

Saving cost by rapid bearing replacement at locations of restricted access

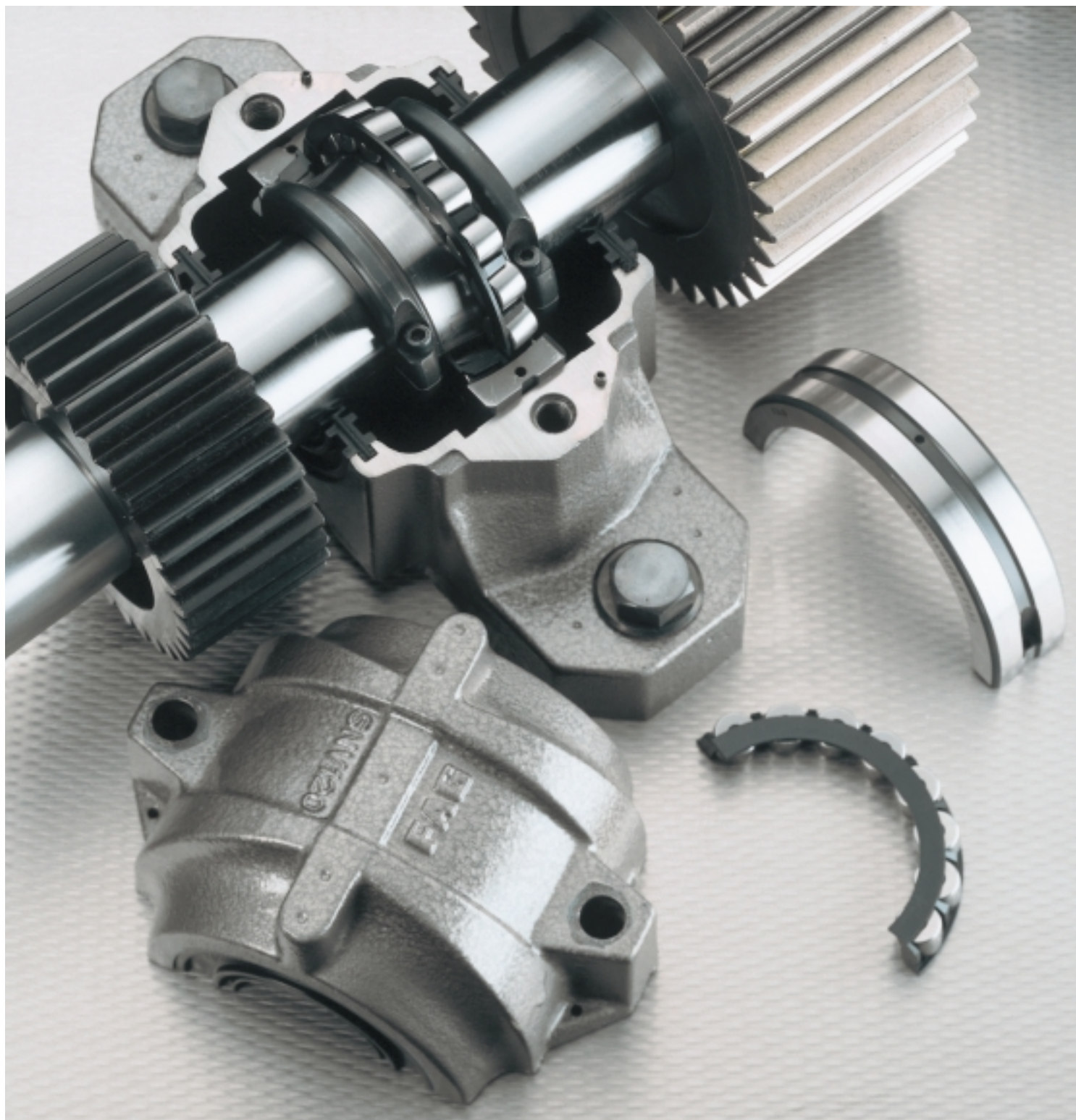
FAG Split Spherical Roller Bearings

FAG

Rolling Bearings

FAG Norge A/S · FAG Svenska AB

Publ. No. WL 43 165 Enosv



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at locations of restricted access**

FAG Split Spherical Roller Bearings

Publ. No. WL 43 165 EA

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Preface

The OEM und Handel company of FAG Kugelfischer Georg Schäfer AG supplies rolling bearings, accessories and services to original equipment customers in the machine and plant construction sector as well as customers in the distribution and replacement sector. Broad rolling bearing know-how, competent advice for specific applications and extensive customer service for more operational reliability make FAG an indispensable partner to its customers. The development and progressive development of our products is based on the requirements of their future operation in the field. Ideally, the outline of requirements is drawn up jointly by our researchers and application engineers in cooperation with the machine manufacturers and operators. This forms the basis for convincing solutions both technically and economically speaking.

Our production sites are situated in Germany, Italy, Portugal, the USA and India. Marketing is effected through a network of subsidiaries and business partners spanning almost the whole world.



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Time-saving bearing replacement · Cost reduction · Ranges of application · Fitting into split plummer block housings

Time-saving bearing replacement at locations of restricted access

Split spherical roller bearings are mainly used for applications where the replacement of an unsplit spherical roller bearing would require intricate additional work, e.g. where gearwheels or couplings have to be withdrawn, drives dismounted, and shaftings disassembled. With split spherical roller bearings the downtimes of machines and plants is reduced and thus the production cost as well.

Cost reduction

Calculation examples on pages 26 and 27 show the extent of cost reduction which can be achieved by using split spherical roller bearings instead of unsplit ones. In one case the cost reduction amounts to about DM 80,000.00, in the other one even to about DM 430,000.00.

We have provided a form on page 28 which you may use to draw up a similar cost comparison for one of your applications. The filled-in form is a useful basis for talks with our service engineers.

With new constructions split spherical roller bearings help in many cases to save considerable cost since they simplify the assembly and facilitate mounting.

Ranges of application

Applications range from shafts supported by several bearings to bearing locations of restricted access, for example:

- belt drives
- ships
- conveyor plants
- rolling mills
- ventilation systems
- paper machines

Replacement bearings for spherical roller bearings with adapter sleeve

The dimensions of FAG split spherical roller bearings were adapted so that they can be used instead of unsplit spherical roller bearings and their adapter sleeves.

Outside diameter, outer ring width and shaft seat diameter are identical.

Fitting into split plummer block housings

FAG split spherical roller bearings can be mounted into FAG split plummer block housings without requiring any further machining of the housings. The same applies to housings from other manufacturers provided that the internal dimensions are identical.

Conveyor plant drive unit

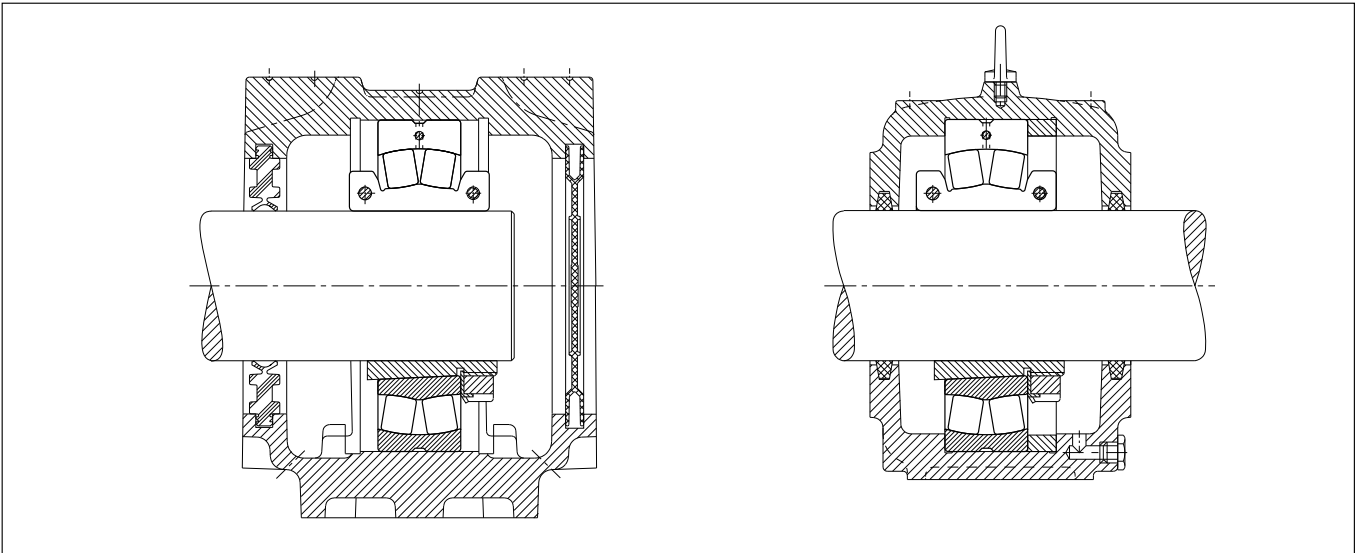


Ventilator drive unit



Time-saving bearing replacement · Fitting into split plummer block housings

1: Easy bearing replacement as split spherical roller bearings (top) require the same mounting space as unsplit bearings with adapter sleeves (bottom).



2: Easy to inspect, fast and easy mounting – the FAG split spherical roller bearing directly before mounting into an SNV housing.



Bearing design

FAG split spherical roller bearings have a cylindrical bore. Inner ring, outer ring and roller/cage assembly are split into halves. The split bearing rings are bolted together.

The internal design of the split spherical roller bearings was adapted from the well-proven spherical roller bearings of design E so that the bearings have maximum load carrying capacity.

The bearings are equipped either with a split moulded cage of glass-fibre rein-

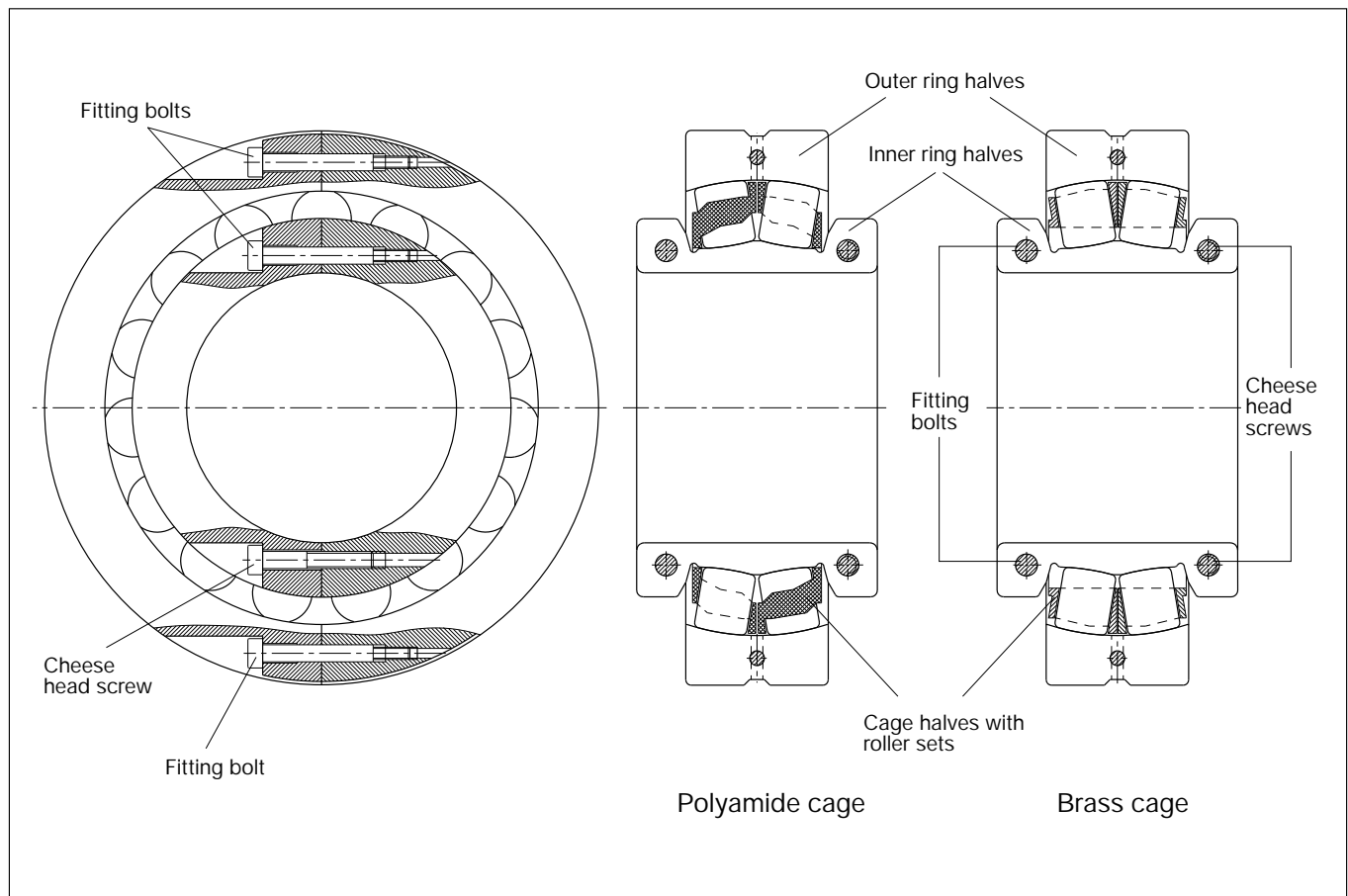
forced polyamide (suitability for high temperatures, see FAG catalogue WL 41 520) or with a split machined brass cage.

Split spherical roller bearings have the normal tolerances of unsplit radial bearings and the normal clearance of unsplit spherical roller bearings with a cylindrical bore (DIN 620).

In this publication the standard design of split spherical roller bearings is de-

scribed where the locking rings are integrated in the inner rings. FAG split spherical roller bearings with separate locking rings are recommended for applications where considerable temperature differences between shaft and inner ring halves may have to be accommodated, e.g. dryer rolls of paper machines. Information on this special design will be supplied by FAG on request (cp. FAG video "The Installation of Split Spherical Roller Bearings in the Dryer Section of a Paper Mill").

3: The internal design corresponds to the well-proven E design.



Load carrying capacity

The load carrying capacity of split spherical roller bearings is smaller than that of unsplit spherical roller bearings since the pitch circle for the roller/cage assembly is reduced due to the outer ring bolting. Nevertheless, a high load carrying capacity is achieved by providing the largest possible number of rollers with the largest possible diameter (E design).

Cycling of the separating joint is taken into consideration in calculating the equivalent dynamic load by the impact factor 1.1.

Bearing dimensioning is effected in accordance with the usual calculation procedure indicated in FAG catalogue WL 41 520.

High-speed suitability

The bearing tables indicate the kinematically permissible speeds. These values take into account the cage strength and the vibrations caused by cycling of the

separating joints. In cases where the kinematically permissible speeds are exceeded FAG Application Engineering must be consulted.

Fits

The shaft has to be machined to h6...h9 in order to attain the required tight inner ring fit after bolting. These shaft tolerances are also used for unsplit bearings mounted with adapter sleeves. Usually, the housing bore is machined to H7 or H8.

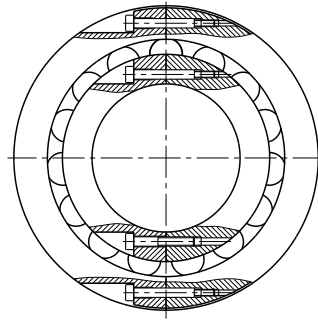
Lubrication

FAG split spherical roller bearings are usually lubricated with a lithium soap base grease of penetration class 2 with EP additives. The lubrication intervals are identical with those of unsplit bearings.

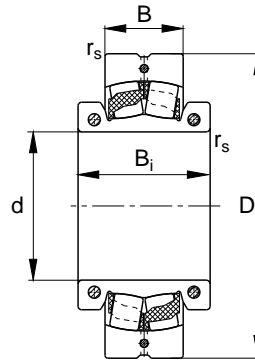
Split spherical roller bearings may be relubricated via a groove and holes in the outer ring.

FAG spherical roller bearings

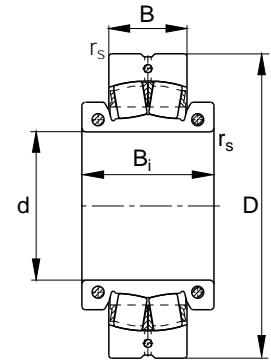
split, in metric dimensions



Suffix:



Moulded polyamide cage
T



Machined brass cage
MA

Shaft	Dimensions					Load rating · Factor						Weight ≈ kg	Permissible axial loads*)	Kinematically permissible speeds
	d	D	B	B _i	r _s min	C	e	Y	Y	stat.	dyn.			
	mm					kN		F _a /F _r ≤ e	F _a /F _r > e	C ₀	Y ₀		kN	min ⁻¹
55	55	110	28	52	1.5	120	0.23	2.9	4.4	146	2.9	1.7	5.4	3000
60	60	120	31	55	1.5	143	0.24	2.8	4.2	166	2.8	2.7	5.4	2800
65	65	130	31	60	1.5	173	0.24	2.8	4.2	208	2.8	2.8	5.4	2400
70	70	140	33	62	2	180	0.23	3	4.4	228	2.9	3	5.4	2400
75	75	150	36	68	2	183	0.22	3.1	4.6	236	3	4	7.6	2200
80	80	160	40	70	2	212	0.22	3.1	4.7	270	3.1	4.9	7.6	2000
85	85	170	43	74	2	260	0.22	3	4.5	325	3	5.7	7.6	1900
90	90	180	46	76	2.1	285	0.23	2.9	4.3	360	2.8	6.1	7.6	1700
100	100	180	56	90	2	310	0.28	2.4	3.5	430	2.3	8	7.6	1100
	100	200	53	92	2.1	360	0.24	2.8	4.2	465	2.8	9.8	13.8	1500
110	110	180	46	86	2	270	0.23	2.9	4.3	390	2.8	7	7.6	1100
	110	200	62	102	2	390	0.28	2.4	3.6	570	2.3	9.55	14	1000
	110	215	58	98	2.1	455	0.25	2.7	4	585	2.7	10.7	13.8	1300
115	115	200	52	90	2	305	0.22	3	4.5	455	3	9.5	7.6	1100
	115	210	64	104	2	490	0.28	2.4	3.6	710	2.3	11.2	7.6	900
	115	230	64	104	3	540	0.25	2.7	4	720	2.7	14.2	13.8	1200
125	125	210	53	94	2	390	0.23	3	4.4	600	2.9	10	7.6	950
	125	225	68	110	2.1	510	0.28	2.5	3.6	750	2.4	13.5	13.8	850
	125	250	68	110	3	630	0.26	2.6	3.9	880	2.6	18.8	13.8	1100

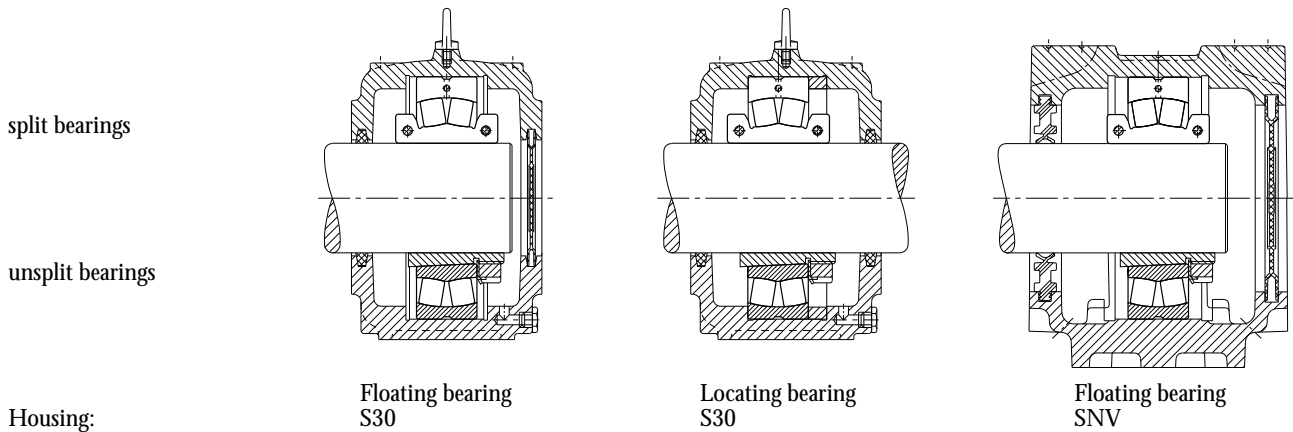
The designs printed in **bold face** are produced in series.
Information on other designs will be supplied on request.

*) For inner rings which are not axially supported.

Equivalent dynamic load			Equivalent static load		
$P = 1.1 (F_r + Y \cdot F_a)$	[kN]	$F_a/F_r \leq e$	$P_0 = F_r + Y_0 \cdot F_a$	[kN]	
$P = 1.1 (0.67 \cdot F_r + Y \cdot F_a)$	[kN]	$F_a/F_r > e$			

P/C must be equal to or less than 0.2 to prevent the inner rings from creeping on the shaft in circumferential direction. Higher values are permissible if the speed is much lower than the kinematically permissible speed. Please consult our experts in such cases.

Examples for bearing exchange in plummer block housings



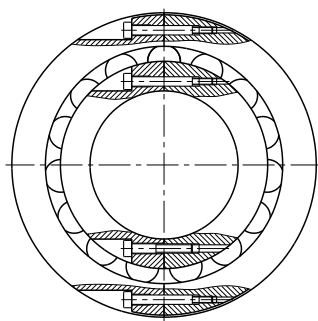
Bolt tightening torque		Code		Can replace unsplit spherical roller bearings with adapter sleeve	Matching plummer block housings**)	
Inner ring M_i N m	Outer ring M_a N m	Bearing FAG	FAG	Bearing	Adapter sleeve	FAG
8.5	1.5	222SM55T		22212K	H312	SNV110
8.5	4	222SM60T		22213K	H313	SNV120
8.5	4	222SM65T		22215K	H315	SNV130
8.5	4	222SM70T		22216K	H316	SNV140
14	8.5	222SM75T		22217K	H317	SNV150
14	8.5	222SM80T		22218K	H318	SNV160
14	8.5	222SM85T		22219K	H319	SNV170
14	14	222SM90T		22220K	H320	SNV180
14 35	4 14	222SM100T	231SM100MA	23122K 22222K	H3122 H322	- SNV200
14 35 35	4 8 14	222SM110T	230SM110MA 231SM110MA	23024K 23124K 22224K	H3024 H3124 H3124	S3024K - SNV215 ¹⁾
14 14 35	8.5 4 14	222SM115T	230SM115MA 231SM115MA	23026K 23126K 22226K	H3026 H3126 H3126	S3026K - SNV230 ¹⁾
14 35 35	4 8 14	222SM125T	230SM125MA 231SM125MA	23028K 23128K 22228K	H3028 H3128 H3128	S3028K - SNV250 ¹⁾

***) The bearings also fit into housings from other manufacturers provided the inside dimensions are the same. Seals, covers and locating rings for SNV housings, see FAG catalogue WL 41 520

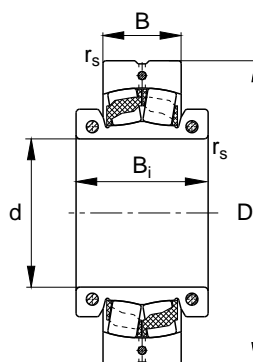
¹⁾ Housing with eye bolt

FAG spherical roller bearings

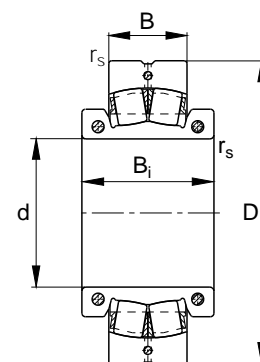
split, in metric dimensions



Suffix:



Moulded polyamide cage
T



Machined brass cage
MA

Shaft	Dimensions					Load rating · Factor						Weight ≈ kg	Permissible axial loads*) kN	Kinematically permissible speeds min ⁻¹
	d	D	B	B _i	r _s min	dyn.		stat.		C ₀	Y ₀			
	mm					C	e	Y	Y	C ₀	Y ₀			
						kN		F _a /F _r ≤ e	F _a /F _r > e	kN				
135	135	225	56	100	2.1	405	0.22	3.1	4.6	620	3	13	13.8	950
	135	250	80	123	2.1	570	0.27	2.5	3.7	850	2.4	19.5	22.2	800
	135	270	73	122	3	735	0.25	2.7	4	1020	2.6	22.3	22.2	1000
140	140	240	60	106	2.1	450	0.22	3.1	4.6	680	3	15.5	13.8	900
	140	270	86	135	2.1	710	0.29	2.3	3.5	1040	2.3	25.8	22	700
	140	290	80	124	3	850	0.25	2.7	4	1200	2.6	28.5	22.2	950
150	150	260	67	112	2.1	510	0.22	3.1	4.6	800	3	20.5	13.8	800
	150	280	88	133	2.1	710	0.29	2.3	3.5	1040	2.3	26.4	22	700
	150	310	86	128	4	965	0.26	2.6	3.9	1370	2.6	36.5	22.2	900
160	160	280	74	123	2.1	640	0.23	3	4.4	1000	2.9	25.5	22.2	750
	160	300	96	140	2.1	830	0.29	2.3	3.5	1220	2.3	32.7	22	670
	160	320	86	131	4	965	0.26	2.6	3.9	1370	2.6	35.7	22.2	900
170	170	290	75	120	2.1	780	0.23	2.9	4.3	1250	2.8	23.6	22.2	700
	170	320	104	142	2.1	915	0.28	2.4	3.5	1430	2.3	40.6	22	630
	170	340	92	142	4	1140	0.25	2.7	4	1630	2.7	43.6	22.2	800
180	180	310	82	134	2.1	800	0.23	3	4.4	1270	2.9	35	22	670
	180	340	112	160	3	1020	0.29	2.3	3.5	1530	2.3	48.4	22	600
	180	360	98	154	4	1140	0.25	2.7	4	1630	2.7	52.8	22.2	600
200	200	340	90	136	3	965	0.23	2.9	4.3	1530	2.8	37.2	22	630
	200	370	120	175	4	1320	0.31	2.2	3.3	2040	2.2	61.8	32	530
	200	400	108	162	4	1340	0.25	2.7	4	1900	2.6	77.5	32	560
220	220	360	92	156	3	1100	0.23	2.9	4.3	1830	2.8	53	32	560
	220	400	128	190	4	1630	0.3	2.3	3.3	2600	2.2	86	32	480
	220	440	120	170	4	1460	0.25	2.7	4	2080	2.7	89.3	32	500

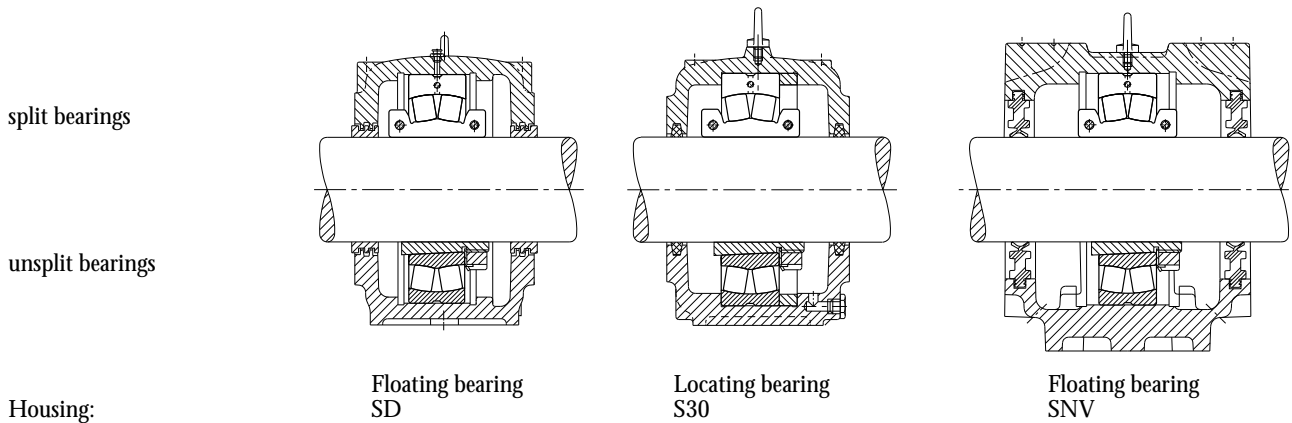
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Information on other designs will be supplied on request.

*) For inner rings which are not axially supported.

Equivalent dynamic load		Equivalent static load	
$P = 1.1 (F_r + Y \cdot F_a)$	[kN]	$F_a/F_r \leq e$	$P_0 = F_r + Y_0 \cdot F_a$ [kN]
$P = 1.1 (0.67 \cdot F_r + Y \cdot F_a)$	[kN]	$F_a/F_r > e$	

P/C must be equal to or less than 0.2 to prevent the inner rings from creeping on the shaft in circumferential direction. Higher values are permissible if the speed is much lower than the kinematically permissible speed. Please consult our experts in such cases.

Examples for bearing exchange in plummer block housings

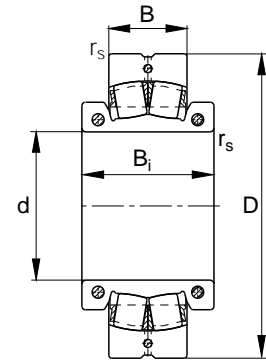
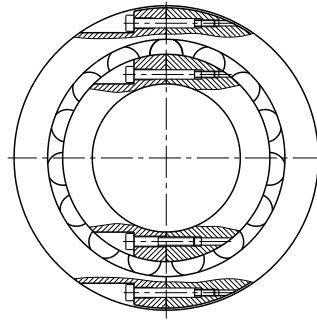


Bolt tightening torque		Code		Can replace unsplit spherical roller bearings with adapter sleeve	Matching plummer block housings**)	
Inner ring M_i N m	Outer ring M_a N m	Bearing FAG	FAG	Bearing	Adapter sleeve FAG	
35	8.5	222SM135T	230SM135MA	23030K	H3030	S3030K
69	14		231SM135MA	23130K	H3130	-
69	35			22230K	H3130	SNV270
35	8.5	222SM140T	230SM140MA	23032K	H3032	S3032K
69	14		231SM140MA	23132K	H3132	-
69	35			22232K	H3132	SNV290
35	8.5	222SM150T	230SM150MA	23034K	H3034	S3034K
69	35		231SM150MA	23134K	H3134	SD3134TS
69	35			22234K	H3134	SD534
69	14	222SM160T	230SM160MA	23036K	H3036	S3036K
69	35		231SM160MA	23136K	H3136	SD3136TS
69	35			22236K	H3136	SD536
69	14	222SM170T	230SM170MA	23038K	H3038	S3038K
69	35		231SM170MA	23138K	H3138	SD3138TS
69	35			22238K	H3138	SD538
69	14	222SM180MA	230SM180MA	23040K	H3040	S3040K
69	35		231SM180MA	23140K	H3140	SD3140TS
69	35			22240K	H3140	SD540
69	35	222SM200MA	230SM200MA	23044K	H3044X	S3044K
120	69		231SM200MA	23144K	H3144X	SD3144TS
120	69			22244K	H3144X	SD544
120	35	222SM220MA	230SM220MA	23048K	H3048	S3048K
120	69		231SM220MA	23148K	H3148X	SD3148TS
120	69			22248K	H3148X	SD548

***) The bearings also fit into housings from other manufacturers provided the inside dimensions are the same. Seals, covers and locating rings for SNV housings, see FAG catalogue WL 41 520

FAG spherical roller bearings

split, in metric dimensions



Suffix:

Machined brass cage
MA

Shaft	Dimensions					Load rating · Factor						Weight ≈ kg	Permissible axial loads*)	Kinematically permissible speeds min ⁻¹
	d	D	B	B _i	r _s min	dyn.			stat.					
						C	e	Y	Y	C ₀	Y ₀			
mm	mm	mm	mm	mm	kN	F _a /F _r ≤ e	F _a /F _r > e	F _a /F _r > e	kN	kN	min ⁻¹			
240	240	400	104	160	4	1220	0.22	3	4.5	2120	3	57.4	32	560
	240	440	144	210	4	1860	0.3	2.3	3.4	3050	2.2	114	32	450
	240	480	130	200	5	1860	0.26	2.6	3.9	2600	2.6	136	60	450
260	260	420	106	170	4	1460	0.23	2.9	4.4	2450	2.9	72	32	500
	260	460	146	190	5	2280	0.3	2.2	3.3	3800	2.2	110	32	400
	260	500	130	200	5	2200	0.25	2.7	4	3100	2.6	143	60	430
280	280	460	118	175	4	1600	0.22	3	4.5	2800	3	96	32	480
	280	500	160	218	5	2320	0.29	2.3	3.5	3900	2.3	160	44	400
	280	540	140	200	5	2400	0.24	2.8	4.2	3550	2.7	175	60	430
300	300	480	121	186	4	1860	0.23	2.9	4.3	3200	2.8	106	32	430
	300	540	176	225	5	2750	0.29	2.3	3.4	4750	2.3	184	60	360
	300	580	150	212	5	2650	0.24	2.8	4.2	4050	2.8	214	60	380
320	320	520	133	200	5	2040	0.22	3	4.5	3650	3	120	32	430
	320	580	190	235	5	3100	0.3	2.3	3.4	5200	2.2	226	60	340
	320	620	165	230	6	3100	0.24	2.8	4.1	4750	2.7	244	60	360
340	340	540	134	205	5	2360	0.22	3	4.5	4150	2.9	150	60	380
	340	600	192	270	5	3900	0.3	2.3	3.3	6800	2.2	285	60	300
	340	650	170	240	6	3450	0.25	2.7	4	5100	2.6	267	60	340
360	360	560	135	218	5	2550	0.22	3.1	4.6	4650	3	137	60	380
	360	620	194	270	5	3900	0.3	2.3	3.4	6950	2.2	292	60	300
380	380	600	148	225	5	2700	0.21	3.2	4.8	5100	3.1	169	60	380
	380	650	200	270	6	4050	0.28	2.4	3.6	7200	2.3	365	60	300

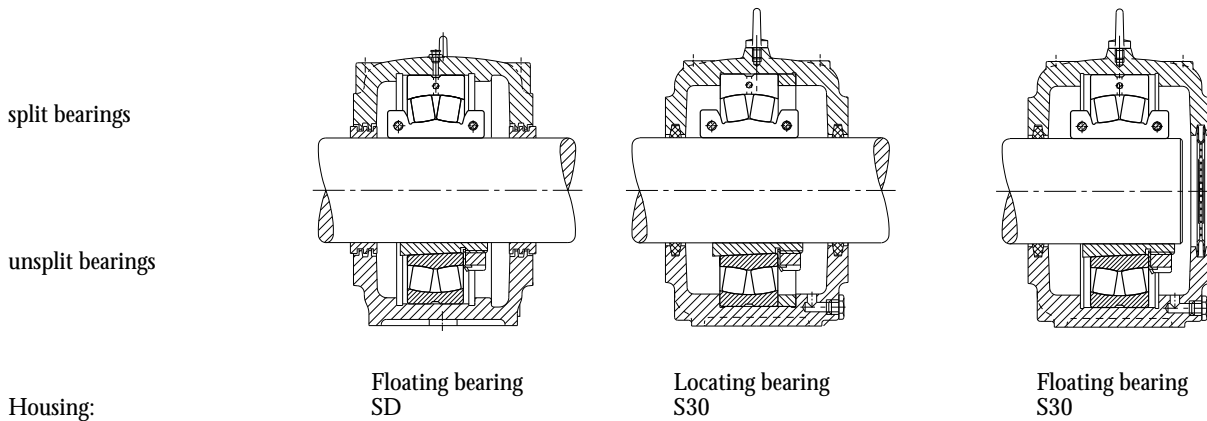
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Equivalent dynamic load			Equivalent static load		
$P = 1.1 (F_r + Y \cdot F_a)$	[kN]	$F_a/F_r \leq e$	$P_0 = F_r + Y_0 \cdot F_a$	[kN]	
$P = 1.1 (0.67 \cdot F_r + Y \cdot F_a)$	[kN]	$F_a/F_r > e$			

P/C must be equal to or less than 0.2 to prevent the inner rings from creeping on the shaft in circumferential direction. Higher values are permissible if the speed is much lower than the kinematically permissible speed. Please consult our experts in such cases.

Examples for bearing exchange in plummer block housings



Bolt tightening torque

Code

Can replace unsplit spherical roller bearings with adapter sleeve Matching plummer block housings**)

Inner ring
 M_i
N m

Outer ring
 M_a
N m

Bearing

Bearing

Adapter sleeve

FAG

FAG

120
120
295

69
69
120

230SM240MA
231SM240MA
222SM240MA

23052K
23152K
22252K

H3052
H3152X
H3152X

S3052K
SD3152TS
SD552

120
120
295

35
35
69

230SM260MA
231SM260MA
222SM260MA

23056K
23156K
22256K

H3056
H3156X
H3156X

S3056K
SD3156TS
SD556

120
190
295

69
120
120

230SM280MA
231SM280MA
222SM280MA

23060K
23160K
22260K

H3060
H3160HG
H3160HG

S3060K
SD3160TS
SD560

120
295
295

69
120
120

230SM300MA
231SM300MA
222SM300MA

23064K
23164K
22264K

H3064HG
H3164HG
H3164HG

S3064K
SD3164TS
SD564

295
295
295

69
190
120

230SM320MA
231SM320MA
222SM320MA

23068K
23168K

H3068HG
H3168HG

S3068K
SD3168TS

295
295
295

69
69
120

230SM340MA
231SM340MA
222SM340MA

23072K
23172K

H3072HG
H3172HG

SD3172TS

295
295

69
69

230SM360MA
231SM360MA

23076K
23176K

H3076HG
H3176HG

SD3176TS

295
295

120
120

230SM380MA
231SM380MA

23080K
23180K

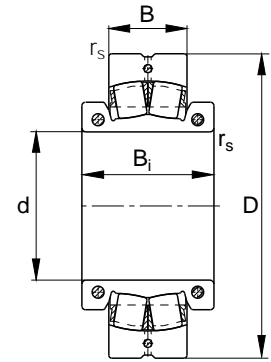
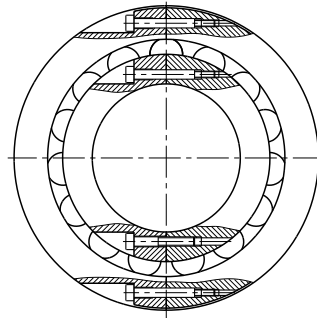
H3080HG
H3180HG

SD3180TS

**) The bearings also fit into housings from other manufacturers provided the inside dimensions are the same.

FAG spherical roller bearings

split, in metric dimensions



Suffix:

Machined brass cage
MA

Shaft	Dimensions					Load rating · Factor						Weight ≈ kg	Permissible axial loads*)	Kinematically permissible speeds
	d	D	B	B _i	r _s min	dyn.		stat.		C ₀	Y ₀			
	mm					C	e	Y	Y	C ₀	Y ₀		kN	min ⁻¹
						kN		F _a /F _r ≤ e	F _a /F _r > e	kN				
400	400	620	150	225	5	3100	0.22	3.1	4.6	5700	3	210	60	340
	400	700	224	285	6	4400	0.28	2.4	3.6	7650	2.3	415	60	280
410	410	650	157	225	5	3100	0.21	3.2	4.8	5850	3.1	250	60	340
	410	720	224	315	6	5400	0.29	2.3	3.4	9650	2.3	475	94	260
420	420	650	157	235	5	3100	0.21	3.2	4.8	5850	3.1	246	60.5	340

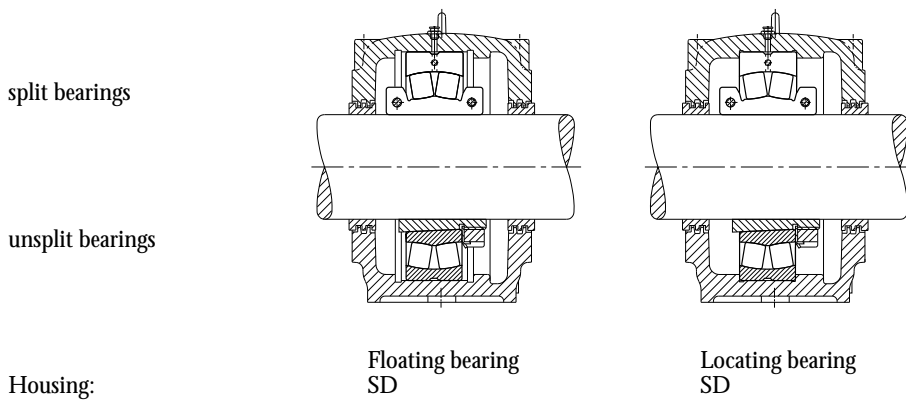
The designs printed in **bold face** are produced in series.
Information on other designs will be supplied on request.

*) For inner rings which are not axially supported.

Equivalent dynamic load			Equivalent static load		
$P = 1.1 (F_r + Y \cdot F_a)$	[kN]	$F_a/F_r \leq e$	$P_0 = F_r + Y_0 \cdot F_a$	[kN]	
$P = 1.1 (0.67 \cdot F_r + Y \cdot F_a)$	[kN]	$F_a/F_r > e$			

P/C must be equal to or less than 0.2 to prevent the inner rings from creeping on the shaft in circumferential direction. Higher values are permissible if the speed is much lower than the kinematically permissible speed. Please consult our experts in such cases.

Examples for bearing exchange in plummer block housings



Bolt tightening torque

Code

Can replace unsplit spherical roller bearings with adapter sleeve **Matching plummer block housings**)**

Inner ring
M_i
N m

Outer ring
M_a
N m

Bearing
FAG

Bearing Adapter sleeve

FAG

295
295

69
190

230SM400MA
231SM400MA

23084K
23184K

H3084HG
H3184HG

SD3184TS

295
500

120
120

230SM410MA
231SM410MA

23088K
23188K

H3088HG
H3188HG

295

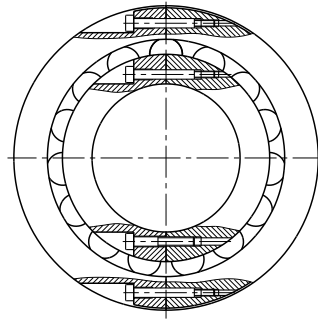
120

230SM420MA

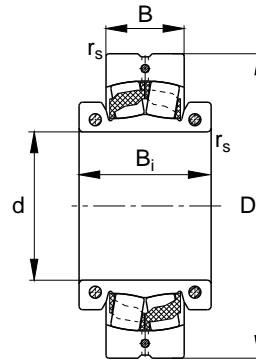
**) The bearings also fit into housings from other manufacturers provided the inside dimensions are the same.

FAG spherical roller bearings

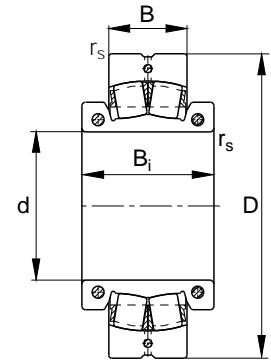
split, in inch dimensions



Suffix:



Moulded polyamide cage



Machined brass cage
MA

Shaft	Dimensions					Load rating · Factor						Weight ≈	Permissible axial loads*)	Kinematically permissible speed
	d	D	B	B _i	r _s min	C	e	Y	Y	stat. C ₀	Y ₀			
inch	inch mm					lbs kN	F _a /F _r ≤ e	F _a /F _r > e		lbs kN		lbs kg	lbs kN	min ⁻¹
2 3/16	2.1875 55.563	4.7244 120	1.2205 31	2.1654 55	0.06 1.5	32500 143	0.24	2.8	4.2	37500 166	2.8	5.1 2.3	1200 5.4	2800
2 1/4	2.2500 57.15	4.7244 120	1.2205 31	2.1654 55	0.06 1.5	32500 143	0.24	2.8	4.2	37500 166	2.8	4.3 1.95	1200 5.4	2800
2 7/16	2.4375 61.913	5.1181 130	1.2205 31	2.3622 60	0.06 1.5	39000 173	0.24	2.8	4.2	47500 208	2.8	6.2 2.8	1200 5.4	2400
2 1/2	2.5000 63.5	5.1181 130	1.2205 31	2.3622 60	0.06 1.5	39000 173	0.24	2.8	4.2	47500 208	2.8	5.5 2.5	1200 5.4	2400
2 11/16	2.6875 68.263	5.5118 140	1.2992 33	2.4409 62	0.08 2	40500 180	0.23	3	4.4	51000 228	2.9	6.6 3	1200 5.4	2400
2 15/16	2.9375 74.613	5.9055 150	1.4173 36	2.6772 68	0.08 2	41500 183	0.22	3.1	4.6	53000 236	3	8.8 4	1700 7.6	2200
3	3.0000 76.2	5.9055 150	1.4173 36	2.6772 68	0.08 2	41500 183	0.22	3.1	4.6	53000 236	3	8.8 4	1700 7.6	2200
3 3/16	3.1875 80.963	6.2992 160	1.5748 40	2.7559 70	0.08 2	47500 212	0.22	3.1	4.7	60000 270	3.1	10.6 4.8	1700 7.6	2000
3 1/4	3.2500 82.55	6.2992 160	1.5748 40	2.7559 70	0.08 2	47500 212	0.22	3.1	4.7	60000 270	3.1	9.15 4.15	1700 7.6	2000
3 7/16	3.4375 87.313	7.0866 180	1.8110 46	2.9921 76	0.08 2.1	58500 260	0.23	2.9	4.3	72000 320	2.8	14.2 6.45	1700 7.6	1300
	3.4375 87.313	7.0866 180	1.8110 46	2.9921 76	0.08 2.1	64000 285	0.23	2.9	4.3	81500 360	2.8	14.2 6.45	1700 7.6	1700

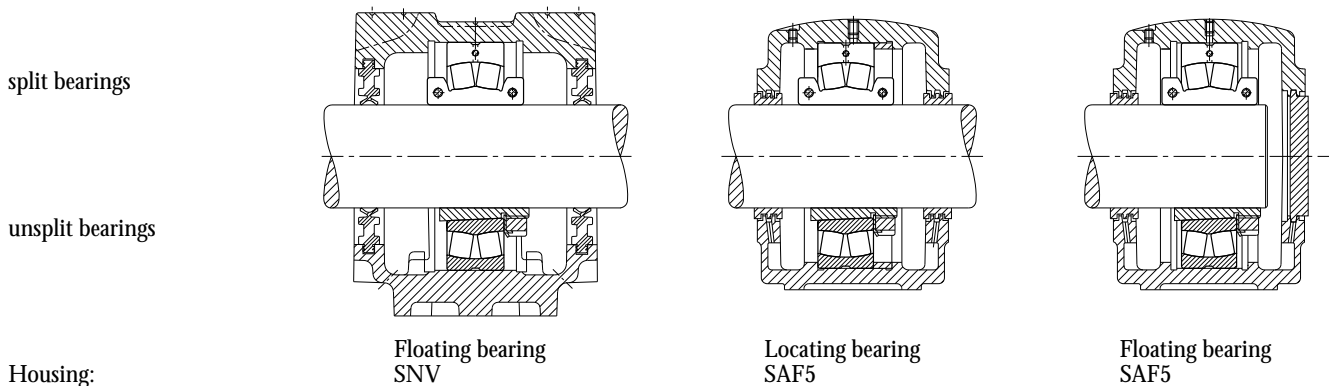
The designs printed in **bold face** are produced in series.
Information on other designs will be supplied on request.

*) For inner rings which are not axially supported.

Equivalent dynamic load		Equivalent static load	
$P = 1.1 (F_r + Y \cdot F_a)$	[lbs, kN]	$F_a/F_r \leq e$	$P_0 = F_r + Y_0 \cdot F_a$ [lbs, kN]
$P = 1.1 (0.67 \cdot F_r + Y \cdot F_a)$	[lbs, kN]	$F_a/F_r > e$	

P/C must be equal to or less than 0.2 to prevent the inner rings from creeping on the shaft in circumferential direction. Higher values are permissible if the speed is much lower than the kinematically permissible speed. Please consult our experts in such cases.

Examples for bearing exchange in plummer block housings



Bolt tightening torque

Inner ring
M_i
ft lbs
N m

Outer ring
M_a
ft lbs
N m

Code

Bearing

FAG

FAG

Can replace unsplit spherical roller bearings with adapter sleeve

Bearing

Adapter sleeve

Matching plummer block housings**)

FAG

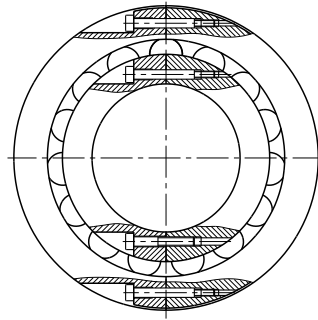
Inner ring M _i ft lbs N m	Outer ring M _a ft lbs N m	Bearing FAG	FAG	Bearing	Adapter sleeve	FAG
6 8.5	1.1 1.5	222S.203		22213K	•SNW13 H313.203	•SAF513 SNV120
6 8.5	1.1 1.5	222S.204		22213K	H313.204	SNV120
6 8.5	3 4	222S.207		22215K	•SNW15 H315.207	•SAF515 SNV130
6 8.5	3 4	222S.208		22215K	H315.208	SNV130
6 8.5	3 4	222S.211		22216K	•SNW16 H316.211	•SAF516 SNV140
10 14	6 8.5	222S.215		22217K	•SNW17 H317.215	•SAF517 SNV150
10 14	6 8.5	222S.300		22217K	H317.300	SNV150
10 14	6 8.5	222S.303		22218K	•SNW18 H318.303	•SAF518 SNV160
10 14	6 8.5	222S.304		22218K	H318.304	SNV160
10 14	10 14		222S.307MA	22220K	•SNW20 H320.307	•SAF520 SNV180
10 14	10 14	222S.307		22220K	•SNW20 H320.307	•SAF520 SNV180

***) The bearings also fit into housings from other manufacturers provided the inside dimensions are the same. Seals, covers and locating rings for SNV housings, see FAG catalogue WL 41 520

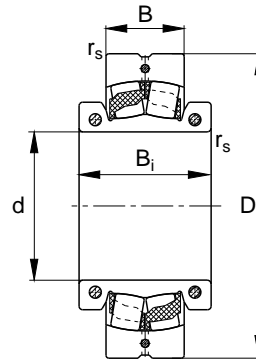
- Designs for the North American market. The split seals for the SAF housings are supplied together with the bearing.

FAG spherical roller bearings

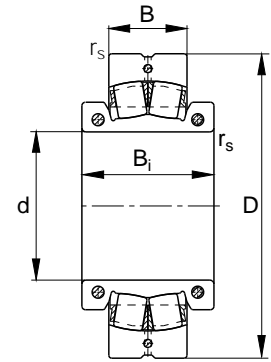
split, in inch dimensions



Suffix:



Moulded polyamide cage



Machined brass cage
MA

Shaft	Dimensions					Load rating · Factor						Weight ≈	Permissible axial loads*)	Kinematically permissible speed
	d	D	B	B _i	r _s min	C	e	Y	Y	stat. C ₀	Y ₀			
inch	inch mm					lbs kN	F _a /F _r ≤ e	F _a /F _r > e		lbs kN		lbs kg	lbs kN	min ⁻¹
3 1/2	3.5000	7.0866	1.8110	2.9921	0.08	58500	0.23	2.9	4.3	72000	2.8	13.6	1700	1300
	88.9	180	46	76	2.1	260				320		6.15	7.6	
	3.5000	7.0866	1.8110	2.9921	0.08	64000	0.23	2.9	4.3	81500	2.8	13.6	1700	1700
	88.9	180	46	76	2.1	285				360		6.15	7.6	
3 15/16	3.9375	7.8740	2.0866	3.6220	0.08	80000	0.24	2.8	4.2	104000	2.8	21.6	3100	1500
	100.013	200	53	92	2.1	360				465		9.8	13.8	
4	4.0000	7.8740	2.0866	3.6220	0.08	80000	0.24	2.8	4.2	104000	2.8	21.4	3100	1500
	101.6	200	53	92	2.1	360				465		9.7	13.8	
4 3/16	4.1875	8.4646	2.2835	3.8583	0.08	102000	0.25	2.7	4	132000	2.7	25.6	3100	1300
	106.363	215	58	98	2.1	455				585		11.6	13.8	
4 7/16	4.4375	9.0551	2.5197	4.0945	0.12	120000	0.25	2.7	4	163000	2.7	32.2	3100	1200
	112.713	230	64	104	3	540				720		14.6	13.8	
4 1/2	4.5000	9.0551	2.5197	4.0945	0.12	120000	0.25	2.7	4	163000	2.7	31.1	3100	1200
	114.3	230	64	104	3	540				720		14.1	13.8	
4 15/16	4.9373	9.8425	2.6772	4.3307	0.12	129000	0.26	2.6	3.9	176000	2.6	41.2	3100	850
	125.413	250	68	110	3	585				780		18.7	13.8	
	4.9373	9.8425	2.6772	4.3307	0.12	143000	0.26	2.6	3.9	196000	2.6	41.2	3100	1100
	125.413	250	68	110	3	630				880		18.7	13.8	
5	5.0000	9.8425	2.6772	4.3307	0.12	143000	0.26	2.6	3.9	196000	2.6	40.8	3100	1100
	127	250	68	110	3	630				880		18.5	13.8	
5 3/16	5.1875	10.6299	2.8740	4.8031	0.12	166000	0.25	2.7	4	228000	2.6	53.1	5000	1000
	131.763	270	73	122	3	735				1020		24.1	22.2	

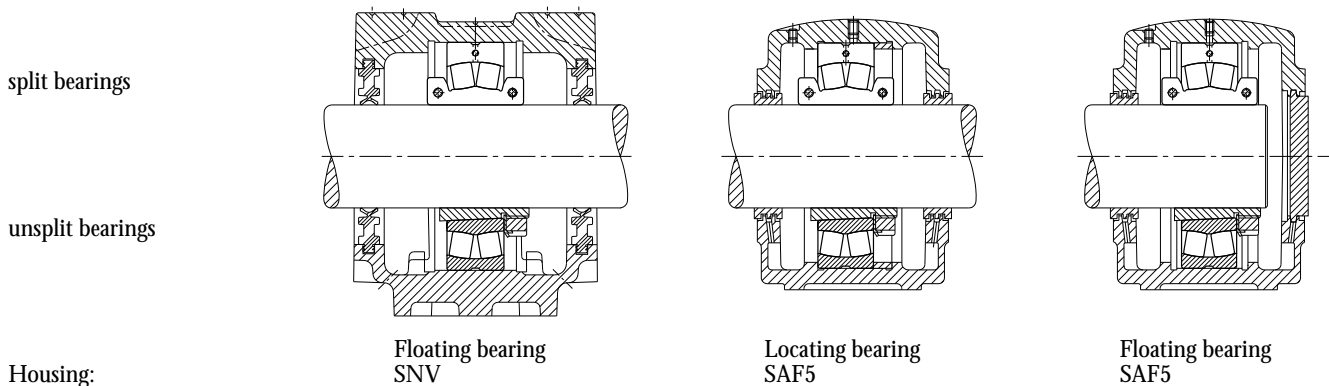
The designs printed in **bold face** are produced in series.
Information on other designs will be supplied on request.

*) For inner rings which are not axially supported.

Equivalent dynamic load		Equivalent static load	
$P = 1.1 (F_r + Y \cdot F_a)$	[lbs, kN]	$F_a/F_r \leq e$	$P_0 = F_r + Y_0 \cdot F_a$ [lbs, kN]
$P = 1.1 (0.67 \cdot F_r + Y \cdot F_a)$	[lbs, kN]	$F_a/F_r > e$	

P/C must be equal to or less than 0.2 to prevent the inner rings from creeping on the shaft in circumferential direction. Higher values are permissible if the speed is much lower than the kinematically permissible speed. Please consult our experts in such cases.

Examples for bearing exchange in plummer block housings



Bolt tightening torque		Code		Can replace unsplit spherical roller bearings with adapter sleeve		Matching plummer block housings**)
Inner ring M_i ft lbs N m	Outer ring M_o ft lbs N m	Bearing		Bearing	Adapter sleeve	FAG
		FAG	FAG			
10 14	10 14		222S.308MA	22220K	H320.308	SNV180
10 14	10 14	222S.308		22220K	H320.308	SNV180
26 35	10 14	222S.315		22222K	•SNW22 H322.315	•SAF522 SNV200
26 35	10 14	222S.400		22222K	•SNW22x4 H322.400	•SAF522 SNV200
26 35	10 14	222S.403		22224K	•SNW24 H3124.403	•SAF524 SNV215 ¹⁾
26 35	10 14	222S.407		22226K	•SNW26 H3126.407	•SAF526 SNV230 ¹⁾
26 35	10 14	222S.408		22226K	•SNW26x4 1/2 H3126.408	•SAF526 SNV230 ¹⁾
26 35	10 14		222S.415MA	22228K	•SNW28 H3128.415	•SAF528 SNV250 ¹⁾
26 35	10 14	222S.415		22228K	•SNW28 H3128.415	•SAF528 SNV250 ¹⁾
26 35	10 14	222S.500		22228K	H3128.500	SNV250 ¹⁾
51 69	26 35	222S.503		22230K	•SNW30 H3130.503	•SAF530 SNV270 ¹⁾

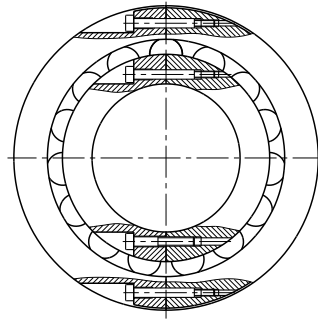
***) The bearings also fit into housings from other manufacturers provided the inside dimensions are the same. Seals, covers and locating rings for SNV housings, see FAG catalogue WL 41 520

- Designs for the North American market. The split seals for the SAF housings are supplied together with the bearing.

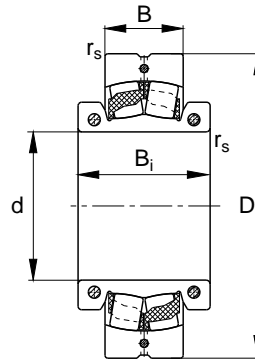
¹⁾ Housing with eye bolt

FAG spherical roller bearings

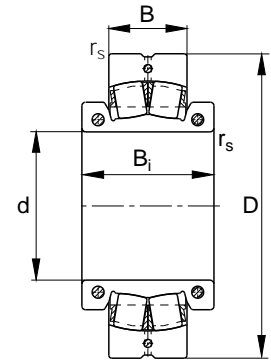
split, in inch dimensions



Suffix:



Moulded polyamide cage



Machined brass cage
MA

Shaft	Dimensions					Load rating · Factor					Weight ≈	Permissible axial loads*)	Kinematically permissible speed	
	d	D	B	B _i	r _s min	C	e	Y	Y	stat. C ₀				Y ₀
inch	inch mm					lbs kN	F _a /F _r ≤ e	F _a /F _r > e		lbs kN		lbs kg	lbs kN	min ⁻¹
5 7/16	5.4375	11.4173	3.1496	4.8819	0.12	173000	0.25	2.7	4	240000	2.6	58.4	5000	750
	138.113	290	80	124	3	780				1060		26.5	22.2	
5 1/2	5.5000	9.4488	2.3622	4.1732	0.08	100000	0.22	3.1	4.6	153000	3	30.2	3100	900
	139.7	240	60	106	2.1	450				680		13.7	13.8	
5 15/16	5.5000	11.4173	3.1496	4.8819	0.12	190000	0.25	2.7	4	270000	2.6	63.1	5000	950
	139.7	290	80	124	3	850				1200		28.6	22.2	
6	5.9375	12.2047	3.3858	5.0394	0.16	200000	0.26	2.6	3.9	275000	2.6	74.7	5000	900
	150.813	310	86	128	4	880				1220		33.9	22.2	
6 7/16	6.0000	12.2047	3.3858	5.0394	0.16	216000	0.26	2.6	3.9	310000	2.6	74.7	5000	900
	152.4	310	86	128	4	965				1370		33.9	22.2	
6 7/8	6.4375	11.4173	2.9528	4.7244	0.08	173000	0.23	2.9	4.3	285000	2.8	48.3	5000	700
	163.513	290	75	120	2.1	780				1250		21.9	22.2	
	6.4375	11.8110	3.7795	5.5118	0.08	186000	0.29	2.3	3.5	275000	2.3	81.6	5000	670
	163.513	300	96	140	2.1	830				1220		37	22.2	
6 1/2	6.4375	12.5984	3.3858	5.1575	0.16	216000	0.26	2.6	3.9	310000	2.6	79.4	5000	900
	163.513	320	86	131	4	965				1370		36	22.2	
6 15/16	6.5000	12.5984	3.3858	5.1575	0.16	216000	0.26	2.6	3.9	310000	2.6	79.4	5000	900
	165.1	320	86	131	4	965				1370		36	22.2	
7	6.9375	13.3858	3.6220	5.5905	0.16	255000	0.25	2.7	4	365000	2.7	98.5	5000	800
	176.213	340	92	142	4	1140				1630		44.7	22.2	
7 1/8	7.0000	11.4173	2.9528	4.7244	0.08	173000	0.23	2.9	4.3	285000	2.8	68.3	5000	700
	177.8	290	75	120	2.1	780				1250		31	22.2	

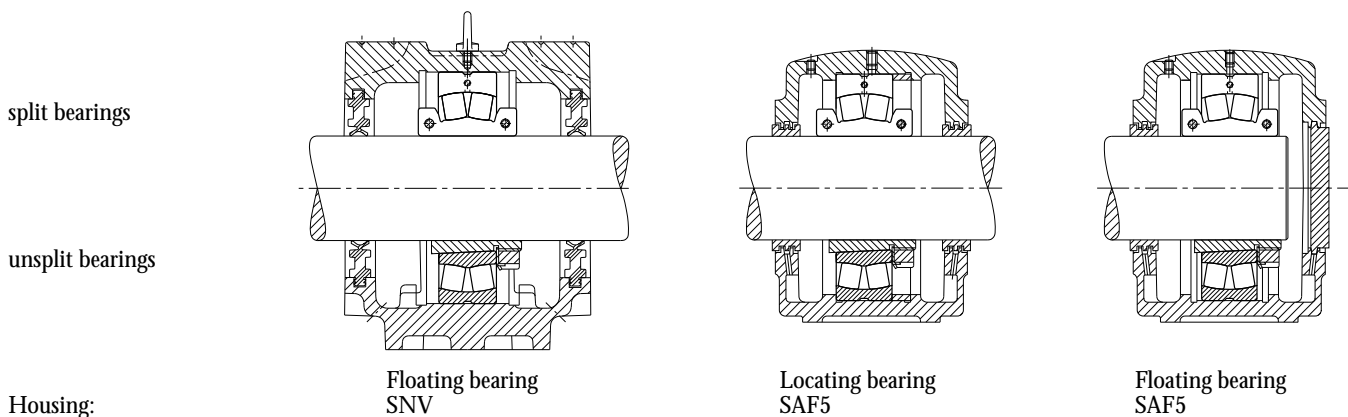
The designs printed in **bold face** are produced in series.
Information on other designs will be supplied on request.

*) For inner rings which are not axially supported.

Equivalent dynamic load		Equivalent static load	
$P = 1.1 (F_r + Y \cdot F_a)$	[lbs, kN]	$P_0 = F_r + Y_0 \cdot F_a$	[lbs, kN]
$P = 1.1 (0.67 \cdot F_r + Y \cdot F_a)$	[lbs, kN]		

P/C must be equal to or less than 0.2 to prevent the inner rings from creeping on the shaft in circumferential direction. Higher values are permissible if the speed is much lower than the kinematically permissible speed. Please consult our experts in such cases.

Examples for bearing exchange in plummer block housings



Bolt tightening torque

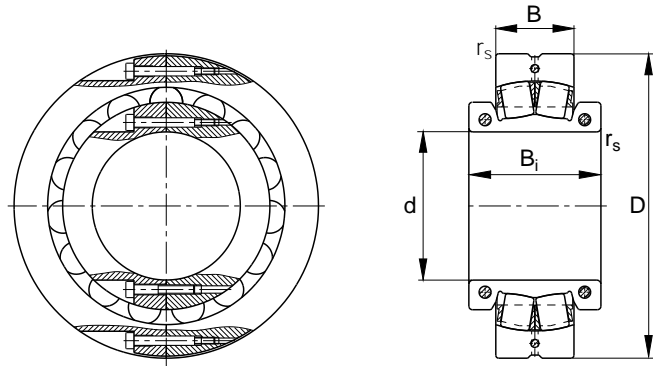
Inner ring M_i ft lbs N m		Outer ring M_a ft lbs N m		Bearing	Code	Can replace unsplit spherical roller bearings with adapter sleeve		Matching plummer block housings**)
				FAG	FAG	Bearing	Adapter sleeve	FAG
51 69	26 35				222S.507MA	22232K	•SNW32 H3132.507	•SAF532 SNV290
51 69	26 35			222S.507		22232K	•SNW32 H3132.507	•SAF532 SNV290
26 35	6 8.5				230S.508MA	23032K	•SNP3032x5 1/2 H3032.508	•SAF032K/5 1/2
51 69	26 35			222S.508		22232K	H3132.508	SNV290
51 69	26 35			222S.515		22234K	•SNW34 H3134.515	•SAF534
51 69	26 35			222S.600		22234K	•SNW34x6 H3134.600	•SAF534
51 69	10 14			230S.607		23038K	•SNP3038x6 7/16 H3038.607	•SAF038K/6 7/16
51 69	26 35				231S.607MA	23136K	•SNP3136x6 7/16 H3136.607	•SDAF3136K/6 7/16
51 69	26 35			222S.607		22236K	•SNW36 H3136.607	•SAF536
51 69	26 35			222S.608		22236K	•SNW36x6 1/2 H3136.608	•SAF536
51 69	26 35			222S.615		22238K	•SNW38 H3138.615	•SAF538
51 69	10 14			230S.700		23038K	•SNP3038x7 H3038.700	•SAF038K/7

**) The bearings also fit into housings from other manufacturers provided the inside dimensions are the same. Seals, covers and locating rings for SNV housings, see FAG catalogue WL 41 520

- Designs for the North American market. The split seals for the SAF housings are supplied together with the bearing.

FAG spherical roller bearings

split, in inch dimensions



Machined brass cage
(no suffix if $d > 7$ inch)

Shaft	Dimensions					Load rating · Factor						Weight ≈	Permissible axial loads*)	Kinematically permissible speed
	d	D	B	B _i	r _s min	C	e	Y	Y	stat. C ₀	Y ₀			
inch	inch mm					lbs kN	F _a /F _r ≤ e	F _a /F _r > e		lbs kN		lbs kg	lbs kN	min ⁻¹
7 3/16	7.1875 182.563	14.1732 360	3.8583 98	6.0630 154	0.16 4	255000 1140	0.25	2.7	4	365000 1630	2.7	130 59	5000 22.2	600
7 1/2	7.5000 190.5	15.7480 400	4.2520 108	6.3779 162	0.16 4	300000 1340	0.25	2.7	4	425000 1900	2.6	162 73.3	7200 32	560
7 15/16	7.9375 201.613	15.7480 400	4.2520 108	6.3779 162	0.16 4	300000 1340	0.25	2.7	4	425000 1900	2.6	169 76.5	7200 32	560
8	8.0000 203.2	15.7480 400	4.2520 108	6.3779 162	0.16 4	300000 1340	0.25	2.7	4	425000 1900	2.6	168 76	7200 32	560
8 1/2	8.5000 215.9	14.1732 360	3.6220 92	6.1417 156	0.12 3	250000 1100	0.23	2.9	4.3	415000 1830	2.8	117 53	7200 32	560
9	9.0000 228.6	14.1732 360	3.6220 92	6.2992 160	0.12 3	250000 1100	0.23	2.9	4.3	415000 1830	2.8	106 48	7200 32	560
9 1/2	9.5000 241.3	15.7480 400	4.0945 104	6.2992 160	0.16 4	275000 1220	0.22	3	4.5	480000 2120	3	154 70	7200 32	560
10	10.0000 254	16.5354 420	4.1732 106	6.6929 170	0.16 4	325000 1460	0.23	3	4.4	550000 2450	2.9	165 75	7200 32	500
11	11.0000 279.4	18.1102 460	4.6457 118	6.9291 176	0.16 4	360000 1600	0.22	3	4.5	620000 2800	3	211 96	7200 32	480
	11.0000 279.4	19.6850 500	6.2992 160	8.5827 218	0.2 5	520000 2320	0.29	2.3	3.5	880000 3900	2.3	353 160	9900 44	400

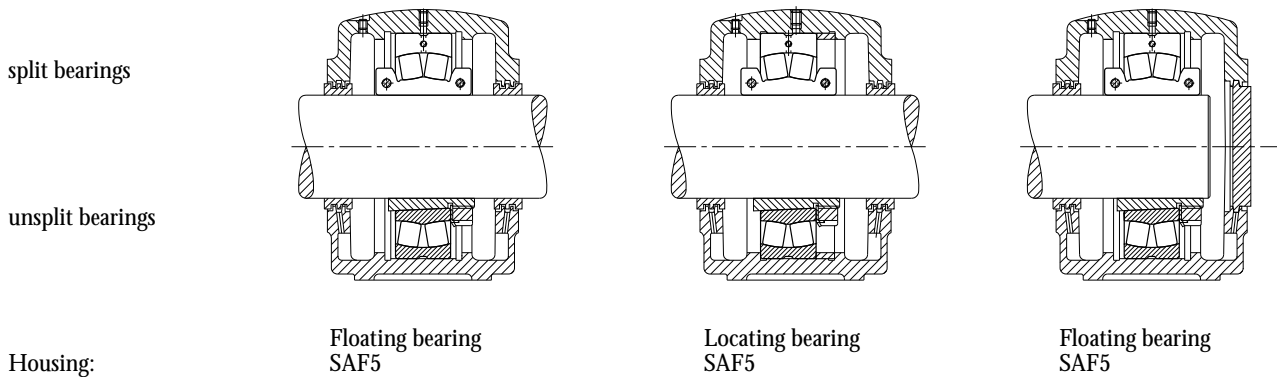
The designs printed in **bold face** are produced in series.
Information on other designs will be supplied on request.

*) For inner rings which are not axially supported.

Equivalent dynamic load		Equivalent static load	
$P = 1.1 (F_r + Y \cdot F_a)$	[lbs, kN]	$F_a/F_r \leq e$	$P_0 = F_r + Y_0 \cdot F_a$ [lbs, kN]
$P = 1.1 (0.67 \cdot F_r + Y \cdot F_a)$	[lbs, kN]	$F_a/F_r > e$	

P/C must be equal to or less than 0.2 to prevent the inner rings from creeping on the shaft in circumferential direction. Higher values are permissible if the speed is much lower than the kinematically permissible speed. Please consult our experts in such cases.

Examples for bearing exchange in plummer block housings



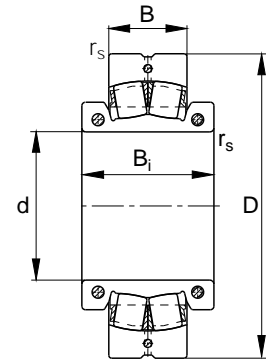
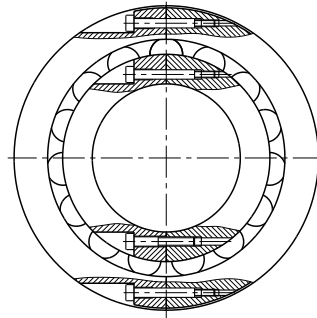
Bolt tightening torque		Code	Can replace unsplit spherical roller bearings with adapter sleeve		Matching plummer block housings**)
Inner ring M_i ft lbs N m	Outer ring M_a ft lbs N m	Bearing FAG	Bearing	Adapter sleeve	FAG
51 69	26 35	222S.703	22240K	•SNW40 H3140.703	•SAF540
88 120	51 69	222S.708	22244K	•SNW44x7 1/2 H3144X.708	•SAF544
88 120	51 69	222S.715	22244K	•SNW44 H3144X.715	•SAF544
88 120	51 69	222S.800	22244K	•SNW44x8 H3144X.800	•SAF544
88 120	26 35	230S.808	23048K	•SNP3048x8 1/2 H3048.808	•SAF048K/8 1/2 •SD048K/8 1/2
88 120	26 35	230S.900	23048K	•SNP3048x9 H3048.900	•SAF048K/9 •SD048K/9
88 120	51 69	230S.908	23052K	•SNP3052x9 1/2 H3052X.908	•SAF052K/9 1/2 •SD052K/9 1/2
88 120	26 35	230S.1000	23056K	•SNP3056x10 H3056.1000	•SAF056K/10 •SD056K/10
88 120	51 69	230S.1100	23060K	•SNP3060x11 H3060.1100	•SDAF060K/11 •SD060K/11
140 190	88 120	231S.1100	23160K	•SNP3160x11 H3160HG.1100	•SDAF3160K/11 •SD3160K/11

***) The bearings also fit into housings from other manufacturers provided the inside dimensions are the same.

- Designs for the North American market. The split seals for the SAF and SDAF housings are supplied together with the bearing.

FAG spherical roller bearings

split, in inch dimensions



Machined brass cage
(no suffix if $d > 7$ inch)

Shaft	Dimensions					Load rating · Factor						Weight ≈	Permissible axial loads*)	Kinematically permissible speed
	d	D	B	B _i	r _s min	dyn.		stat.		C ₀	Y ₀			
inch	inch mm					lbs kN	e	Y	Y	lbs kN		lbs kg	lbs kN	min ⁻¹
							F _a /F _r ≤ e	F _a /F _r > e						
12	12.0000	18.8976	4.7638	7.3228	0.16	425000	0.23	2.9	4.3	720000	2.8	227	7200	430
	304.8	480	121	186	4	1860				3200		103	32	
	12.0000	21.2598	6.9291	8.8583	0.2	620000	0.29	2.3	3.4	1060000	2.3	441	13500	360
	304.8	540	176	225	5	2750				4750		200	60	
13	13.0000	21.2598	5.2756	8.0709	0.2	530000	0.22	3	4.5	930000	2.9	317	13500	380
	330.2	540	134	205	5	2360				4150		144	60	
	13.0000	23.6220	7.5590	10.6299	0.2	880000	0.3	2.3	3.3	1530000	2.2	573	13500	300
	330.2	600	192	270	5	3900				6800		260	60	
14	14.0000	22.0472	5.3150	8.5827	0.2	570000	0.22	3.1	4.6	1040000	3	311	13500	380
	355.6	560	135	218	5	2550				4650		141	60	
	14.0000	24.4094	7.6378	10.6299	0.2	880000	0.3	2.3	3.4	1560000	2.3	600	13500	300
	355.6	620	194	270	5	3900				6950		272	60	

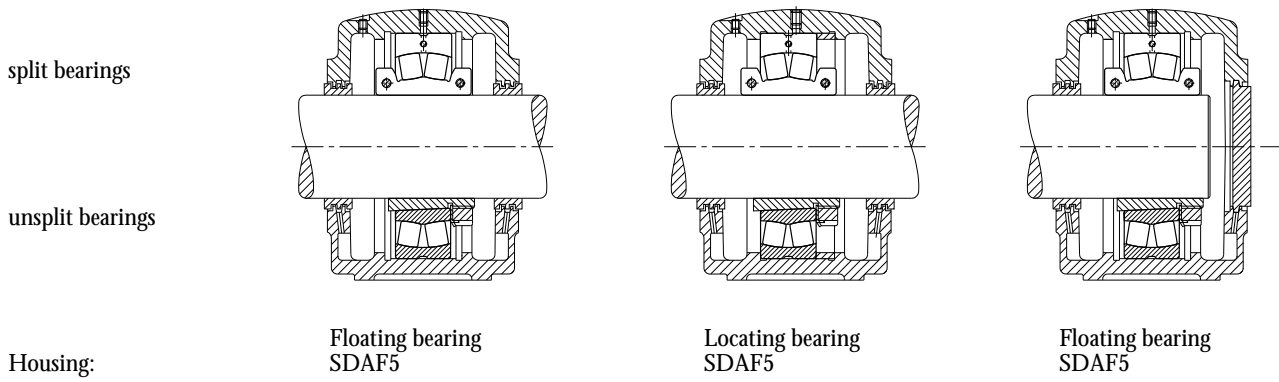
The designs printed in **bold face** are produced in series.
Information on other designs will be supplied on request.

*) For inner rings which are not axially supported.

Equivalent dynamic load			Equivalent static load		
$P = 1.1 (F_r + Y \cdot F_a)$	[lbs, kN]	$F_a/F_r \leq e$	$P_0 = F_r + Y_0 \cdot F_a$	[lbs, kN]	
$P = 1.1 (0.67 \cdot F_r + Y \cdot F_a)$	[lbs, kN]	$F_a/F_r > e$			

P/C must be equal to or less than 0.2 to prevent the inner rings from creeping on the shaft in circumferential direction. Higher values are permissible if the speed is much lower than the kinematically permissible speed. Please consult our experts in such cases.

Examples for bearing exchange in plummer block housings



Bolt tightening torque		Code	Can replace unsplit spherical roller bearings with adapter sleeve		Matching plummer block housings**)
Inner ring M_i ft lbs N m	Outer ring M_a ft lbs N m	Bearing FAG	Bearing	Adapter sleeve	FAG
88 120	51 69	230S.1200	23064K	•SNP3064x12 H3064HG.1200	•SDAF064K/12 •SD064K/12
212 295	88 120	231S.1200	23164K	•SNP3164x12 H3164HG.1200	•SDAF3164K/12 •SD3164K/12
212 295	51 69	230S.1300	23072K	•SNP3072x13 H3072HG.1300	•SDAF072K/13 •SD072K/13
212 295	88 120	231S.1300	23172K	•SNP3172x13 H3172HG.1300	•SDAF3172K/13 •SD3172K/13
212 295	51 69	230S.1400	23076K	•SNP3076x14 H3076HG.1400	•SDAF076K/14 •SD076K/14
212 295	51 69	231S.1400	23176K	•SNP3176x14 H3176HG.1400	•SDAF3176K/14 •SD3176K/14

**) The bearings also fit into housings from other manufacturers provided the inside dimensions are the same.

- Designs for the North American market. The split seals for the SAF and SDAF housings are supplied together with the bearing.

Cost reduction due to shorter downtimes

Example 1: Exhaust gas ventilator

Existing bearing with sleeve: 22226EK.C3+H3126 at drive end and opposite end
 FAG split bearing: 222SM115T

Required steps in bearing mounting and dismounting	
Unsplit bearing 22226EK.C3 + H3126	Split bearing 222SM115T
Disassemble couplings	not required
Loosen fastening bolts (housing bases)	not required
Remove coupling (mounted with feather key and shrink fit)	not required
Remove bearing at drive end (replaced as a precaution)	not required
Remove bearing at opposite end	yes
Install new bearing at opposite end	yes
Install new bearing at drive end	not required
Assembly in reverse order	–

Cost factors	Unsplit bearing 22226EK.C3 + H3126	Split bearing 222SM115T
Downtime	14 hours	3 hours
Downtime cost (disruption of production) (DM 39,000.00/h of ventilator downtime)	14 x DM 39,000.00 = DM 546,000.00	3 x DM 39,000.00 = DM 117,000.00
Man hours (2 men working 14 h each, 2 men working 3 h each) (hourly rate: DM 39.00)	2 x 14 = 28 h 28 x DM 39.00 = DM 1,090.00	2 x 3 = 6 h 6 x DM 39.00 = DM 235.00
Alignment (hourly rate: DM 65.00)	3 hours 3 x DM 65.00 = DM 195.00	not required
Crane rental	4 x DM 200.00 = DM 800.00	not required
Replacement bearing (drive end) as a precaution	DM 650.00	not required
Replacement bearing (opposite end)	DM 650.00	DM 1,600.00
Total cost of bearing replacement	DM 549,385.00	DM 118,835.00
Cost saved by using FAG split spherical roller bearings	DM 430,550.00	

Cost reduction due to shorter downtimes

Example 2: Exhaust ventilator

Existing bearing with sleeve: 23152K.MB + H3152XHG at drive end and opposite end
 FAG split bearing: 231SM240MA

Required steps in bearing mounting and dismounting

Unsplit bearing 23152K.MB + H3152XHG	Split bearing 231SM240MA
Disassemble couplings at transmission input and output ends	not required
Loosen connection between foundation and electric motor	not required
Loosen fastening bolts (housing bases)	not required
Remove cover for easier lifting	not required
Use loops to suspend impeller	not required
Lift rotor using a crane	not required
Remove transmission using a crane (access to coupling)	not required
Remove coupling (mounted with feather key and shrink fit)	not required
Remove bearing at drive end (replaced as a precaution)	no
Remove bearing at opposite end	yes
Install new bearing at opposite end	yes
Install new bearing at drive end	not required
Assembly in reverse order	–

Cost factors

	Unsplit bearing 23152K.MB + H3152XHG	Split bearing 231SM240MA
Downtime	36 h	6 h
Downtime cost (DM 2,600.00/h)	36 x DM 2,600.00 = DM 93,600.00	6 x DM 2,600.00 = DM 15,600.00
Man hours (3 men working 18 h each, 2 men working 6 h each) (hourly rate: DM 39.00)	3 x 18 = 54 h 54 x DM 39.00 = DM 2,105.00	2 x 6 = 12 h 12 x DM 39.00 = DM 470.00
Alignment (hourly rate DM 65.00)	3 hours 3 x DM 65.00 = DM 195.00	not required
Crane rental	24 x DM 200.00 = DM 4,800.00	not required
Replacement bearing (drive end)	DM 4,300.00	not required
Replacement bearing (opposite end)	DM 4,300.00	DM 17,200.00
Hydraulic nut RKP 260	DM 4,900.00	not required
Total cost of bearing replacement	DM 114,200.00	DM 33,270.00
Cost saved by using FAG split spherical roller bearings	DM 80,930.00	

Cost reduction due to shorter downtimes

Firm/contact partner
Application
Existing bearing with sleeve
FAG split bearing

Required steps in bearing mounting and dismounting	Unsplit bearing	Split bearing
Disassemble drive unit (transmission, belt/chain, electric motor)		not required
Remove coupling halves/pulley/sprocket		not required
Support rotor on trestles	not required	
Detach housing bases		not required
Lift rotor		not required
Remove housing cover		
Remove housing base		not required
Clean components, install and inspect new bearing		
Assemble housing		
Align housing relative to shaft		not required
Mount housing on foundation		not required
Mount coupling halves/pulley/sprocket		not required
Assemble drive unit (transmission, belt/chain, electric motor)		not required
Align drive train		not required
Total downtime in hours		

Cost comparison	Unsplit bearing	Split bearing
Downtime cost		
Lifting equipment		
Special mounting tools (e.g. hydraulic nut)		
Labour cost (man hours)		
Replacement bearing (split or unsplit with adapter sleeve)		
Alignment (equipment and labour cost)		
Total cost of bearing replacement		

Costs saved by using FAG split spherical roller bearings

Saving cost by rapid bearing replacement at locations of restricted access

FAG Split Spherical Roller Bearings

Every care has been taken to ensure the correctness of the information contained in this publication but no liability can be accepted for any errors or omissions.

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