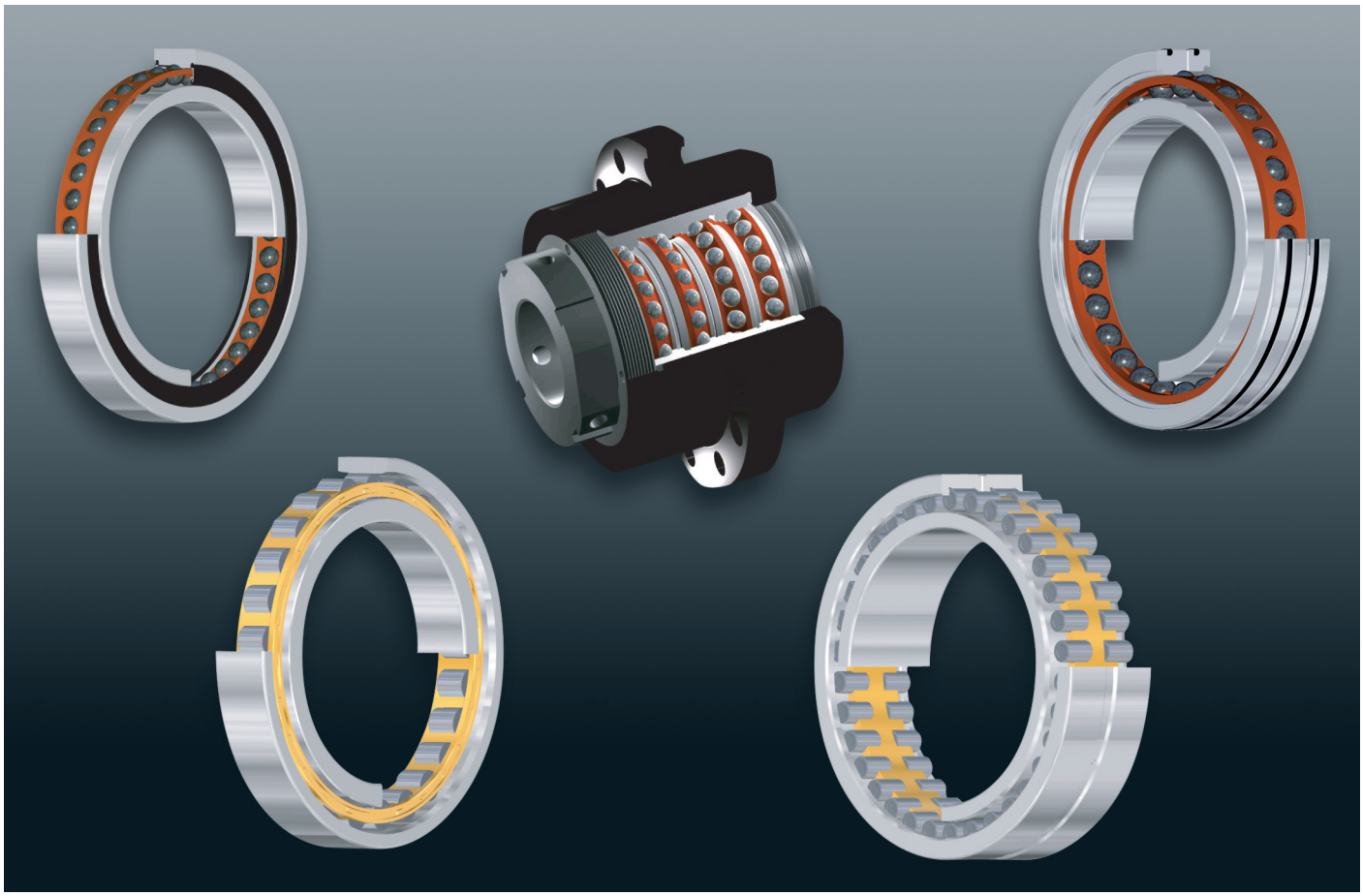
IBC



Product Range
Super Precision Bearings

Precision Bearing Units · Precision Locknuts

TI-I-5000.0 / E

Headquarter of the IBC Wälzlager GmbH at the industrial area of Solms-Oberbiel

Location with Tradition

The headquarters in Solms-Oberbiel is centrally located in Germany close to the North/South and East/West highways which also provides for a central location in Europe. The international Airport Frankfurt approx. 80 km away serves as a worldwide link.

Flexible and Reliable

In the middle of 1996 we opened the central computer controlled high shelf warehouse with more than 2.000 pallet places. It is used for finsihed and semi-finished products as well as for large bearings. This is in addition to our existing two-storage computer controlled service warehouse also with more than 2.500 storage places.

Both warehouse systems provide together with our distribution centre and communication network precise logistics and a worldwide unequaled reliability.

Central Computer Controlled High Shelf Warehouse – Middle 1996

Precise Logistics provide an unequaled worldwide reliability

Precision with Future…

We are future orientated.
We have the creativity and vision to perform and provide.
This is our exact presentation to solutions with precision.

1. Introduction

Permanent increase in demands on quality bearing systems is leading on to new developments of various technologies and new materials, to meet the high and very specific technical and economical fields of application. IBC is taking responsibility for this fact by continuous increase in performance of products and technical processes, as well as extension of product range.

IBC Wälzlager GmbH Industrial Bearings and Components, has more than 30 years experience in the field of bearing technologie. IBC continues the tradition of the 1918 founded Robert Kling Wetzlar GmbH.

Close customer contacts based on fair dialogues and partnership achieve common aims and objectives together with our customers.

The very intensive cooperation with universities, not only in the field of research and development, but also practical job training is a traditional and essential part of the scientific work of IBC Wälzlager GmbH.

The innovation is reflected in the intensive activities of research and development. As an example we point out the material variation of bearing components as a contributing factor to increase the efficiency of our products. This combination of research and controlled processes is leading to high precision bearings.

At the very first beginning special applications have been the cause of hybrid ball bearings, and nowadays these belong to our standard programme for the machine tool and electric motor industry.

Modified materials for cages, as PEEK are used for high-speed precision bearings and for high temperature applications.

Lubricated high precision bearings, completed with sealed versions allow for maintenance free operation with lifetime lubrication. This makes a valuable contribution towards easy mounting and design.

The IBC Wälzlager GmbH delivery programme is enhanced by ATCoat thin dense chromium coated high precision bearings for special applications. Prolongation of usage, reduced wear and friction as well as reasonable corrosion protection are the main value-added benefits of ATCoat high precision bearings.

The following pages of this catalogue are showing the variety of products of high precision angular contact ball bearings (spindle bearings), high precision cylindrical roller bearings, high precision single row deep groove ball bearings, completed by precision rolling bearings of special design, i. e. for turbo charger bearings, compressors, separators and vacuum pumps.

Depending on application high precision angular contact ball bearings can be delivered with contact angle 15°, 25°, 30°, 35°, 40° or 60°, with different diameters of balls out of steel or ceramic, open or sealed. Direct lubrication by the outer ring is another possible variation.
The most convenient bearings can be chosen depending on the requirements regarding rotational speed, load capacity, rigidity, and lubrication as well as any further surrounding parameters.

Many different and innovative principles granting a safe floating bearing function can be found in IBC's product range. Not only high precision cylindrical roller bearings with its constructive floating function, but also the spring loaded high precision deep groove ball bearings and high precision angular contact ball bearings are worth mentioning. Bearings with ATCoat are representing an alternative to avoid fretting corrosion and to grant a slide fit.

Further components of the bearing systems like precision locknuts and labyrinth seals are essential parts of the IBC's delivery programme for many years. They are mainly used for preloading of spindle and ball screw support bearings. A large variety of designs and dimensions implies an optimization of economical efficiency for the users.

Further more IBC is producing an extensive programme of precision flange and pillow block units. In addition to the standard design IBC is offering a large number of special customized solutions.

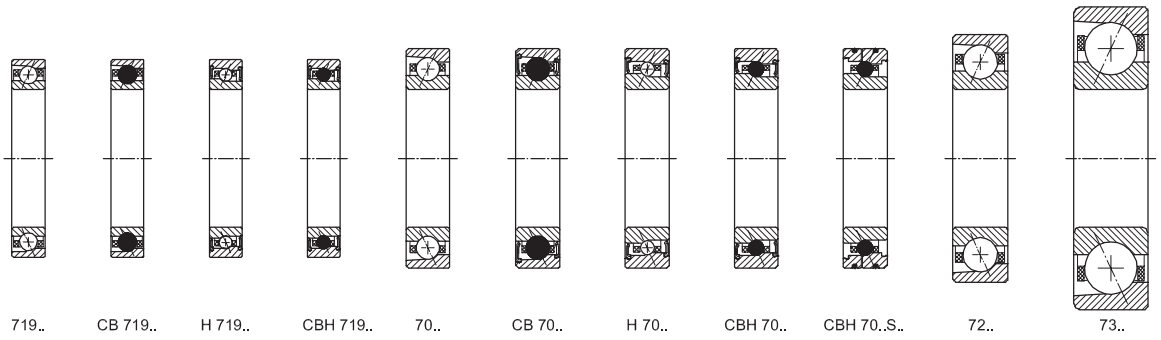
Our quality management system is implemented and accredited according DIN EN ISO 9001: 2000 for design, development, production and sales of all kinds of rolling bearings and linear motion bearings.

For any further details regarding the different bearing systems as well as how to select the right bearing for safe integration in your individual design, please refer to our corresponding catalogues and brochures. An overview is indicated on the last page.

With this extensive delivery programme, you will find an appropriate IBC high precision bearing for your special application. For further details, our technical department is pleased to be of your assistance and support at any time.

2. Designation of IBC Super Precision Angular Contact Ball Bearings

719..
CB 719..
H 719..
CBH 719..
70..
CB 70..
H 70..
CBH 719..
72..
73..



51-102

		70	14	.	E	S	.	T		. P2A.		UL				
		70	16	.	E		.	T		. P4A.	X5	. QBTM.		GS32. V...		
		719	10	.	E		.	T		. P4A.	X7	. UM .		GS34		
CB	H	70	12	.	C		.	T	. 2RSZ	. P2H.	X6	. UL				
AC-		72	13	.	E		.	M		. P4A.	X2	. U40	. A11			
CB	H	719	16	.	E		.	T		. P2H.	X5	. UL				

Material

–	Steel balls 100 Cr6
CB	Ceramic balls Si_3N_4
AC-	Rings ATCoated
ACC-	Rings ATCoated + balls Si_3N_4

Design

–	Standard design version B
H	High speed design version C

Series

719.. 72..
70.. 73..

Bore code

00 10 mm 02 15 mm
01 12 mm 03 17 mm
At number 04 and upward x 5 [mm]

Contact angle

C 15°
E 25°

Lubrication groove and bore

S Lubrication via outer ring

Cage

T(PA)	Fabric reinforced phenolic resin
M	Solid brass
K	PEEK
S	Stainless steel
P	PA6.6 Polyamide glass fibre reinforced

Special specification

V.. K..

Lubrication

–	Corrosion protected
G..	BearLub grease

Coating with ATCoat

A11	Inner and outer ring ATCoated
A15	Inner and outer ring ATCoated, rolling elements and cage corrosion resistant*
A 21	Inner ring ATCoated
A 31	Outer ring ATCoated

Preload/universally faced bearings

UX	Extra light
UL	Light
UM	Medium
UH	High
U..	Special preload in daN
A..	Axial clearance with actual value

Bearing arrangements (sets) see page 6

Sorting (bore and O.D.)

X1, X2, X3, X4, X5, X6, X7, X8, X9 see matrix page 6

Precision ABEC ISO DIN

P4, P4A, P2H, P2A

Sealing

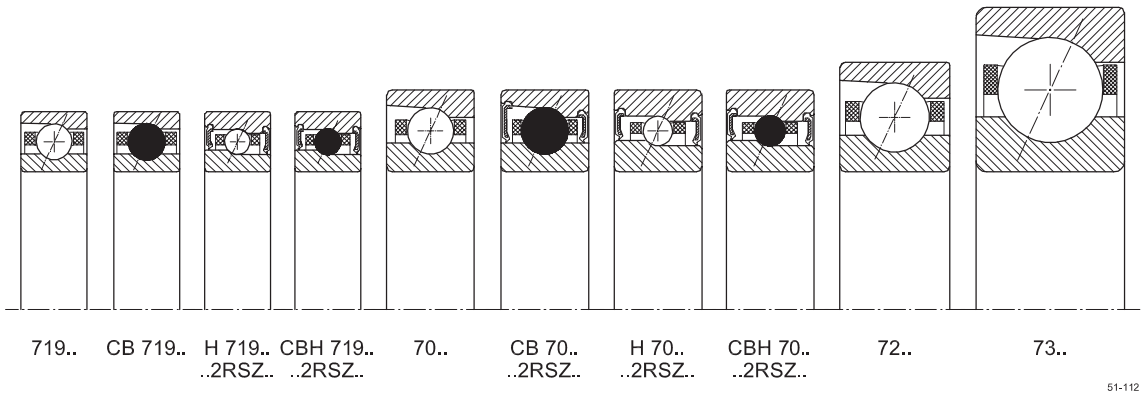
2RSZ Non-contact seal, both sides

Designation system 51-900

**Corrosion protection depending on application, for further information please refer to main catalogue*

2.1 Production Range of IBC Precision Angular Contact Ball Bearings

719..
CB 719..
H 719..
CBH 719..
70..
CB 70..
H 70..
CBH 70..
72..
73..



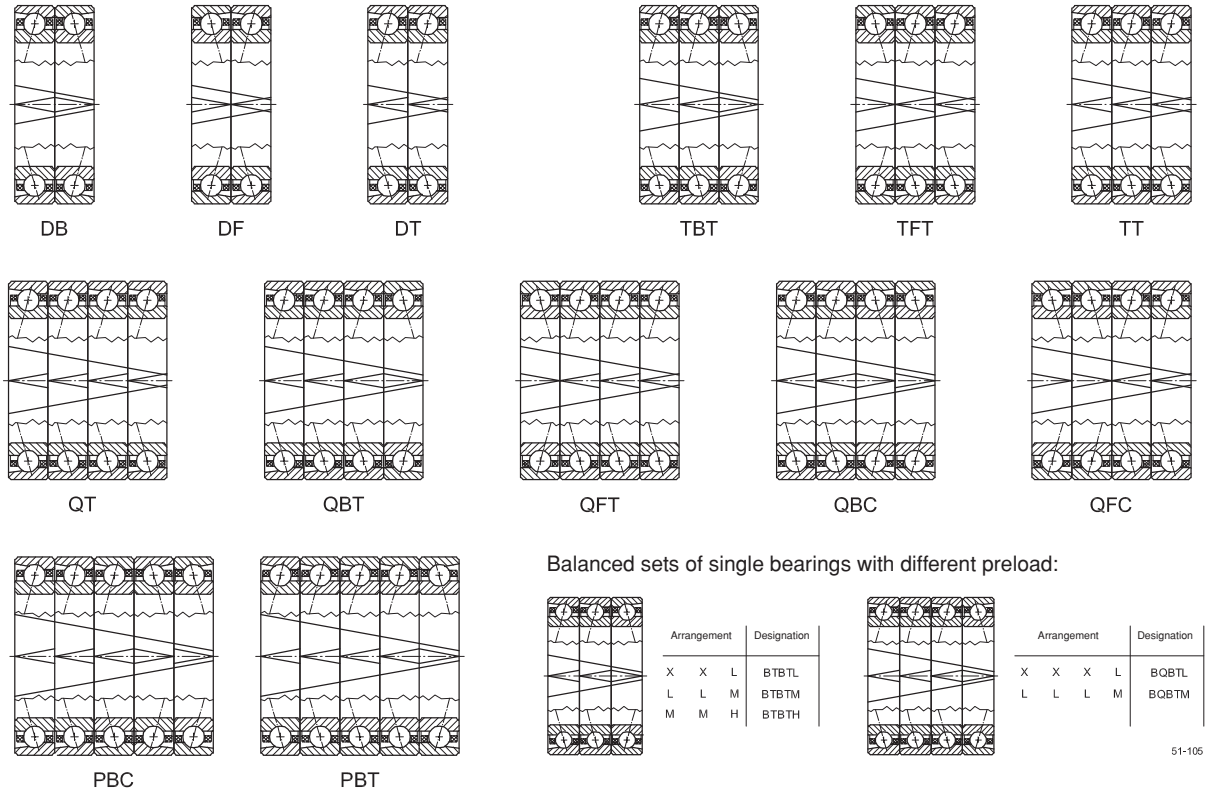
	Production series																					
	719...				H 719...				70...				H 70...				72...				73...		
d		D	B			D	B			D	B			D	B			D	B			D	B
mm		mm		DI*		mm		DI*		mm		DI*		mm		DI*		mm		DI*		mm	
10	**71900**	22	6						**7000**	26	8						**7200**	30	9	•			
12	**71901**	24	6						**7001**	28	8						**7201**	32	10	•			
15	**71902**	28	7						**7002**	32	9						**7202**	35	11	•			
17	**71903**	30	7						**7003**	35	10						**7203**	40	12	•			
20	**71904**	37	9						**7004**	42	12						**7204**	47	14	•	**7304**	52	15
25	**71905**	42	9	•	**H 71905**	42	9	•	**7005**	47	12	•	**H 7005**	47	12	•	**7205**	52	15	•	**7305**	62	17
30	**71906**	47	9	•	**H 71906**	47	9	•	**7006**	55	13	•	**H 7006**	55	13	•	**7206**	62	16	•	**7306**	72	19
35	**71907**	55	10	•	**H 71907**	55	10	•	**7007**	62	14	•	**H 7007**	62	14	•	**7207**	72	17	•	**7307**	80	21
40	**71908**	62	12	•	**H 71908**	62	12	•	**7008**	68	15	•	**H 7008**	68	15	•	**7208**	80	18	•	**7308**	90	23
45	**71909**	68	12	•	**H 71909**	68	12	•	**7009**	75	16	•	**H 7009**	75	16	•	**7209**	85	19	•	**7309**	100	25
50	**71910**	72	12	•	**H 71910**	72	12	•	**7010**	80	16	•	**H 7010**	80	16	•	**7210**	90	20	•	**7310**	110	27
55	**71911**	80	13	•	**H 71911**	80	13	•	**7011**	90	18	•	**H 7011**	90	18	•	**7211**	100	21	•	**7311**	120	29
60	**71912**	85	13	•	**H 71912**	85	13	•	**7012**	95	18	•	**H 7012**	95	18	•	**7212**	110	22	•	**7312**	130	31
65	**71913**	90	13	•	**H 71913**	90	13	•	**7013**	100	18	•	**H 7013**	100	18	•	**7213**	120	23		**7313**	140	33
70	**71914**	100	16	•	**H 71914**	100	16	•	**7014**	110	20	•	**H 7014**	110	20	•	**7214**	125	24		**7314**	150	35
75	**71915**	105	16	•	**H 71915**	105	16	•	**7015**	115	20	•	**H 7015**	115	20	•	**7215**	130	25		**7315**	160	37
80	**71916**	110	16	•	**H 71916**	110	16	•	**7016**	125	22	•	**H 7016**	125	22	•	**7216**	140	26				
85	**71917**	120	18	•	**H 71917**	120	18	•	**7017**	130	22	•	**H 7017**	130	22	•	**7217**	150	28				
90	**71918**	125	18	•	**H 71918**	125	18	•	**7018**	140	24	•	**H 7018**	140	24	•	**7218**	160	30				
95	**71919**	130	18	•	**H 71919**	130	18	•	**7019**	145	24	•	**H 7019**	145	24	•	**7219**	170	32				
100	**71920**	140	20	•	**H 71920**	140	20	•	**7020**	150	24	•	**H 7020**	150	24	•	**7220**	180	34				
105	**71921**	145	20		**H 71921**	145	20		**7021**	160	26		**H 7021**	160	26		**7221**	190	36				
110	**71922**	150	20		**H 71922**	150	20		**7022**	170	28		**H 7022**	170	28		**7222**	200	38				
120	**71924**	165	22		**H 71924**	165	22		**7024**	180	28		**H 7024**	180	28		**7224**	215	40				
130	**71926**	180	24						**7026**	200	33						**7226**	230	40				
140	**71928**	190	24						**7028**	210	33						**7228**	250	42				
150	**71930**	210	28						**7030**	225	35												
160	**71932**	220	28						**7032**	240	38												
170	**71934**	230	28						**7034**	260	42												
180	**71936**	250	33						**7036**	280	46												
190	**71938**	260	33						**7038**	290	46												
200	**71940**	280	38						**7040**	310	51												
220	**71944**	300	38																				
240	**71948**	320	38																				
260	**71952**	360	46																				
280	**71956**	380	46																				

Table 14-302: Production Range of IBC Precision Angular Contact Ball Bearings

*DI: sealed version

2.2 Arrangements, assorting of Precision Angular Contact Ball Bearings

Sets out of single bearings of same preload (indication of main load in V-direction):



Balanced sets of single bearings with different preload:

Arrangement			Designation
X	X	L	BTBTL
L	L	M	BTBTM
M	M	H	BTBTH

Arrangement				Designation
X	X	X	L	BQBTL
L	L	L	M	BQBTM

51-105

Arrangements, advantages of bearing sets, mounting

According to different needs spindle bearings are used in various arrangements.

IBC supplies single bearings as well as sets with an overall V-marking over the outer rings.

(The V-mark on a single bearing points in the direction, from which side the axial load is applied at the inner ring).

Sets with V-marking are advantageous in several aspects for the customer:

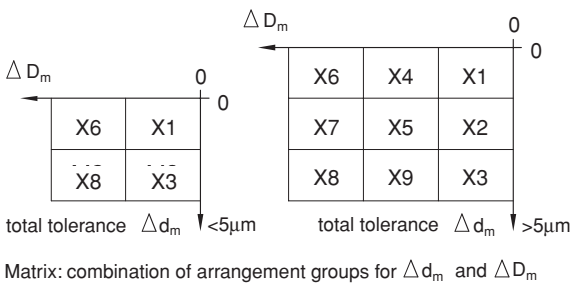
a. The diameter tolerance of the inner and outer rings of the bearings is within a selected close tolerance spectrum. (See matrix).
   This allows for a more even support of the shafts and housings for the whole set.
   It eases the combination with shafts and housings to achieve the same fits for a greater lot.
   For fast moving spindles it means a better speed behaviour.

b. The V-marking eases the mounting especially with sealed bearings, where the sealing hides the view into the bearing, which makes it more difficult to put the bearings into the right order based on the main load direction.
   The overall V-marking on the set of the outer rings shows the main load direction acting on the inner rings of the set.

c. The V-marking also shows the point of highest material thickness or highest radial eccentricity of the outer ring.

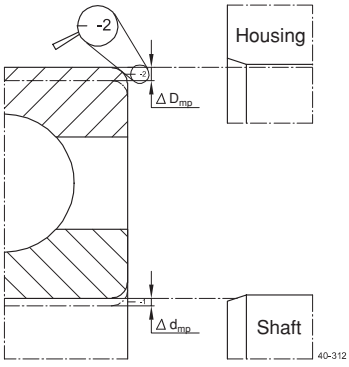
d. A marked ring at one side face of the bearing shows the highest material thickness or highest radial eccentricity of the inner ring. Even these points should be lined up before mounting.

e. A compensation of eccentricities on bearing rings, shaft and housing can be achieved by following before mounting the hints according to c and d in that way that the markings for highest points of the inner rings will be arranged opposite to the smallest diameter of the shaft and at the same time the outer ring markings are in line with the biggest diameter of the housing. Thus enables best running accuracy.



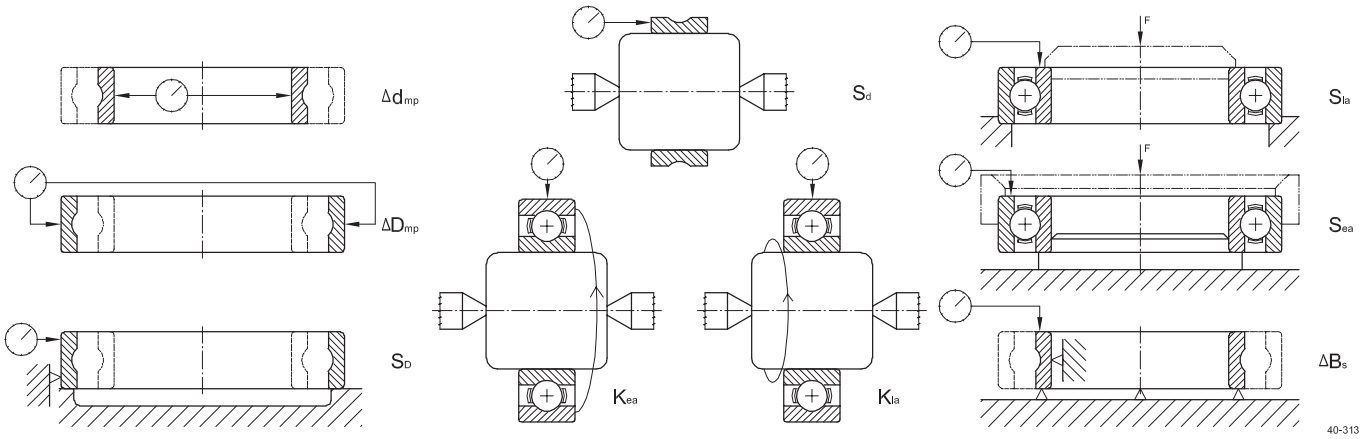
Matrix: combination of arrangement groups for Δd_m and ΔD_m

40-311



40-312

2.3 Equivalent Data of Precision Angular Contact Ball Bearings



1. Table of precision classes

Designation IBC	P5	P4	P4A	P2H	P2A
DIN (Deutsches Institut für Normung)	P5	P4	P4S		P2
AFBMA STD 20 (Anti-Friction Bearing Manufacturers Association)	ABEC5	ABEC7			ABEC9
ISO 492 (International Standards Organisation)	Class 5	Class 4			Class 2
BS 292 (British Standards Institution)	EP5	EP7			EP9

2. Tolerances of precision classes

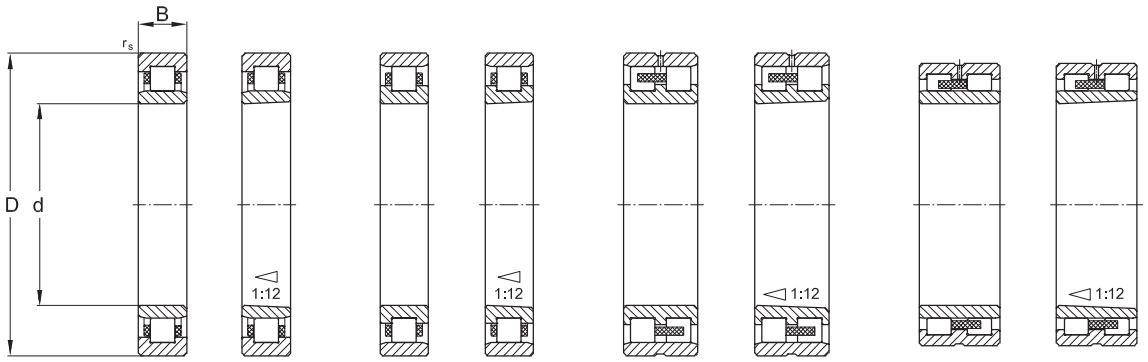
Designation according to ISO	Feature	Inner ring	Outer ring	P4	P4A	P2H	P2A
Δd_{mp}	Max. deviation of the mean bore diameter from the nominal	X		P4	P4	P4	P2
ΔD_{mp}	Max. deviation of mean outside diameter from the nominal		X	P4	P4	P4	P2
K_{ia}	Radial runout of assembled bearing inner ring	X		P4	P2	P2	P2
K_{ea}	Radial runout of assembled bearing outer ring		X	P4	P2	P2	P2
S_d	Side face runout referring to bore of inner ring	X		P4	P2	P2	P2
S_D	Variation in inclination of outside cylindrical surface to outer ring side face		X	P4	P2	P2	P2
S_{ia}	Side face runout of the assembled bearing inner ring	X		P4	P2	P2	P2
S_{ea}	Side face runout referring to raceway of assembled bearing outer ring		X	P4	P2	P2	P2
V_{Bs}/V_{Cs}	Ring width variation	X	X	P4	P4	P2	P2
$\Delta B_s/\Delta C_s$	Deviation of inner ring width	X	X	P4	P4	P4	P2

3. Interchange Data

Manufacturer	IBC	FAG	NSK	SKF	SNFA
Precision Classes	P5	P5	P5	P5	
	P4	P4	P4	P4	7
	P4A	P4S	P3	P4A	
	P2H	(P4S)	(P3)	(P4A)	
	P2A			PA9A	9

3. Designation of IBC Precision Cylindrical Roller Bearings

NU10..
NU10...K
N10..
N10...K
NN30..
NN30...K
NNU49..
NNU49...K



	NN	30	18	K	. W33	. M	. SP	
	NNU	49	24	K	. W33	. M	. SPC2X	. A26
CR	N	10	15	K	.	. M	. SP	
AC-	N	10	20		.	. M	. SP	. A11
	NU	10	08		.	. M	. P52	. A26

Material

–	Steel rollers 100 Cr6
CR	Ceramic rollers Si_3N_4
AC-	Rings ATCoated
ACC-	Rings ATCoated + rollers Si_3N_4

Design

N..
NN..
NU..
NNU..

Series

10..
30..
49..

Bore code

00	10 mm	02	15 mm
01	12 mm	03	17 mm

At number 04 and upward x 5 [mm]

Execution

–	Cylindrical bore
K	Tapered bore 1:12

Lubrication groove

W33	Lubrication groove with 3 bores in outer ring

Coating with ATCoat

A11	Inner and outer ring ATCoated
A15	Inner and outer ring ATCoated, rolling elements and cage corrosion resistant*
A 21	Inner ring ATCoated
A 31	Outer ring ATCoated

Precision classes and radial clearance

P6, P63, SPC1X, SPC2X, P52, P53, SP(C1)

Cage

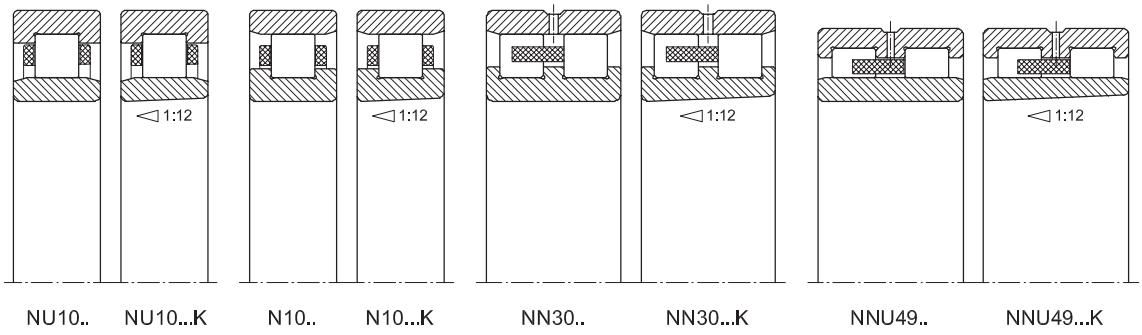
M	Machined brass cage located on rolling elements
M1	Machined brass cage, riveted, located on rolling elements
M1A	Machined brass cage, riveted, located on outer ring
MA	Machined brass cage located on outer ring
MB	Machined brass cage located on inner ring
P	Polyamide window type cage located on outer ring with lubrication groove in outer diameter of cage
PA	Polyamide window type cage, located on outer ring
PB	Polyamide window type cage, located on inner ring
PH	Polyamide window type cage, located on rolling elements

Designation system 52-900

**Corrosion protection depending on application, for further information please refer to main catalogue*

3.1 Production Range IBC Precision Cylindrical Roller Bearings

NU10..
NU10...K
N10..
N10...K
NN30..
NN30...K
NNU49..
NNU49...K



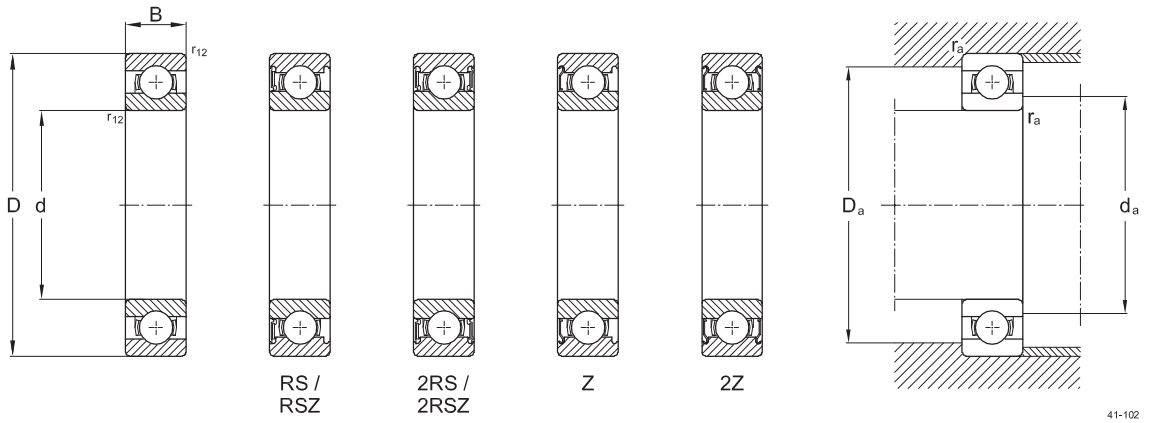
52-112

	Production series											
	NU 10... / NU 10...K			N 10... / N 10...K			NN 30... / NN 30...K			NNU 49... / NNU 49...K		
d		D	B		D	B		D	B		D	B
mm		mm			mm			mm			mm	
10												
12												
15												
17												
20												
25	**NU 1005**	47	12									
30	**NU 1006**	55	13									
35	**NU 1007**	62	14									
40	**NU 1008**	68	15	**N 1008**	68	15						
45	**NU 1009**	75	16	**N 1009**	75	16						
50	**NU 1010**	80	16	**N 1010**	80	16	**NN 3010**	80	23			
55				**N 1011**	90	18	**NN 3011**	90	26			
60				**N 1012**	95	18	**NN 3012**	95	26			
65				**N 1013**	100	18	**NN 3013**	100	26			
70				**N 1014**	110	20	**NN 3014**	110	30			
75				**N 1015**	115	20	**NN 3015**	115	30			
80				**N 1016**	125	22	**NN 3016**	125	34			
85				**N 1017**	130	22	**NN 3017**	130	34			
90				**N 1018**	140	24	**NN 3018**	140	37			
95				**N 1019**	145	24	**NN 3019**	145	37			
100				**N 1020**	150	24	**NN 3020**	150	37	**NNU 4920**	140	40
105				**N 1021**	160	26	**NN 3021**	160	41	**NNU 4921**	145	40
110				**N 1022**	170	28	**NN 3022**	170	45	**NNU 4922**	150	40
120							**NN 3024**	180	46	**NNU 4924**	165	45
130							**NN 3026**	200	52	**NNU 4926**	180	50
140							**NN 3028**	210	53	**NNU 4928**	190	50
150							**NN 3030**	225	56	**NNU 4930**	210	60
160							**NN 3032**	240	60	**NNU 4932**	220	60
170							**NN 3034**	260	67	**NNU 4934**	230	60
180							**NN 3036**	280	74	**NNU 4936**	250	69
190							**NN 3038**	290	75	**NNU 4938**	260	69
200							**NN 3040**	310	82	**NNU 4940**	280	80
220										**NNU 4944**	300	80
240										**NNU 4948**	320	80
260												
280												

Table 14-303: Production Range IBC Precision Cylindrical Roller Bearings

4. Designation of IBC Precision Single Row Deep Groove Ball Bearings

617..
618..
619..
60..
CB 60..
62..
CB 62..
63..
CB 63..



CB	60	14		. TB	. P63	.			GH73
	617	01	. 2RS	. Y					
	618	05	. 2Z	.	. C3				
	63	08	. 2Z	.	. P64				
ACC-	60	10	.	. TB	. P53	. X22	. A15	.GH62	

Material

–	Steel rollers 100 Cr6
CB	Ceramic rollers Si_3N_4
AC-	Rings ATCoated
ACC-	Rings ATCoated + balls Si_3N_4

Series

617..	60..
618..	62..
619..	63..

Bore code

00	10 mm	02	15 mm
01	12 mm	03	17 mm

At number 04 and upward x 5 [mm]

Sealing

–	Open
Z	Shield (at one side)
2Z	Shield (at both sides)
RS	Seal (at one side)
2RS	Seal (at both sides)
RSZ	Seal, low friction, at one side up to Ø 62 mm
2RSZ	Seal, low friction, at both sides up to Ø 62 mm
RSD	Seal, low friction, at one side at Ø 62 mm and above
2RSD	Seal, low friction, at both sides at Ø 62 mm and above

Cage

–	Steel sheet cage (standard)	JH	Steel sheet snap cage
TB	Fabric reinforced phenolic resin cage located on inner ring	THB	Fabric reinforced phenolic resin cage
TA	Fabric reinforced phenolic resin cage located on outer ring	MA	Solid machined brass, located on outer ring
LB	Aluminium cage located on inner ring	MB	Solid machined brass, located on inner ring
LA	Aluminium cage located on outer ring	KA	PEEK located on outer ring
PH	Polyamide snap cage	KB	PEEK located on inner ring
		Y	Brass sheet cage

Lubrication

–	Corrosion protected
G..	BearLub grease

Coating with ATCoat

A11	Inner and outer ring ATCoated
A15	Inner and outer ring ATCoated, rolling elements and cage corrosion resistant*
A 21	Inner ring ATCoated
A 31	Outer ring ATCoated

Grading

X03	Outer diameter in 3 groups
X20	Bore in 2 groups
X22	Outer diameter and bore in 2 groups
X33	Outer diameter and bore in 3 groups

Precision classes and radial clearance

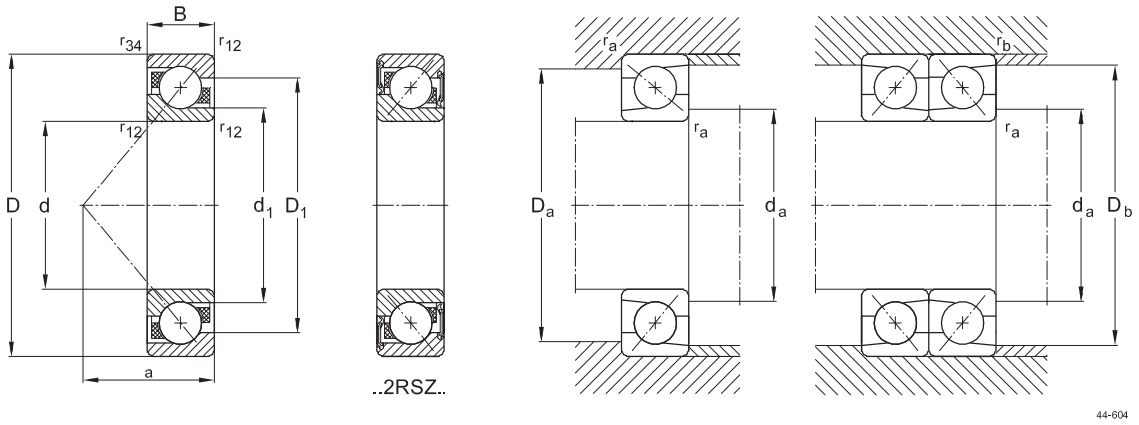
P6, P63, P5, P52, P53
C2
CN
C3
C4
e.g.: P53 = P5 + C3

Designation system 41-900

**Corrosion protection depending on application, for further information please refer to main catalogue*

5. Designation of IBC Precision Angular Contact Ball Bearings 40°

70..BE
CB 70..BE
72..BE
CB 72..BE
73..BE
CB 73..BE



CB	70	05	. BE	P	.		P6	.DBA		
	72	06	. BE	K	.		P5	. UL		
	73	05	. BE	P	.2RSZ.		P5	. UO		
	72	05	. BE	J	.			UA		
	73	07	. BE	M	.		P6	. UA		
ACC-	73	08	. BE	M	.		P5	. UO	. A15.	GH62

Material

–	Steel balls 100 Cr6
CB	Ceramic balls Si_3N_4
AC-	Rings ATCoated
ACC-	Rings ATCoated + balls Si_3N_4

Series

70..
72..
73..

Bore code

00	10 mm	02	15 mm
01	12 mm	03	17 mm

At number 04 and upward x 5 [mm]

Design C

BE 40° contact angle
reinforced inner construction

Cage

P	Window cage PA 6.6 glass fibre reinforced
M	Solid machined brass
J	Steel sheet
K	Window cage PEEK glass fibre reinforced

Lubrication

–	Corrosion protected
G..	BearLub grease

Coating with ATCoat

A11	Inner and outer ring ATCoated
A15	Inner and outer ring ATCoated, rolling elements and cage corrosion resistant*
A 21	Inner ring ATCoated
A 31	Outer ring ATCoated

Axial clearance/preload, universal bearing

UA	Normal axial clearance
UB	Small axial clearance
UL	Light preload
UO	Without play
A..-..	Axial clearance range

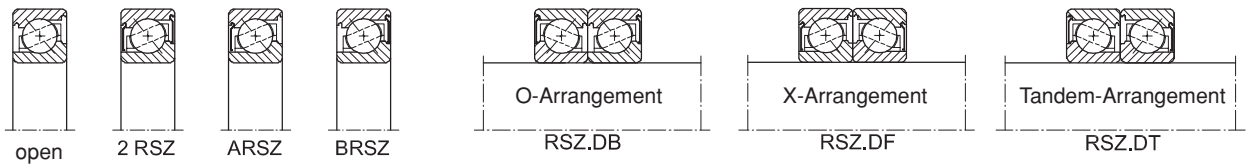
Bearing arrangement DB, DF, DT

Precision classes

P6	Dimensional and running accuracy acc. to ISO class 6
P5	Dimensional and running accuracy acc. to ISO class 5
P4	Dimensional and running accuracy acc. to ISO class 4

Sealing

RSZ	Friction reduced sealing at one side
2RSZ	Friction reduced sealing at both sides
ARSZ	At one side – IR lower bord
BRSZ	At one side – IR high bord



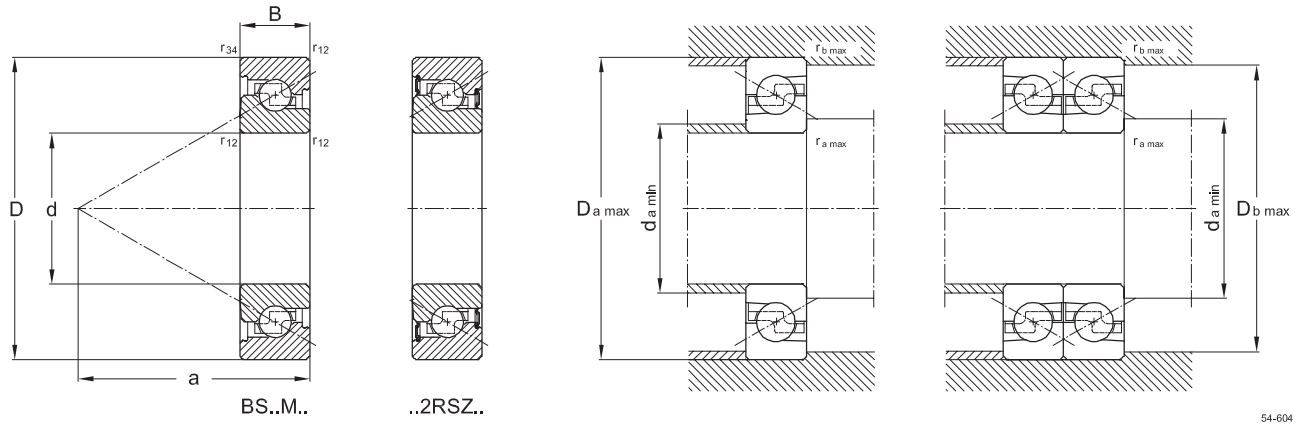
Open sealed 40° Angular Contact Ball Bearings as single and matched bearing sets

Designation system 44-900

**Corrosion protection depending on application, for further information please refer to main catalogue*

Detailed information see catalogue TI-1-4044.0/E

6. Designation of IBC 60° Super Precision Angular Contact Thrust Ball Bearings



CB	BS	75	M	110				S	.	P4A	.	D	.	M	.	OX			
	BS	30	M	62	/16	.	2RSZ			P4A	.	U	.	M					
AC	BS	50	M	100						P4A	.	Q	.	M					
–	BS	25	M	62	/17					P4A	.	D	.	M	.	A15	.	GH62G	

Material

–	Steel balls 100 Cr6
CB	Ceramic balls Si_3N_4
AC-	Rings ATCoated
ACC-	Rings ATCoated + balls Si_3N_4

Series

BS	60° Ang. Contact Ball Bearings

Bore code

25 M	Metric bore 25 mm
150 I	Inch bore 1,50"

Dimension unit

M	Metric
I	Inch

Outer diameter

Only metric bearings are marked [mm]

Bearing width

Standard width not marked
/17 = 17 mm width according to DIN 616

(not all combinations are possible)

Sealing

RSZ	Friction reduced sealing at one side
2RSZ	Friction reduced sealing at both sides

Lubrication

–	50 % / GH62 (standard)
GN21G	30–35 % / GN21
OX	Corrosion protected

Coating with ATCoat

A11	Inner and outer ring ATCoated
A15	Inner and outer ring ATCoated, rolling elements and cage corrosion resistant*
A 21	Inner ring ATCoated
A 31	Outer ring ATCoated

Axial clearance/preload, universal bearing

UX	Extra light
UL	Light
UD	Double light
UM	Medium
UH	High
U..	Special preload in daN
A..-..	Axial clearance range

Bearing arrangements (sets) see page 6

Arrangement

U	Universal (single bearing)
D	Duplex set universal
T	Triplex set
Q	Quadruple set universal

Precision

P4A

Lubrication groove and bore

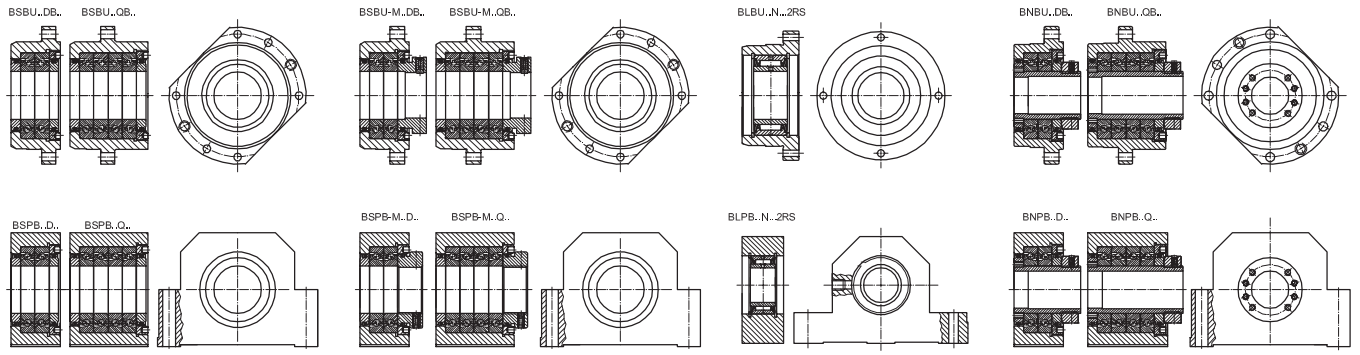
S	Re-lubrication via outer ring

Designation system 54-900

**Corrosion protection depending on application, for further information please refer to main catalogue*

Detailed information see catalogue TI-1-5010.2/E

7. Designation of IBC Precision Bearing Units for Ball Screws



57-604

	BS	BU	-M	25	D	B	88	.				M					
ACC-	BS	BU	-M	40	Q	B	128	.			QBT	M		A15	.	GH62G	
	BS	PB		30	Q		50	.				L					
	BN	BU		63	Q	B	138	.		2		L	-M2				
	BN	BU	S	75	Q	B	178	.		2	DB	L	-M2				
	BN	PB		95	D		105	.		2		M	-M2				
	BL	PB		20	N		32	.	2RS								

Material
- – Steel balls 100 Cr6
- CB Ceramic balls Si_3N_4
- AC- Bearing rings ATCoat
- ACC- Balls Si_3N_4 + ATCoat

Bearing units for Ball Screws
- BS Fixed end units for spindle ends
- BN Bearing units for BS nuts
- BL Floating end units

Execution
- BU Flange unit
- PB Pillow block unit

Integrated lubrication
- S Integrated for Ball Screw nut

Integrated Locknut
- M Integrated
- – Locknut to integrated separately (MMRB)

Bore code
- 25 Design/Metric bore 25 mm

Number of bearings
- D Duplex set
- Q Quadriple set
- N Needleroller for floating end units

Form of flange
- A Round
- B Flattened on both sides
- C Flattened on one side

Reference dimension
Flange seat diameter
Center height of the pillow block

Not all combinations are available

Lubrication
- – 50% / GH62 (standard)
- GN21G 30–35% / GN21

Coating with ATCoat
- A11 Inner and outer ring ATCoated
- A15 Inner and outer ring ATCoated, rolling elements and cage corrosion resistant*
- A 21 Inner ring ATCoated
- A 31 Outer ring ATCoated

Mounting of adapter
For BN..-units
- M2 As shown
- M1 Mounted when twisted 180°

Preload/Bearing
- L Light preload
- M Medium preload
- H High preload

Bearing arrangement
- DB, QBC Standard
- QBT ØØØØ
- DT Tandem bearing for spring preloaded units

Adapter Sleeve (DIN 69051)
- 1 Hole pattern 1
- 2 Hole pattern 2

Sealing
- – Labyrinth sealing
- 2RS Sealing for floating end units

Designation system 57-900

For fixed end bearing units for higher speed, also bearings with ceramic balls (CB) can be offered. On request also with ATCoat (AC) for bearings.

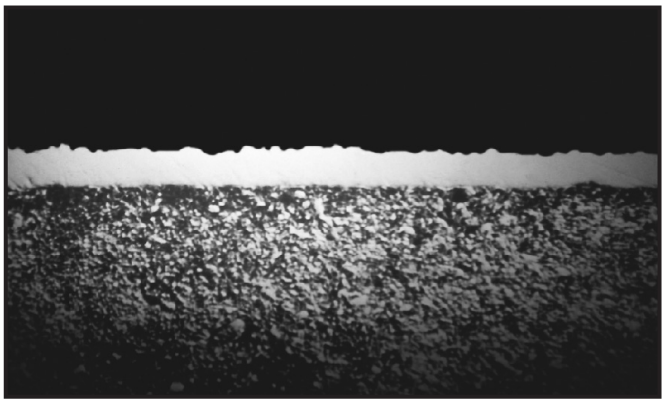
Detailed information please refer to catalogue TI-1-5010.2/E

**Corrosion protection depending on application, for further information please refer to main catalogue*

Bearing units with more bearings on request, as well as special housings with integrated coupling and bearing units with integrated lubrication for BS nuts.

Lubrication
Bearings with standard lubrication GH 62; without suffix.
Bearings with grease for higher speed: suffix GN21G.

8. IBC Precision Bearings with ATCoat



Cross section of ATCoat

Coated bearings

The ATCoat enables a bearing to be higher resistant against corrosion, wear and allows an increase of speed. This is caused by thin dense chromium coat. The special topographic surface also increases the ability of a bearing to withstand emergency situations. All these abilities lead to use coated IBC bearings under uncomfortable lubrication circumstances.

These conditions are for example as explained below:

– when it is impossible to use a lubricant.
– when it is only possible to use a low viscous lubricant which can not create a separating film.
– when the movement is not a complete rotation, where the lubricant film will not remain.
– when the bearing is unloaded and starts to slide.
– when the lubrication of the bearing is under the circumstance that acceleration or braking bring the rolling elements into slide.

The ATCoat coated bearings are an opportunity to corrosion resistant bearings. It can compete especially with those on the functional surfaces.
The coating thickness is about 2–4 µm and the microscopical structure of the surface is ball headed. A combination with ceramic balls lead to very good abilities under extreme conditions.

Purposes of ATCoat

Reduction of friction

Combination of materials	static friction (dry) [µo]	sliding friction (dry) [µ]
Steel/Steel	0.25	0.18
Steel/ATCoat	0.17	0.15
ATCoat/ATCoat	0.14	0.12

– Better adhesion of lubricant film
– Separation of similar materials
– Reduction of friction welding caused by adhesion
– Reduction of fretting corrosion
– Saving of the sliding abilities from inner and outer ring against attached parts (floating bearings)
– Protection of the bearing against intruding corrosion caused by aggressive materials (tribooxidation)
– Wear protection caused by higher hardness of the coat (78–80 HRC; 1300–1400 HV)

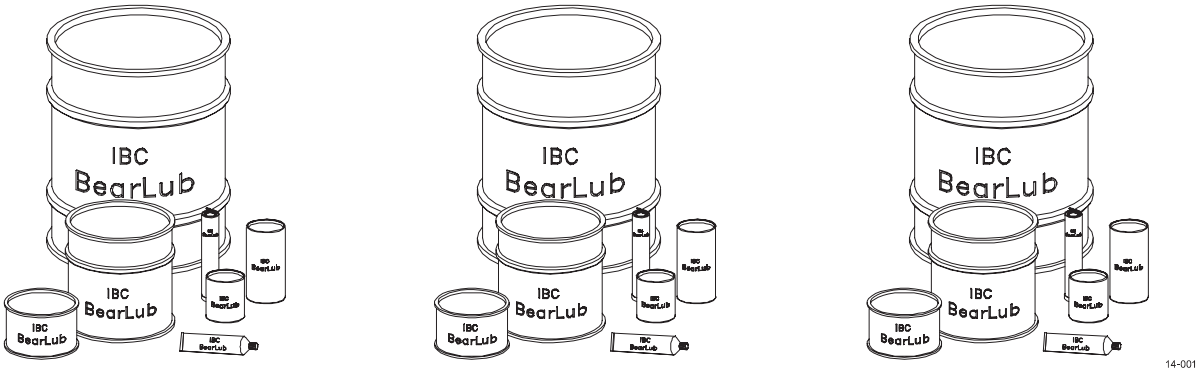
Prefixes of ATCoat bearings

AC-	Inner and outer ring ATCoated
ACC-	Rolling elements Si_3N_4 + ATCoat

Suffixes of ATCoat coated bearings

A11	Inner and outer ring ATCoated
A15	Inner and outer ring ATCoated, rolling elements and cage corrosion resistant
A21, A26	Inner ring ATCoated
A31	Outer ring ATCoated

9. Lubrication of bearings – IBC BearLub-Greases



IBC suffix	Rotational figures dm · n	Temperature range	Consistence classification NLGI	Basic oil	Viscosity of basic oil		Thickener	Density	Comments
	·10⁶ [mm/min]	[°C]			40°C	100°C		[g/cm³]	
GN 02	0.6	−30/+130	2	Mineral oil	100	10	Li-12 Hydro Stearat	0.9	Standard grease for single row deep groove ball bearings until D=72, noise reduced
GN 03	0.6	−25/+130	3	Mineral oil	100	10	Li-12 Hydro Stearat	0.9	Standard grease for single row deep groove ball bearings above D=72, noise reduced
GN 21	1.0	−35/+140	2	Mineral oil + EP	82	12.5	Li-12 Hydro Stearat	0.87	Multi purpose heavy duty grease for lubrication of guides and stationary housing applications
GS 32	1.0	−50/+120	2	Mineral oil + Ester oil	15	3.7	Li-soap	0.88	Noise tested grease for high rotational speed and low temperatures
GS 34	1.0	−50/+120	2	Mineral oil + Ester oil	21	4.7	Ba-Complex	0.99	High speed and low temperature grease
GS 36	1.8	−40/+120	2/3	PAO Ester	25	6	Li-soap	0.94	Especially for high speed spindle bearings in machine tools
GS 41	1.0	−60/+140	2	SK-Synthetic oil	18	4	Ba-Complex soap	0.96	High speed grease for taper roller bearings
GS 75	>2.0	−50/+120	2	Ester oil + SKW	22	5	Polycarbamide	0.92	Especially for high speed spindle bearings in machine tools
GH 62	0.5	−30/+160	2/3	Ester oil + SKW	150	18	Polycarbamide	0.88	High temperature and long duration
GH 68	1.3	−35/+160	2	Ester oil	55	9	Li-soap	0.975	Grease for high temperature, heavy duty and high speed
GH 70	0.6	−40/+180	2/3	Synthetic	70	9.4	Polycarbamide	0.95	Very low noise, high temperature grease
GH 72	0.7	−40/+180	2/3	Ester oil	100	12	Polycarbamide	0.97	Low noise, life time lubrication, high temperature, corrosion protective
GH 83	0.3	−60/+250	1	Fluoridated Polyester oil	300	85	PTFE	1.94	Highest viscosity during operation under high temperature conditions
GH 88	0.3	−30/+260	2	Perfluoro-polyether	55	9	PU	1.7	High thermal and chemical resistance, high performance under pressure, radiation and in vacuum
GH 90	0.6	−50/+260	2	PFPE	190	34	PTFE	1.9	High life time, consistent with most elastomers, good resistance against aggressive chemicals
GA 91	0.3	−75/+260	1/2	Silicon oil			Teflon		Resistance against corrosion and oxidation, used for aircraft industry
GF 20	0.3	−40/+120	1	Mineral oil	230	22	Al-Complex soap	0.9	Good adhesive and wear protection, used for food industry

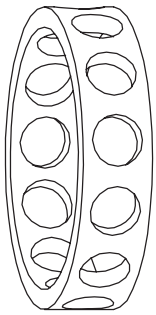
Table 14-300: Lubrication of bearings – IBC BearLub-Greases

The mentioned speed ratio (medium bearing diameter) of lubricants is a reference value for spring-preloaded bearings of medium diameter. Hybrid bearings allow for higher values (35%), roller bearings and others allow for reduced values.

For further lubricants please ask our Technical Department.

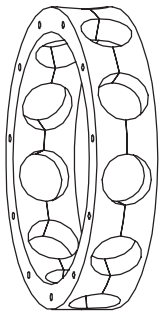
10. Design Version of IBC Precision Bearing Cages

Precision Angular Contact Thrust Bearings
and Single Row Deep Groove Ball Bearings

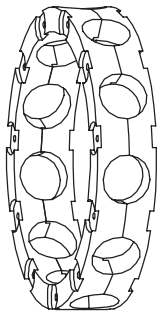


T (PA)
M (PA)
K (PA)

THB
SHA
SHB



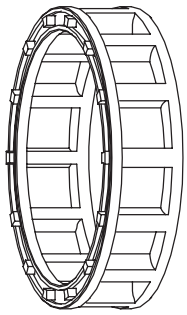
TA
TB



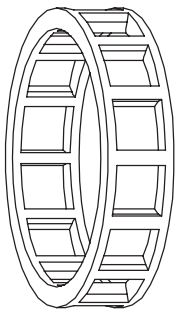
M
MA
MB
LA
LB

51-103

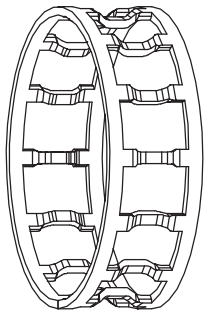
Cylindrical Roller Bearings



M
M1
MA
M1A



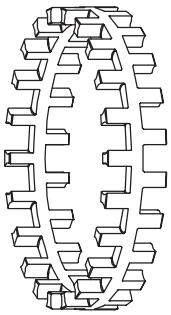
P



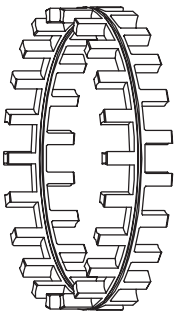
J

42-103

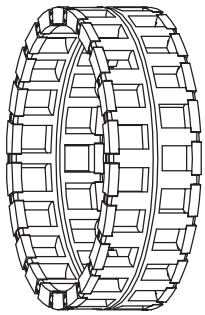
Precision Cylindrical Roller Bearings



M



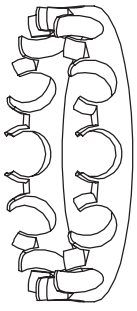
M



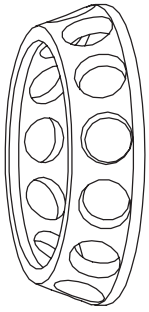
P

52-103

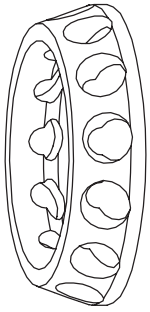
Angular Contact Ball Bearings 40°; 60°



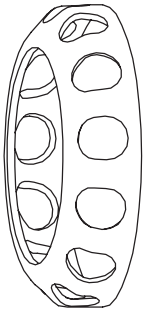
PH
KH



M



P



J

44-106

10.1 Characteristics and features of Bearing Cages

IBC suffix	Material	Centring of cage	Cage design	Speed classification* $d_m \cdot n$	Cage factor n_k	Temp.*** °C	Misalignment (except spherical roller bearing)	Speed	Vibration	Lubrication (always necessary)
(J) JL/JN	steel plate	roller guided	ribbon cage riveted cage	0.65	1	300	danger of breaking	danger of breaking	limited	due to steel, very important
JH	steel plate	roller guided	snap cage	0.65	1	220 (300)	limited usability	limited	limited	due to steel, very important
JW	steel plate	roller guided	window type cage	0.65	1	300	limited usability	limited	good	important
M M1	brass	roller guided	riveted cage	1.0	1.5	200 (300)	limited usability	limited	good	good index of friction
MA M1A	brass	outer ring guided	riveted cage window type	1.35	2.1	220 (300)	limited usability	high mech. strength, high inertia	excellent	good index of friction
MP	brass	roller guided	solid window type cage	1.1	0.75**	220 (300)	limited usability	high mech. strength, high inertia	excellent	good index of friction
MPB	brass	inner ring guided	solid window type cage	1.2	1.9	220 (300)	limited usability	insufficient flexibility	excellent	good index of friction
M (MPA)	brass	outer ring guided	solid window type cage	1.3	0.85**	220	limited usability	good	good	good index of friction
TA	fabric-reinforced phenolic resin	outer ring guided	two-piece riveted cage	1.5	2.4	120	not recommendable	excellent	good	excellent index of friction
TB	fabric-reinforced phenolic resin	inner ring guided	two-piece riveted cage	1.4	2.2	120	not recommendable	excellent	good	excellent index of friction
THB	fabric-reinforced phenolic resin	inner ring guided	snap cage	<1	1.5	120	limited usability	excellent	good	good index of friction
T (TPA)	fabric-reinforced phenolic resin	outer ring guided	solid window type cage	see catalogue		120 (150)	limited usability	excellent high mech. strength	low inertia, well balanced	excellent index of friction
P	polyamide PA6.6 glass fibre reinforced	roller guided	window type cage extruded	see catalogue	2.1	120* 140*	recommendable	very good, high elasticity	excellent high elasticity	good index of friction
PH	polyamide PA6.6 glass fibre reinforced	roller guided	snap cage	1.4	2.1	140 (160)	elastic behaviour	good	very good	good index of friction
K (KPA)	PEEK	outer ring guided	solid window type cage	see catalogue		120* 140* (160)	recommendable	very good, high elasticity	excellent high elasticity	good index of friction
KH	PEEK	roller guided	snap cage	1.4	2.1	120 (160)	elastic behaviour	good	very good	good index of friction
L	light metal	roller guided	riveted cage	1.2	1.9	200	limited usability	limited	good	good index of friction
LA	light metal	outer ring guided	riveted cage	1.5	2.3	200	not recommendable	high mech. strength	very good	good index of friction
LB	light metal	inner ring guided	riveted cage	1.3	2	200	not recommendable	low flexibility, low inertia	very good	good index of friction
SHA	stainless steel	outer ring guided	snap cage	<1	1.3	200 (250)	not recommendable	high mech. strength, high inertia	good	good index of friction with ceramic balls
SHB	stainless steel	inner ring guided	snap cage	<1	1.3	200 (250)	not recommendable	high mech. strength, high inertia	good	good index of friction with ceramic balls
S (SPA)	stainless steel	roller guided	solid window type cage	see catalogue		200 (250)	limited usability	limited	good	good index of friction with ceramic balls

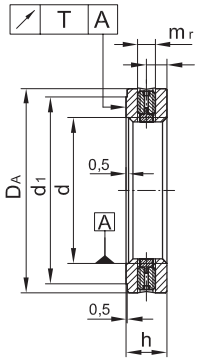
Table 14-301: Characteristics and features of Bearing Cages

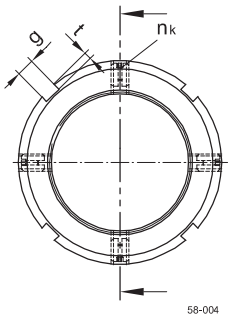
* $\cdot 10^6$ mm/min standard value only for single row deep groove ball bearing at moderate bearing load (<0.05 C) and oil. Please ask for cages out of further materials. By adding of glass, or carbon fibres, as well as graphite, or PTFE components in the cage material a temperature extension up to 260 °C is possible. High stability, ductility and low weight allow for higher rotational speed.
Lubrication with aggressive additives within the oil the cage material can reduce the length of service of a bearing. This could happen mainly under high temperature conditions and in such a case as a preventive measure the temperature should be limited to 100 °C.

** Cages for spindle bearings have higher basic speed ratings.

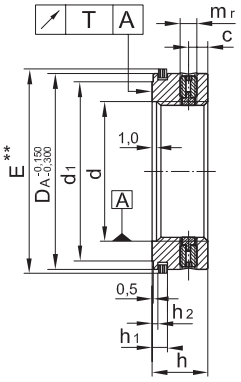
*** For temperature above 140 °C also the inner and outer rings have to be stabalized.

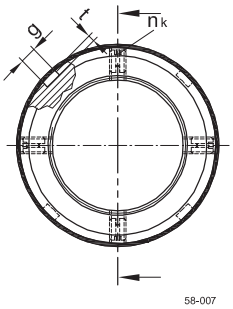
11. IBC Precision Locknuts, Labyrinth Seals



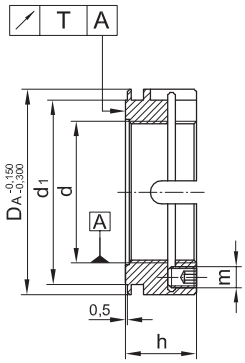


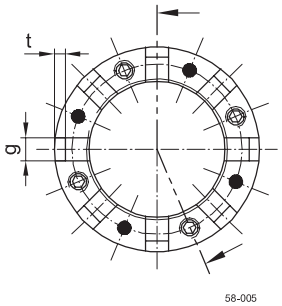
MMR..



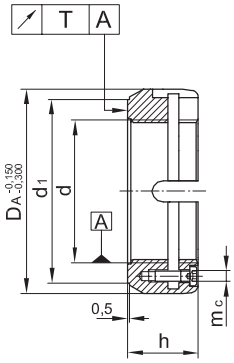


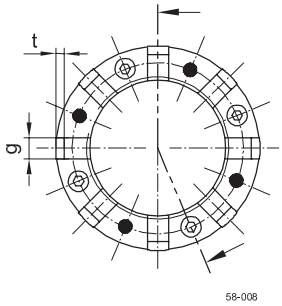
MMRBS...



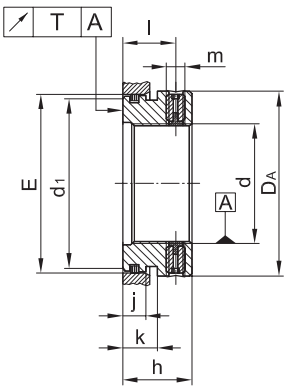


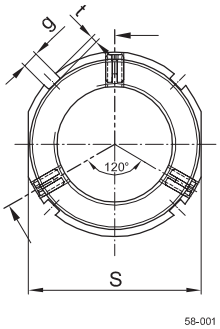
MBA..



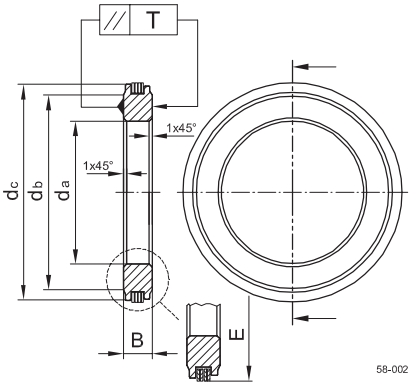


MBC..

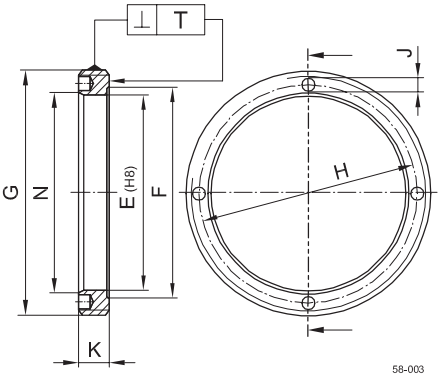




MMRS..-..Q2



S..-...Q2



MD..-...Q5

Designation IBC – Precision Locknuts and accessories

MMR	narrow Precision Locknut with radial lock
MMRB	wide Precision Locknut with radial lock
MMRBS	the same as MMRB, but with laminar Labyrinth Seal
MBA	Precision Locknut with axial lock via slotted segments, from Ø 20 on
MBAS	the same as MBA, but with laminar Labyrinth Seal
MBC	Precision Locknut with axial lock via slotted segments and four screws
MMA	Precision Locknut with axial lock via 2 cones meeting at an angle of 90°
MMRS	special locknut with radial lock, to match 60° super precision angular contact thrust ball bearings BS and MD Locknut
MD	seal nut with fine outer thread, fits to Labyrinth Seals S and MMRS nut
S	Precision Labyrinth Seal with laminar rings made of spring steel
. . . . Q	4 securing elements, unless standard

Delivery programme

M6 … M300

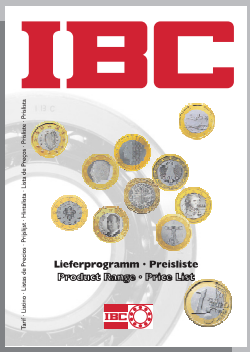
The mentioned designs could not be produced in all thread dimensions.

Detailed information see catalogue TI-1-5010.2/E

More of IBC …

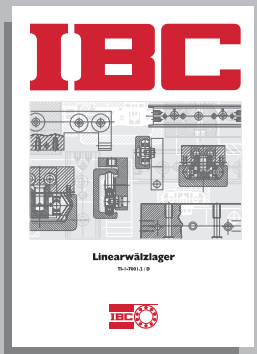
Company Profile

Precision Locknuts
T1-I-5020.0 / D (German)
T1-I-5020.0 / E (English)



Product Range
Price List

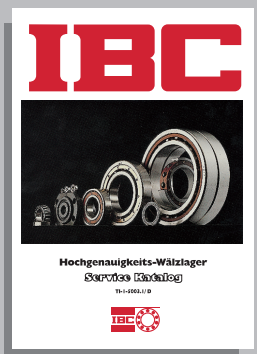
Ball Screw Support Bearings
TI-I-5010.2 / D (German)
TI-I-5010.2 / E (English)



Linear Bearings
T1-1-7001.2 / D (German)

Telescopic Rails
T1-1-7005.1 / D (German)

Angular Contact
Bearings 40°
T1-1-4044.0 / D (German)



Super Precision Bearings
Service Catalog
T1-1-5003.1 / D (German)
T1-1-5003.1 / E (English)

ATCoated Bearings
TI-1-5010.2 / D (German)

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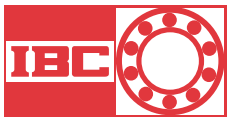
Fax: +49/64 41/5 30 15



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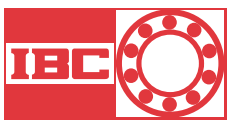

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