NSK

ROBUSTDYNA ANGULAR CONTACT BALL BEARINGS



BRANDS OF **NSK EUROPE**

NSK RHP *bearings* PPL

HIGH LOAD CAPACITY AND ULTRA-HIGH SPEED FOR MACHINE TOOL SPINDLES

ENABLING HIGHLY VERSATILE, ULTRA-HIGH SPEED MACHINING

ROBUSTDYNA angular contact ball bearings are a result of NSK's expertise with material engineering and design optimisation for machine tool bearings, excelling at both heavy cutting and ultra-high speed finishing.

With an optimised internal design that considerably expands their performance envelope, ROBUSTDYNA bearings support reduced machining time and stable operation over a longer operating life with:

- **Higher machining capacity** with maximum load capacity increased by 15% compared to NSKROBUST equivalents
- **Longer spindle life** with a 40% increase in dynamic load rating that extends bearing fatigue life as much as 3 times
- **Higher impact resistance** with higher static load ratings that reduce the risk of bearing damage
- **Ultra-high speed performance** with NSK's proprietary heat and seizure-resistant SHX steel achieving limiting speeds as great as 3 million d_mN



HIGHER CAPACITY. HIGHER SPEED. LONGER OPERATING LIFE.

Built on the foundation of advanced material and analysis technologies behind NSK's proven ultra-high speed NSKROBUST line-up, ROBUSTDYNA angular contact ball bearings boast an optimised internal design to support heavy cutting of materials such as titanium alloys and ceramics with stability and durability. Without sacrifice to high-speed finishing capabilities.

For stable operation over a long operating life, ROBUSTDYNA bearings are available with long-life SHJ steel inner and outer rings. For superior heat resistance and utmost limiting speeds, SHX steel is available.

X-type
with heat-resistant SHX steel

J-type
with long-life SHJ steel



Left: ROBUSTDYNA with phenolic resin cage

Right: Sealed ROBUSTDYNA with polyamide resin cage

DESIGN FEATURES

- **Optimised internal design** with larger sized rolling elements for increased load ratings
- **Silicon nitride (Si_3N_4) ceramic balls** for outstanding speed and accuracy with low heat generation and high seizure resistance
- **High-performance polyamide and phenolic resin cages** for stable, ultra-high speed operation
- **J-type option with long-life SHJ steel rings** that deliver twice the fatigue life than standard SUJ2 bearing steel
- **X-type option with heat-resistant SHX steel rings** that deliver 4 times longer fatigue life and 20% higher limiting speeds than standard SUJ2 bearing steel
- **Non-contact seal option** prevents contamination and lubricant breakdown, extending grease life
- **Optional oil-air lubrication features** for a continuous supply of lubrication to the bearing working surfaces
- Available with 18° (**BNRD** type) and 25° (**BERD** type) contact angles

DESIGNATION SYSTEM

ROBUSTDYNA ANGULAR CONTACT BALL BEARINGS

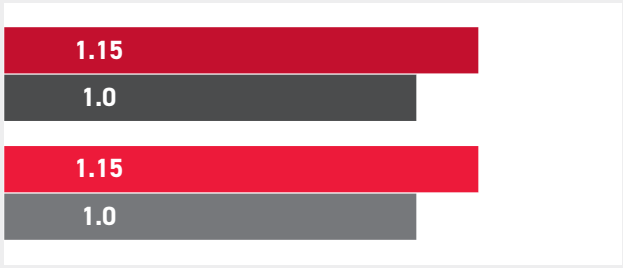
Nominal Bore Diameter		Dimension Series		Cage	Seal		Arrangement		Accuracy	
70	BNRD	10	X	TR		E34D	SU	EL	P4Y	+Y3
Type - Contact Angle		Type - Materials			Lubrication Feature		Preload		Accessories	

DESIGNATION		ATTRIBUTE
Nominal bore diameter		expressed in millimeters
Type - contact angle	BNRD	18° contact angle
	BERD	25° contact angle
Dimension series	10	10 series
Type - materials	J	SHJ steel rings with ceramic balls
	X	SHX steel rings with ceramic balls
Cage	TYN	ball guided, polyamide resin
	TR	outer ring guided, phenolic resin
Seal	blank	open bearing
	V1V	non-contact rubber seal
Arrangement	SU	single row, universal matching
	DU	double row, universal matching
	DUD	three row, universal matching
	QU	four row, universal matching

DESIGNATION		ATTRIBUTE
Lubrication feature	blank	no lubrication features
	E34D	outer ring lubrication groove, holes and 2 O-ring grooves
Preload	EL	extra-light preload
	L	light preload
Accuracy	P2	ISO class 2
	P3	dimensional accuracy ISO class 4, running accuracy ISO class 2
	P4	ISO class 4
	P4Y	special dimensional accuracy with running accuracy ISO class 4
Accessories	blank	standard outer ring
	+Y3	2 x O-rings mounted on the outer ring



Load capacity, ROBUSTDYNA v. NSKROBUST



Rolling fatigue life, ROBUSTDYNA v. NSKROBUST



Limiting speed, ROBUSTDYNA v. NSKROBUST



ROBUSTDYNA X-type
SHX steel rings

ROBUSTDYNA J-type
SHJ steel rings

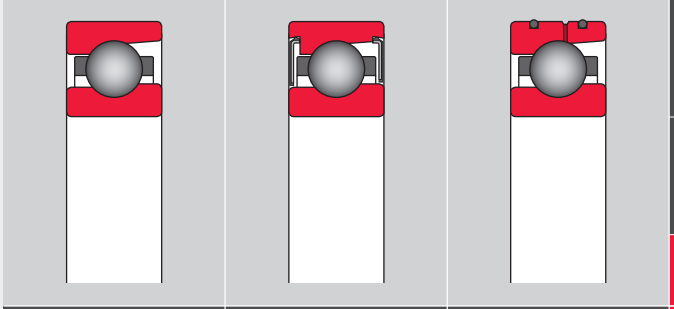
NSKROBUST X-type
SHX steel rings

NSKROBUST H-type
SUJ2 steel rings



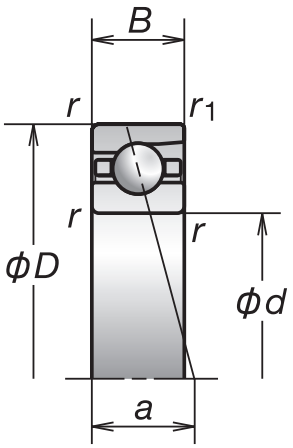
Right: NSK ROBUSTDYNA
Left: NSKROBUST

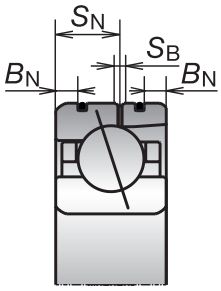
ROBUSTDYNA types and design features



Open	Sealed	Direct lube

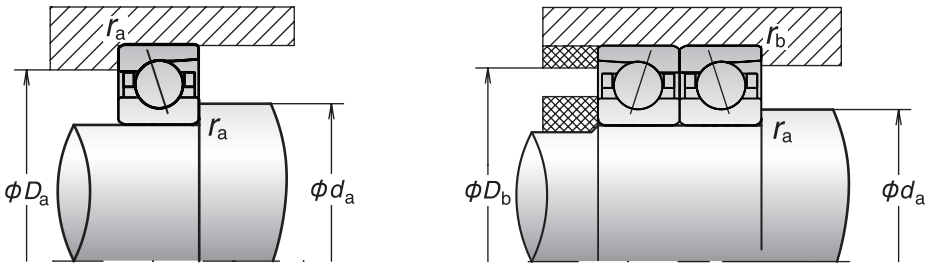
Contact angle	BNRD	18° contact angle
	BERD	25° contact angle
Type / material	J	SHJ steel rings with ceramic balls
	X	SHX steel rings with ceramic balls
Lubrication		non-contact V1V seal
Lubrication feature option		outer ring lubrication groove, holes





Direct lubrication
feature available for all
ROBUSTDYNA designations

Bearing Designation	Boundary Dimensions (mm)								Basic Load Ratings (kN)		Permissible Axial Load (kN)	Contact angle (°)	Factor fo	Effective Load Center (mm) a	Limiting Speeds (min^{-1})	
	d	D	B	B_N	S_N	S_B	r (min.)	r_1 (min.)	Cr (Dynamic)	Cor (Static)					Grease	Oil
40BNRD10J	40	68	15	2.8	8.8	1.4	1	0.6	22.6	8.0	7.7	18	7.9	16.3	33400	51900
40BNRD10X	40	68	15	2.8	8.8	1.4	1	0.6	28.5	8.0	7.7	18	7.9	16.3	38900	61200
40BERD10J	40	68	15	2.8	8.8	1.4	1	0.6	21.8	7.7	9.45	25	-	20.1	29700	46300
40BERD10X	40	68	15	2.8	8.8	1.4	1	0.6	27.4	7.7	9.45	25	-	20.1	35200	55600
45BNRD10J	45	75	16	3.4	9.3	1.4	1	0.6	26.9	9.75	9.4	18	7.9	17.8	30000	46700
45BNRD10X	45	75	16	3.4	9.3	1.4	1	0.6	34.0	9.75	9.4	18	7.9	17.8	35000	55000
45BERD10J	45	75	16	3.4	9.3	1.4	1	0.6	25.9	9.35	11.5	25	-	22.0	26700	41700
45BERD10X	45	75	16	3.4	9.3	1.4	1	0.6	32.5	9.35	11.5	25	-	22.0	31700	50000
50BNRD10J	50	80	16	3.4	9.3	1.4	1	0.6	28.7	11.1	10.7	18	8.1	18.6	27700	43100
50BNRD10X	50	80	16	3.4	9.3	1.4	1	0.6	36.0	11.1	10.7	18	8.1	18.6	32400	50800
50BERD10J	50	80	16	3.4	9.3	1.4	1	0.6	27.6	10.6	13.1	25	-	23.2	24700	38500
50BERD10X	50	80	16	3.4	9.3	1.4	1	0.6	35.0	10.6	13.1	25	-	23.2	29300	46200
55BNRD10J	55	90	18	4.3	10	1.4	1.1	0.6	37.5	14.5	13.9	18	8	20.8	24900	38700
55BNRD10X	55	90	18	4.3	10	1.4	1.1	0.6	47.5	14.5	13.9	18	8	20.8	29000	45600
55BERD10J	55	90	18	4.3	10	1.4	1.1	0.6	36.0	13.9	17.1	25	-	25.9	22100	34500
55BERD10X	55	90	18	4.3	10	1.4	1.1	0.6	45.5	13.9	17.1	25	-	25.9	26300	41400
60BNRD10J	60	95	18	4.3	10	1.4	1.1	0.6	39.0	15.5	14.9	18	8.1	21.6	23300	36200
60BNRD10X	60	95	18	4.3	10	1.4	1.1	0.6	49.0	15.5	14.9	18	8.1	21.6	27100	42600
60BERD10J	60	95	18	4.3	10	1.4	1.1	0.6	37.5	14.9	18.3	25	-	27.1	20700	32300
60BERD10X	60	95	18	4.3	10	1.4	1.1	0.6	47.0	14.9	18.3	25	-	27.1	24600	38800
65BNRD10J	65	100	18	4	10.4	1.4	1.1	0.6	41.0	17.3	16.7	18	8.1	22.4	21900	34000
65BNRD10X	65	100	18	4	10.4	1.4	1.1	0.6	52.0	17.3	16.7	18	8.1	22.4	25500	40000
65BERD10J	65	100	18	4	10.4	1.4	1.1	0.6	39.5	16.7	20.5	25	-	28.2	19400	30400
65BERD10X	65	100	18	4	10.4	1.4	1.1	0.6	50.0	16.7	20.5	25	-	28.2	23100	36400
70BNRD10J	70	110	20	4	11.6	1.4	1.1	0.6	52.0	21.8	21.1	18	8.1	24.6	20000	31200
70BNRD10X	70	110	20	4	11.6	1.4	1.1	0.6	65.5	21.8	21.1	18	8.1	24.6	23400	36700
70BERD10J	70	110	20	4	11.6	1.4	1.1	0.6	50.0	20.9	25.9	25	-	31.0	17800	27800
70BERD10X	70	110	20	4	11.6	1.4	1.1	0.6	63.0	20.9	25.9	25	-	31.0	21200	33400
75BNRD10J	75	115	20	4	11.6	1.4	1.1	0.6	53.5	23.1	22.4	18	8.2	25.4	19000	29500
75BNRD10X	75	115	20	4	11.6	1.4	1.1	0.6	67.0	23.1	22.4	18	8.2	25.4	22200	34800
75BERD10J	75	115	20	4	11.6	1.4	1.1	0.6	51.5	22.2	27.4	25	-	32.2	16900	26400
75BERD10X	75	115	20	4	11.6	1.4	1.1	0.6	64.5	22.2	27.4	25	-	32.2	20000	31600
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	17600	27400
80BNRD10X	80	125	22	4.7	12.2	2.2	1.1	0.6	82.0	28.0	27.3	18	8.1	27.7	20500	32200
80BERD10J	80	125	22	4.7	12.2	2.2	1.1	0.6	62.5	27.0	33.5	25	-	34.9	15700	24400
80BERD10X	80	125	22	4.7	12.2	2.2	1.1	0.6	79.0	27.0	33.5	25	-	34.9	18600	29300
85BNRD10J	85	130	22	4.7	12.2	2.2	1.1	0.6	67.0	29.7	28.9	18	8.2	28.5	16800	26100
85BNRD10X	85	130	22	4.7	12.2	2.2	1.1	0.6	84.5	29.7	28.9	18	8.2	28.5	19600	30700
85BERD10J	85	130	22	4.7	12.2	2.2	1.1	0.6	64.5	28.5	35.5	25	-	36.1	14900	23300
85BERD10X	85	130	22	4.7	12.2	2.2	1.1	0.6	81.0	28.5	35.5	25	-	36.1	17700	28000
90BNRD10J	90	140	24	5.5	14.5	2.2	1.5	1	79.5	35.0	34.0	18	8.1	30.7	15700	24400
90BNRD10X	90	140	24	5.5	14.5	2.2	1.5	1	100	35.0	34.0	18	8.1	30.7	18300	28700
90BERD10J	90	140	24	5.5	14.5	2.2	1.5	1	76.5	33.5	41.5	25	-	38.8	14000	21800
90BERD10X	90	140	24	5.5	14.5	2.2	1.5	1	96.5	33.5	41.5	25	-	38.8	16600	26100
100BNRD10J	100	150	24	5.5	14.5	2.2	1.5	1	84.0	39.0	38.0	18	8.2	32.3	14400	22400
100BNRD10X	100	150	24	5.5	14.5	2.2	1.5	1	106	39.0	38.0	18	8.2	32.3	16800	26400
100BERD10J	100	150	24	5.5	14.5	2.2	1.5	1	80.5	37.5	46.5	25	-	41.1	12800	20000
100BERD10X	100	150	24	5.5	14.5	2.2	1.5	1	102	37.5	46.5	25	-	41.1	15200	24000
110BNRD10J	110	170	28	6.0	16.2	2.2	2	1	118	53.0	51.0	18	8.1	36.7	12900	20000
110BNRD10X	110	170	28	6.0	16.2	2.2	2	1	148	53.0	51.0	18	8.1	36.7	15000	23600
110BERD10J	110	170	28	6.0	16.2	2.2	2	1	113	51.0	63.0	25	-	46.6	11500	17900
110BERD10X	110	170	28	6.0	16.2	2.2	2	1	142	51.0	63.0	25	-	46.6	13600	21500



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	EL	L	M	EL	L	M	
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
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
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
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
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
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
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	1089	94	215	278	0	-12	-21	0.534
77	103	105	1	0.6	49	533	1089	94	215	278	0	-12	-21	0.534
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	1137	97	225	291	0	-12	-21	0.557
82	108	110	1	0.6	49	554	1137	97	225	291	0	-12	-21	0.557
87	118	120	1	0.6	98	499	1051	75	135	180	0	-15	-29	0.748
87	118	120	1	0.6	98	499	1051	75	135	180	0	-15	-29	0.748
87	118	120	1	0.6	98	663	1437	125	242	319	0	-12	-23	0.748
87	118	120	1	0.6	98	663	1437	125	242	319	0	-12	-23	0.748
92	123	125	1	0.6	98	550	1092	77	144	188	0	-16	-29	0.778
92	123	125	1	0.6	98	550	1092	77	144	188	0	-16	-29	0.778
92	123	125	1	0.6	98	750	1496	129	261	334	0	-13	-23	0.778
92	123	125	1	0.6	98	750	1496	129	261	334	0	-13	-23	0.778
99	131	134	1.5	0.8	98	621	1325	77	150	201	0	-18	-34	1.01
99	131	134	1.5	0.8	98	621	1325	77	150	201	0	-18	-34	1.01
99	131	134	1.5	0.8	98	883	1748	129	275	352	0	-15	-26	1.01
99	131	134	1.5	0.8	98	883	1748	129	275	352	0	-15	-26	1.01
109	141	144	1.5	0.8	98	706	1488	82	167	223	0	-19	-35	1.10
109	141	144	1.5	0.8	98	706	1488	82	167	223	0	-19	-35	1.10
109	141	144	1.5	0.8	98	950	1993	137	300	392	0	-15	-27	1.10
109	141	144	1.5	0.8	98	950	1993	137	300	392	0	-15	-24	1.10
120	160	164	2	1	98	986	1996	81	183	241	0	-26	-45	1.65
120	160	164	2	1	98	986	1996	81	183	241	0	-26	-45	1.65
120	160	164	2	1	98	1312	2735	134	328	428	0	-20	-35	1.65
120	160	164	2	1	98	1312	2735	134	328	428	0	-20	-35	1.65

NSK SALES OFFICES
EUROPE, MIDDLE EAST AND AFRICA

France
NSK France S.A.S.
Quartier de l'Europe
2, rue Georges Guynemer
78283 Guyancourt Cedex
Tel. +33 (0) 1 30573939
info-fr@nsk.com
nsk.com/eu-fr/

Germany, Austria, Benelux
Switzerland, Nordic
NSK Deutschland GmbH
Harkortstraße 15
40880 Ratingen
Tel. +49 (0) 2102 4810
info-de@nsk.com
nsk.com/eu-de/

Italy
NSK Italia S.p.A.
Via Garibaldi, 215
20024 Garbagnate
Milanese (MI)
Tel. +39 02 995 191
info-it@nsk.com
nsk.com/eu-it/

Middle East
NSK Bearings Gulf Trading Co.
JAFZA View 19, Floor 24 Office 2/3
Jebel Ali Downtown,
PO Box 262163
Dubai, UAE
Tel. +971 (0) 4 804 8205
info-me@nsk.com
nsk.com/eu-en/

Poland & CEE
NSK Polska Sp. z o.o.
Warsaw Branch
Ul. Migdałowa 4/73
02-796 Warszawa
Tel. +48 22 645 15 25
info-pl@nsk.com
nsk.com/eu-pl/

Romania
NSK Europe Limited Maidenhead
- Sucursala Ploiesti
Bdul Republicii, 178
100072 Ploiesti
Tel. +40 344 803 210
info-ro@nsk.com
nsk.com/eu-en/

South Africa
NSK South Africa (Pty) Ltd.
25 Galaxy Avenue
Linbro Business Park
Sandton 2146
Tel. +27 (011) 458 3600
nsk-sa@nsk.com
nsk.com/eu-en/

Spain
NSK Spain, S.A.
C/ Via Augusta 85, planta 3 A
08174 Sant Cugat del Vallés
Tel. +34 646 313 506
info-es@nsk.com
nsk.com/eu-es/

Turkey
NSK Rulmanları Orta Doğu Tic. Ltd. Şti.
Cevizli Mah. D-100 Güney Yan Yol
Kuriş Kule İş Merkezi No:2 Kat:4
Kartal - Istanbul
Tel. +90 216 5000 675
turkey@nsk.com
nsk.com/eu-tr/

UK
NSK UK Ltd.
Northern Road, Newark
Nottinghamshire NG24 2JF
Tel. +44 (0) 1636 605123
info-uk@nsk.com
nsk.com/eu-en/

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