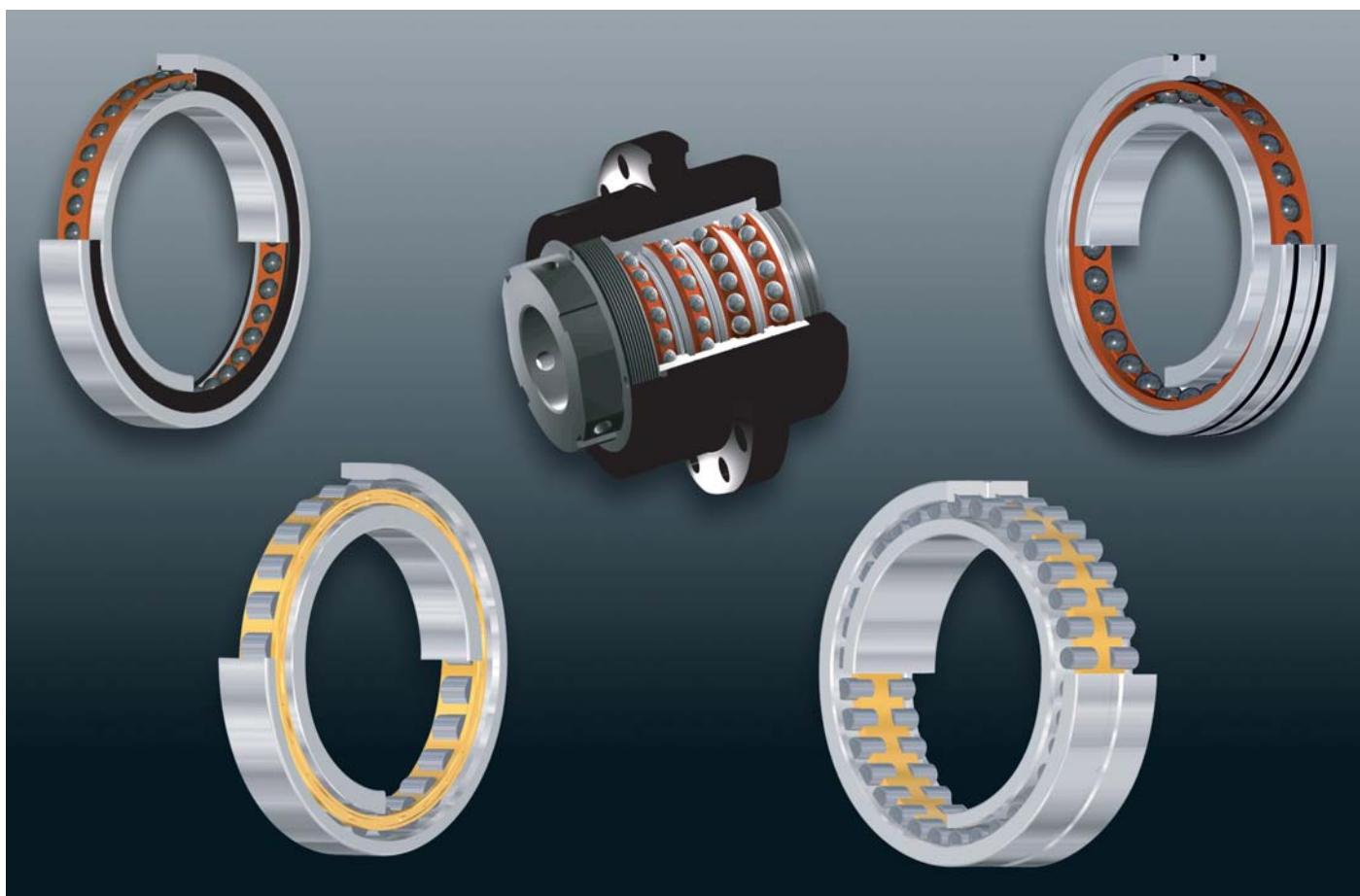


# IBC



**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 finished 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 unequalled reliability.



Central Computer Controlled High Shelf Warehouse – Middle 1996

Precise Logistics provide an unequalled 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.

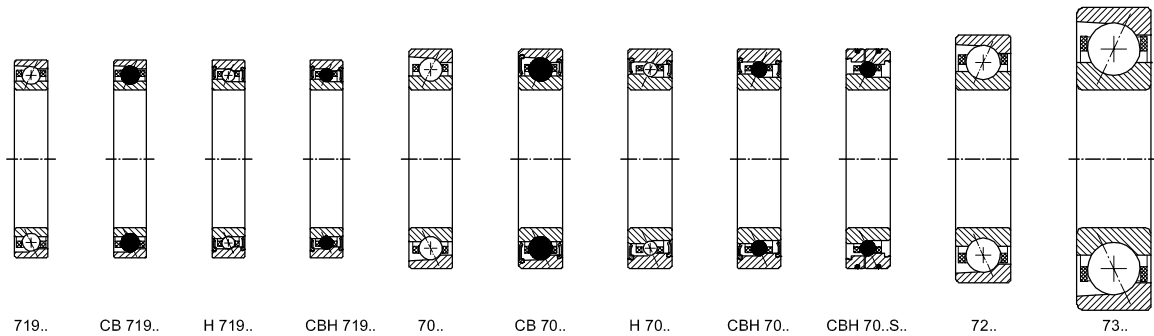
Our quality management system is implemented and accredited according DIN EN ISO 9001: 2000 for design, development, production and sales of all kinds of rolling bearings and linear motion bearings.

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 70..  
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 <sub>3</sub> N <sub>4</sub>
AC-	Rings ATCoated
ACC-	Rings ATCoated + balls Si <sub>3</sub> N <sub>4</sub>

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	

Precision	ABEC	ISO	DIN
P4, P4A, P2H, P2A			

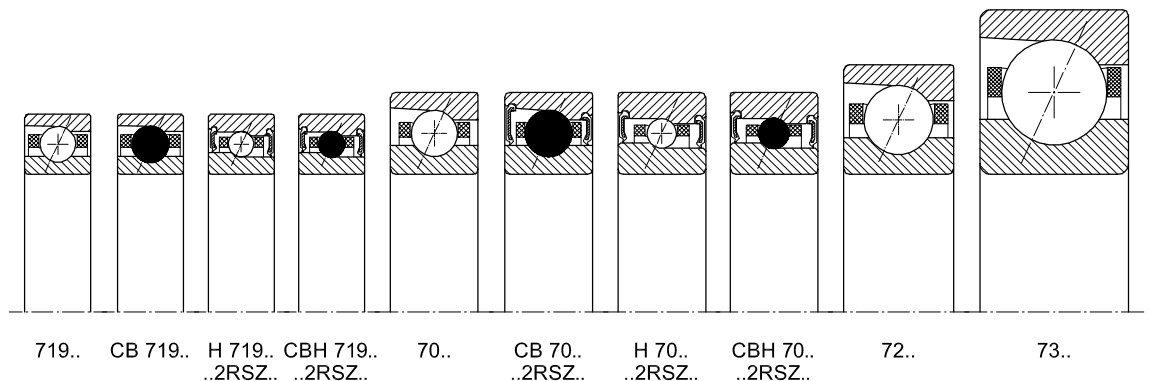
Sealing	
2RSZ	Non-contact seal, both sides

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..



51-112

	Production series																	
	719...			H 719...			70...			H 70...			72...			73...		
d mm	D mm	B mm	DI*	D mm	B mm	DI*	D mm	B mm	DI*	D mm	B mm	DI*	D mm	B mm	DI*	D mm	B mm	DI*
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															

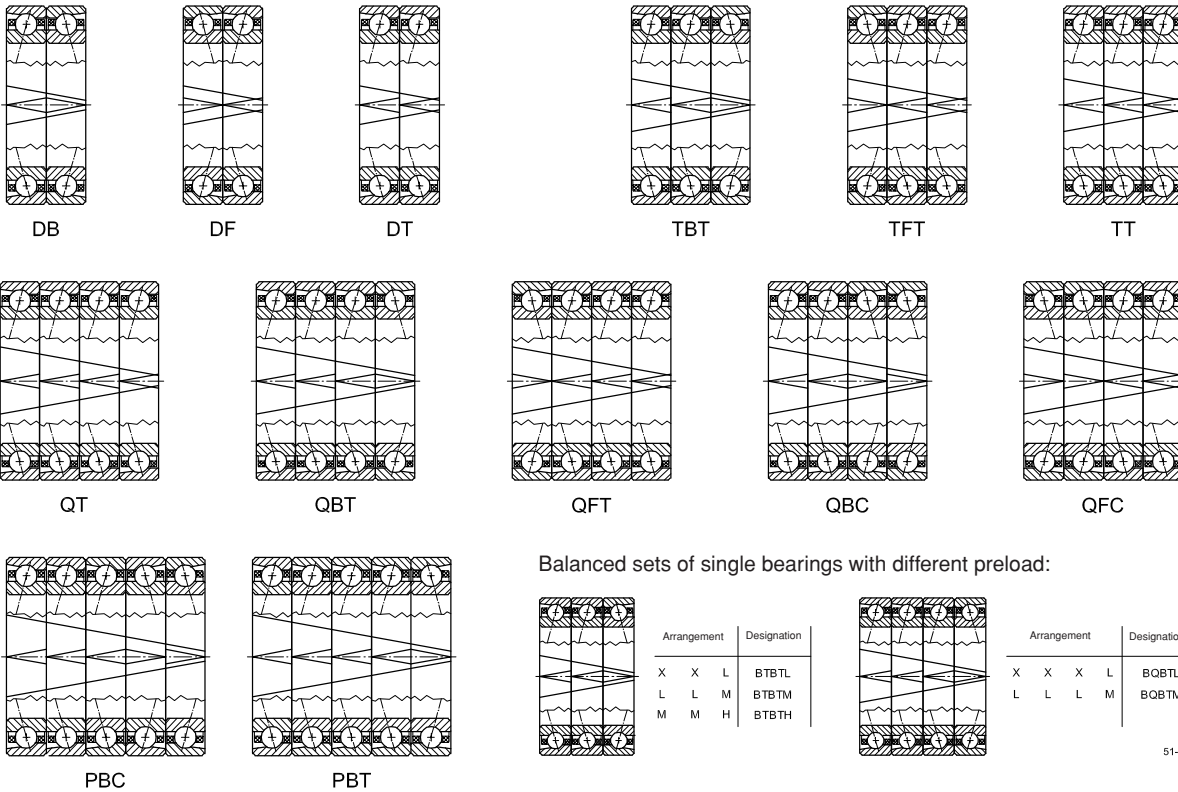
Table 14-302: Production Range of IBC Precision Angular Contact Ball Bearings

\*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):



### 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).

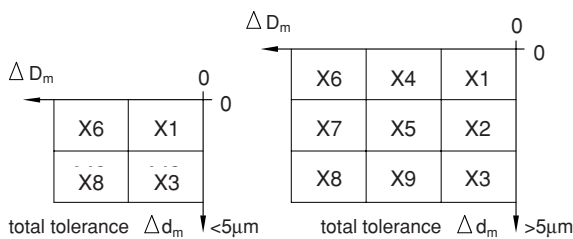
Sets with V-marking are advantageous in several aspects for the customer:

- 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.
- 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.

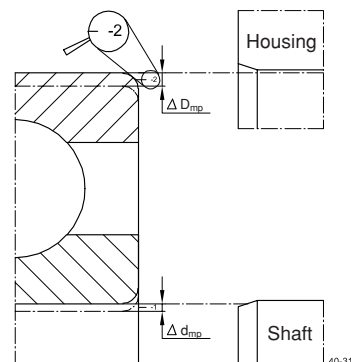
The overall V-marking on the set of the outer rings shows the main load direction acting on the inner rings of the set.

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

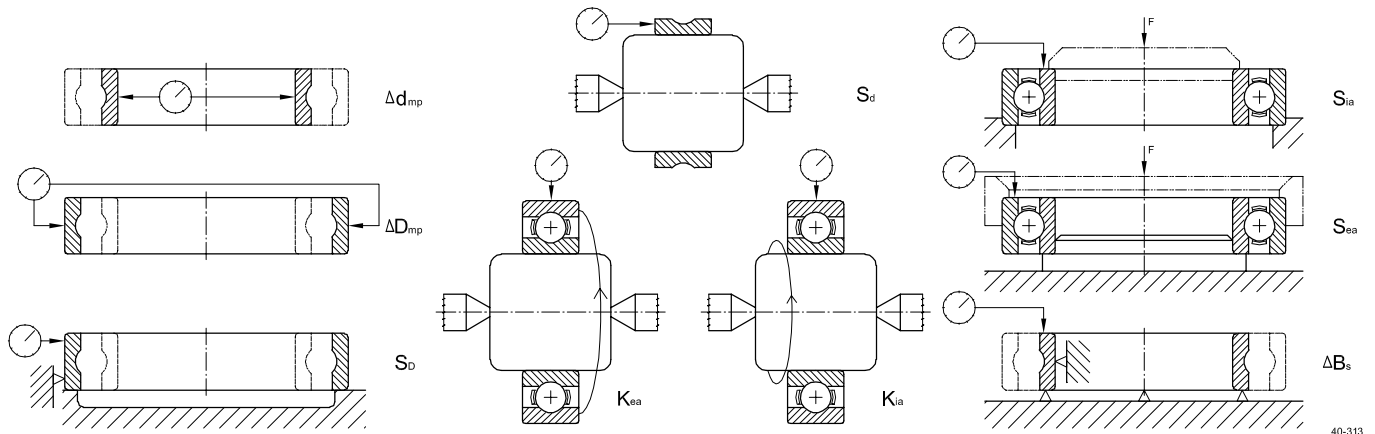


Matrix: combination of arrangement groups for  $\Delta d_m$  and  $\Delta D_m$

40-311



## 2.3 Equivalent Data of Precision Angular Contact Ball Bearings

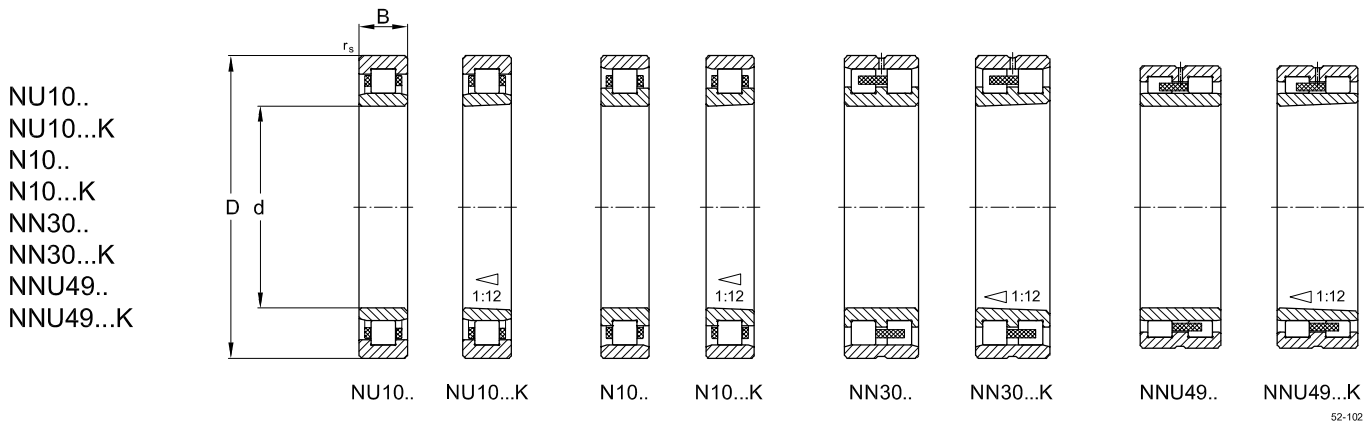


1. Table of precision classes					
Designation IBC	P5	P4	P4A	P2H	P2A
DIN (Deutsches Institut für Normung)	P5	P4	P4S		P2
AFBMA STD 20 (Anti-Friction Bearing Manufacturers Association)	ABEC5	ABEC7			ABEC9
ISO 492 (International Standards Organisation)	Class 5	Class 4			Class 2
BS 292 (British Standards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

2. Tolerances of precision classes							
Designation according to ISO	Feature	Inner ring	Outer ring	P4	P4A	P2H	P2A
$\Delta d_{mp}$	Max. deviation of the mean bore diameter from the nominal	X		P4	P4	P4	P2
$\Delta D_{mp}$	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
	P5	P5	P5	P5	
	P4	P4	P4	P4	7
Precision Classes	P4A	P4S	P3	P4A	
	P2H	(P4S)	(P3)	(P4A)	
	P2A			PA9A	9

### 3. Designation of IBC Precision Cylindrical Roller Bearings



	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 $\text{Si}_3\text{N}_4$
AC-	Rings ATCoated
ACC-	Rings ATCoated + rollers $\text{Si}_3\text{N}_4$

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)

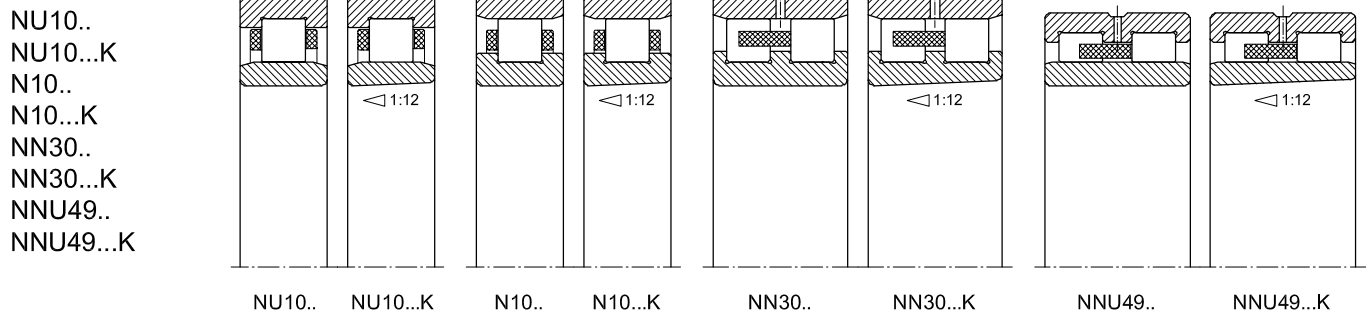
Cage	
M	Machined brass cage located on rolling elements
M1	Machined brass cage, riveted, located on rolling elements
M1A	Machined brass cage, riveted, located on outer ring
MA	Machined brass cage located on outer ring
MB	Machined brass cage located on inner ring
P	Polyamide window type cage located on 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*



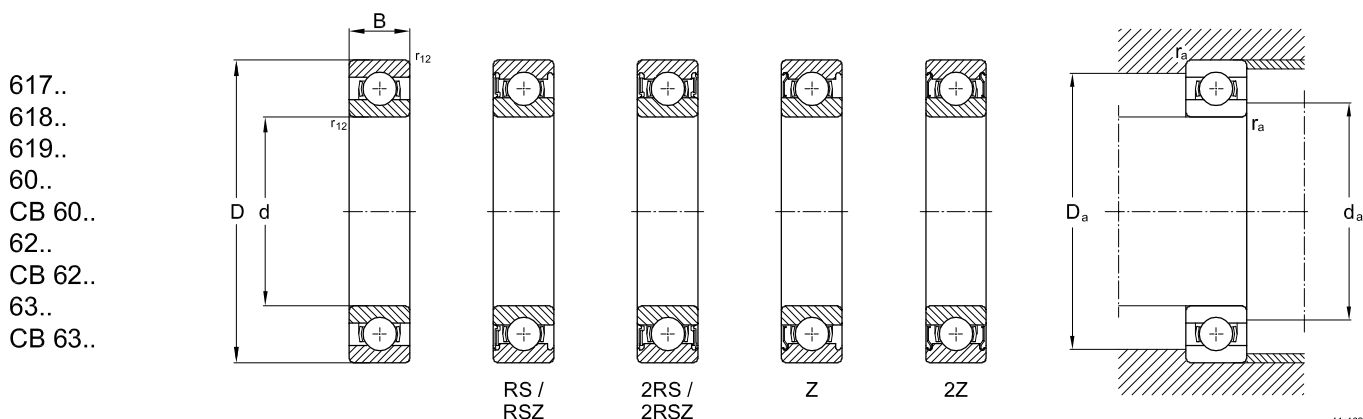
## 3.1 Production Range IBC Precision Cylindrical Roller Bearings



	Production series																			
	NU 10.../NU 10...K			N 10.../N 10...K			NN 30.../NN 30...K			NNU 49.../NNU 49...K										
d mm	D B mm			D B mm			D B mm			D B 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



CB	60	14		.T	.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 $\text{Si}_3\text{N}_4$
AC-	Rings ATCoated
ACC-	Rings ATCoated + balls $\text{Si}_3\text{N}_4$

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

Bore code	
00	10 mm
01	12 mm
02	15 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

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

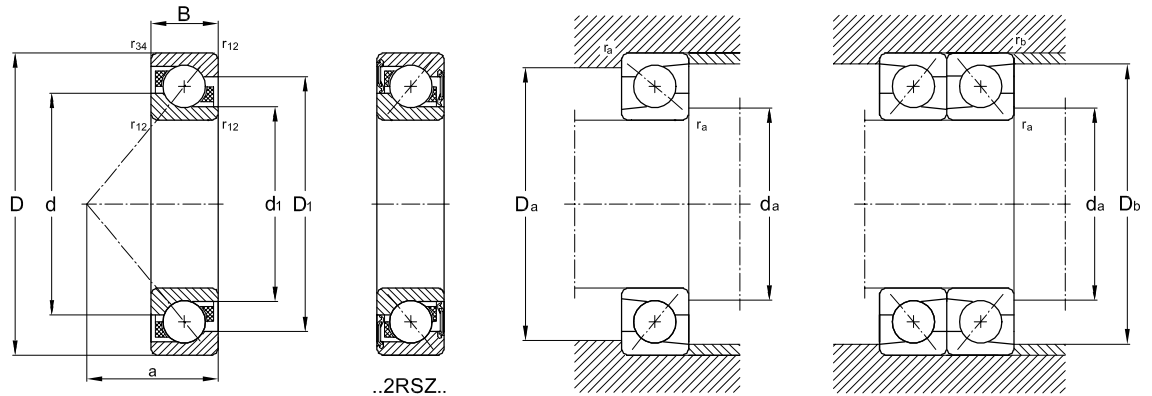
Precision classes and radial clearance	
P6, P63, P5, P52, P53	
C2	
CN	
C3	
C4	
e.g.: P53 = P5 + C3	

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°

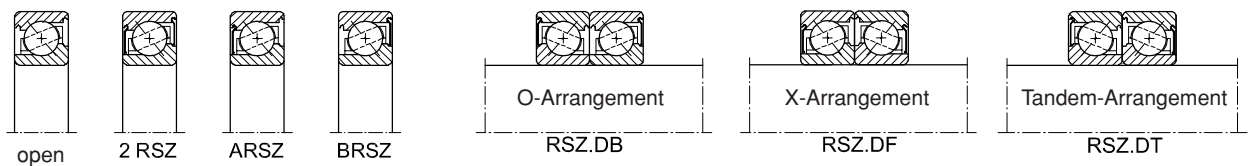
70..BE  
CB 70..BE  
72..BE  
CB 72..BE  
73..BE  
CB 73..BE



44-604

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

<b>Material</b>		<b>Lubrication</b>	
–	Steel balls 100 Cr6	–	Corrosion protected
CB	Ceramic balls Si <sub>3</sub> N <sub>4</sub>	G..	BearLub grease
AC-	Rings ATCoated	<b>Coating with ATCoat</b>	
ACC-	Rings ATCoated + balls Si <sub>3</sub> N <sub>4</sub>	A11 Inner and outer ring ATCoated	
<b>Series</b>		A15 Inner and outer ring ATCoated, rolling elements and cage corrosion resistant*	
70..		A 21 Inner ring ATCoated	
72..		A 31 Outer ring ATCoated	
73..		<b>Axial clearance/preload, universal bearing</b>	
<b>Bore code</b>		UA Normal axial clearance	
00 10 mm 02 15 mm		UB Small axial clearance	
01 12 mm 03 17 mm		UL Light preload	
At number 04 and upward x 5 [mm]		UO Without play	
<b>Design C</b>		A... Axial clearance range	
BE 40° contact angle		Bearing arrangement DB, DF, DT	
reinforced inner construction		<b>Precision classes</b>	
<b>Cage</b>		P6 Dimensional and running accuracy acc. to ISO class 6	
P	Window cage PA 6.6 glass fibre reinforced	P5 Dimensional and running accuracy acc. to ISO class 5	
M	Solid machined brass	P4 Dimensional and running accuracy acc. to ISO class 4	
J	Steel sheet	<b>Sealing</b>	
K	Window cage PEEK glass fibre reinforced	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	



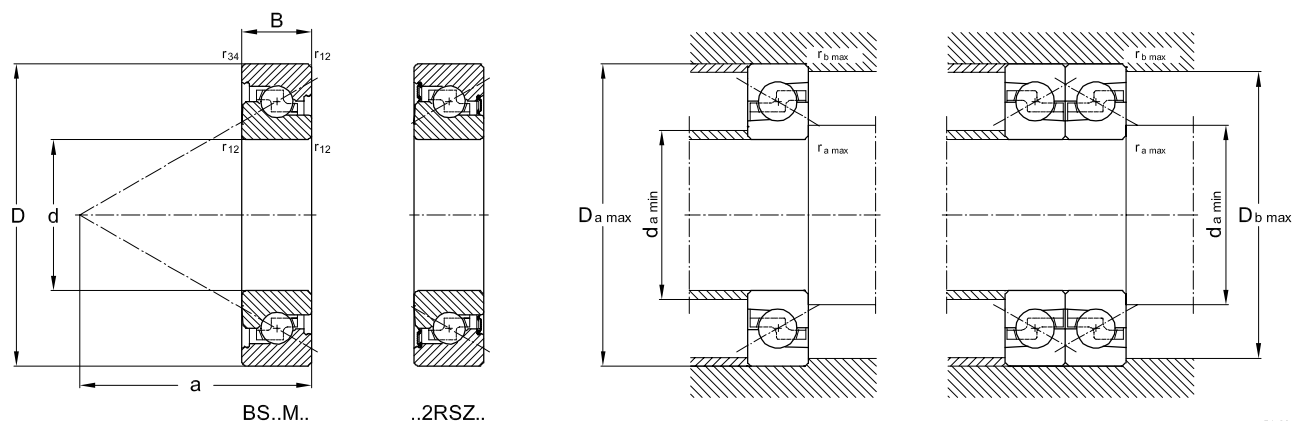
Open sealed 40° Angular Contact Ball Bearings as single and matched bearing sets

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



54-604

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

Material	
-	Steel balls 100 Cr6
CB	Ceramic balls $\text{Si}_3\text{N}_4$
AC-	Rings ATCoated
ACC-	Rings ATCoated + balls $\text{Si}_3\text{N}_4$

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	

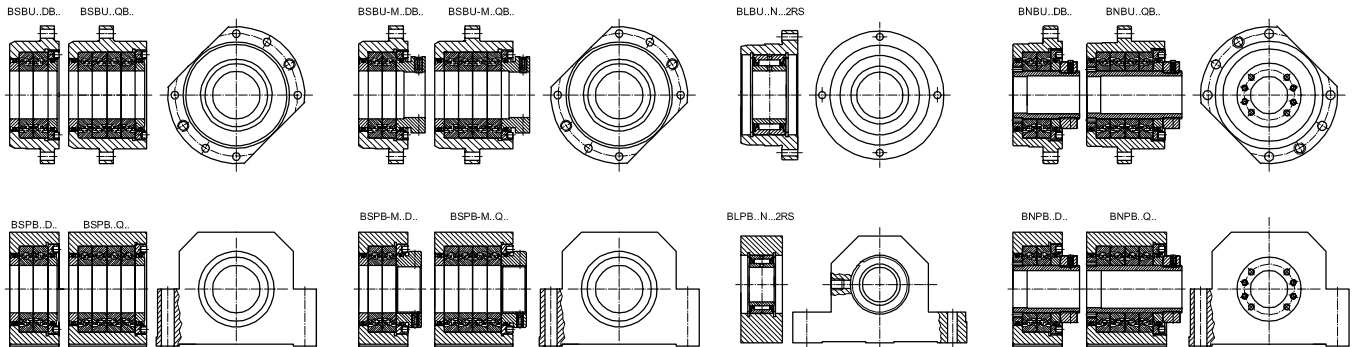
Lubrication groove and bore	
S	Re-lubrication via outer ring

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

ACC-	BS	BU	-M	25	D	B	88		M		
	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			

<b>Material</b> – Steel balls 100 Cr6 CB Ceramic balls Si <sub>3</sub> N <sub>4</sub> AC- Bearing rings ATCoat ACC- Balls Si <sub>3</sub> N <sub>4</sub> + ATCoat	<b>Bearing units for Ball Screws</b> BS Fixed end units for spindle ends BN Bearing units for BS nuts BL Floating end units	<b>Execution</b> BU Flange unit PB Pillow block unit	<b>Integrated lubrication</b> S Integrated for Ball Screw nut	<b>Integrated Locknut</b> M Integrated – Locknut to integrated separately (MMRB)	<b>Bore code</b> 25 Design/Metric bore 25 mm	<b>Number of bearings</b> D Duplex set Q Quadriple set N Needleroller for floating end units	<b>Form of flange</b> A Round B Flattened on both sides C Flattened on one side	<b>Reference dimension</b> Flange seat diameter Center height of the pillow block	<b>Lubrication</b> – 50% /GH62 (standard) GN21G 30–35% /GN21	<b>Coating with ATCoat</b> 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	<b>Mounting of adapter</b> For BN..units M2 As shown M1 Mounted when twisted 180°	<b>Preload/Bearing</b> L Light preload M Medium preload H High preload	<b>Bearing arrangement</b> DB, QBC Standard QBT ØØØØ DT Tandem bearing for spring preloaded units	<b>Adapter Sleeve (DIN 69051)</b> 1 Hole pattern 1 2 Hole pattern 2	<b>Sealing</b> – Labyrinth sealing 2RS Sealing for floating end units
---	--	--	--	--	---	---	--	---	--	--	--	---	--	---	---

Not all combinations are available

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

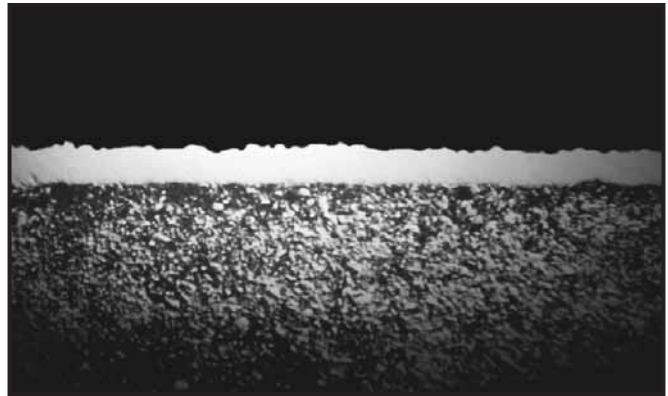
Bearing units with more bearings on request, as well as special housings with integrated coupling and bearing units with integrated lubrication for BS nuts.

### 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  $\mu\text{m}$  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) [ $\mu$ ]	sliding friction (dry) [ $\mu$ ]
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)

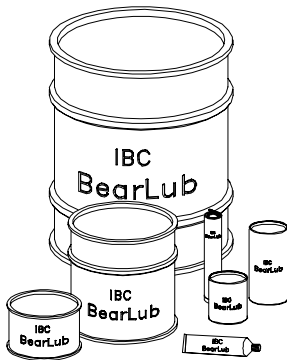
#### Prefixes of ATCoat bearings

- AC- Inner and outer ring ATCoated
- ACC- Rolling elements  $\text{Si}_3\text{N}_4$  + 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



14-001

IBC suffix	Rotational figures	Temperature range	Consistence classification NLGI	Basic oil	Viscosity of basic oil		Thickener	Density	Comments
	dm · n ·10 <sup>6</sup> [mm/min]	[°C]			40°C	100°C			
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

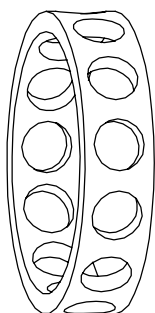
Table 14-300: Lubrication of bearings – IBC BearLub-Greases

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

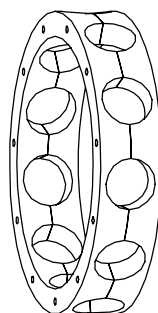
Precision Angular Contact Thrust Bearings  
and Single Row Deep Groove Ball Bearings



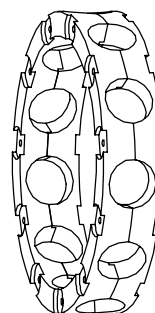
T (PA)  
M (PA)  
K (PA)



THB  
SHA  
SHB



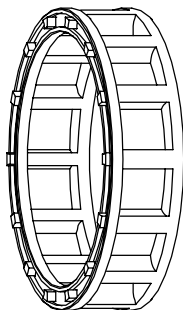
TA  
TB



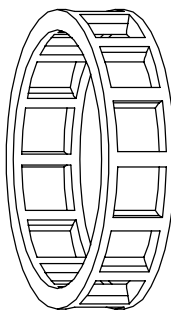
M  
MA  
MB  
LA  
LB

51-103

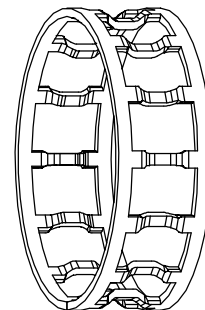
Cylindrical Roller Bearings



M  
M1  
MA  
M1A



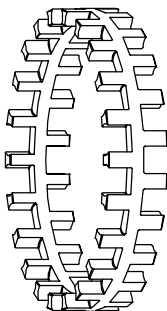
P



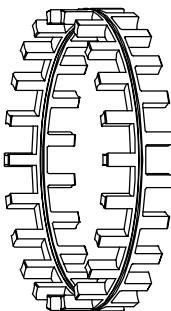
J

42-103

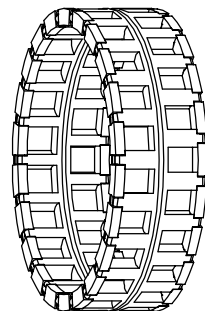
Precision Cylindrical Roller Bearings



M



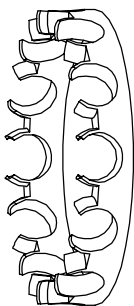
M



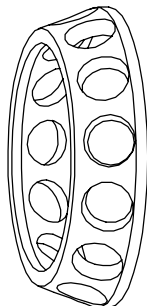
P

52-103

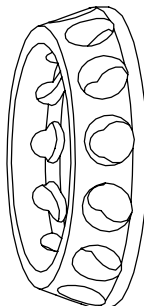
Angular Contact Ball Bearings 40°; 60°



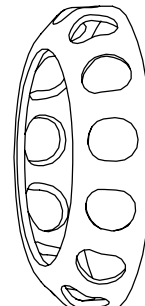
PH  
KH



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	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

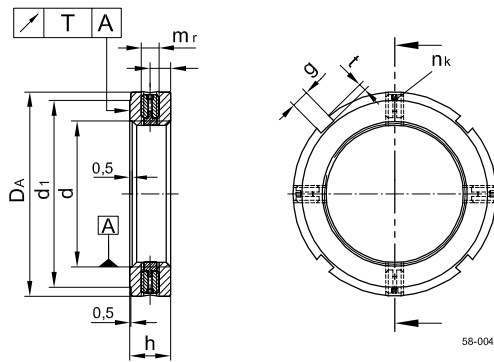
Table 14-301: Characteristics and features of Bearing Cages

\*  $\cdot 10^6$  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.

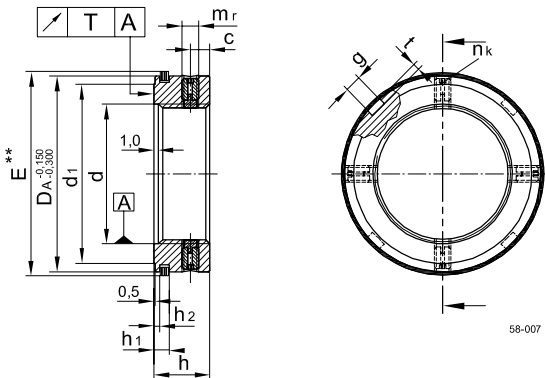
\*\* Cages for spindle bearings have higher basic speed ratings.

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

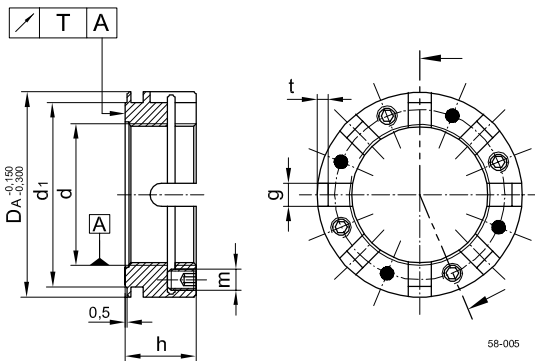
## 11. IBC Precision Locknuts, Labyrinth Seals



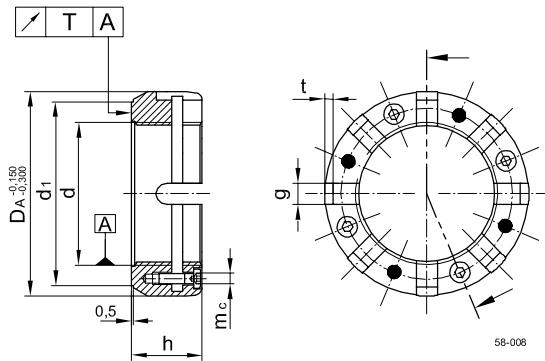
MMR..



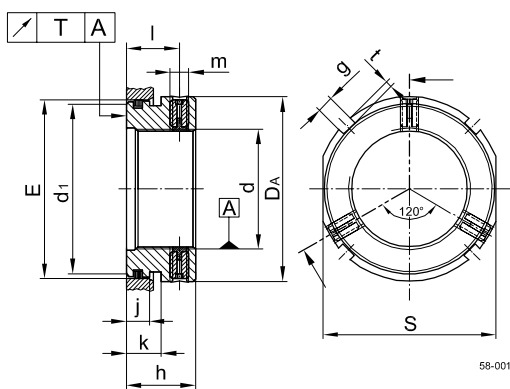
MMRBS..



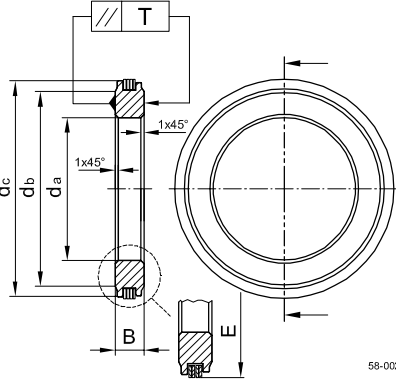
MBA..



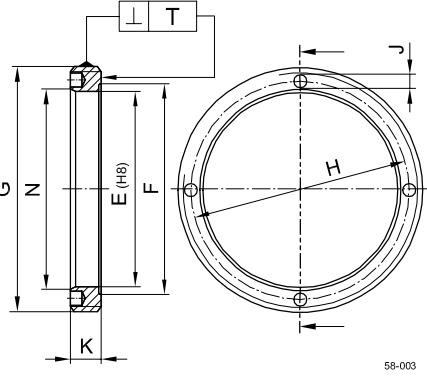
MBC..



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



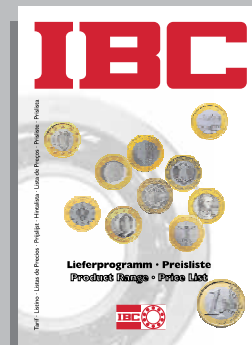
## More of IBC ...



Company Profile



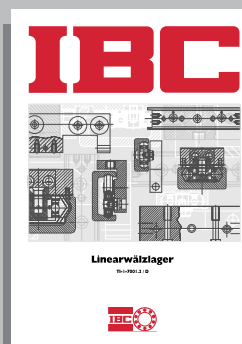
Precision Locknuts  
TI-I-5020.0 / D (German)  
TI-I-5020.0 / E (English)



Product Range  
Price List



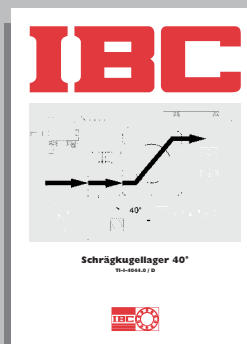
Ball Screw Support Bearings  
TI-I-5010.2 / D (German)  
TI-I-5010.2 / E (English)



Linear Bearings  
TI-I-7001.2 / D (German)



Telescopic Rails  
TI-I-7005.1 / D (German)



Angular Contact  
Bearings 40°  
TI-I-4044.0 / D (German)



Super Precision Bearings  
Service Catalog  
TI-I-5003.1 / D (German)  
TI-I-5003.1 / E (English)



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

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