SKF

Recommended Product Range

Bearings and housings for papermaking machines



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For preferential treatment – the SKF recommended product range

To further improve customer service SKF has made special application-oriented selections of bearings from the comprehensive SKF range. These recommended product ranges are directed at specific segments.

Each bearing has been carefully chosen based on the extensive experience of bearing applications in the particular segment. SKF has accumulated this knowledge through working closely with bearing users the world over.

To meet customer demands SKF is prepared to supply virtually any bearing. However, when special bearings are required in small quantities for an application, a recommended product range item offers the chance to obtain the optimum product at a favourable price and with the appropriate availability.

Thus, to choose a bearing from this recommended product range implies additional benefits, even for small quantities.

Benefits of choosing from SKF recommended product range

– Simplified bearing selection and application design work coupled with confidence in the suitability of the range offered
– Short delivery times
– Long-term supply stability
– Worldwide availability
– No minimum order quantity
– Simplified ordering and stocking

Bearings and housings used in papermaking machines

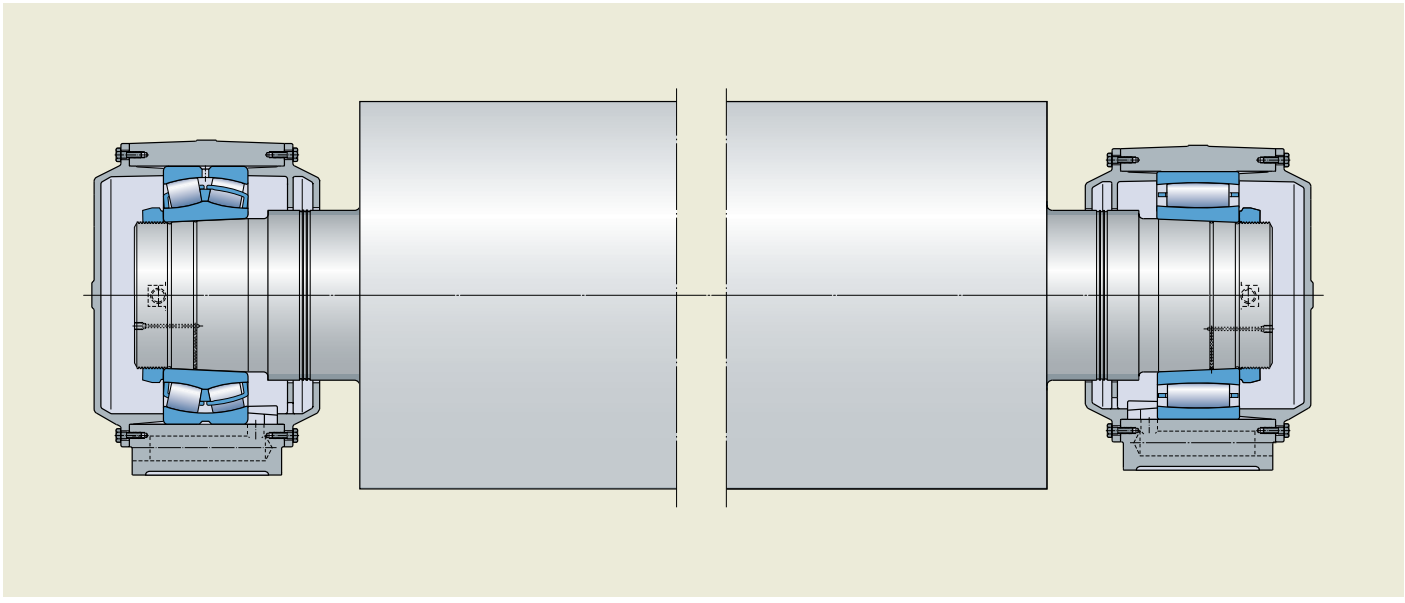
Introduction

A high proportion of the bearings used in papermaking machinery consists of spherical roller bearings of standard design. Their ability to accommodate considerable radial loads in combination with axial loads make these bearings very suitible for supporting the locating side, usually the drive side, of the various rolls and cylinders of paper-making machines. Spherical roller bearings also permit misalignment between shaft and housing, which is especially important for papermaking machines as the bearings are mounted in separate housings spaced far apart.

Spherical roller bearings can in many cases be used successfully also at the non-locating side, usually the front side, of papermaking machines. However, the ideal solution is in most cases to combine a spherical roller bearing at the drive side with a CARB™ toroidal roller bearing at the front side **(→ fig 1)**.

Accordingly, as CARB become available in sizes suitable for press rolls, suction rolls, calender rolls etc. this will be the recommended bearing type for the front side of these rolls as well. If a CARB is used it may be possible to downsize the bearing arrangements at both the drive and front sides.

Fig 1 *The standard solution – an SKF spherical roller bearing at the drive side and a CARB™ at the front side*



Spherical roller bearings

SKF spherical roller bearings of CC, C and EC designs
These bearings have symmetrical rollers, a flangeless inner ring and a pressed steel cage for each roller row **(→ fig 2)**. The guide ring is centred on the inner ring. EC design bearings incorporate reinforced roller sets for added load carrying capacity. The bearings of the CC design have been optimised to promote roller guidance and reduce friction.

SKF spherical roller bearings of CAC, ECAC, CA and ECA designs
These designs are used for the large-sized bearings **(→ fig 3)**. The rollers are symmetrical and the inner ring has retaining flanges. The guide ring is centred on the inner ring between the two rows of rollers and the cage is a one-piece, double pronged machined cage of brass or steel. The CAC and ECAC designs are based on the CC design and the ECAC and ECA designs have reinforced roller sets for increased load carrying capacity.

SKF spherical roller bearings of E design
The bearings of this standard SKF design have symmetrical rollers, a flangeless inner ring, and a guide ring centred on the cages **(→ fig 4)**. The E design bearings incorporate all the advantages of the well-proven SKF CC bearings as well as additional refinements such as an even higher load carrying capacity.

Fig 2 *SKF spherical roller bearings of CC, C and EC designs*

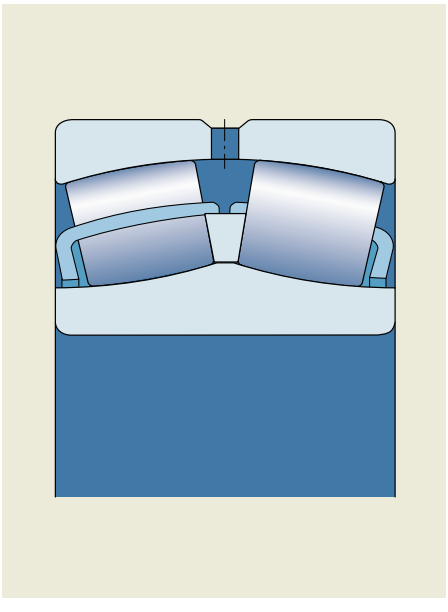


Fig 3 *SKF spherical roller bearings of CAC, ECAC, CA and ECA designs*

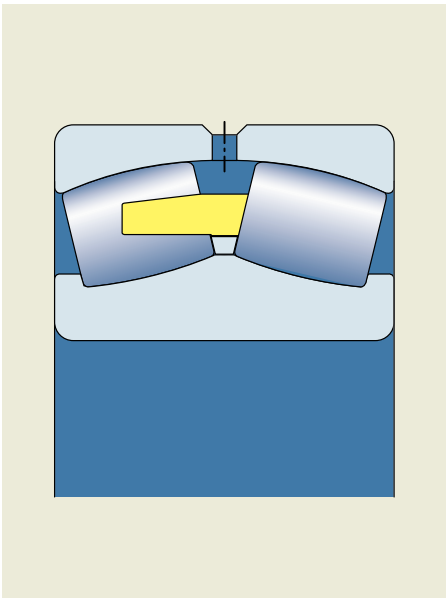
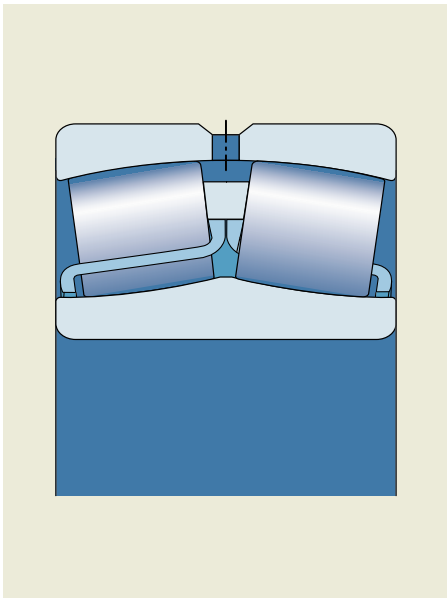


Fig 4 *SKF spherical roller bearing of E design*



CARB™

The best solution for most rolls and cylinders is to combine a spherical roller bearing at the drive side with a CARB at the front side as CARB is the ideal non-locating bearing **(→ fig 5)**.

This bearing invention by SKF is in accordance with the increasing demand for high load carrying capacity, robustness and low friction. Like a spherical roller bearing the CARB can accomodate misalignment and heavy radial loads, but is also able to take axial displacement like a cylindrical roller bearing. This is what makes CARB the ideal non-locating solution for most papermaking machine applications. For more information, see for instance SKF publication 4410 “CARB™ – a better solution for the front side of drying cylinders”.

Doctor bearings

Specially designed multi-row radial ball bearings are used for doctors, allowing both the axial oscillation of the doctor as well as rotating movement. The rotating movement is necessary when the doctor is turned to a rest position during maintenance or changing of blade. In addition to this high degree of movement the bearing is able to take shaft misalignment. This misalignment is accomodated either by a radius on the outside diameter which accommodates the misalignment between housing and bearing **(→ fig 6)** or, for another bearing design, in the sphered contact between the two mating parts of the bearing outer ring.

Fig 5 *SKF CARB*

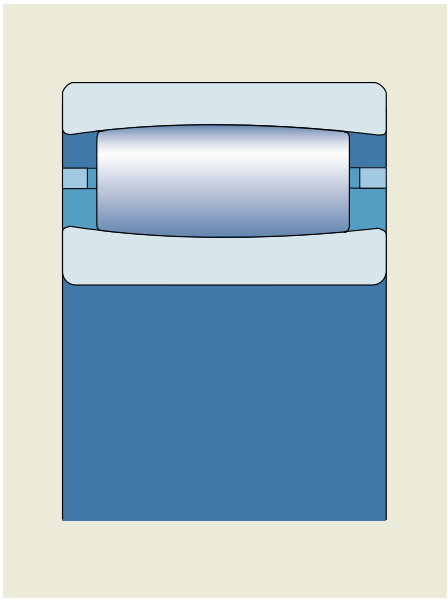
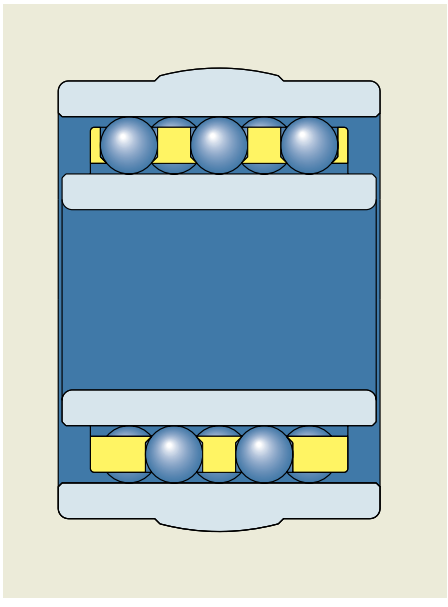


Fig 6 *SKF doctor bearing*



Housings

Historically all papermaking machines have been equipped with specially designed bearing housings. The manufacturer has designed a special housing for more or less every individual machine which has involved costly pattern equipment and design time. Specially made housings have also been very difficult to find when a replacement has been required at the paper mill.

SKF stepped into the lead position in the early nineties by introducing a standard range of bearing housings for felt rolls in the dryer section, drying cylinders and Yankee cylinders. All housings are designed for high flow circulating oil lubrication, they have maintenance-free sealing arrangements and have connections for conditioning monitoring equipment.

Felt roll housings, dryer section
Felt roll housings are available in the following basic designs:

– Drive side:
  spherical roller bearing with located outer ring **(➔ fig 7)**
– Front side:
  CARB bearing with located outer ring
– Front side:
  spherical roller bearing with non-located outer ring

Drying cylinder housings
Drying cylinder housings are available in the following basic designs:

– Drive side:
  spherical roller bearing with located outer ring
– Front side:
  CARB bearing with located outer ring (**➔ fig 8)**

Yankee cylinder housings
Yankee cylinder housings are available in the following basic designs:

– Drive side:
  spherical roller bearing with located outer ring
– Front side:
  CARB bearing with located outer ring
– Front side:
  spherical roller bearing in housing on rockers **(➔ fig 9)**
– Front side:
  spherical roller bearing in housing on rockers with two support rockers

Fig 7 *SKF felt roll housing*

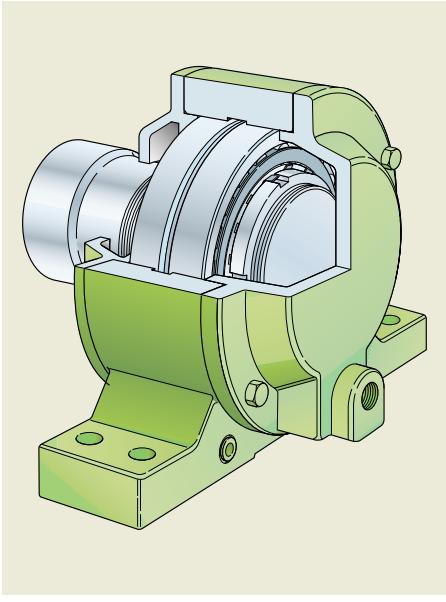


Fig 8 *SKF drying cylinder housing*

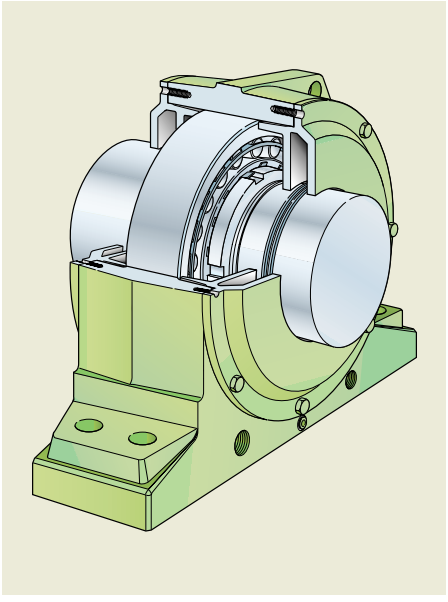
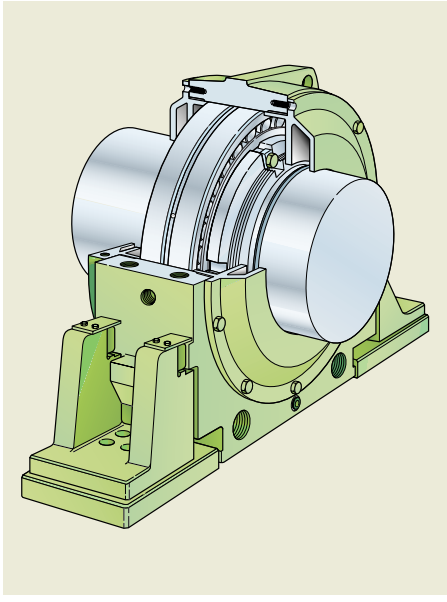


Fig 9 *SKF Yankee cylinder housing*



Recommended product range matrices

The bearings included in this Recommended product range are presented under the different positions of the machine in the same bearing type order as in the SKF General Catalogue. They are shown in Dimension Series order (light section series to the left, heavy to the right).

Bearing and housing designations

The matrix headings show bearing and housing designations without the size figures. A darker coloured square indicates the position for the size figures which are shown to the right of the matrices.

Designation suffixes

The following designation suffixes will be found in the matrices.

C3 Radial internal clearance greater than Normal

C4 Radial internal clearance greater than C3

C08 Radial runout of assembled inner ring and outer ring better than Normal (P5)

C083 C08 + C3

HA3 Case hardened inner ring

K Tapered bore, taper 1:12 on diameter

VQ424 Radial runout better than C08, reduced waviness, eccentricity high point marked on inner and outer rings

W33 Annular groove and three lubrication holes in outer ring

Spherical roller bearings

See SKF General catalogue 4000 or Interactive Engineering Catalogue for more detailed specifications

Drive side Drive and front side

Bearing bore diameter, mm	Suction rolls						Press rolls				Deflection-compensating rolls										Wire & felt rolls			Drying cylinders	Yankee cylinders				Heated calenders				Bearing size
	239 CACK/C083W33	239 CAK/C083W33	230 CCK/C083W33	230 CACK/C083W33	230 CAK/C083W33		232 CCK/C08W33	232 CACK/C08W33	232 CAK/C08W33		239 CAC/C08W33	239 CAC/W33VQ424	239 CA/C08W33	239 CA/W33VQ424		230 CC/C08W33	230 CC/W33VQ424	230 CAC/C08W33	230 CAC/W33VQ424	230 CA/C08W33	230 CA/W33VQ424	223 CCK/C3W33	223 EK/C3	232 CCK/C3W33	231 CCK/HA3C4W33	230 CAK/HA3C084W33	231 CCK/HA3C084W33	231 CKJ/HA3C084W33	231 CAK/HA3C084W33	231 CAK/C4W33	231 CKJ/C4W33	232 CACK/C4W33	232 CAK/C4W33	
50																																	10
55																																	11
60																																	12
65																																	13
70																																	14
75																																	15
80																																	16
85																																	17
90																																	18
95																																	19
100																																	20
110																																	22
120																																	24
130																																	26
140																																	28
150																																	30
160																																	32
170																																	34
180																																	36
190																																	38
200																																	40
220																																	44
240																																	48
260																																	52
280																																	56
300																																	60
320																																	64
340																																	68
360																																	72
380																																	76
400																																	80
420																																	84
440																																	88
460																																	92
480																																	96
500																																	/500
530																																	/530
560																																	/560
600																																	/600
630																																	/630
670																																	/670
710																																	/710
750																																	/750
800																																	/800
850																																	/850
900																																	/900
950																																	/950

CARB

See SKF publication 4410 or Interactive Engineering Catalogue for more detailed specifications

Front side

Bearing bore diameter, mm	Wire & felt rolls		Drying cylinders	Yankee cylinders		Bearing size
	C 23 K/C3	C 32 K/C3	C 31 K/HA3C4	C 30 K/HA3C084	C 31 K/HA3C084	
50						10
55						11
60						12
65						13
70						14
75	□					15
80	□					16
85	□					17
90	□					18
95						19
100	□					20
110						22
120		□				24
130						26
140						28
150						30
160		□				32
170						34
180		□				36
190						38
200			□			40
220			□			44
240			□			48
260			□			52
280			□			56
300			□			60
320						64
340						68
360						72
380						76
400						80
420					□	84
440						88
460						92
480						96
500						/500
530				□	□	/530
560						/560
600						/600
630						/630
670				□		/670
710						/710
750						/750
800						/800

Doctor bearings

See SKF “Large bearings” catalogue 4003 or Interactive Engineering Catalogue for more detailed specifications

Bearing bore diameter, mm	I-38148 M	362060	I-118996 M	362061	362444
30					
35					
40					
45	■				
50		■			
55			■		
60					
65					
70					
75					
80				■	
85					
90					
95					
100					■
110					
120					

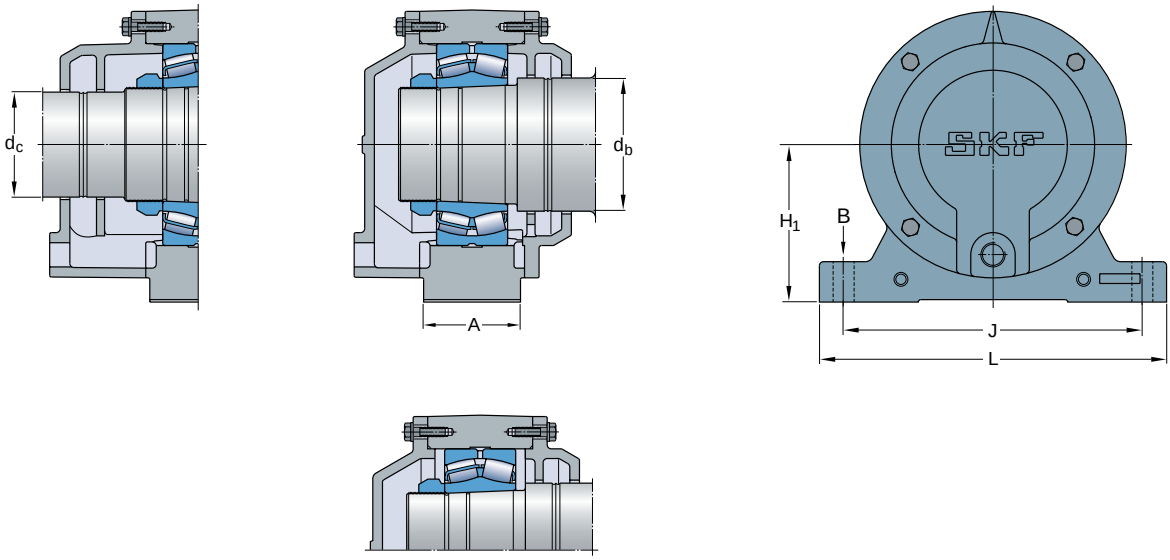
Housings

The matrix does not show final variants, see pages 12 – 17 for specifications

Drive side Front side Drive and front side

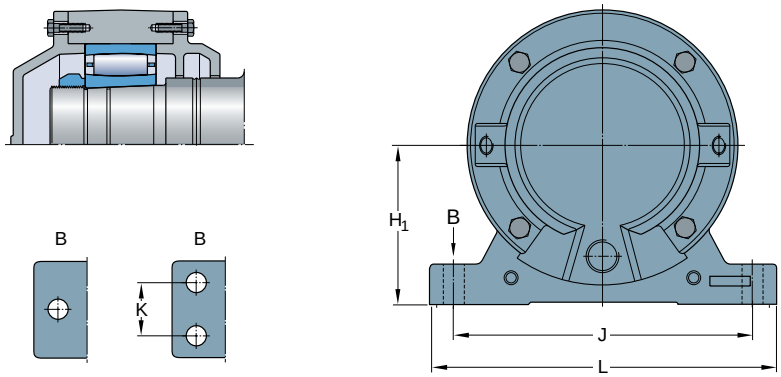
Bearing bore diameter, mm	Wire & felt rolls				Drying cylinders		Yankee cylinders				Housing size
	SBF 23	SBF 32	SBF 23 RA	SBF 32 RA	SBP 31	SBP 31 RA	SDM 30	SDM 31	SDM 30 RA	SDM 31 RA	
50											10
55											11
60											12
65											13
70											14
75											15
80											16
85											17
90											18
95											19
100											20
110											22
120											24
130											26
140											28
150											30
160											32
170											34
180											36
190											38
200											40
220											44
240											48
260											52
280											56
300											60
320											64
340											68
360											72
380											76
400											80
420											84
440											88
460											92
480											96
500											/500
530											/530
560											/560
600											/600
630											/630
670											/670
710											/710
750											/750
800											/800

Felt roll bearing housings



Drive and front side

Basic housing designation	Bearing size	Dimensions Shaft d_b	d_c	Housing A	H_1	J	K	L
–	–	mm						
SBF 2312	22312	75	55	70	110	235	–	280
SBF 2316	22316	100	70	90	135	285	44	340
SBF 2316 RA	C 2316	100	70	90	135	285	44	340
SBF 2320	22320	135	90	105	175	330	52	390
SBF 2320 RA	C 2320	135	90	105	175	330	52	390
SBF 3224	23224	140	110	105	175	330	52	390
SBF 3224 RA	C 3224	140	110	105	175	330	52	390
SBF 3228	23228	165	130	120	195	370	60	430
SBF 3232	23232	190	150	135	225	430	70	500
SBF 3232 RA	C 3232	190	150	135	225	430	70	500
SBF 3236	23236	210	170	150	250	480	75	570
SBF 3236 RA	C 3236	210	170	150	250	480	75	570



RA design

Basic design

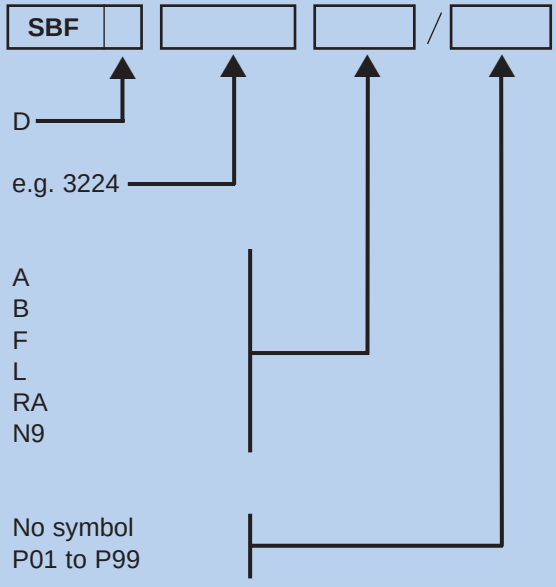
Housing of grey cast iron (standard) no symbol
Housing of spheroidal graphite cast iron

Size designation

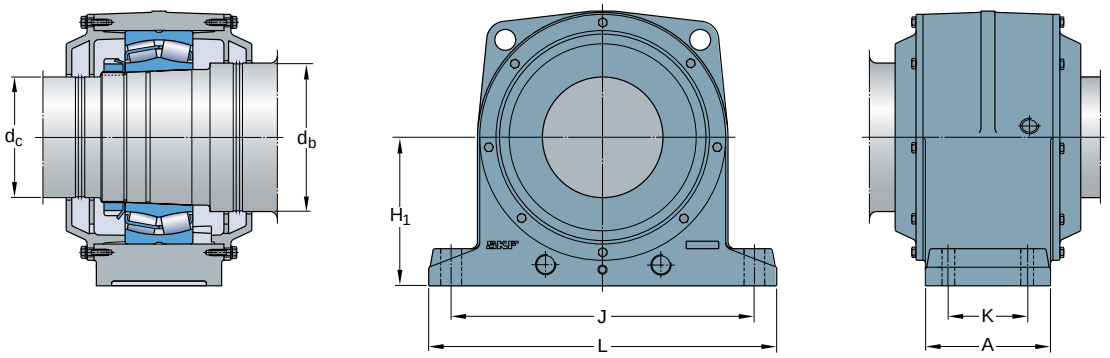
Designation suffixes

Housing for shaft end, with end cover	A
Housing for through shaft	B
Housing for locating bearing (drive side)	F
Housing for non-locating bearing (front side)	L
Housing for CARB (front side)	RA
Housing for inch thread connection arrangements (metric = standard)	N9
SKF standard painting	No symbol
Painting variant	P01 to P99

Designation example: SBF 3224 BRA



Drying cylinder bearing housings

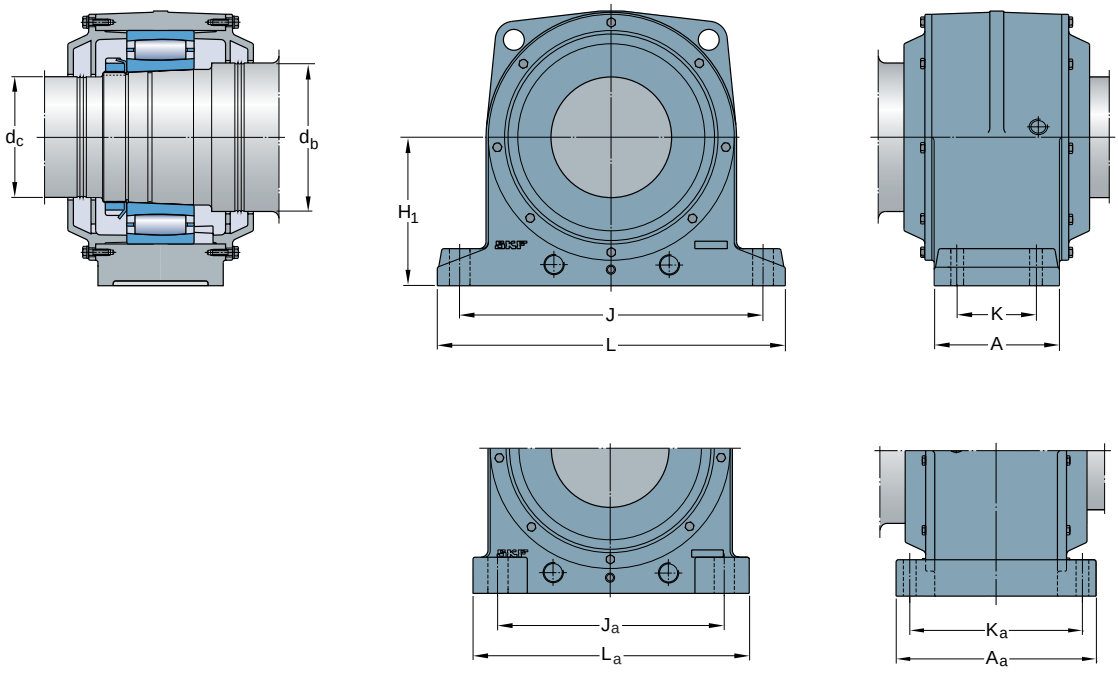


Drive side

Basic housing designation	Bearing size	Dimensions Shaft d_b	d_c	Housing H_1	Base design standard A	J	K	L	Base design A A_a	J_a	K_a	L_a
–	–	mm										
SBP 3140	23140	230	180	240	200	485	115	570	370	350	310	440
SBP 3144	23144	250	200	265	235	550	135	640	400	380	340	490
SBP 3148	23148	275	220	285	250	580	150	680	410	425	350	530
SBP 3152	23152	300	240	310	265	620	160	720	435	470	375	580
SBP 3156	23156	320	260	320	270	650	170	750	440	500	380	610
SBP 3160	23160	340	280	335	300	720	180	820	470	560	410	670

Front side

Basic housing designation	Bearing size	Dimensions Shaft d_b	d_c	Housing H_1	Base design standard A	J	K	L	Base design A A_a	J_a	K_a	L_a
–	–	mm										
SBP 3140 RA	C 3140	230	180	240	200	485	115	570	370	350	310	440
SBP 3144 RA	C 3144	250	200	265	235	550	135	640	400	380	340	490
SBP 3148 RA	C 3148	275	220	285	250	580	150	680	410	425	350	530
SBP 3152 RA	C 3152	300	240	310	265	620	160	720	435	470	375	580
SBP 3156 RA	C 3156	330	260	320	270	650	170	750	440	500	380	610
SBP 3160 RA	C 3160	340	280	335	300	720	180	820	470	560	410	670



Base design A

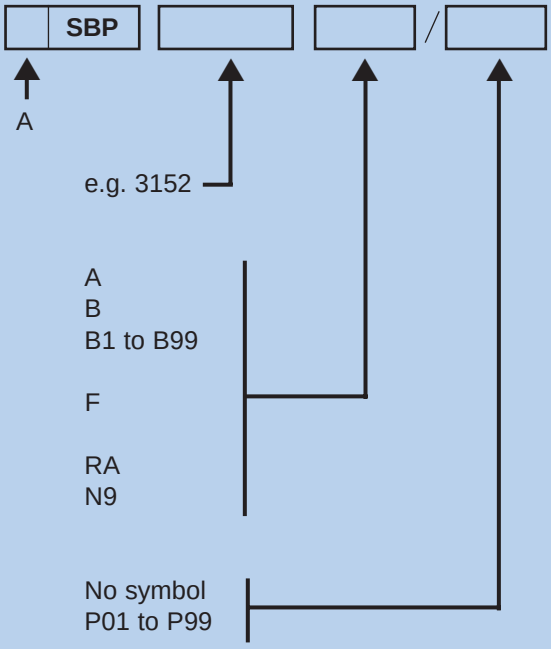
Basic design

Designation prefix
Base design A (short and wide base)

Size designation

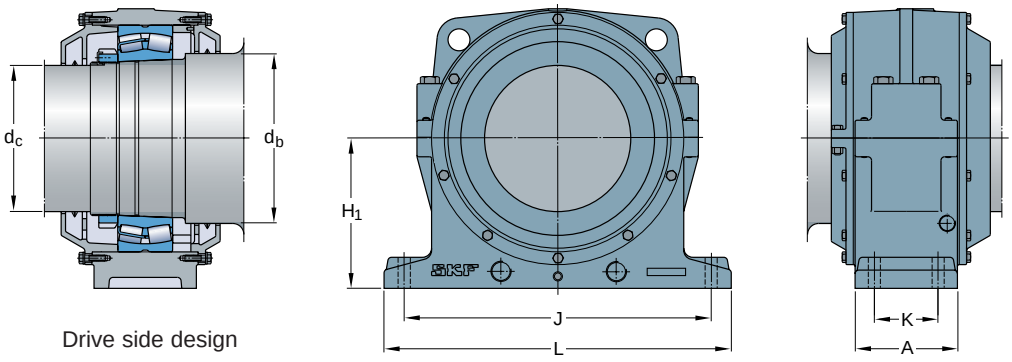
Designation suffixes

Housing for shaft end, with end cover	A
Housing for through shaft	B
Housing for through shaft with outer cover for steam joint connection	B1 to B99
Housing for locating bearing (drive side) with holes for radially mounted attachment bolts	F
Housing for CARB (front side)	RA
Housing for inch thread connection arrangements (metric = standard)	N9
SKF standard painting	No symbol
Painting variant	P01 to P99

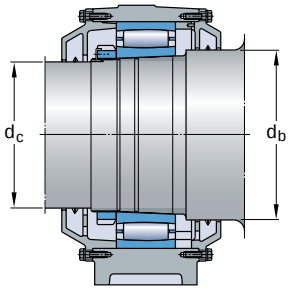


Designation example: SBP 3152 ARAN9

Yankee cylinder bearing housings

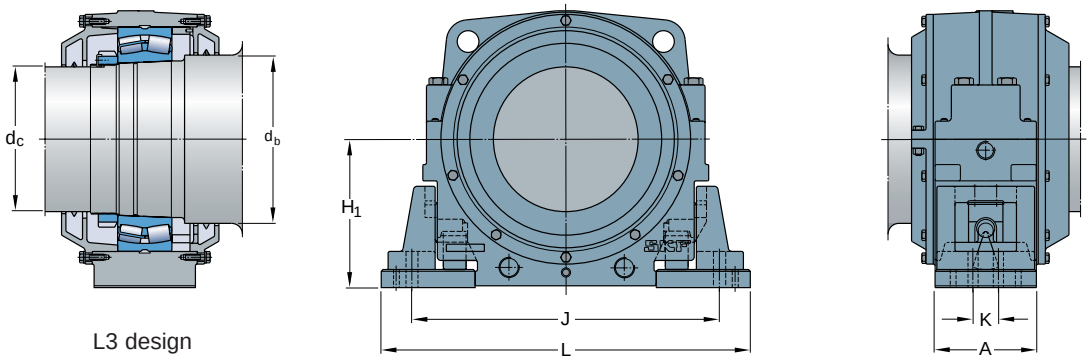


Drive side design

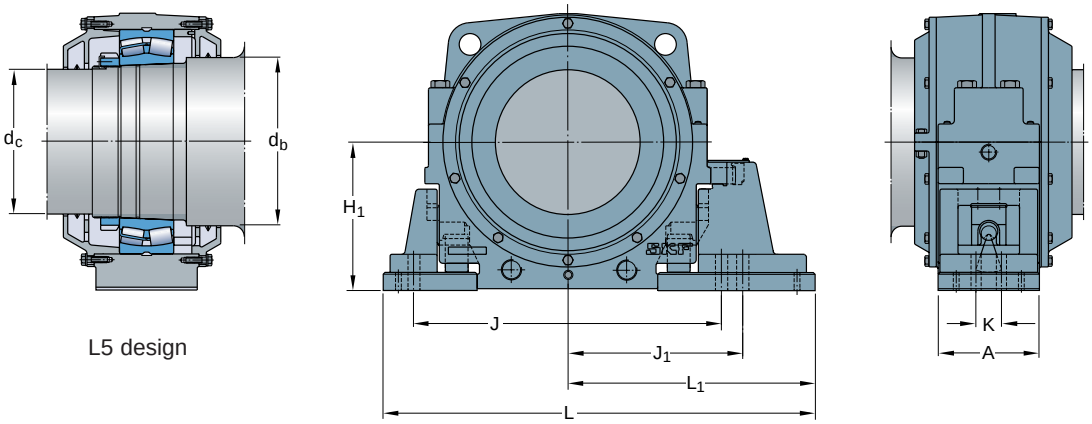


RA design

Basic housing designation	Bearing size	Dimensions Shaft		Housing		Drive + RA design			L3 design			L5 design				
		d_b	d_c	H_1	A	J	K	L	J	K	L	J	J_1	K	L	L_1
–	–	mm														
SDM 3084	23084	465	400	410	280	840	180	950	850	70	1 020	425	485	70	510	685
SDM 30/530	230/530	580	500	510	360	1 090	240	1 200	–	–	–	–	–	–	–	–
SDM 30/530 RA	C 30/530	580	500	510	360	1 090	240	1 200	–	–	–	–	–	–	–	–
SDM 30/670	230/670	750	630	620	420	1 260	300	1 380	–	–	–	–	–	–	–	–
SDM 30/670 RA	C 30/670	750	630	620	420	1 260	300	1 380	–	–	–	–	–	–	–	–
SDM 3168	23168	390	320	400	320	800	180	900	830	80	940	415	475	80	470	690
SDM 3184	23184	465	400	480	400	1 045	280	1 165	–	–	–	–	–	–	–	–
SDM 3184 RA	C 3184	465	400	480	400	1 045	280	1 165	–	–	–	–	–	–	–	–
SDM 31/530	231/530	590	500	550	410	1 220	240	1 360	–	–	–	–	–	–	–	–
SDM 31/530 RA	C 31/530	590	500	550	410	1 220	240	1 360	–	–	–	–	–	–	–	–
SDM 31/630	231/630	710	590	700	510	1 330	350	1 500	1 430	130	1 600	715	805	130	800	1 085



L3 design



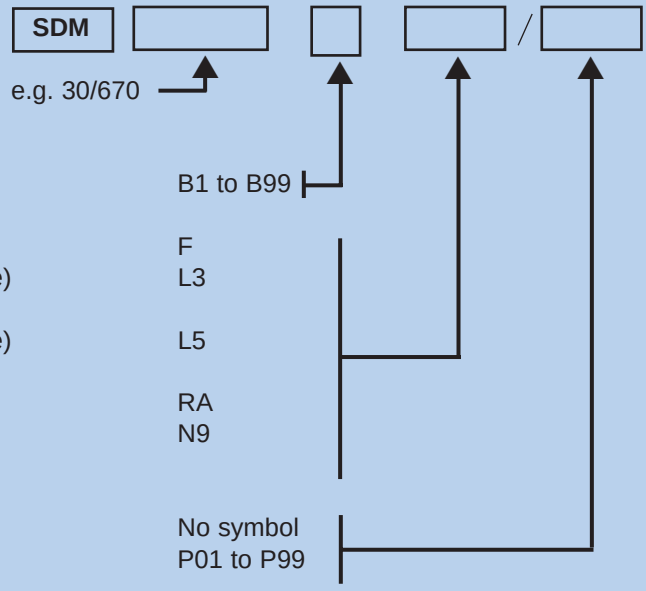
L5 design

Basic design

Size designation

Designation suffixes

Housing for through shaft with outer cover for steam joint connection	B1 to B99
Housing for locating bearing	F
Housing on 3 rockers for non-locating bearing (front side) without support rockers	L3
Housing on 3 rockers for non-locating bearing (front side) with 2 support rockers	L5
Housing for CARB bearing (front side)	RA
Housing for inch thread connection arrangements (metric = standard)	N9
SKF standard painting	No symbol
Painting variant	P01 to P99



Designation example: SDM 30/670 B2RAN9

Application examples

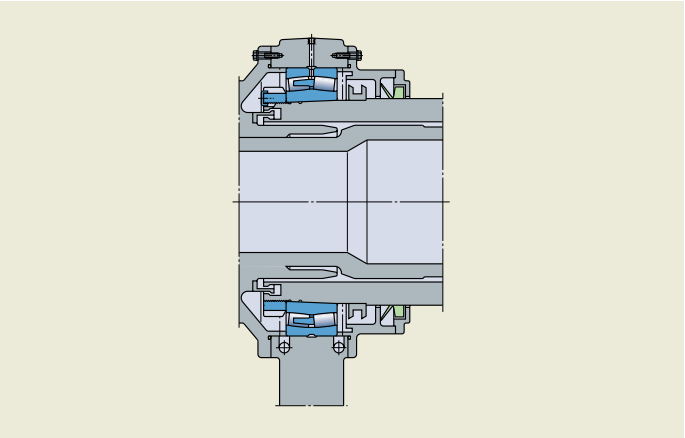


Fig A *Suction roll bearing arrangement*

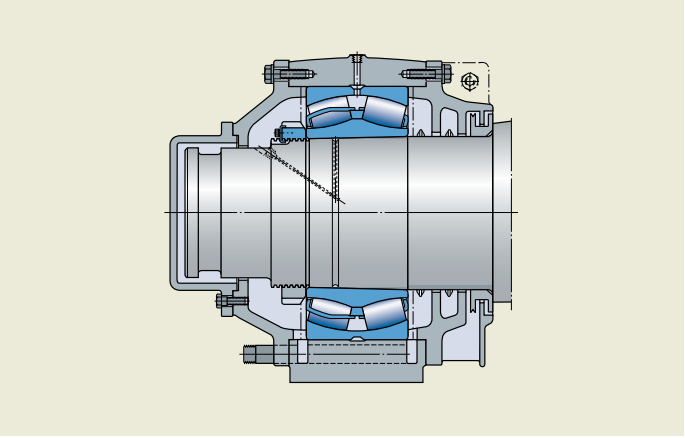


Fig B *Press roll bearing arrangement*

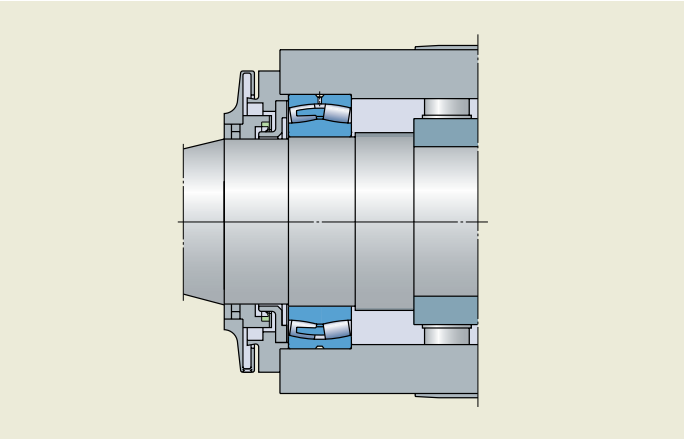


Fig C *Deflection-compensating roll bearing arrangement*

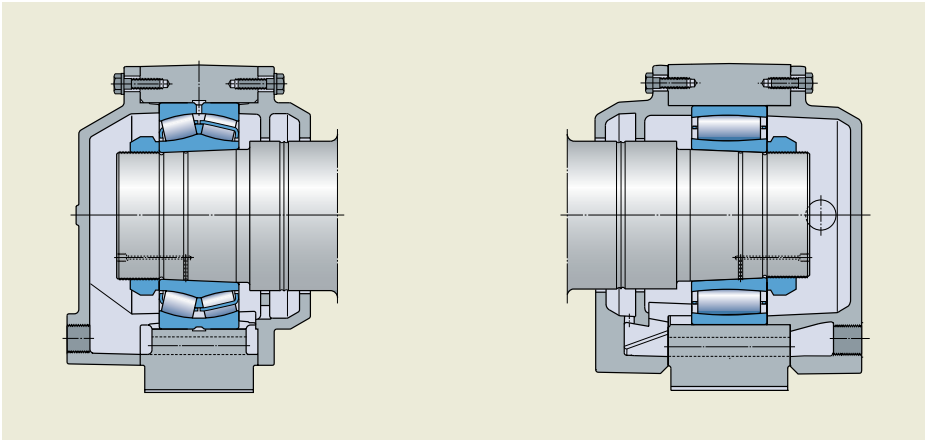


Fig D *Felt roll bearing arrangement, dryer section*

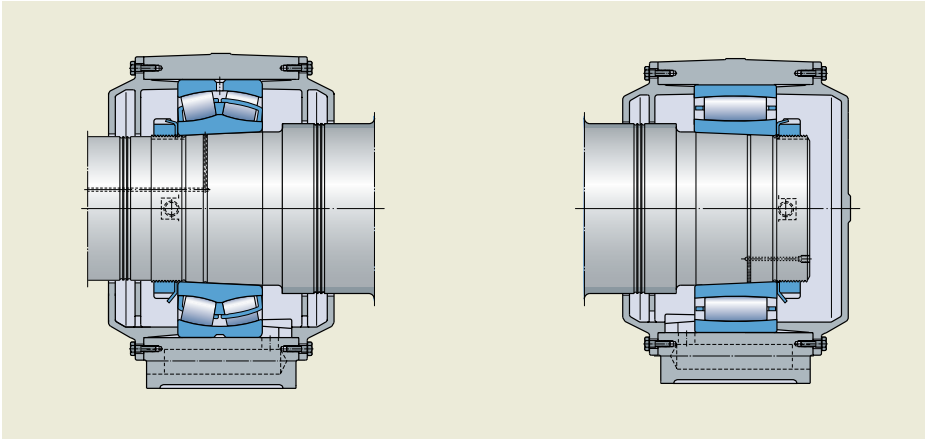


Fig E *Drying cylinder bearing arrangement*

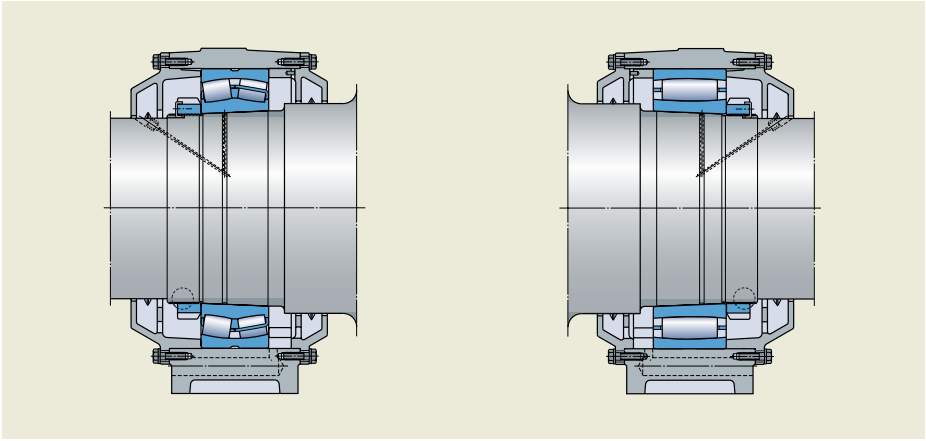


Fig F *Yankee cylinder bearing arrangement*

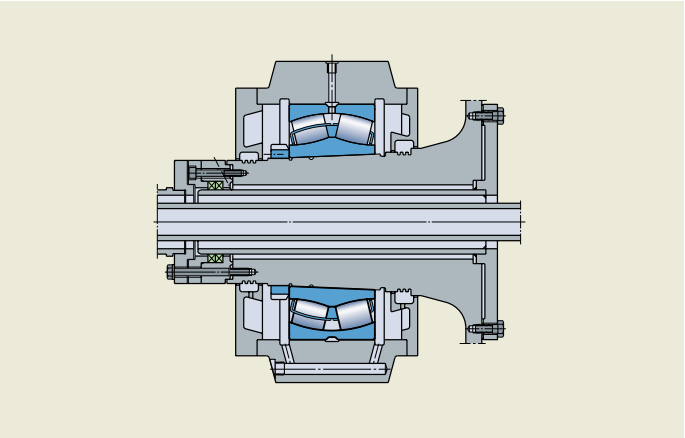


Fig G *Heated calender roll bearing arrangement*

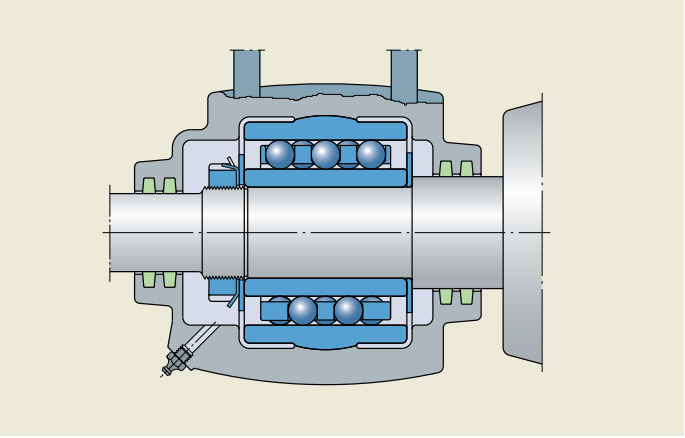


Fig H *Doctor bearing arrangement*

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