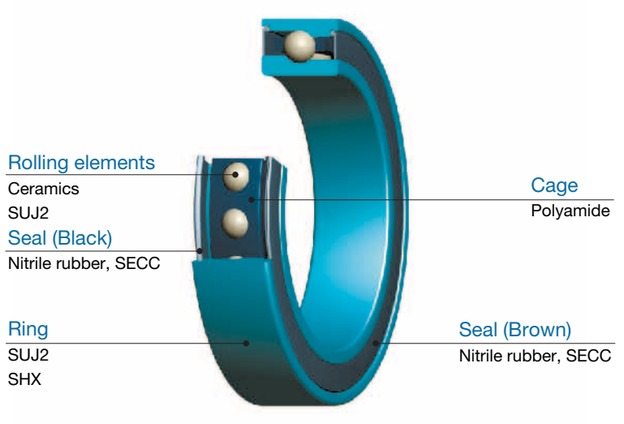
Type	Series	Ring	Rolling elements	Cage	Grease
SUJ2 specification	10,19	SUJ2	SUJ2	Phenolic (TR)	MTE MTS
Ceramic ball specification		SUJ2	Ceramics		

Super Precision Sealed Angular Contact Ball Bearings (ROBUST Series)



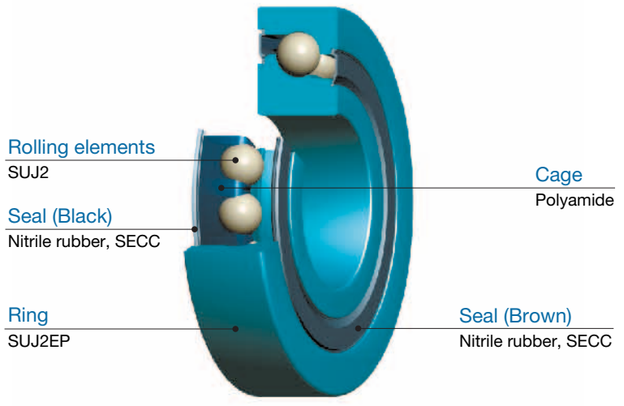
Type	Series	Ring	Rolling elements	Cage	Grease
S	10,19	SUJ2	SUJ2	Polyamide 46 (TYN) Phenolic (T)	MTE MTS
H		SUJ2	Ceramics		
X		SHX	Ceramics		

Super Precision Sealed Angular Contact Ball Bearings (ROBUST Wide Series)



Type	Series	Ring	Rolling elements	Cage	Grease
S	20,29	SUJ2	SUJ2	Polyamide 46 (TYN)	MTE MTS
H		SUJ2	Ceramics		
X		SHX	Ceramics		

Sealed Angular Contact Thrust Ball Bearings for Ball Screw Support

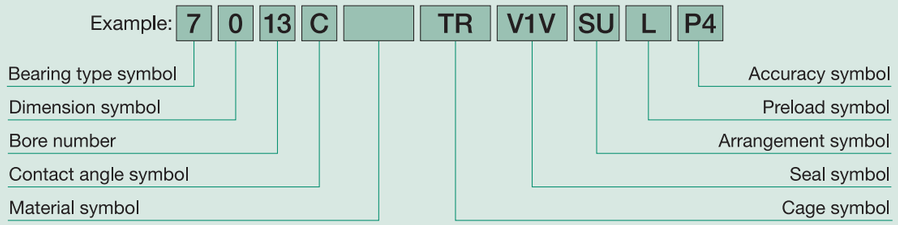


Ring	Rolling elements	Cage	Grease
SUJ2EP	SUJ2	Polyamide 66	AS2

Outer Ring Guided Phenolic Cage (TR, T) with excellent stability under high-speed operation

Ball Guided Polyamide Cage (TYN) designed by NSK

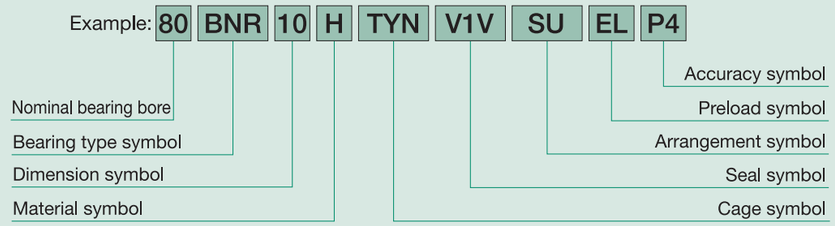
Numbering System of Sealed Angular Contact Ball Bearings (Standard Series)



7	**Bearing type**	7: single-row angular contact ball bearing
0	**Dimension**	9: 19 series / 0: 10 series
13	**Bore number**	03 or less: bearing bore / 00: 10 mm / 01: 15 mm / 03: 17 mm 04 or more: bearing bore: bore number x 5 (mm)
C	**Contact angle**	C: 15° / A5: 25°
	Material	No symbol: steel (SUJ2) / SN24: ceramic ball (Si_3N_4)(1)
TR	**Cage**	TR: outer ring guided phenol resin cage; operational temperature limit = 120 °C
V1V	**Seal**	V1V: non-contact rubber seal
SU	**Arrangement**	SU: universal arrangement (single row) / DU: universal arrangement (double row)
L	**Preload**	EL: extra light preload / L: light preload / M: medium preload / H: heavy preload CP: special preload / CA: special axial clearance
P4	**Accuracy**	P2: ISO Class 2 / P4: ISO Class 4 / P5: ISO Class 5 P3: special class (dimensional accuracy: ISO Class 4 / rotating accuracy: ISO Class 2) P4Y: special class (Bore diameter and outside diameter are exclusive to NSK. All others are ISO Class 4.)

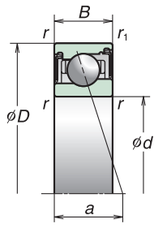
Note (1) Angular contact ceramic ball bearings are also available.

Numbering System of Ultra High-Speed Super Precision Sealed Angular Contact Ball Bearings (ROBUST Series) (ROBUST Wide Series (Dimension:*symbols))



80	**Bearing bore**	Bore diameter (mm)
BNR	**Bearing type**	BNR: 18° contact angle, BER: 25° contact angle
10	**Dimension**	10: 10 series, 19: 19 series, *20: 20 series, *29: 29 series
H	**Material**	Type S: Rings: Bearing steel (SUJ2); Rolling elements: Bearing steel (SUJ2) Type H: Rings: Bearing steel (SUJ2); Rolling elements: Ceramics (Si_3N_4) Type X: Rings: Heat resistant steel (SHX); Rolling elements: Ceramics (Si_3N_4)
TYN	**Cage**	TYN: ball guided polyamide resin cage; limiting speed d_mn = 1 400 000; operational temperature limit = 120 °C T: phenol resin cage with outer ring guide; operational temperature limit = 120 °C
V1V	**Seal**	V1V: non-contact rubber seal
SU	**Arrangement**	SU: universal arrangement (single row) / DU: universal arrangement (double row)
EL	**Preload**	EL: extra light preload / L: light preload / M: medium preload CP: special preload / CA: special axial clearance
P4	**Accuracy**	P2: ISO Class 2 / P4: ISO Class 4 / P5: ISO Class 5 P3: special class (dimensional accuracy: ISO Class 4 / rotating accuracy: ISO Class 2) P4Y: special class (Bore diameter and outside diameter are exclusive to NSK. All others are ISO Class 4.)

Super Precision Sealed Angular Contact Ball Bearings (Standard Series)



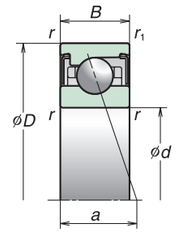
79 Series Nominal contact angle α = 15°, 25°

Bore diameter 30–100 mm

Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (kN)	Factor f_0	Effective Load Center (mm) a	Mass (kg) (approx)	Limiting Speeds(1) (min⁻¹)
	d	D	B	r (min)	r_1 (min)	C_r (Dynamic)	C_{0r} (Static)					Grease
7906CV1V	30	47	9	0.3	0.15	8.30	6.25	4.40	15.9	9.7	0.049	29 900
7906A5V1V	30	47	9	0.3	0.15	7.85	5.95	4.95	–	13.5	0.050	26 000
7907CV1V	35	55	10	0.6	0.3	12.1	9.15	6.60	15.7	11.0	0.074	25 600
7907A5V1V	35	55	10	0.6	0.3	11.4	8.70	7.20	–	15.5	0.075	22 300
7908CV1V	40	62	12	0.6	0.3	15.1	11.7	8.40	15.7	12.8	0.109	22 600
7908A5V1V	40	62	12	0.6	0.3	14.3	11.2	8.90	–	17.9	0.110	19 700
7909CV1V	45	68	12	0.6	0.3	16.0	13.4	8.55	16.0	13.6	0.129	20 400
7909A5V1V	45	68	12	0.6	0.3	15.1	12.7	9.95	–	19.2	0.130	17 700
7910CV1V	50	72	12	0.6	0.3	16.9	15.0	9.45	16.2	14.2	0.130	18 900
7910A5V1V	50	72	12	0.6	0.3	15.9	14.2	11.0	–	20.2	0.132	16 400
7911CV1V	55	80	13	1.0	0.6	19.1	17.7	11.0	16.3	15.5	0.182	17 100
7911A5V1V	55	80	13	1.0	0.6	18.1	16.8	12.5	–	22.2	0.184	14 900
7912CV1V	60	85	13	1.0	0.6	19.4	18.7	11.5	16.5	16.2	0.195	15 900
7912A5V1V	60	85	13	1.0	0.6	18.3	17.7	13.0	–	23.4	0.198	13 800
7913CV1V	65	90	13	1.0	0.6	20.2	20.5	12.5	16.7	16.9	0.208	14 900
7913A5V1V	65	90	13	1.0	0.6	19.1	19.4	14.2	–	24.6	0.211	13 000
7914CV1V	70	100	16	1.0	0.6	28.1	27.8	17.3	16.4	19.4	0.338	13 600
7914A5V1V	70	100	16	1.0	0.6	26.5	26.3	20.3	–	27.8	0.341	11 800
7915CV1V	75	105	16	1.0	0.6	28.6	29.3	18.0	16.6	20.1	0.358	12 800
7915A5V1V	75	105	16	1.0	0.6	26.9	27.7	21.2	–	29.0	0.355	11 200
7916CV1V	80	110	16	1.0	0.6	29.0	30.5	18.7	16.7	20.7	0.377	12 200
7916A5V1V	80	110	16	1.0	0.6	27.3	29.0	22.1	–	30.2	0.381	10 600
7917CV1V	85	120	18	1.1	0.6	39.0	40.5	25.9	16.5	22.7	0.534	11 300
7917A5V1V	85	120	18	1.1	0.6	36.5	38.5	30.0	–	32.9	0.541	9 800
7918CV1V	90	125	18	1.1	0.6	41.5	46.0	29.1	16.6	23.4	0.568	10 700
7918A5V1V	90	125	18	1.1	0.6	39.5	43.5	33.5	–	34.1	0.560	9 400
7919CV1V	95	130	18	1.1	0.6	42.5	48.0	30.0	16.7	24.1	0.597	10 300
7919A5V1V	95	130	18	1.1	0.6	40.0	45.5	35.0	–	35.2	0.603	8 900
7920CV1V	100	140	20	1.1	0.6	50.0	54.0	33.0	16.5	26.1	0.800	9 600
7920A5V1V	100	140	20	1.1	0.6	47.5	51.5	39.5	–	38.0	0.808	8 400

Note (1) The limiting speeds listed in the bearing table are reference values that are applicable to conditions where the bearing is operated under a light preload using a preload spring, and in an environment where sufficient cooling or heat dissipation is available.
When using various arrangements (duplex, triplex, quadruplex, etc.) of matched bearings under preloaded conditions, the limiting speeds given in the bearing table need to be adjusted by multiplying the given limiting speed with the corresponding correction factor given in the table shown on the right.

Arrangement Symbols	Arrangements	EL	L	M	H
DB	⌀ ⌭	0.85	0.80	0.65	0.55
DBB	⌀ ⌀ ⌭ ⌭	0.80	0.75	0.60	0.45
DBD	⌀ ⌀ ⌭	0.75	0.70	0.55	0.40



70 Series Nominal contact angle α = 15°, 25°

Bore diameter 30–100 mm

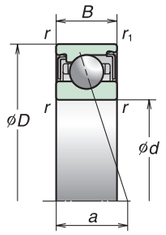
Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (kN)	Factor f_0	Effective Load Center (mm) a	Mass (kg) (approx)	Limiting Speeds(1) (min⁻¹)
	d	D	B	r (min)	r_1 (min)	C_r (Dynamic)	C_{0r} (Static)					Grease
7006CV1V	30	55	13	1.0	0.6	15.1	10.3	6.85	14.9	12.2	0.114	27 100
7006A5V1V	30	55	13	1.0	0.6	14.4	9.80	8.05	–	16.4	0.114	23 600
7007CV1V	35	62	14	1.0	0.6	19.1	13.7	9.35	15.0	13.5	0.151	23 800
7007A5V1V	35	62	14	1.0	0.6	18.2	13.0	11.4	–	18.3	0.151	20 700
7008CV1V	40	68	15	1.0	0.6	20.6	15.9	10.6	15.4	14.7	0.189	21 300
7008A5V1V	40	68	15	1.0	0.6	19.5	15.1	12.0	–	20.1	0.188	18 600
7009CV1V	45	75	16	1.0	0.6	24.4	19.3	12.4	15.4	16.0	0.238	19 200
7009A5V1V	45	75	16	1.0	0.6	23.1	18.3	14.5	–	22.0	0.250	16 700
7010CV1V	50	80	16	1.0	0.6	26.0	21.9	13.9	15.7	16.7	0.259	17 700
7010A5V1V	50	80	16	1.0	0.6	24.6	20.8	16.2	–	23.2	0.270	15 400
7011CV1V	55	90	18	1.1	0.6	34.0	28.6	18.9	15.5	18.7	0.380	15 900
7011A5V1V	55	90	18	1.1	0.6	32.5	27.2	21.8	–	25.9	0.383	13 800
7012CV1V	60	95	18	1.1	0.6	35.0	30.5	19.9	15.7	19.4	0.405	14 900
7012A5V1V	60	95	18	1.1	0.6	33.0	29.1	23.0	–	27.1	0.408	13 000
7013CV1V	65	100	18	1.1	0.6	37.0	34.5	22.0	15.9	20.0	0.435	14 000
7013A5V1V	65	100	18	1.1	0.6	35.0	32.5	25.4	–	28.2	0.455	12 200
7014CV1V	70	110	20	1.1	0.6	47.0	43.0	26.8	15.7	22.1	0.606	12 800
7014A5V1V	70	110	20	1.1	0.6	44.5	41.0	32.0	–	31.0	0.625	11 200
7015CV1V	75	115	20	1.1	0.6	48.0	45.5	28.1	15.9	22.7	0.643	12 200
7015A5V1V	75	115	20	1.1	0.6	45.5	43.5	33.5	–	32.1	0.652	10 600
7016CV1V	80	125	22	1.1	0.6	58.5	55.5	34.5	15.7	24.7	0.855	11 300
7016A5V1V	80	125	22	1.1	0.6	55.5	52.5	41.0	–	34.9	0.880	9 800
7017CV1V	85	130	22	1.1	0.6	60.0	58.5	38.0	15.9	25.4	0.898	10 700
7017A5V1V	85	130	22	1.1	0.6	57.0	55.5	43.0	–	36.1	0.904	9 400
7018CV1V	90	140	24	1.5	1.0	71.5	69.0	44.5	15.7	27.4	1.160	10 000
7018A5V1V	90	140	24	1.5	1.0	68.0	65.5	52.0	–	38.8	1.170	8 700
7019CV1V	95	145	24	1.5	1.0	73.5	73.0	47.0	15.9	28.1	1.210	9 600
7019A5V1V	95	145	24	1.5	1.0	69.5	69.5	52.5	–	40.0	1.410	8 400
7020CV1V	100	150	24	1.5	1.0	75.5	77.0	49.0	16.0	28.7	1.270	9 200
7020A5V1V	100	150	24	1.5	1.0	71.0	73.5	57.5	–	41.1	1.450	8 000

Note (1) The limiting speeds listed in the bearing table are reference values applicable to single row bearings. See the note and corresponding table on page 19 for matched bearings used in various arrangements.

Ultra High-Speed Super Precision Sealed Angular Contact Ball Bearings (ROBUST Series)

BNR 19 Series Nominal contact angle $\alpha = 18^\circ$
BER 19 Series Nominal contact angle $\alpha = 25^\circ$

Bore diameter 30–65 mm

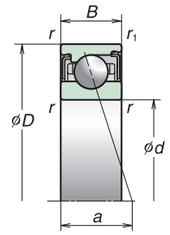


Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (kN)	Effective Load Center (mm)	Mass (kg) (approx)	Limiting Speeds[1] (min⁻¹)
	d	D	B	r (min)	r1 (min)	Cr (Dynamic)	C0r (Static)		a		Grease
30BNR19SV1V	30	47	9	0.3	0.15	6.30	4.05	5.75	10.8	0.048	36 400
30BNR19HV1V	30	47	9	0.3	0.15			3.80		0.043	46 800
30BNR19XV1V	30	47	9	0.3	0.15					0.043	54 600
30BER19SV1V	30	47	9	0.3	0.15	6.00	3.90	6.80	13.5	0.048	31 200
30BER19HV1V	30	47	9	0.3	0.15			4.60		0.043	41 600
30BER19XV1V	30	47	9	0.3	0.15					0.043	49 400
35BNR19SV1V	35	55	10	0.6	0.3	9.20	6.00	8.55	12.3	0.072	31 200
35BNR19HV1V	35	55	10	0.6	0.3			5.60		0.063	40 000
35BNR19XV1V	35	55	10	0.6	0.3					0.063	46 700
35BER19SV1V	35	55	10	0.6	0.3	8.80	5.75	10.0	15.5	0.072	26 700
35BER19HV1V	35	55	10	0.6	0.3			6.80		0.063	35 600
35BER19XV1V	35	55	10	0.6	0.3					0.063	42 300
40BNR19SV1V	40	62	12	0.6	0.3	11.5	7.65	10.8	14.3	0.105	27 500
40BNR19HV1V	40	62	12	0.6	0.3			7.10		0.092	35 300
40BNR19XV1V	40	62	12	0.6	0.3					0.092	41 200
40BER19SV1V	40	62	12	0.6	0.3	11.0	7.35	12.8	17.9	0.105	23 600
40BER19HV1V	40	62	12	0.6	0.3			8.65		0.092	31 400
40BER19XV1V	40	62	12	0.6	0.3					0.092	37 300
45BNR19SV1V	45	68	12	0.6	0.3	12.1	8.70	12.4	15.2	0.125	24 800
45BNR19HV1V	45	68	12	0.6	0.3			8.10		0.111	31 900
45BNR19XV1V	45	68	12	0.6	0.3					0.111	37 200
45BER19SV1V	45	68	12	0.6	0.3	11.6	8.35	14.6	19.2	0.125	21 300
45BER19HV1V	45	68	12	0.6	0.3			9.85		0.111	28 400
45BER19XV1V	45	68	12	0.6	0.3					0.111	33 700
50BNR19SV1V	50	72	12	0.6	0.3	12.8	9.75	13.9	15.9	0.127	23 000
50BNR19HV1V	50	72	12	0.6	0.3			9.10		0.111	29 600
50BNR19XV1V	50	72	12	0.6	0.3					0.111	34 500
50BER19SV1V	50	72	12	0.6	0.3	12.3	9.35	16.3	20.2	0.127	19 700
50BER19HV1V	50	72	12	0.6	0.3			11.0		0.111	26 300
50BER19XV1V	50	72	12	0.6	0.3					0.111	31 200
55BNR19SV1V	55	80	13	1.0	0.6	14.4	11.4	16.2	17.5	0.178	20 800
55BNR19HV1V	55	80	13	1.0	0.6			10.6		0.158	26 700
55BNR19XV1V	55	80	13	1.0	0.6					0.158	31 200
55BER19SV1V	55	80	13	1.0	0.6	13.8	10.9	16.1	22.2	0.178	17 800
55BER19HV1V	55	80	13	1.0	0.6			12.9		0.158	23 800
55BER19XV1V	55	80	13	1.0	0.6					0.158	28 200
60BNR19SV1V	60	85	13	1.0	0.6	14.6	12.0	17.1	18.3	0.190	19 400
60BNR19HV1V	60	85	13	1.0	0.6			11.2		0.170	24 900
60BNR19XV1V	60	85	13	1.0	0.6					0.170	29 000
60BER19SV1V	60	85	13	1.0	0.6	14.0	11.5	20.1	23.4	0.190	16 600
60BER19HV1V	60	85	13	1.0	0.6			13.6		0.170	22 100
60BER19XV1V	60	85	13	1.0	0.6					0.170	26 300
65BNR19SV1V	65	90	13	1.0	0.6	15.2	13.2	18.7	19.1	0.204	18 100
65BNR19HV1V	65	90	13	1.0	0.6			12.3		0.181	23 300
65BNR19XV1V	65	90	13	1.0	0.6					0.181	27 100
65BER19SV1V	65	90	13	1.0	0.6	14.5	12.6	22.1	24.6	0.204	15 500
65BER19HV1V	65	90	13	1.0	0.6			14.9		0.181	20 700
65BER19XV1V	65	90	13	1.0	0.6					0.181	24 600

Note (1) The limiting speeds listed in the bearing table are reference values applicable to single row bearings. See the note and corresponding table on page 19 for matched bearings used in various arrangements.

BNR 19 Series Nominal contact angle $\alpha = 18^\circ$
BER 19 Series Nominal contact angle $\alpha = 25^\circ$

Bore diameter 70–100 mm



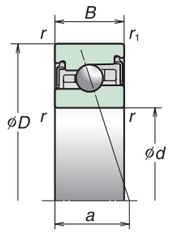
Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (kN)	Effective Load Center (mm)	Mass (kg) (approx)	Limiting Speeds[1] (min⁻¹)
	d	D	B	r (min)	r1 (min)	Cr (Dynamic)	C0r (Static)		a		Grease
70BNR19SV1V	70	100	16	1.0	0.6	21.3	18.1	26.1	21.8	0.328	16 500
70BNR19HV1V	70	100	16	1.0	0.6			17.1		0.292	21 200
70BNR19XV1V	70	100	16	1.0	0.6					0.292	24 800
70BER19SV1V	70	100	16	1.0	0.6	20.4	17.3	30.5	27.8	0.328	14 200
70BER19HV1V	70	100	16	1.0	0.6			20.7		0.292	18 900
70BER19XV1V	70	100	16	1.0	0.6					0.292	22 400
75BNR19SV1V	75	105	16	1.0	0.6	21.6	19.0	27.5	22.6	0.348	15 600
75BNR19HV1V	75	105	16	1.0	0.6			18.0		0.310	20 000
75BNR19XV1V	75	105	16	1.0	0.6					0.310	23 400
75BER19SV1V	75	105	16	1.0	0.6	20.7	18.2	32.5	29.0	0.348	13 400
75BER19HV1V	75	105	16	1.0	0.6			21.7		0.310	17 800
75BER19XV1V	75	105	16	1.0	0.6					0.310	21 200
80BNR19SV1V	80	110	16	1.0	0.6	22.0	19.9	28.9	23.4	0.366	14 800
80BNR19HV1V	80	110	16	1.0	0.6			18.9		0.326	19 000
80BNR19XV1V	80	110	16	1.0	0.6					0.326	22 200
80BER19SV1V	80	110	16	1.0	0.6	21.0	19.1	34.0	30.1	0.366	12 700
80BER19HV1V	80	110	16	1.0	0.6			22.8		0.326	16 900
80BER19XV1V	80	110	16	1.0	0.6					0.326	20 000
85BNR19SV1V	85	120	18	1.1	0.6	29.4	26.3	38.0	25.7	0.527	13 700
85BNR19HV1V	85	120	18	1.1	0.6			24.8		0.456	17 600
85BNR19XV1V	85	120	18	1.1	0.6					0.456	20 500
85BER19SV1V	85	120	18	1.1	0.6	28.1	25.2	35.5	32.9	0.527	11 800
85BER19HV1V	85	120	18	1.1	0.6			30.0		0.456	15 700
85BER19XV1V	85	120	18	1.1	0.6					0.456	18 600
90BNR19SV1V	90	125	18	1.1	0.6	31.5	29.7	43.0	26.5	0.552	13 100
90BNR19HV1V	90	125	18	1.1	0.6			28.1		0.480	16 800
90BNR19XV1V	90	125	18	1.1	0.6					0.480	19 600
90BER19SV1V	90	125	18	1.1	0.6	30.0	28.5	50.5	34.1	0.552	11 200
90BER19HV1V	90	125	18	1.1	0.6			34.0		0.480	14 900
90BER19XV1V	90	125	18	1.1	0.6					0.480	17 700
95BNR19SV1V	95	130	18	1.1	0.6	32.0	31.0	50.0	28.3	0.571	12 500
95BNR19HV1V	95	130	18	1.1	0.6			32.5		0.497	16 000
95BNR19XV1V	95	130	18	1.1	0.6					0.497	18 700
95BER19SV1V	95	130	18	1.1	0.6	30.5	29.7	58.5	36.7	0.571	10 700
95BER19HV1V	95	130	18	1.1	0.6			39.5		0.497	14 300
95BER19XV1V	95	130	18	1.1	0.6					0.497	16 900
100BNR19SV1V	100	140	20	1.1	0.6	38.0	35.0	50.5	29.5	0.770	11 700
100BNR19HV1V	100	140	20	1.1	0.6			33.0		0.673	15 000
100BNR19XV1V	100	140	20	1.1	0.6					0.673	17 500
100BER19SV1V	100	140	20	1.1	0.6	36.0	33.5	59.5	38.0	0.770	10 000
100BER19HV1V	100	140	20	1.1	0.6			40.0		0.673	13 400
100BER19XV1V	100	140	20	1.1	0.6					0.673	15 900

Note (1) The limiting speeds listed in the bearing table are reference values applicable to single row bearings. See the note and corresponding table on page 19 for matched bearings used in various arrangements.

Ultra High-Speed Super Precision Sealed Angular Contact Ball Bearings (ROBUST Series)

BNR 10 Series Nominal contact angle $\alpha = 18^\circ$
BER 10 Series Nominal contact angle $\alpha = 25^\circ$

Bore diameter 30–50 mm

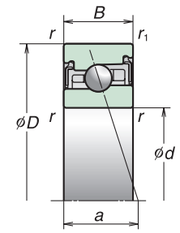


Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (kN)	Effective Load Center (mm)	Mass (kg) (approx)	Limiting Speeds(1) (min−1)
	d	D	B	r (min)	r1 (min)	Cr (Dynamic)	C0r (Static)		a		Grease
30BNR10SV1V	30	55	13	1.0	0.6	8.65	5.75	8.20	13.3	0.124	33 000
30BNR10HV1V	30	55	13	1.0	0.6			5.35		0.116	42 400
30BNR10XV1V	30	55	13	1.0	0.6					0.116	49 500
30BER10SV1V	30	55	13	1.0	0.6	8.30	5.50	9.65	16.3	0.124	28 300
30BER10HV1V	30	55	13	1.0	0.6			6.50		0.116	37 700
30BER10XV1V	30	55	13	1.0	0.6					0.116	44 800
35BNR10SV1V	35	62	14	1.0	0.6	10.1	7.10	10.2	14.8	0.164	28 900
35BNR10HV1V	35	62	14	1.0	0.6			6.70		0.154	37 200
35BNR10XV1V	35	62	14	1.0	0.6					0.154	43 300
35BER10SV1V	35	62	14	1.0	0.6	9.70	6.85	12.0	18.2	0.164	24 800
35BER10HV1V	35	62	14	1.0	0.6			8.10		0.154	33 000
35BER10XV1V	35	62	14	1.0	0.6					0.154	39 200
40BNR10SV1V	40	68	15	1.0	0.6	10.6	7.95	11.5	16.2	0.204	26 000
40BNR10HV1V	40	68	15	1.0	0.6			7.50		0.193	33 400
40BNR10XV1V	40	68	15	1.0	0.6					0.193	38 900
40BER10SV1V	40	68	15	1.0	0.6	10.1	7.65	13.5	19.9	0.204	22 300
40BER10HV1V	40	68	15	1.0	0.6			9.10		0.193	29 700
40BER10XV1V	40	68	15	1.0	0.6					0.193	35 200
45BNR10SV1V	45	75	16	1.0	0.6	11.7	9.00	12.7	17.6	0.259	23 400
45BNR10HV1V	45	75	16	1.0	0.6			8.35		0.246	30 000
45BNR10XV1V	45	75	16	1.0	0.6					0.246	35 000
45BER10SV1V	45	75	16	1.0	0.6	11.2	8.60	15.0	21.8	0.259	20 000
45BER10HV1V	45	75	16	1.0	0.6			10.1		0.246	26 700
45BER10XV1V	45	75	16	1.0	0.6					0.246	31 700
50BNR10SV1V	50	80	16	1.0	0.6	12.2	9.90	14.0	18.4	0.281	21 600
50BNR10HV1V	50	80	16	1.0	0.6			9.20		0.266	27 700
50BNR10XV1V	50	80	16	1.0	0.6					0.266	32 400
50BER10SV1V	50	80	16	1.0	0.6	11.6	9.50	16.5	23.0	0.281	18 500
50BER10HV1V	50	80	16	1.0	0.6			11.1		0.266	24 700
50BER10XV1V	50	80	16	1.0	0.6					0.266	29 300

Note (1) The limiting speeds listed in the bearing table are reference values applicable to single row bearings. See the note and corresponding table on page 19 for matched bearings used in various arrangements.

BNR 10 Series Nominal contact angle $\alpha = 18^\circ$
BER 10 Series Nominal contact angle $\alpha = 25^\circ$

Bore diameter 55–80 mm



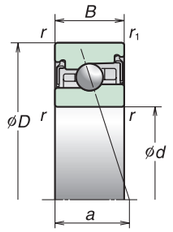
Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load*1 (kN)	Effective Load Center (mm)	Mass (kg) (approx)	Limiting Speeds(1) (min−1)
	d	D	B	r (min)	r1 (min)	Cr (Dynamic)	C0r (Static)		a		Grease
55BNR10SV1V	55	90	18	1.1	0.6	15.1	12.5	17.8	20.6	0.414	19 400
55BNR10HV1V	55	90	18	1.1	0.6			11.7		0.393	24 900
55BNR10XV1V	55	90	18	1.1	0.6					0.393	29 000
55BER10SV1V	55	90	18	1.1	0.6	14.4	12.0	21.0	25.7	0.414	16 600
55BER10HV1V	55	90	18	1.1	0.6			14.1		0.393	22 100
55BER10XV1V	55	90	18	1.1	0.6					0.393	26 300
60BNR10SV1V	60	95	18	1.1	0.6	15.6	13.7	19.5	21.5	0.443	18 100
60BNR10HV1V	60	95	18	1.1	0.6			12.8		0.419	23 300
60BNR10XV1V	60	95	18	1.1	0.6					0.419	27 100
60BER10SV1V	60	95	18	1.1	0.6	15.0	13.1	22.9	26.9	0.443	15 500
60BER10HV1V	60	95	18	1.1	0.6			15.5		0.419	20 700
60BER10XV1V	60	95	18	1.1	0.6					0.419	24 600
65BNR10SV1V	65	100	18	1.1	0.6	16.2	14.8	21.1	22.3	0.472	17 000
65BNR10HV1V	65	100	18	1.1	0.6			13.9		0.447	21 900
65BNR10XV1V	65	100	18	1.1	0.6					0.447	25 500
65BER10SV1V	65	100	18	1.1	0.6	15.5	14.2	24.9	28.0	0.472	14 600
65BER10HV1V	65	100	18	1.1	0.6			16.8		0.447	19 400
65BER10XV1V	65	100	18	1.1	0.6					0.447	23 100
70BNR10SV1V	70	110	20	1.1	0.6	22.3	19.8	28.6	24.5	0.645	15 600
70BNR10HV1V	70	110	20	1.1	0.6			18.8		0.605	20 000
70BNR10XV1V	70	110	20	1.1	0.6					0.605	23 400
70BER10SV1V	70	110	20	1.1	0.6	21.3	18.9	33.5	30.8	0.645	13 400
70BER10HV1V	70	110	20	1.1	0.6			22.6		0.605	17 800
70BER10XV1V	70	110	20	1.1	0.6					0.605	21 200
75BNR10SV1V	75	115	20	1.1	0.6	22.6	20.7	30.0	25.3	0.679	14 800
75BNR10HV1V	75	115	20	1.1	0.6			19.7		0.638	19 000
75BNR10XV1V	75	115	20	1.1	0.6					0.638	22 200
75BER10SV1V	75	115	20	1.1	0.6	21.6	19.8	35.0	31.9	0.679	12 700
75BER10HV1V	75	115	20	1.1	0.6			23.7		0.638	16 900
75BER10XV1V	75	115	20	1.1	0.6					0.638	20 000
80BNR10SV1V	80	125	22	1.1	0.6	26.5	24.5	35.5	27.5	0.921	13 700
80BNR10HV1V	80	125	22	1.1	0.6			23.4		0.867	17 600
80BNR10XV1V	80	125	22	1.1	0.6					0.867	20 500
80BER10SV1V	80	125	22	1.1	0.6	25.3	23.5	42.0	34.6	0.921	11 800
80BER10HV1V	80	125	22	1.1	0.6			28.2		0.867	15 700
80BER10XV1V	80	125	22	1.1	0.6					0.867	18 600

Note (1) The limiting speeds listed in the bearing table are reference values applicable to single row bearings. See the note and corresponding table on page 19 for matched bearings used in various arrangements.

Ultra High-Speed Super Precision Sealed Angular Contact Ball Bearings (ROBUST Series)

BNR 10 Series Nominal contact angle $\alpha = 18^\circ$
BER 10 Series Nominal contact angle $\alpha = 25^\circ$

Bore diameter 85–100 mm



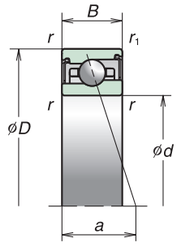
Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (kN)	Effective Load Center (mm)	Mass (kg) (approx)	Limiting Speeds(1) (min⁻¹)
	d	*D*	*B*	*r* (min)	r_1 (min)	C_r (Dynamic)	C_{0r} (Static)		*a*		Grease
85BNR10SV1V	85	130	22	1.1	0.6	26.8	25.7	37.5	28.4	0.962	13 100
85BNR10HV1V	85	130	22	1.1	0.6			24.5		0.906	16 800
85BNR10XV1V	85	130	22	1.1	0.6					0.906	19 600
85BER10SV1V	85	130	22	1.1	0.6	25.6	24.6	43.5	36.1	0.962	11 200
85BER10HV1V	85	130	22	1.1	0.6			29.5		0.906	14 900
85BER10XV1V	85	130	22	1.1	0.6					0.906	17 700
90BNR10SV1V	90	140	24	1.5	1.0	35.0	33.0	48.0	30.7	1.241	12 200
90BNR10HV1V	90	140	24	1.5	1.0			31.5		1.155	15 700
90BNR10XV1V	90	140	24	1.5	1.0					1.155	18 300
90BER10SV1V	90	140	24	1.5	1.0	33.5	31.5	56.0	38.8	1.241	10 500
90BER10HV1V	90	140	24	1.5	1.0			38.0		1.155	14 000
90BER10XV1V	90	140	24	1.5	1.0					1.155	16 600
95BNR10SV1V	95	145	24	1.5	1.0	35.5	34.5	50.0	31.3	1.298	11 700
95BNR10HV1V	95	145	24	1.5	1.0			32.5		1.209	15 000
95BNR10XV1V	95	145	24	1.5	1.0					1.209	17 500
95BER10SV1V	95	145	24	1.5	1.0	34.0	33.0	58.5	39.7	1.298	10 000
95BER10HV1V	95	145	24	1.5	1.0			39.5		1.209	13 400
95BER10XV1V	95	145	24	1.5	1.0					1.209	15 900
100BNR10SV1V	100	150	24	1.5	1.0	36.0	36.0	52.0	32.3	1.245	11 200
100BNR10HV1V	100	150	24	1.5	1.0			34.0		1.253	14 400
100BNR10XV1V	100	150	24	1.5	1.0					1.253	16 800
100BER10SV1V	100	150	24	1.5	1.0	34.5	34.5	61.0	41.2	1.245	9 600
100BER10HV1V	100	150	24	1.5	1.0			41.0		1.253	12 800
100BER10XV1V	100	150	24	1.5	1.0					1.253	15 200

Note (1) The limiting speeds listed in the bearing table are reference values applicable to single row bearings. See the note and corresponding table on page 19 for matched bearings used in various arrangements.

Ultra High-Speed Super Precision Sealed Angular Contact Ball Bearings (ROBUST Wide Series)

BNR 29 Series Nominal contact angle $\alpha = 18^\circ$
BER 29 Series Nominal contact angle $\alpha = 25^\circ$

Bore diameter 30–50 mm

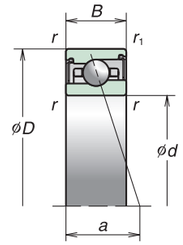


Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (kN)	Effective Load Center (mm)	Mass (kg) (approx)	Limiting Speeds[1] (min⁻¹)
	d	D	B	r (min)	r1 (min)	Cr (Dynamic)	C0r (Static)		a		Grease
30BNR29SV1V	30	47	11	0.3	0.15	6.30	4.05	5.75	11.8	0.057	36 400
30BNR29HV1V	30	47	11	0.3	0.15			3.80		0.053	46 800
30BNR29XV1V	30	47	11	0.3	0.15					0.053	54 600
30BER29SV1V	30	47	11	0.3	0.15	6.00	3.90	6.80	14.5	0.057	31 200
30BER29HV1V	30	47	11	0.3	0.15			4.60		0.053	41 600
30BER29XV1V	30	47	11	0.3	0.15					0.053	49 400
35BNR29SV1V	35	55	13	0.6	0.3	9.20	6.00	8.55	13.8	0.091	31 200
35BNR29HV1V	35	55	13	0.6	0.3			5.60		0.081	40 000
35BNR29XV1V	35	55	13	0.6	0.3					0.081	46 700
35BER29SV1V	35	55	13	0.6	0.3	8.80	5.75	10.0	17.0	0.091	26 700
35BER29HV1V	35	55	13	0.6	0.3			6.80		0.081	35 600
35BER29XV1V	35	55	13	0.6	0.3					0.081	42 300
40BNR29SV1V	40	62	14	0.6	0.3	11.5	7.65	10.8	15.3	0.120	27 500
40BNR29HV1V	40	62	14	0.6	0.3			7.10		0.107	35 300
40BNR29XV1V	40	62	14	0.6	0.3					0.107	41 200
40BER29SV1V	40	62	14	0.6	0.3	11.0	7.35	12.8	18.9	0.120	23 600
40BER29HV1V	40	62	14	0.6	0.3			8.65		0.107	31 400
40BER29XV1V	40	62	14	0.6	0.3					0.107	37 300
45BNR29SV1V	45	68	14	0.6	0.3	12.1	8.70	12.4	16.2	0.143	24 800
45BNR29HV1V	45	68	14	0.6	0.3			8.10		0.128	31 900
45BNR29XV1V	45	68	14	0.6	0.3					0.128	37 200
45BER29SV1V	45	68	14	0.6	0.3	11.6	8.35	14.6	20.2	0.143	21 300
45BER29HV1V	45	68	14	0.6	0.3			9.85		0.128	28 400
45BER29XV1V	45	68	14	0.6	0.3					0.128	33 700
50BNR29SV1V	50	72	14	0.6	0.3	12.8	9.75	13.9	16.9	0.144	23 000
50BNR29HV1V	50	72	14	0.6	0.3			9.10		0.128	29 600
50BNR29XV1V	50	72	14	0.6	0.3					0.128	34 500
50BER29SV1V	50	72	14	0.6	0.3	12.3	9.35	16.3	21.2	0.144	19 700
50BER29HV1V	50	72	14	0.6	0.3			11.0		0.128	26 300
50BER29XV1V	50	72	14	0.6	0.3					0.128	31 200

Note (1) The limiting speeds listed in the bearing table are reference values applicable to single row bearings. See the note and corresponding table on page 19 for matched bearings used in various arrangements.

BNR 29 Series Nominal contact angle $\alpha = 18^\circ$
BER 29 Series Nominal contact angle $\alpha = 25^\circ$

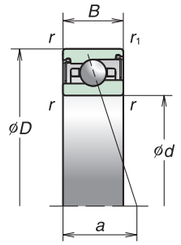
Bore diameter 55–80 mm



Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (kN)	Effective Load Center (mm)	Mass (kg) (approx)	Limiting Speeds[1] (min⁻¹)
	d	D	B	r (min)	r1 (min)	Cr (Dynamic)	C0r (Static)		a		Grease
55BNR29SV1V	55	80	16	1.0	0.6	14.4	11.4	16.2	19.0	0.213	20 800
55BNR29HV1V	55	80	16	1.0	0.6			10.6		0.194	26 700
55BNR29XV1V	55	80	16	1.0	0.6					0.194	31 200
55BER29SV1V	55	80	16	1.0	0.6	13.8	10.9	16.1	23.7	0.213	17 800
55BER29HV1V	55	80	16	1.0	0.6			12.9		0.194	23 800
55BER29XV1V	55	80	16	1.0	0.6					0.194	28 200
60BNR29SV1V	60	85	16	1.0	0.6	14.6	12.0	17.1	19.8	0.228	19 400
60BNR29HV1V	60	85	16	1.0	0.6			11.2		0.208	24 900
60BNR29XV1V	60	85	16	1.0	0.6					0.208	29 000
60BER29SV1V	60	85	16	1.0	0.6	14.0	11.5	20.1	24.9	0.228	16 600
60BER29HV1V	60	85	16	1.0	0.6			13.6		0.208	22 100
60BER29XV1V	60	85	16	1.0	0.6					0.208	26 300
65BNR29SV1V	65	90	16	1.0	0.6	15.2	13.2	18.7	20.6	0.245	18 100
65BNR29HV1V	65	90	16	1.0	0.6			12.3		0.223	23 300
65BNR29XV1V	65	90	16	1.0	0.6					0.223	27 100
65BER29SV1V	65	90	16	1.0	0.6	14.5	12.6	22.1	26.1	0.245	15 500
65BER29HV1V	65	90	16	1.0	0.6			14.9		0.223	20 700
65BER29XV1V	65	90	16	1.0	0.6					0.223	24 600
70BNR29SV1V	70	100	19	1.0	0.6	21.3	18.1	26.1	23.3	0.381	16 500
70BNR29HV1V	70	100	19	1.0	0.6			17.1		0.344	21 200
70BNR29XV1V	70	100	19	1.0	0.6					0.344	24 800
70BER29SV1V	70	100	19	1.0	0.6	20.4	17.3	30.5	29.3	0.381	14 200
70BER29HV1V	70	100	19	1.0	0.6			20.7		0.344	18 900
70BER29XV1V	70	100	19	1.0	0.6					0.344	22 400
75BNR29SV1V	75	105	19	1.0	0.6	21.6	19.0	27.5	24.1	0.403	15 600
75BNR29HV1V	75	105	19	1.0	0.6			18.0		0.365	20 000
75BNR29XV1V	75	105	19	1.0	0.6					0.365	23 400
75BER29SV1V	75	105	19	1.0	0.6	20.7	18.2	32.5	30.5	0.403	13 400
75BER29HV1V	75	105	19	1.0	0.6			21.7		0.365	17 800
75BER29XV1V	75	105	19	1.0	0.6					0.365	21 200
80BNR29SV1V	80	110	19	1.0	0.6	22.0	19.9	28.9	24.9	0.425	14 800
80BNR29HV1V	80	110	19	1.0	0.6			18.9		0.385	19 000
80BNR29XV1V	80	110	19	1.0	0.6					0.385	22 200
80BER29SV1V	80	110	19	1.0	0.6	21.0	19.1	34.0	31.6	0.425	12 700
80BER29HV1V	80	110	19	1.0	0.6			22.8		0.385	16 900
80BER29XV1V	80	110	19	1.0	0.6					0.385	20 000

Note (1) The limiting speeds listed in the bearing table are reference values applicable to single row bearings. See the note and corresponding table on page 19 for matched bearings used in various arrangements.

Ultra High-Speed Super Precision Sealed Angular Contact Ball Bearings (ROBUST Wide Series)

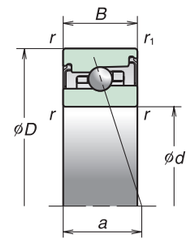


BNR 29 Series Nominal contact angle $\alpha = 18^\circ$
BER 29 Series Nominal contact angle $\alpha = 25^\circ$

Bore diameter 85–100 mm

Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (kN)	Effective Load Center (mm)	Mass (kg) (approx)	Limiting Speeds[1] (min⁻¹)
	d	D	B	r (min)	r1 (min)	Cr (Dynamic)	C0r (Static)		a		Grease
85BNR29SV1V	85	120	22	1.1	0.6	29.4	26.3	38.0	27.7	0.617	13 700
85BNR29HV1V	85	120	22	1.1	0.6			24.8		0.554	17 600
85BNR29XV1V	85	120	22	1.1	0.6					0.554	20 500
85BER29SV1V	85	120	22	1.1	0.6	28.1	25.2	35.5	34.9	0.617	11 800
85BER29HV1V	85	120	22	1.1	0.6			30.0		0.554	15 700
85BER29XV1V	85	120	22	1.1	0.6					0.554	18 600
90BNR29SV1V	90	125	22	1.1	0.6	31.5	29.7	43.0	28.5	0.653	13 100
90BNR29HV1V	90	125	22	1.1	0.6			28.1		0.582	16 800
90BNR29XV1V	90	125	22	1.1	0.6					0.582	19 600
90BER29SV1V	90	125	22	1.1	0.6	30.0	28.5	50.5	36.1	0.653	11 200
90BER29HV1V	90	125	22	1.1	0.6			34.0		0.582	14 900
90BER29XV1V	90	125	22	1.1	0.6					0.582	17 700
95BNR29SV1V	95	130	22	1.1	0.6	32.0	31.0	50.0	29.3	0.758	12 500
95BNR29HV1V	95	130	22	1.1	0.6			32.5		0.684	16 000
95BNR29XV1V	95	130	22	1.1	0.6					0.684	18 700
95BER29SV1V	95	130	22	1.1	0.6	30.5	29.7	58.5	37.2	0.758	10 700
95BER29HV1V	95	130	22	1.1	0.6			39.5		0.684	14 300
95BER29XV1V	95	130	22	1.1	0.6					0.684	16 900
100BNR29SV1V	100	140	24	1.1	0.6	38.0	35.0	50.5	31.5	0.770	11 700
100BNR29HV1V	100	140	24	1.1	0.6			33.0		0.673	15 000
100BNR29XV1V	100	140	24	1.1	0.6					0.673	17 500
100BER29SV1V	100	140	24	1.1	0.6	36.0	33.5	59.5	40.0	0.902	10 000
100BER29HV1V	100	140	24	1.1	0.6			40.0		0.805	13 400
100BER29XV1V	100	140	24	1.1	0.6					0.805	15 900

Note (1) The limiting speeds listed in the bearing table are reference values applicable to single row bearings. See the note and corresponding table on page 19 for matched bearings used in various arrangements.



BNR 20 Series Nominal contact angle $\alpha = 18^\circ$
BER 20 Series Nominal contact angle $\alpha = 25^\circ$

Bore diameter 30–50 mm

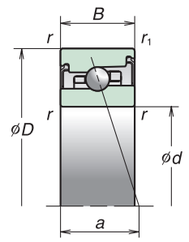
Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (kN)	Effective Load Center (mm)	Mass (kg) (approx)	Limiting Speeds[1] (min⁻¹)
	d	D	B	r (min)	r1 (min)	Cr (Dynamic)	C0r (Static)		a		Grease
30BNR20SV1V	30	55	16	1.0	0.6	8.65	5.75	8.20	14.9	0.150	33 000
30BNR20HV1V	30	55	16	1.0	0.6			5.35		0.142	42 400
30BNR20XV1V	30	55	16	1.0	0.6					0.142	49 500
30BER20SV1V	30	55	16	1.0	0.6	8.30	5.50	9.65	17.9	0.150	28 300
30BER20HV1V	30	55	16	1.0	0.6			6.50		0.142	37 700
30BER20XV1V	30	55	16	1.0	0.6					0.142	44 800
35BNR20SV1V	35	62	17	1.0	0.6	10.1	7.10	10.2	16.4	0.197	28 900
35BNR20HV1V	35	62	17	1.0	0.6			6.70		0.187	37 200
35BNR20XV1V	35	62	17	1.0	0.6					0.187	43 300
35BER20SV1V	35	62	17	1.0	0.6	9.70	6.85	12.0	19.8	0.197	24 800
35BER20HV1V	35	62	17	1.0	0.6			8.10		0.187	33 000
35BER20XV1V	35	62	17	1.0	0.6					0.187	39 200
40BNR20SV1V	40	68	18	1.0	0.6	10.6	7.95	11.5	17.8	0.242	26 000
40BNR20HV1V	40	68	18	1.0	0.6			7.50		0.231	33 400
40BNR20XV1V	40	68	18	1.0	0.6					0.231	38 900
40BER20SV1V	40	68	18	1.0	0.6	10.1	7.65	13.5	21.6	0.242	22 300
40BER20HV1V	40	68	18	1.0	0.6			9.10		0.231	29 700
40BER20XV1V	40	68	18	1.0	0.6					0.231	35 200
45BNR20SV1V	45	75	19	1.0	0.6	11.7	9.00	12.7	19.2	0.305	23 400
45BNR20HV1V	45	75	19	1.0	0.6			8.35		0.291	30 000
45BNR20XV1V	45	75	19	1.0	0.6					0.291	35 000
45BER20SV1V	45	75	19	1.0	0.6	11.2	8.60	15.0	23.5	0.305	20 000
45BER20HV1V	45	75	19	1.0	0.6			10.1		0.291	26 700
45BER20XV1V	45	75	19	1.0	0.6					0.291	31 700
50BNR20SV1V	50	80	19	1.0	0.6	12.2	9.90	14.0	20.1	0.330	21 600
50BNR20HV1V	50	80	19	1.0	0.6			9.20		0.315	27 700
50BNR20XV1V	50	80	19	1.0	0.6					0.315	32 400
50BER20SV1V	50	80	19	1.0	0.6	11.6	9.50	16.5	24.7	0.330	18 500
50BER20HV1V	50	80	19	1.0	0.6			11.1		0.315	24 700
50BER20XV1V	50	80	19	1.0	0.6					0.315	29 300

Note (1) The limiting speeds listed in the bearing table are reference values applicable to single row bearings. See the note and corresponding table on page 19 for matched bearings used in various arrangements.

Ultra High-Speed Super Precision Sealed Angular Contact Ball Bearings (ROBUST Wide Series)

BNR 20 Series Nominal contact angle $\alpha = 18^\circ$
BER 20 Series Nominal contact angle $\alpha = 25^\circ$

Bore diameter 55–80 mm

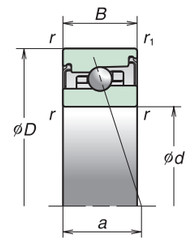


Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (kN)	Effective Load Center (mm)	Mass (kg) (approx)	Limiting Speeds[1] (min⁻¹)
	d	D	B	r (min)	r1 (min)	Cr (Dynamic)	C0r (Static)		a		Grease
55BNR20SV1V	55	90	22	1.1	0.6	15.1	12.5	17.8	22.8	0.501	19 400
55BNR20HV1V	55	90	22	1.1	0.6			11.7		0.480	24 900
55BNR20XV1V	55	90	22	1.1	0.6					0.480	29 000
55BER20SV1V	55	90	22	1.1	0.6	14.4	12.0	21.0	27.9	0.501	16 600
55BER20HV1V	55	90	22	1.1	0.6			14.1		0.480	22 100
55BER20XV1V	55	90	22	1.1	0.6					0.480	26 300
60BNR20SV1V	60	95	22	1.1	0.6	15.6	13.7	19.5	23.6	0.535	18 100
60BNR20HV1V	60	95	22	1.1	0.6			12.8		0.512	23 300
60BNR20XV1V	60	95	22	1.1	0.6					0.512	27 100
60BER20SV1V	60	95	22	1.1	0.6	15.0	13.1	22.9	29.1	0.535	15 500
60BER20HV1V	60	95	22	1.1	0.6			15.5		0.512	20 700
60BER20XV1V	60	95	22	1.1	0.6					0.512	24 600
65BNR20SV1V	65	100	22	1.1	0.6	16.2	14.8	21.1	24.4	0.570	17 000
65BNR20HV1V	65	100	22	1.1	0.6			13.9		0.545	21 900
65BNR20XV1V	65	100	22	1.1	0.6					0.545	25 500
65BER20SV1V	65	100	22	1.1	0.6	15.5	14.2	24.9	30.2	0.570	14 600
65BER20HV1V	65	100	22	1.1	0.6			16.8		0.545	19 400
65BER20XV1V	65	100	22	1.1	0.6					0.545	23 100
70BNR20SV1V	70	110	24	1.1	0.6	22.3	19.8	28.6	26.6	0.764	15 600
70BNR20HV1V	70	110	24	1.1	0.6			18.8		0.724	20 000
70BNR20XV1V	70	110	24	1.1	0.6					0.724	23 400
70BER20SV1V	70	110	24	1.1	0.6	21.3	18.9	33.5	33.0	0.764	13 400
70BER20HV1V	70	110	24	1.1	0.6			22.6		0.724	17 800
70BER20XV1V	70	110	24	1.1	0.6					0.724	21 200
75BNR20SV1V	75	115	24	1.1	0.6	22.6	20.7	30.0	27.4	0.806	14 800
75BNR20HV1V	75	115	24	1.1	0.6			19.7		0.764	19 000
75BNR20XV1V	75	115	24	1.1	0.6					0.764	22 200
75BER20SV1V	75	115	24	1.1	0.6	21.6	19.8	35.0	34.1	0.806	12 700
75BER20HV1V	75	115	24	1.1	0.6			23.7		0.764	16 900
75BER20XV1V	75	115	24	1.1	0.6					0.764	20 000
80BNR20SV1V	80	125	27	1.1	0.6	26.5	24.5	35.5	30.2	1.115	13 700
80BNR20HV1V	80	125	27	1.1	0.6			23.4		1.061	17 600
80BNR20XV1V	80	125	27	1.1	0.6					1.061	20 500
80BER20SV1V	80	125	27	1.1	0.6	25.3	23.5	42.0	37.4	1.115	11 800
80BER20HV1V	80	125	27	1.1	0.6			28.2		1.061	15 700
80BER20XV1V	80	125	27	1.1	0.6					1.061	18 600

Note (1) The limiting speeds listed in the bearing table are reference values applicable to single row bearings. See the note and corresponding table on page 19 for matched bearings used in various arrangements.

BNR 20 Series Nominal contact angle $\alpha = 18^\circ$
BER 20 Series Nominal contact angle $\alpha = 25^\circ$

Bore diameter 85–100 mm



Bearing Numbers	Boundary Dimensions (mm)					Basic Load Ratings (kN)		Permissible Axial Load (kN)	Effective Load Center (mm)	Mass (kg) (approx)	Limiting Speeds[1] (min⁻¹)
	d	D	B	r (min)	r1 (min)	Cr (Dynamic)	C0r (Static)		a		Grease
85BNR20SV1V	85	130	27	1.1	0.6	26.8	25.7	37.5	31.0	1.163	13 100
85BNR20HV1V	85	130	27	1.1	0.6			24.5		1.107	16 800
85BNR20XV1V	85	130	27	1.1	0.6					1.107	19 600
85BER20SV1V	85	130	27	1.1	0.6	25.6	24.6	43.5	38.6	1.163	11 200
85BER20HV1V	85	130	27	1.1	0.6			29.5		1.107	14 900
85BER20XV1V	85	130	27	1.1	0.6					1.107	17 700
90BNR20SV1V	90	140	30	1.5	1.0	35.0	33.0	48.0	33.7	1.521	12 200
90BNR20HV1V	90	140	30	1.5	1.0			31.5		1.436	15 700
90BNR20XV1V	90	140	30	1.5	1.0					1.436	18 300
90BER20SV1V	90	140	30	1.5	1.0	33.5	31.5	56.0	41.8	1.521	10 500
90BER20HV1V	90	140	30	1.5	1.0			38.0		1.436	14 000
90BER20XV1V	90	140	30	1.5	1.0					1.436	16 600
95BNR20SV1V	95	145	30	1.5	1.0	35.5	34.5	50.0	34.5	1.595	11 700
95BNR20HV1V	95	145	30	1.5	1.0			32.5		1.506	15 000
95BNR20XV1V	95	145	30	1.5	1.0					1.506	17 500
95BER20SV1V	95	145	30	1.5	1.0	34.0	33.0	58.5	43.0	1.595	10 000
95BER20HV1V	95	145	30	1.5	1.0			39.5		1.506	13 400
95BER20XV1V	95	145	30	1.5	1.0					1.506	15 900
100BNR20SV1V	100	150	30	1.5	1.0	36.0	36.0	52.0	35.3	1.650	11 200
100BNR20HV1V	100	150	30	1.5	1.0			34.0		1.558	14 400
100BNR20XV1V	100	150	30	1.5	1.0					1.558	16 800
100BER20SV1V	100	150	30	1.5	1.0	34.5	34.5	61.0	44.1	1.650	9 600
100BER20HV1V	100	150	30	1.5	1.0			41.0		1.558	12 800
100BER20XV1V	100	150	30	1.5	1.0					1.558	15 200

Note (1) The limiting speeds listed in the bearing table are reference values applicable to single row bearings. See the note and corresponding table on page 19 for matched bearings used in various arrangements.

Numbering System of Sealed Angular Contact Thrust Ball Bearings for Ball Screw Support

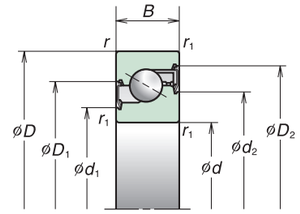
Example: 30 | TAC | 62 | B | DDG | SU | C10 | PN7B

- 30 — Bore diameter
- TAC — Bearing type symbol
- 62 — Outer diameter
- B — Internal design symbol
- DDG — Seal symbol
- SU — Arrangement symbol
- C10 — Preload symbol
- PN7B — Accuracy symbol

30	**Bore diameter**	Bore diameter (mm)
TAC	**Bearing type**	Angular contact thrust ball bearing; 60° contact angle
62	**Outer diameter**	Outer diameter (mm)
B	**Internal design**	
DDG	**Seal**	DDG: non-contact rubber seal(1)
SU	**Arrangement**	SU: universal arrangement (single row) / DU: universal arrangement (double row)
C10	**Preload**	C10: standard preload / C9: light preload (low torque specification)
PN7B	**Accuracy**	PN7A: standard accuracy (equivalent to ISO Class 4) PN7B: special accuracy (Bore diameter and outside diameter are exclusive to NSK. Equivalent to ISO Class 4; for SU arrangement only.)

Note (1) Sealed Angular Contact Thrust Ball Bearings for Ball Screw Support are SU arrangement and PN7B class as a standard.

Sealed Angular Contact Thrust Ball Bearings for Ball Screw Support



TAC B Series Nominal contact angle $\alpha = 60^\circ$

Bore diameter 15–45 mm

Bearing Numbers	Boundary Dimensions (mm)					Reference Dimensions (mm)				Limiting Speeds(1) (min⁻¹)
	d	*D*	*B*	*r* (min)	r_1 (min)	d_1	d_2	D_1	D_2	Grease
15 TAC 47BDDG	15	47	15	1.0	0.6	25.1	30.8	36	41.8	6 000
17 TAC 47BDDG	17	47	15	1.0	0.6	25.1	30.8	36	41.8	6 000
20 TAC 47BDDG	20	47	15	1.0	0.6	25.1	30.8	36	41.8	6 000
25 TAC 62BDDG	25	62	15	1.0	0.6	34.3	40.5	46.5	52.9	4 500
30 TAC 62BDDG	30	62	15	1.0	0.6	36.8	43	49	55.4	4 300
35 TAC 72BDDG	35	72	15	1.0	0.6	44.3	50.5	56.5	62.9	3 600
40 TAC 72BDDG	40	72	15	1.0	0.6	46.3	52.5	58.5	64.9	3 600
40 TAC 90BDDG	40	90	20	1.0	0.6	54	64	70	79.4	3 000
45 TAC 100BDDG	45	100	20	1.0	0.6	61	71	77	86.4	2 600

Note (1) Limiting speeds are based on C10 preload. In case of C9 preload, the figures become 1.3 times of the figures listed above. The figures are free from influences of the arrangement type.

Bearing Numbers	Dynamic Load Rating Ca			Limiting Axial Load(2)			Mass (kg) (approx)
	Single Row Load DF, DB	Double Row Load DT, DFD, DBD, DFF, DBB	Triple Row Load DTD, DFT, DBT	Single Row Load DF, DB	Double Row Load DT, DFD, DBD, DFF, DBB	Triple Row Load DTD, DFT, DBT	
	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	
15 TAC 47BDDG	21.9	35.5	47.5	26.6	53.0	79.5	0.144
17 TAC 47BDDG	21.9	35.5	47.5	26.6	53.0	79.5	0.144
20 TAC 47BDDG	21.9	35.5	47.5	26.6	53.0	79.5	0.135
25 TAC 62BDDG	28.5	46.5	61.5	40.5	81.5	122	0.252
30 TAC 62BDDG	29.2	47.5	63.0	43.0	86.0	129	0.224
35 TAC 72BDDG	31.0	50.5	67.0	50.0	100	150	0.310
40 TAC 72BDDG	31.5	51.5	68.5	52.0	104	157	0.275
40 TAC 90BDDG	59.0	95.5	127	89.5	179	269	0.674
45 TAC 100BDDG	61.5	100	133	99.0	198	298	0.842

Note (2) Permissible axial load equals 0.7 times of limiting axial load.

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