

# Super-precision bearings interchange



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# Use of the equivalents data manual

*SKF offers a wide range of super-precision bearings. They are designed for machine tool spindles and other applications that require a high level of running accuracy at high to extremely high speeds.*

This interchange guide to SKF super-precision bearings provides fast and easy conversions of manufacturer's designations to the SKF equivalent designations. However, it will not result in an identical bearing, since competitors' designs may vary from SKF designs, and you can have differences in shoulder diameter, number of balls, cage location, etc.

The interchange information was compiled using data available at the time of publication; however, SKF makes no claims about performance equivalence and assumes no responsibility or liability for use of this interchange information.

This interchange is to be used as a guideline only, as manufacturers' designations may change without notice.

Interchanges to SKF super-precision bearings are made in the following bearing types:

- super-precision angular contact ball bearings
- super-precision cylindrical roller bearings
- super-precision double direction angular contact thrust ball bearings
- super-precision angular contact thrust ball bearings for screw drives

## Work flow to crossover super-precision bearing designations

**1** Determine the manufacturer and designation of the bearing. This is normally found on the side face of the bearing.

**2** Use the tables to identify the characteristics and features of the bearing by identifying the prefix or suffix (symbol • means "information not available"; symbol ■ means "not included in the range").

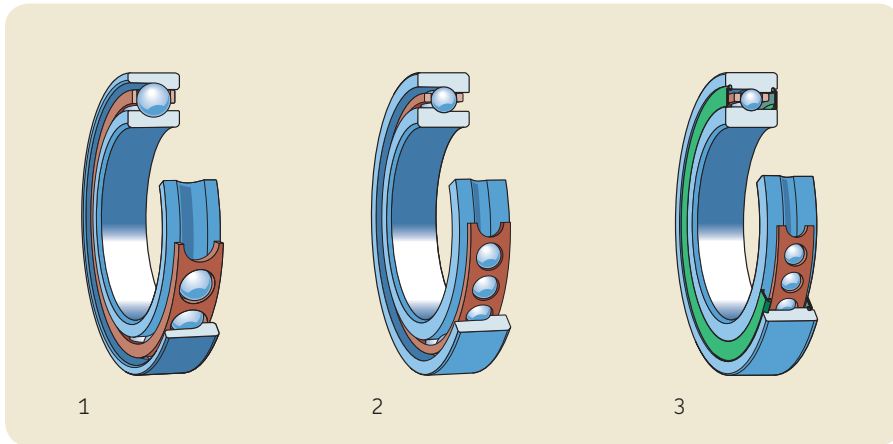
**3** Use the SKF designation system tables to construct the complete SKF designation of the bearing.

If the bearing designation is not recognizable or incomplete, please contact the SKF application engineering service or your local SKF company with as much information as possible regarding external dimensions, bearing type, cage, ball and ring material, number of rolling elements, bearing set arrangement and preload, and manufacturer of the bearing and the machine.

Detailed information on the individual SKF super-precision bearing types, including their characteristics and the available designs, is provided in the SKF catalogue Super-precision bearings (→ *Publ. 13383*) or at [skf.com](http://skf.com).



# Super-precision angular contact ball bearings



SKF super-precision angular contact ball bearings high-capacity D design (1), high-speed E design (2), high-speed B design (3).

## Designation examples

SKF S7016 ACE/HCP4ADGA

SKF 7010 CD/P4ADGB

Manu-  
facturer

Designation

Designation

SKF	S	70	16	AC	E	HC	P4A	DG	A	70	10	C	D	P4A	DG	B		
NSK	80	B	ER	10	H	T	V1V	DU	EL	P4Y	70	10	C	TR	DU	L	P4	
FAG	HC	RS	70	16	D	2RSD	T	P4S	DU	L	B	70	10	C	T	DU	L	P4
NTN	55	HSE	0	16	LLB	T1	AD	GD2	GL	P42	70	10	U	C	GD2	GL	P4	
GMN	HY	SM	60	16	2RZ	E	TA	P4	DU	L	S	60	10	C	TAM	7	DU	L
RHP	T	70	16	S	C	T	RR	DU	L	P3	B	70	10	X2	TA	DU	L	EP7
BARDEN	C	1	16	J	RR	DU	L				1	10	H	C	DU	L		
IBC	CB	H	70	16	E	T	2RSZ	P4A	DU	X	70	10	C	-	T	P4	DU	L
FAFNIR	3	MMV	C	91	16	HX	VV	DU	X		2	MM	91	10	WI	CR	DU	L
KOYO	3NC	HAR	00	0	16	CA	GLx2	S	P4		70	10	C	PA	DG	L	P4	
SNR	ML	E	CH	70	16	H	V	DU	J7	4S	70	10	C	V	DU	J	8	4
ZYS	V7	0	16	AC	-	HQ1	2RZ	P4A	DG	A	7	0	10	C	-	P4	DG	B
SNFA	VE	X	80	S	NS	7/9	CE	3	DU	L	E	X	50	7	CE	1	DU	M

## Colour codes

- Sealing
- Contact angle
- Accuracy
- Bearing series
- Bearing size
- Internal design
- Cage
- Bearing set arrangement
- Preload
- Ball material
- Special ring material
- Lubrication features

### Sealing

Manufacturer	Designation
SKF	S
NSK	V1V
FAG	2RSD <sup>1)</sup> H5S, HCS, XCS <sup>2)</sup>
NTN	LLB
GMN	2RZ
RHP	RR
BARDEN	RR
IBC	2RSZ
FAFNIR	VV
KOYO	00
SNR	E
ZYS	2RZ
SNFA	S

<sup>1)</sup> for B design  
<sup>2)</sup> for other types

### Contact angle

Manufacturer	15°	18°	20°	25°	30°
SKF	C	F	■	AC	■
NSK	C	BNR <sup>2)</sup>	•	A5	A
FAG	C	•	D	E	•
NTN	C	•	- <sup>1)</sup>	AD	- <sup>1)</sup>
GMN	C	18	•	E	•
RHP	X2	•	•	X3	•
BARDEN	C	•	•	E	•
IBC	C	•	•	E	A
FAFNIR	2	•	•	3	•
KOYO	C	•	CA	•	A
SNR	C	•	•	H	•
ZYS	C	•	•	AC	•
SNFA	1	2	•	3	•

<sup>1)</sup> – no designation suffix  
<sup>2)</sup> bearing type and contact angle in the ROBUST series

### Accuracy

Manufacturer	Designation			
SKF	P4	P4A	PA9A	VQ126
NSK	P4	P3	P2	P4Y
FAG	P4	P4S	•	P4S-K5 <sup>2)</sup>
NTN	P4	P42	P2	•
GMN	A7	P4	P2/A9	•
RHP	EP7	EP7/9	EP9	•
BARDEN	- <sup>1)</sup>	•	•	C
IBC	P4A	P2H	P2A	X1 to X9
FAFNIR	MM	MMV	MMX	•
KOYO	P2	P4	•	•
SNR	4	4S	2	R
ZYS	P4	P4A	P2	•
SNFA	7	7/9	9	SQ

<sup>1)</sup> – no designation suffix  
<sup>2)</sup> Reduced bore and outer diameter tolerance as per VQ253

### Bearing series

Manufacturer	Designation			
SKF	718	719	70	72
NSK	•	9	0	2
FAG	718	719	70	72
NTN	78	79	70	72
GMN	618	619	60	62
RHP	•	9	0	2
BARDEN	•	19	1	2
IBC	718	719	70	72
FAFNIR	•	93	91	2
KOYO	•	9	0	2
SNR	•	719	70	72
ZYS	18	19	0	2
SNFA	A	B	X	2

### Bearing size

Manufacturer	Designation (bore code)				
	10 mm <sup>1)</sup>	12 mm	15 mm	17 mm	20 mm
SKF	00	01	02	03	04 <sup>2)</sup>
NSK <sup>3)</sup>	00	01	02	03	04 <sup>2)</sup>
FAG	00	01	02	03	04 <sup>2)</sup>
NTN	00	01	02	03	04 <sup>2)</sup>
GMN	00	01	02	03	04 <sup>2)</sup>
IBC	00	01	02	03	04 <sup>2)</sup>
RHP	00	01	02	03	04 <sup>2)</sup>
BARDEN	00	01	02	03	04 <sup>2)</sup>
FAFNIR	00	01	02	03	04 <sup>2)</sup>
KOYO	00	01	02	03	04 <sup>2)</sup>
SNR	00	01	02	03	04 <sup>2)</sup>
ZYS	00	01	02	03	04 <sup>2)</sup>
SNFA	10	12	15	17	20

<sup>1)</sup> less than 10 mm, bearing size = mm bore diameter  
<sup>2)</sup> from 04 and up multiply by 5 (for example 05 = 25 mm bore diameter)  
<sup>3)</sup> for BER and BNR code = mm bore diameter

### Cage

Manufacturer	Outer ring centred				Ball centred		
	Phenolic	Brass	PEEK	Polyamide	Phenolic	PEEK	Polyamide
SKF	- <sup>1)</sup>	MA	TNHA	■	T	TNH	TN9
NSK	TR	•	•	•	•	•	TYN
FAG	T	•	•	•	•	•	•
NTN	T1	L1	•	T2	•	•	•
GMN	TA, TAM <sup>2)</sup>	•	TXM <sup>2)</sup>	TA	•	•	•
RHP	T (design E) TA (design D)	MA	•	•	•	•	•
BARDEN	- <sup>1)</sup> , H	•	•	•	•	•	•
IBC	T	M	K	PX	•	•	•
FAFNIR	CR	•	•	PRB, PRC	•	•	•
KOYO	PA.. FT	PA.. FY	•	PA.. FG	-5 .. FT	•	-5 .. FG
SNR	V (70-719) G1 (72)	•	•	•	•	•	•
ZYS	- <sup>1)</sup>	•	•	TN1	•	•	•
SNFA	CE	LE	KE	PE	C	K	•

<sup>1)</sup> – no designation suffix  
<sup>2)</sup> ball retaining

## Bearing set arrangement

Manufacturer	Designation													
SKF	DB	DF	DT	DG	TBT	TFT	TT	TG	QBC	QFC	QBT	QFT	QT	QG
NSK	DB	DF	DT	DU	DBD	DFD	DTD	DUD	DBB	DFF	DBT	DFT	DTT	QU
FAG	DB	DF	DT	DU	TBT	TFT	TT	TU	QBC	QFC	QBT	QFT	QT	QU
NTN	DB	DF	DT	GD2	DBT	•	•	GD3	DTBT	•	•	•	•	GD4
GMN	DB	DF	DT	DU	TBT	TFT	TT	TU	QB	QF	QBT	QFT	QT	QU
RHP	DB	DF	DT	DU	2TB	2FT	3T	3U	2TB2T	2T2FT	3TB	3TF	4T	4U
BARDEN	DB	DF	DT	DU	•	•	•	•	•	•	•	•	•	•
IBC	DB	DF	DT	DU	TBT	TFT	TT	TU	QBC	QFC	QBT	QFT	QT	QU
FAFNIR	DB	DF	DT	DU	•	•	•	TU	•	•	•	•	•	QU
KOYO	DB	DF	DT	GLx2	DBD	DFD	DTD	GLx3	DBB	DFF	DBT	DFT	•	GLx4
SNR	DB	DF	DT	DU	Q16	•	•	TU	Q21	•	Q18	•	•	QU
ZYS	DB	DF	DT	DG	TBT	TFT	TT	TG	QBC	QFC	QBT	QFT	QT	QG
SNFA	DD	FF	T	DU	TD	TF	TT	TU	TDT	TFT	3TD	3TF	4T	4U

## Preload

Manufacturer	Designation					
SKF	A	B	C	D	G...	K...
NSK	EL	L	M	H	CP	CA
FAG	L	M	H	•	•	•
NTN	•	GL	GN	GM	G	CS
GMN	•	L	M	S	V	•
RHP	•	L	M	H	•	•
BARDEN	•	L	M	H	•	•
IBC	X	L	M	H	U	A
FAFNIR	X	L	M	H	•	•
KOYO	S	L	M	H	CY	CS
SNR	7	8	9	•	X	•
ZYS	A	B	C	•	G	•
SNFA	L	M	F	•	...daN	...µm

## Internal design

Manufacturer	High capacity	High speed	High speed (small balls)
SKF	D	E	B
NSK	7	BNC	BNR
		BGR	BER
FAG	B	RS	HS
NTN	D	HSE	HSF
		HSB	
GMN	S	SM	KH
RHP	B	T	X or S
BARDEN	H	J	•
IBC	•	•	H
FAFNIR	WI	HX	WN
KOYO	7	HAR	•
SNR	- <sup>1)</sup>	ML	•
ZYS	7	V7	•
SNFA	E/SE	VE	H

<sup>1)</sup> – no designation suffix

## Ball material

Manufacturer	Designation	
	Steel balls	Ceramic balls
SKF	- <sup>1)</sup>	HC
NSK <sup>2)</sup>	- <sup>1)</sup>	SN24
FAG	- <sup>1)</sup>	HC
NTN	- <sup>1)</sup>	5S
GMN	- <sup>1)</sup>	HY
RHP	- <sup>1)</sup>	SN
BARDEN	- <sup>1)</sup>	C
IBC	- <sup>1)</sup>	CB
FAFNIR	- <sup>1)</sup>	C
KOYO	- <sup>1)</sup>	3NC
SNR	- <sup>1)</sup>	CH
ZYS	- <sup>1)</sup>	HQ1
SNFA	- <sup>1)</sup>	NS

<sup>1)</sup> – no designation suffix

<sup>2)</sup> for BRN, BER and BGR series:

S = steel balls  
H = ceramic balls

## Special ring material

Manufacturer	Designation
SKF	V
NSK	X
FAG	XC
NTN	2LA
GMN	N
RHP	•
BARDEN	XC
IBC	X
FAFNIR	•
KOYO	•
SNR	N
ZYS	•
SNFA	XN

## Lubrication features<sup>1)</sup>

Manufacturer	Designation	
SKF	L	H
NSK	E33	•
FAG	DLR	•
NTN	•	•
GMN	+L	+LB
RHP	•	•
BARDEN	•	•
IBC	S	•
FAFNIR	•	•
KOYO	HAF	•
SNR	L2	L1
ZYS	•	•
SNFA	GH	H

<sup>1)</sup> For other lubrication features refer to the manufacturers' publications

# SKF super-precision angular contact ball bearings designation system

**Examples:** Single bearing – 71922 CDGBTNHA/PA9AL  
 Matched bearing set – S7010 ACD/HCP4AQBCC

	719	22
S	70	10

CD	GB	TNHA	/
ACD			/

## Prefix

- Open bearing (no designation prefix)
- S Sealed bearing
- V Bearing with NitroMax steel rings and bearing grade silicon nitride Si<sub>3</sub>N<sub>4</sub> balls (hybrid bearing)

## Bearing series

- 718 Angular contact ball bearing in accordance with ISO dimension series 18
- 719 Angular contact ball bearing in accordance with ISO dimension series 19
- 70 Angular contact ball bearing in accordance with ISO dimension series 10
- 72 Angular contact ball bearing in accordance with ISO dimension series 02

## Bearing size

- 6 6 mm bore diameter
- 7 7 mm bore diameter
- 8 8 mm bore diameter
- 9 9 mm bore diameter
- 00 10 mm bore diameter
- 01 12 mm bore diameter
- 02 15 mm bore diameter
- 03 17 mm bore diameter
- 04 (x5) 20 mm bore diameter
- to
- 72 (x5) 360 mm bore diameter

## Internal design

- CD 15° contact angle, high-capacity design
- ACD 25° contact angle, high-capacity design
- CE 15° contact angle, high-speed E design
- FE 18° contact angle, high-speed E design
- ACE 25° contact angle, high-speed E design
- CB 15° contact angle, high-speed B design
- FB 18° contact angle, high-speed B design
- ACB 25° contact angle, high-speed B design

## Single bearing – execution and preload

- Single standalone bearing (no designation suffix) (718 .. D, 719 .. D, 70 .. D, 72 .. D, 719 .. E, 70 .. E, 719 .. B and 70 .. B series)
- GA Single, universally matchable, extra light preload (719 .. D, 70 .. D and 72 .. D series)
- GA Single, universally matchable, light preload (718 .. D, 719 .. E, 70 .. E, 719 .. B and 70 .. B series)
- GB Single, universally matchable, light preload (719 .. D, 70 .. D and 72 .. D series)
- GB Single, universally matchable, moderate preload (718 .. D, 719 .. E, 70 .. E, 719 .. B and 70 .. B series)
- GC Single, universally matchable, moderate preload (719 .. D, 70 .. D and 72 .. D series)
- GC Single, universally matchable, heavy preload (718 .. D, 719 .. E, 70 .. E, 719 .. B and 70 .. B series)
- GD Single, universally matchable, heavy preload (719 .. D, 70 .. D and 72 .. D series)

## Cage

- Cotton fabric reinforced phenolic resin or carbon fibre reinforced PEEK, outer ring centred (no designation suffix)
- MA Machined brass, outer ring centred
- TNHA Glass fibre reinforced PEEK, outer ring centred



	PA9A	L		
HC	P4A		QBC	C

#### Bearing set – preload

<b>A</b>	Extra light preload (719 .. D, 70 .. D and 72 .. D series)
<b>L</b>	Light preload (718 .. D, 719 .. E, 70 .. E, 719 .. B and 70 .. B series)
<b>A</b>	Light preload – only for matched bearings sets in TBT, TFT, QBT and QFT arrangements (718 .. D, 719 .. E and 70 .. E series)
<b>B</b>	Light preload (719 .. D, 70 .. D and 72 .. D series)
<b>B</b>	Moderate preload (718 .. D, 719 .. E, 70 .. E, 719 .. B and 70 .. B series)
<b>M</b>	Moderate preload – only for matched bearings sets in TBT, TFT, QBT and QFT arrangements (718 .. D, 719 .. E and 70 .. E series)
<b>C</b>	Moderate preload (719 .. D, 70 .. D and 72 .. D series)
<b>C</b>	Heavy preload (718 .. D, 719 .. E, 70 .. E, 719 .. B and 70 .. B series)
<b>F</b>	Heavy preload – only for matched bearings sets in TBT, TFT, QBT and QFT arrangements (718 .. D, 719 .. E and 70 .. E series)
<b>D</b>	Heavy preload (719 .. D, 70 .. D and 72 .. D series)
<b>G...</b>	Special preload, expressed in daN e.g. G240 (718 .. D, 719 .. D, 70 .. D, 72 .. D, 719 .. E, 70 .. E, 719 .. B and 70 .. B series)

#### Bearing set arrangement

<b>DB</b>	Set of two bearings arranged back-to-back <>
<b>DF</b>	Set of two bearings arranged face-to-face ><
<b>DT</b>	Set of two bearings arranged in tandem <<
<b>DG</b>	Set of two bearings for universal matching
<b>TBT</b>	Set of three bearings arranged back-to-back and tandem <>>
<b>TFT</b>	Set of three bearings arranged face-to-face and tandem ><<
<b>TT</b>	Set of three bearings arranged in tandem <<<
<b>TG</b>	Set of three bearings for universal matching
<b>QBC</b>	Set of four bearings arranged tandem back-to-back <<>>
<b>QFC</b>	Set of four bearings arranged tandem face-to-face >><<
<b>QBT</b>	Set of four bearings arranged back-to-back and tandem <>>>
<b>QFT</b>	Set of four bearings arranged face-to-face and tandem ><<<
<b>QT</b>	Set of four bearings arranged in tandem <<<<
<b>QG</b>	Set of four bearings for universal matching
<b>PBC</b>	Set of five bearings arranged tandem back-to-back <<>>>
<b>PFC</b>	Set of five bearings arranged tandem face-to-face >><<<
<b>PBT</b>	Set of five bearings arranged back-to-back and tandem <>>>>
<b>PFT</b>	Set of five bearings arranged face-to-face and tandem ><<<<
<b>PT</b>	Set of five bearings arranged in tandem <<<<<
<b>PG</b>	Set of five bearings for universal matching

#### Lubrication features

<b>H</b>	Two lubrication holes on the non-thrust side of the outer ring
<b>H1</b>	Two lubrication holes on the thrust side of the outer ring
<b>L</b>	Annular groove with two lubrication holes on the non-thrust side of the outer ring and two annular grooves fitted with O-rings in the outer ring
<b>L1</b>	Annular groove with two lubrication holes on the thrust side of the outer ring and two annular grooves fitted with O-rings in the outer ring

#### Accuracy

<b>P4</b>	Dimensional and running accuracy in accordance with ISO tolerance class 4
<b>P4A</b>	Dimensional accuracy in accordance with ISO tolerance class 4, running accuracy better than ISO tolerance class 4
<b>P2</b>	Dimensional and running accuracy in accordance with ISO tolerance class 2
<b>PA9A</b>	Dimensional and running accuracy in accordance with ISO tolerance class 2

#### Ball material

–	Carbon chromium steel (no designation suffix)
<b>HC</b>	Balls made of bearing grade silicon nitride Si <sub>3</sub> N <sub>4</sub> (hybrid bearing)



# Super-precision cylindrical roller bearings

## Designation examples

SKF N 1016 KPHA/HC5SP

### Manufacturer Designation

SKF	N	10	16	K	PHA	HC5	SP	
NTN	5S	N	10	16	HS <sup>1)</sup>	T6	K	NA P4
FAG	HC	N	10	16	K	PVPA1	SP	
KOYO	3NC	N	10	16	K	C1NA	FG	P4
NSK	N	10	16	RXH <sup>2)</sup>	TP	KR	CCO	P4

SKF NN 3020 KTN9/SPW33

### Manufacturer Designation

SKF	NN	30	20	K	TN9	SP	W33	
NTN	NN	30	20	HS <sup>1)</sup>	T6	K	NA	P4
FAG	NN	30	20	AS	K	M	SP	
KOYO	NN	30	20	K	W	C1NA	FG	P4
NSK	NN	30	20	TB <sup>3)</sup>	KR	E44	CCO	P4

SKF NNU 4924 BK/SPW33

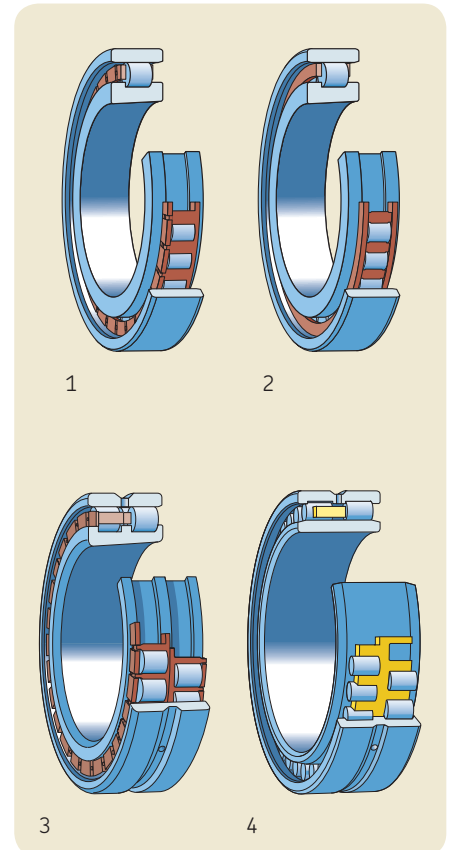
### Manufacturer Designation

SKF	NNU	49	24	BK	SP	W33	
NTN	NNU	49	24	K	P4		
FAG	NNU	49	24	S	K	M	SP
NSK	NNU	49	24	MB	KR	E44	P4

<sup>1)</sup> HS = high speed design

<sup>2)</sup> RXH identifies heat resistant steel SHX in inner and outer rings, ceramic rollers, outer ring guided PEEK cage

<sup>3)</sup> cage material PPS (220°)



SKF super-precision cylindrical roller bearings single row (N design) basic design (1), high-speed design (2), double row (NN design) (3), double row (NNU design) (4).

## Colour codes

- Bearing design
- Dimension series
- Bearing size
- Internal design and bore shape
- Cage
- Roller material
- Internal clearance
- Tolerance class
- Lubrication features

## Tolerance class

Manu-  
facturer Designation

SKF	SP	UP
NTN	P4	UP
FAG	SP	UP
KOYO	P4	•
NSK	P4	•

## Lubrication features

Manu-  
facturer Designation

SKF	W33
NTN	•
FAG	AS <sup>1)</sup> , S <sup>2)</sup>
KOYO	W
NSK	E44

<sup>1)</sup> NN series

<sup>2)</sup> NNU series

### Bearing design

Manu- facturer	Designation		
SKF	NNU	NN	N
NTN	NNU	NN	N
FAG	NNU	NN	N
KOYO	•	NN	N
NSK	NNU	NN	N

### Dimension series

Manu- facturer	Designation		
SKF	49	10	30
NTN	49	10	30
FAG	49	10	30
KOYO	•	10	30
NSK	49	10	30

### Bearing size

Manu- facturer	Designation	Bore diameter
		[mm]
SKF	1)	1)
NTN	1)	1)
FAG	1)	1)
KOYO	1)	1)
NSK	1)	1)

<sup>1)</sup> bearing size from 05 and up x5 (for example 05 = 25 mm bore diameter)

### Internal design and bore shape

Manu- facturer	Tapered bore	Cylindrical bore
SKF	K	- 1)
NTN	K	- 1)
FAG	K	- 1)
KOYO	K	- 1)
NSK	KR	- 1)

<sup>1)</sup> - no designation suffix

### Roller material

Manu- facturer	Steel rollers	Ceramic rollers
SKF	- 1)	HC5
NTN	- 1)	CS
FAG	- 1)	HC
KOYO	- 1)	3NC
NSK	- 1)	RXH

<sup>1)</sup> - no designation suffix

### Internal clearance

Manu- facturer	Standard clearance	Special reduced clearance	Special increased clearance
SKF	- 1)	VS019	SPC2
NTN	C1NA	C9NA	C2NA
FAG	- 1)	•	C2
KOYO	C1NA	C9NA	C2NA
NSK	CC1	CC9	CC2

<sup>1)</sup> - no designation suffix

### Cage (Single row cylindrical roller bearing N design)

Manu- facturer	Brass roller centred	Polyamide PA66 roller centred	Glass fibre reinforced PA66 roller centred	Carbon fibre reinforced PEEK outer ring centred	Glass fibre reinforced PA66 outer ring centred
SKF	■	TN	TN9	PHA	TNHA
NTN	- 1)	•	•	•	T6
FAG	M1	•	•	•	PVPA1
KOYO	FY <sup>2)</sup>	•	FG	•	•
NSK	MR	•	•	•	•

### Cage (Double row cylindrical roller bearing NN)

Manu- facturer	Brass roller centred	Polyamide PA66 roller centred	Glass fibre reinforced PA66 roller centred	Carbon fibre reinforced PEEK outer ring landed	Glass fibre reinforced PEEK outer ring landed
SKF	- 1)	TN	TN9	■	■
NTN	- 1)	•	•	•	T6
FAG	M	•	•	•	•
KOYO	FW <sup>3)</sup>	•	FG	•	•
NSK	MB	•	•	TB	•

SKF super-precision bearing double row cylindrical roller bearings in the NNU series are available only with machined brass cage, roller centred (no designation suffix).

<sup>1)</sup> - no designation suffix

<sup>2)</sup> FY: integrated machined cage made of copper alloy

<sup>3)</sup> FW: separable machined cage made of copper alloy

# SKF super-precision cylindrical roller bearings designation system

Examples: N 1016 KPHA/HC5SP  
 NN 3020 KTN9/SPVR521  
 NNU 49/500 B/SPC3W33X

N	10	16	K	PHA	/	HC5	SP	
NN	30	20	K	TN9	/		SP	VR521
NNU	49	/500	B		/		SPC3	W33X

## Bearing design

N Single row cylindrical roller bearing  
 NN Double row cylindrical roller bearing  
 NNU Double row cylindrical roller bearing

## Dimension series

10 In accordance with ISO dimension series 10  
 30 In accordance with ISO dimension series 30  
 49 In accordance with ISO dimension series 49

## Bearing size

05 (x5) 25 mm bore diameter  
 to  
 92 (x5) 460 mm bore diameter  
 from  
 /500 Bore diameter uncoded [mm]

## Internal design and bore shape

– Cylindrical bore (no designation suffix)  
 B Modified internal design  
 K Tapered bore, taper 1:12

## Cage

– Machined brass cage, roller centred (no designation suffix)  
 PHA Carbon fibre reinforced PEEK cage, outer ring centred  
 TN PA66 cage, roller centred  
 TN9 Glass fibre reinforced PA66 cage, roller centred  
 TNHA Glass fibre reinforced PEEK cage, outer ring centred

## Roller material

– Carbon chromium steel (no designation suffix)  
 HC5 Rollers made of bearing grade silicon nitride Si<sub>3</sub>N<sub>4</sub> (hybrid bearing)

## Tolerance class and internal clearance

SP Dimensional accuracy in accordance with ISO tolerance class 5, running accuracy in accordance with ISO tolerance class 4  
 UP Dimensional accuracy in accordance with ISO tolerance class 4, running accuracy better than ISO tolerance class 4  
 – Standard radial internal clearance C1 (no designation suffix)  
 C2 Radial internal clearance greater than C1  
 CN Normal radial internal clearance  
 C3 Radial internal clearance greater than Normal

## Other variants

VR521 Bearing supplied with measuring report (standard for NN 30 series bearings with d > 130 mm)  
 VU001 Inner ring raceway with finish-grinding allowance  
 W33 Annular groove and three lubrication holes in the outer ring  
 W33X Annular groove and six lubrication holes in the outer ring



# Super-precision double direction angular contact thrust ball bearings

## Designation examples

SKF BTW 70 CTN9/SPW33

### Manufacturer Designation

Manufacturer	Designation
SKF	BTW 70 C TN9 SP W33
NTN	562 0 14 GN P4
FAG	2344 14 M SP
KOYO	2344 14 B FY P4
NSK	70 TAC 20D PN7 C7

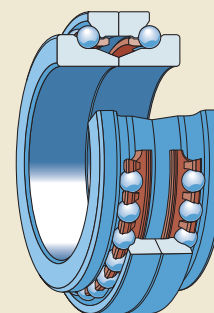
SKF BTM 150 AM/P4CDBA

### Manufacturer Designation

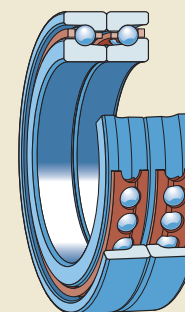
Manufacturer	Designation
SKF	BTM 150 A M P4C DB A
NTN	HTA 0 30 U A L1 DB GL P4L
KOYO	ACT 0 30 A DB L FY P4
NSK	150 BAR 10 S DB L P4A
FAG	BAX 150 F T P4S DB

## Colour codes

- Accuracy
- Bearing series
- Bearing size
- Internal design
- Cage
- Preload
- Ball material
- Arrangement
- Lubrication features



1



2

SKF super-precision double direction angular contact thrust ball bearings basic design (BTW series) (1), high-speed design (BTM series) (2).

**Bearing series – contact angle 60°  
BTW series<sup>1)</sup>**

Manufacturer	Designation
SKF	BTW .. C
NTN	5620
FAG	2344
KOYO	2347.. B
NSK	TAC20D

<sup>1)</sup> Bearings in the BTW series are dimensionally interchangeable with bearings in the former 2344(00) and 2347(00) series.

**Bearing series  
BTM series**

Manufacturer	Designation
SKF	BTM
NTN	HTA 0 U
FAG	BAX
KOYO	ACT 0
NSK	10

**Balls material  
BTW and BTM series**

Manufacturer	Steel ball	Ceramic ball
SKF	– <sup>1)</sup>	HC5
NTN	– <sup>1)</sup>	5S
FAG	– <sup>1)</sup>	•
KOYO	– <sup>1)</sup>	•
NSK	S	H

<sup>1)</sup> – no designation suffix

**Bearing size  
BTW series**

Manufacturer	Designation	Bore diameter [mm]
SKF	70	70
NTN	14	(x5) 70 mm bore
FAG	14	(x5) 70 mm bore
KOYO	14	(x5) 70 mm bore
NSK	70	70

**Bearing size  
BTM series**

Manufacturer	Designation	Bore diameter [mm]
SKF	150	150
NTN	30	(x5) 150 mm bore
FAG	150	150
KOYO	30	(x5) 150 mm bore
NSK	150	150

**Internal design  
BTW series**

Manufacturer	small bore diameter type	large bore diameter type
SKF	– <sup>1)</sup>	A
NTN	– <sup>1)</sup>	M
FAG	4	7
KOYO	4	7
NSK	•	•

<sup>1)</sup> – no designation suffix

**Internal design – Contact angle  
BTM series**

Manufacturer	30°	40°
SKF	A	B
NTN	A	– <sup>1)</sup>
FAG	F	H
KOYO	– <sup>1)</sup>	B
NSK	BAR	BTR

<sup>1)</sup> – no designation suffix

**Cage  
BTW series**

Manufacturer	Brass ball centred	glass fibre reinforced PA66 ball centred
SKF	M	TN9
NTN	– <sup>1)</sup>	•
FAG	M	•
KOYO	FY	•
NSK	– <sup>1)</sup>	•

<sup>1)</sup> – no designation suffix

**Cage  
BTM series**

Manufacturer	Brass ball centred	glass fibre reinforced PA66 ball centred
SKF	M	TN9
NTN	L1	T2
FAG <sup>2)</sup>	•	•
KOYO	FY	FG
NSK	– <sup>1)</sup>	TYN

<sup>1)</sup> – no designation suffix

<sup>2)</sup> laminated fabric, outer ring centered cage, designation suffix T



■ Accuracy  
BTW series

Manufacturer	Designation
SKF	SP
NTN	P4
FAG	SP
KOYO	P4
NSK	PN7

■ Accuracy  
BTM series

Manufacturer	Designation
SKF	P4C
NTN	P4L
FAG	P4S
KOYO	P4
NSK	P4A

■ Preload  
BTW series

Manufacturer	Designation
SKF	–1)
NTN	GN
FAG	–1)
KOYO	–1)
NSK	C7

<sup>1)</sup> – no designation suffix

■ Preload  
BTM series

Manufacturer	Light preload	Heavy preload	Special preload
SKF	A	B	G...
NTN	GL	GM	•
FAG	L	M	•
KOYO	L	M	•
NSK	L	•	CP...

■ Arrangement  
BTM series

Manufacturer	Designation
SKF	DB
NTN	DB
FAG	DB
KOYO	DB
NSK	DB

■ Lubrication features  
BTW series

Manufacturer	Designation
SKF	W33
NTN	•
FAG	•
KOYO	•
NSK	•

# SKF super-precision double direction angular contact thrust ball bearings designation system

**Examples:** BTW 70 CTN9/SPW33  
BTM 150 AM/HCP4CDBA

BTW	70	C	TN9	/		SP	W33		
BTM	150	A	M	/	HC	P4C		DB	A

## Bearing series

**BTW** Basic design double direction angular contact thrust ball bearing  
**BTM** High-speed design double direction angular contact thrust ball bearing

## Bearing size

**35** Bore diameter [mm]  
to  
**200**

## Internal design

**A** 30° contact angle  
**B** 40° contact angle  
**C** 60° contact angle  
**A** As a second letter after the contact angle information (for BTW series only):  
Bearing with a larger bore to be mounted on the large diameter side of a cylindrical roller bearing with a tapered bore.

## Cage

**M** Two machined brass cages, snap-type (for BTW series), window-type (for BTM series), ball centred  
**TN9** Two glass fibre reinforced PA66 cages, snap-type (for BTW series), window-type (for BTM series), ball centred

## Ball material

– Carbon chromium steel (no designation suffix)  
**HC** Balls made of bearing grade silicon nitride Si<sub>3</sub>N<sub>4</sub> (hybrid bearing)

## Accuracy

**P4C** Dimensional accuracy approximately to ISO tolerance class 4 and running accuracy better than ISO tolerance class 4 for radial bearings (for BTM series bearings only).  
**SP** Dimensional accuracy approximately to ISO tolerance class 5 and running accuracy better than ISO tolerance class 4 for thrust bearings (for BTW series bearings only).  
**UP** Dimensional accuracy approximately to ISO tolerance class 4 and running accuracy better than ISO tolerance class 4 for thrust bearings (for BTW series bearings only).

## Lubrication feature (for BTW series bearings only)

**W33** Annular groove and three lubrication holes in the housing washer

## Arrangement (for BTM series bearings only)

**DB** Two bearings arranged back-to-back

## Preload (for BTM series bearings only)

**A** Light preload  
**B** Heavy preload  
**G...** Special preload, expressed in daN e.g. G240



# Super-precision angular contact thrust ball bearings for screw drives

## Designation examples

SKF BSD 3062 CGA-2RZ

### Manufacturer Designation

Manufacturer	Designation
SKF	BSD 30 62 C GA 2RZ
NSK	30 TAC 62 B DDG SU C10 PN7B
FAG	BSB 030 062 2Z T
NTN	BST 30X 62 1B LXL
NACHI	30 TAB 06 U 2NK GM P4
SNFA	BS 30 62 S 7 P 62 U M

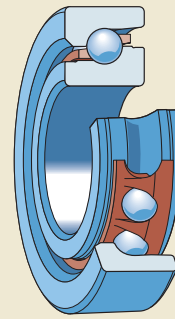
SKF FBSA 206/QBCA

### Manufacturer Designation

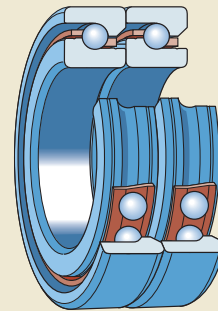
Manufacturer	Designation
SKF	FBSA 2 06 QBC A
NSK	WBK 30 DBB 31
SNFA	BSQU 2 30 TDT 430
IBC	BSBU 30 Q C 88 M

## Colour codes

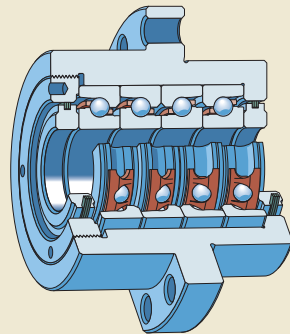
- Bearing series
- Bearing size
- Design features
- Execution – Preload
- Sealing solutions
- Bearing set arrangement
- Tolerance class



1



2



3

SKF super-precision angular contact thrust ball bearings for screw drives single direction (BSA and BSD series) (1), universally matchable for mounting as sets (2); cartridge units with a flanged housing (FBSA series) (3)

### Bearing series

Manu- facturer	Designation			
SKF	BSA 2	BSA 3	BSD	FBSA
NSK	BSB	•	TAC	WBK .. 31 <sup>1)</sup>
FAG	7602	7603	BSB	•
NTN	•	•	BST	•
NACHI	•	TAB	•	•
SNFA	BS2	•	BS	BSDU/BSQU
IBC	•	•	•	BSBU

<sup>1)</sup> WBK = support unit symbol; 31 = serial number

### Bearing size

Manu- facturer	Designation	Bore diameter [mm]
SKF	1) 2)	1) 2)
NSK	2)	2)
FAG	1) 2)	1) 2)
NTN	2)	2)
NACHI	2)	2)
SNFA	2)	2)
IBC	2)	2)

<sup>1)</sup> from 04 and up x5 (for example 04 = 20 mm bore diameter)

<sup>2)</sup> bearing size 20 = 20 mm bore diameter, 25 = 25 mm, etc.

### Design features

Manu- facturer	Designation	
SKF	C	– <sup>1)</sup>
NSK	B	– <sup>1)</sup>
FAG	– <sup>1)</sup>	– <sup>1)</sup>
NTN	– <sup>1)</sup>	– <sup>1)</sup>
NACHI	– <sup>1)</sup>	– <sup>1)</sup>
SNFA	62	P
IBC	Q <sup>2)</sup>	A <sup>2)</sup>
IBC	D <sup>2)</sup>	B <sup>2)</sup>

<sup>1)</sup> – no designation suffix

<sup>2)</sup> only housing form and execution

### Execution and preload

Manu- facturer	Designation			
SKF	■	A	B	G...
NSK	•	C10/31	•	•
FAG	L	M	H	•
NTN	11B	1B	•	•
NACHI	•	M	•	•
SNFA	L	M	F	...daN
IBC	L	M	H	•

### Sealing solutions

Manu- facturer	Designation	
SKF	–2RZ	–2RS
NSK	•	DDG
FAG	2Z	2RS
NTN	•	LXL
NACHI	2NK	2LR
SNFA	S	C
IBC	•	•

### Tolerance class

Manu- facturer	Designation			
SKF	– <sup>1)</sup>	– <sup>1)</sup>	■	■
NSK	PN7B	•	•	•
FAG	– <sup>1)</sup>	– <sup>1)</sup>	•	•
NTN	P5	P4	•	•
NACHI	P5	P4	•	•
SNFA	5	7	9	SQ
IBC	– <sup>1)</sup>	– <sup>1)</sup>	•	•

<sup>1)</sup> – no designation suffix

### Bearing set arrangement

Manu- facturer	Designation											
SKF	DB	DF	DT	TBT	TFT	TT	QBC	QFC	QBT	QFT	QT	
NSK	DB	DF	DT	DBD	DFD	DTD	DBB	DFB	DBT	DFT	DTT	
FAG	DB	DF	DT	TBT	TFT	TT	QBC	QFC	QBT	QFT	QT	
NTN	DB	DF	DT	DBT	DFT	•	DTBT	DTFT	•	•	•	
NACHI	DB	DF	DT	FFB	BFF	FFF	FFBB	BBFF	FFFB	BFFF	•	
SNFA	DD	FF	T	TD	TF	3T	TDT	TFT	3TD	3TF	4T	
IBC	– <sup>1)</sup>	DF	DT	TBT	TFT	TT	– <sup>1)</sup>	QFC	QBT	QFT	QT	

<sup>1)</sup> – no designation suffix

# SKF super-precision angular contact thrust ball bearings for screw drives designation system

**Examples:** Single direction bearing – BSA 205 CGB/GMM  
 Matched set of single direction bearings – BSA 208 C/TFTA  
 Double direction bearing – BEAM 030080-2RS/PE  
 Cartridge unit – FBSA 206 A/QBCA

BSA 2	05	C	GB		/
BSA 2	08	C			/
BEAM	030080			-2RS	
FSBA 2	06	A			

## Bearing series

**BSA 2** Single direction bearing in the 02 ISO dimension series  
**BSA 3** Single direction bearing in the 03 ISO dimension series  
**BSD** Single direction bearing  
**BEAS** Double direction bearing  
**BEAM** Double direction bearing for bolt mounting  
**FBSA 2** Cartridge unit with a flanged housing

## Bearing size

For single direction bearings in accordance with an ISO dimension series

**01** 12 mm bore diameter  
**02** 15 mm bore diameter  
**03** 17 mm bore diameter  
**04** (x5) 20 mm bore diameter  
 to  
**15** (x5) 75 mm bore diameter

For single direction bearings, not standardized

**2047** 20 mm bore diameter and 47 mm outside diameter  
 to  
**60120** 60 mm bore diameter and 120 mm outside diameter

For double direction bearings

**008032** 8 mm bore diameter and 32 mm outside diameter  
 to  
**060145** 60 mm bore diameter and 145 mm outside diameter

## Design features

**C** Improved internal design (single direction bearings only)  
**A** Different flange position (cartridge units only)

## Single direction bearing – execution and preload

**GA** Universally matchable, light preload  
**GB** Universally matchable, moderate preload  
**G...** Universally matchable, special preload, expressed in daN e.g. G240

## Sealing solutions

**-2RS** Contact seal on both sides, NBR  
**-2RZ** Non-contact seal on both sides, NBR

GMM			
		TFT	A
	PE		
		QBC	A

#### Bearing set – preload

- A** Light preload
- B** Moderate preload
- G...** Special preload, expressed in daN e.g. G240

#### Bearing arrangement

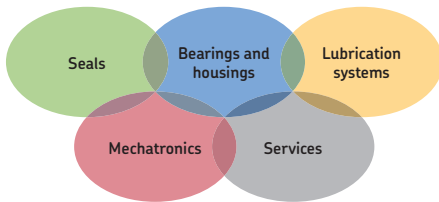
- DB** Set of two bearings arranged back-to-back <>
- DF** Set of two bearings arranged face-to-face ><
- DT** Set of two bearings arranged in tandem <<
- TBT** Set of three bearings arranged back-to-back and tandem <>>
- TFT** Set of three bearings arranged face-to-face and tandem >><
- TT** Set of three bearings arranged in tandem <<<
- QBC** Set of four bearings arranged tandem back-to-back <<>>
- QFC** Set of four bearings arranged tandem face-to-face >><<
- QBT** Set of four bearings arranged back-to-back and tandem <>>>
- QFT** Set of four bearings arranged face-to-face and tandem >><<
- QT** Set of four bearings arranged in tandem <<<<

#### Tolerance class

- Dimensional accuracy to ISO tolerance class 4, running accuracy to ISO tolerance class 2
- PE** Enlarged diameter tolerance and axial run-out to P5 tolerance class for radial bearing (BEAM/BEAS series only)

#### Grease fill

- GMM** Open single direction bearing filled with standard grease



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These competence areas include bearings and units, seals, lubrication systems, mechatronics, and a wide range of services, from 3-D computer modelling to cloud-based condition monitoring and asset management services.

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