

Description of shape

Angular roller bearings are generally in its foundation engineering form single-row roller bearings. Constructing a new design using this type of bearings, the angular roller bearing can't be used alone however, but as a combined bearing pair with a second bearing. For the transmission of axial-, radial-, and moment loads, the angular roller bearing can just be used in a combined version.

Most commonly this bearing is used in a combined version as a bearing pair (two angular roller systems) in a face-to-face or back-to-back-arrangement. The choose of the arrangement depends on the conditions of the construction and the load positions.

KMF-ANGULAR-ROLLER-BEARINGS are made as all KMF-SLIM-SPLIT-BEARINGS and consist therefore of two non-cutting manufactured and opened bearing rings, which are completed with a separator strip filled with cylinder rollers.

All rolling elements are arranged in one running direction, the pressure angle is 45°.

The separator strip with holden and guided rolling elements causes due to its special shape a cover of the bearing gap and protects therefore the raceway system for entering of rough dirt and on the other side, it makes it more difficult for the bearing grease to get out of the raceway system.

KMF-ANGULAR-ROLLER-BEARINGS can be supplied in

two different types. The type series PSR-08 with radial manufactured bearing rings and the type series PSA-08 with axial manufactured bearing rings. Both have in common the same bearing cross cut of 8 x 8 mm.

The type series PSR-08 is the preferred type series in this bearing range, as it offers a more simple and easier to manufacture construction. This high stiffness bearing solution with its high load capacities is integrated especially in applications which require higher accuracy and a smooth running without heavier noise development. The need for specially paired bearings, as it is common at conventional bearings is not given. KMF can supply all bearing types of the complete diameter range within the preferred series and above in short terms. Also all sizes in between the preferred series can be realized within short terms.

Materials

The bearings are made of stainless steel X46Cr13 (material code 1.4034). The separator is made of Polyamide 12.

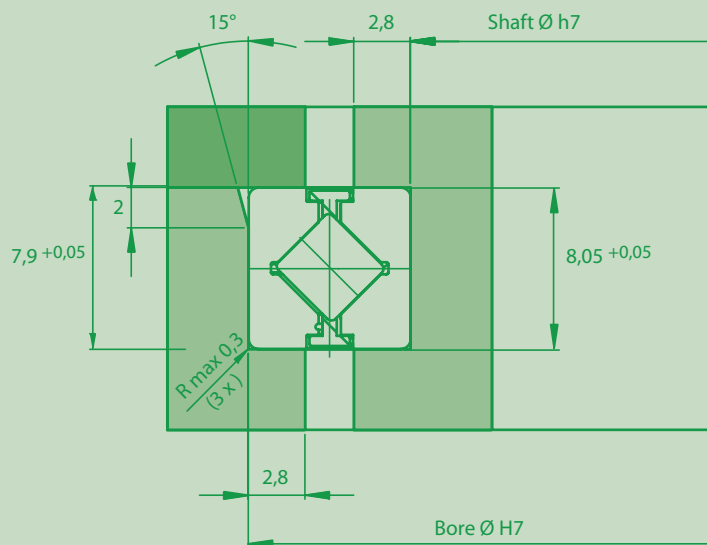
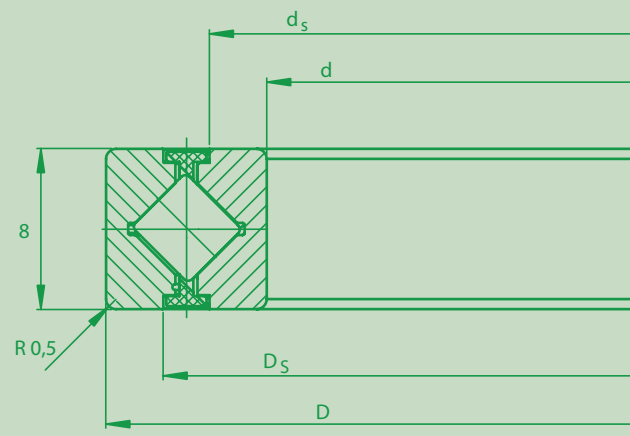
Operating conditions

The temperature limits of the standard bearing in continuous operation are -40°C and +100°C, for short periods up to +120°C.

Features

- Considerably simplification of constructions with angular roller bearings and their connecting parts (economic construction of the connecting parts)
- Free choice of material for the connecting parts, e. g. aluminium
- Corrosion resistant and low maintenance
- High static and dynamic Basic load ratings at maximal stiffness (low deformation)
- Low Mass
- Easy to install
- Dimensions beneath preferred series can be supplied within short terms

ANGULAR-ROLLER-SLIM-SPLIT-BEARING

Fitted dimensions

Bearing dimensions

Table of dimensions (Type series PSR-08)

KMF-type ¹⁾	Bearing dimension				Mass	Basic load ratings				Limiting speeds	
						Axial		Radial		Bearing play	Pre- load
	d	D	d _s	D _s		Dyn.	Stat.	Dyn.	Stat.		
						C _a	C _{oa}	C _r ²⁾	C _{or} ²⁾	n _G	n _{G grease}
	mm	mm	mm	mm		kg	kN	kN	kN	kN	min ⁻¹
PSR 080 08	80	96	85,6	90,4	0,11	10,10	60,0	4,3	12,0	1070	535
PSR 090 08	90	106	95,6	100,4	0,12	10,80	66,0	4,5	13,3	950	475
PSR 100 08	100	116	105,6	110,4	0,13	11,70	76,0	4,9	15,1	860	430
PSR 110 08	110	126	115,6	120,4	0,14	12,20	82,0	5,1	16,4	780	390
PSR 120 08	120	136	125,6	130,4	0,16	12,80	91,0	5,4	18,2	720	360
PSR 130 08	130	146	135,6	140,4	0,17	13,40	97,0	5,6	19,5	660	330
PSR 140 08	140	156	145,6	150,4	0,18	13,70	104,0	5,8	20,7	610	305
PSR 150 08	150	166	155,6	160,4	0,20	14,40	112,0	6,1	22,6	570	285
PSR 160 08	160	176	165,6	170,4	0,21	14,70	120,0	6,2	23,8	540	270
PSR 170 08	170	186	175,6	180,4	0,22	15,20	126,0	6,4	25,0	510	255
PSR 180 08	180	196	185,6	190,4	0,23	15,70	134,0	6,6	27,0	480	240
PSR 190 08	190	206	195,6	200,4	0,25	16,10	140,0	6,8	28,0	450	225
PSR 200 08	200	216	205,6	210,4	0,26	16,40	148,0	6,8	29,5	430	215
PSR 210 08	210	226	215,6	220,4	0,27	17,10	156,0	7,2	31,5	410	205
PSR 220 08	220	236	225,6	230,4	0,29	17,40	162,0	7,3	32,5	390	195
PSR 230 08	230	246	235,6	240,4	0,30	17,70	168,0	7,4	34,0	380	190



KMF-type ¹⁾	Bearing dimension				Mass	Basic load ratings				Limiting speeds	
						Axial		Radial		Bearing play	Pre- load
	d	D	d _s	D _S		Dyn.	Stat.	Dyn.	Stat.		
						C _a	C _{oa}	C _r ²⁾	C _{or} ²⁾	n _{G fett}	n _{G grease}
						mm	mm	mm	mm	kg	kN
PSR 240 08	240	256	245,6	250,4	0,31	18,30	178,0	7,7	35,5	360	180
PSR 250 08	250	266	255,6	260,4	0,33	18,60	184,0	7,8	37,0	350	175
PSR 260 08	260	276	265,6	270,4	0,35	18,90	190,0	7,9	38,0	330	165
PSR 270 08	270	286	275,6	280,4	0,37	19,40	200,0	8,1	40,0	320	160
PSR 280 08	280	296	285,6	290,4	0,39	19,60	206,0	8,3	41,0	310	155
PSR 290 08	290	306	295,6	300,4	0,41	19,90	212,0	8,4	42,5	300	150
PSR 300 08	300	316	305,6	310,4	0,43	20,40	222,0	8,6	44,5	290	145
PSR 310 08	310	326	315,6	320,4	0,45	20,80	228,0	8,7	45,5	280	140
PSR 320 08	320	336	325,6	330,4	0,47	21,00	234,0	8,8	47,0	270	135
PSR 330 08	330	346	335,6	340,4	0,49	21,50	244,0	9,0	48,5	260	130
PSR 340 08	340	356	345,6	350,4	0,50	21,80	250,0	9,1	50,0	250	125
PSR 350 08	350	366	355,6	360,4	0,52	22,00	256,0	9,2	51,0	250	125
PSR 360 08	360	376	365,6	370,4	0,53	22,20	266,0	9,4	53,0	240	120
PSR 370 08	370	386	375,6	380,4	0,55	22,60	272,0	9,5	54,0	230	115
PSR 380 08	380	396	385,6	390,4	0,56	22,80	278,0	9,6	56,0	230	115
PSR 390 08	390	406	395,6	400,4	0,58	23,50	288,0	9,8	57,0	220	110
PSR 400 08	400	416	405,6	410,4	0,59	23,70	294,0	9,9	59,0	220	110
PSR 410 08	410	426	415,6	420,4	0,61	23,80	300,0	10,0	60,0	210	105
PSR 420 08	420	436	425,6	430,4	0,62	24,30	308,0	10,2	62,0	210	105
PSR 430 08	430	446	435,6	440,4	0,64	24,50	314,0	10,3	63,0	220	100
PSR 440 08	440	456	445,6	450,4	0,65	25,00	324,0	10,5	65,0	194	97
PSR 450 08	450	466	455,6	460,4	0,67	25,20	330,0	10,6	66,0	190	95
PSR 460 08	460	476	465,6	470,4	0,68	25,50	336,0	10,7	67,0	186	93
PSR 470 08	470	486	475,6	480,4	0,70	25,90	346,0	10,9	69,0	182	91
PSR 480 08	480	496	485,6	490,4	0,71	26,00	352,0	10,9	70,0	178	89
PSR 490 08	490	506	495,6	500,4	0,73	26,40	358,0	11,0	72,0	174	87
PSR 500 08	500	516	505,6	510,4	0,74	26,70	368,0	11,2	74,0	172	86

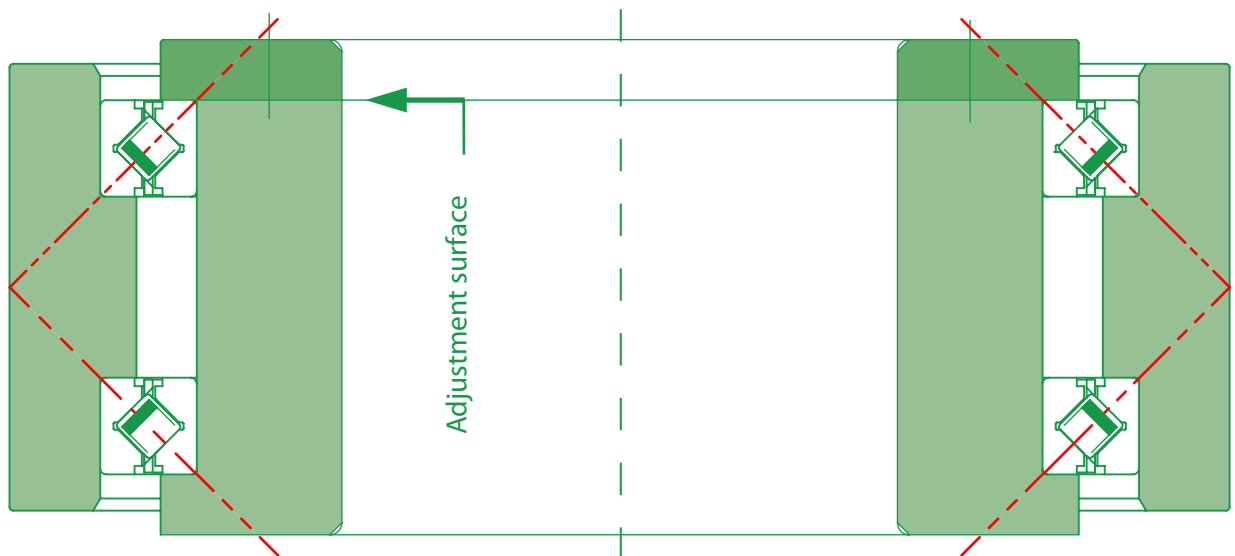
1) Other dimensions on request

2) Load capacities only for absolut radial loads

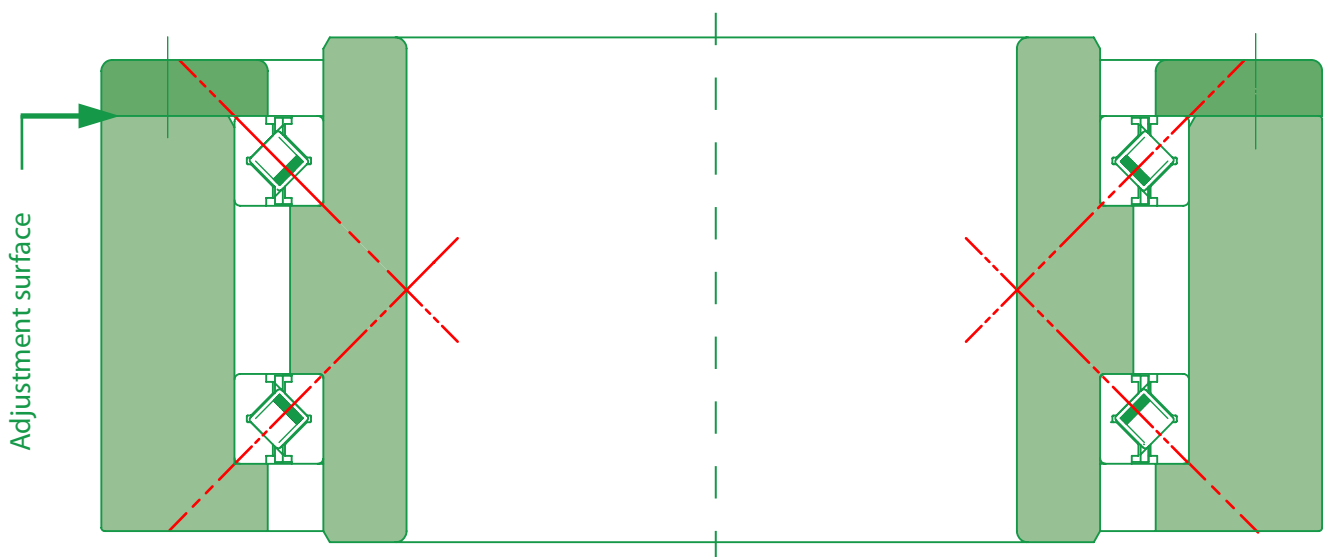
With in pairs arranged camps is valid: C_{or} x 2 und C_r x 1,625

Construction examples

Angular roller bearing PSR in back-to-back mounting¹⁾

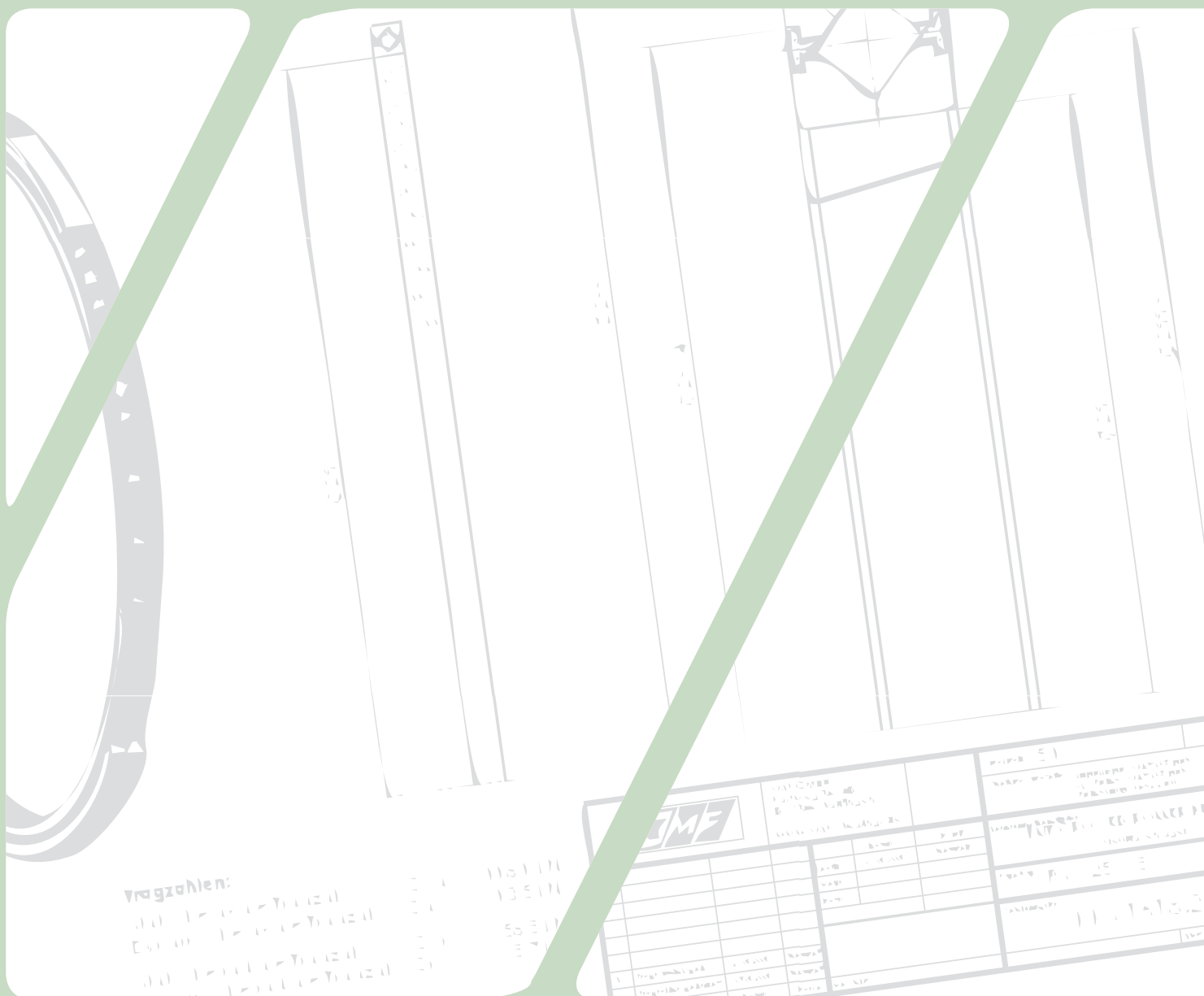


Angular roller bearing Typ PSR in face-to-face mounting¹⁾



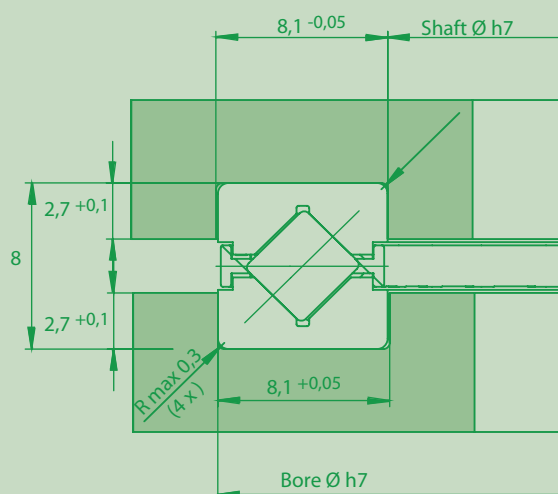
¹⁾ face-to-face and/or back-to-back mounting embodies the situation of the pressure angles to each other

Axial-Angular roller bearing PSA-08



AXIAL-ANGULAR-ROLLER-SLIM-SPLIT-BEARING

Fitted dimensions



Bearing dimensions

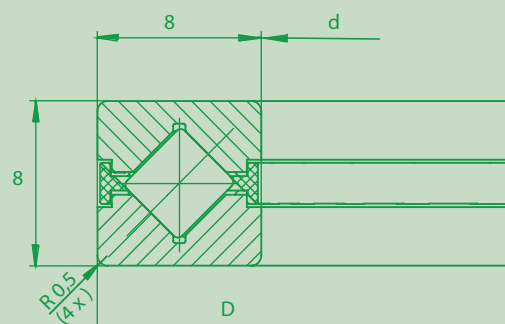


Table of dimensions (Type series PSA-08)

KMF-type ¹⁾	Bearing dimension				Mass	Basic load ratings				Limiting speeds	
						Axial		Radial		Bearing play	Pre-load
	d	D	d _s	D _s		Dyn.	Stat.	Dyn.	Stat.		
						C _a	C _{oa}	C _r ²⁾	C _{or} ²⁾	n _G	n _{G grease}
	mm	mm	mm	mm		kg	kN	kN	kN	kN	min ⁻¹
PSA 150 08	150	166	155,6	160,4	0,20	14,40	112,0	6,1	22,6	570	285
PSA 160 08	160	176	165,6	170,4	0,21	14,70	120,0	6,2	23,8	540	270
PSA 170 08	170	186	175,6	180,4	0,22	15,20	126,0	6,4	25,0	510	255
PSA 180 08	180	196	185,6	190,4	0,23	15,70	134,0	6,6	27,0	480	240
PSA 190 08	190	206	195,6	200,4	0,25	16,10	140,0	6,8	28,0	450	225
PSA 200 08	200	216	205,6	210,4	0,26	16,40	148,0	6,8	29,5	430	215
PSA 210 08	210	226	215,6	220,4	0,27	17,10	156,0	7,2	31,5	410	205
PSA 220 08	220	236	225,6	230,4	0,29	17,40	162,0	7,3	32,5	390	195
PSA 230 08	230	246	235,6	240,4	0,30	17,70	168,0	7,4	34,0	380	190
PSA 240 08	240	256	245,6	250,4	0,31	18,30	178,0	7,7	35,5	360	180
PSA 250 08	250	266	255,6	260,4	0,33	18,60	184,0	7,8	37,0	350	175
PSA 260 08	260	276	265,6	270,4	0,35	18,90	190,0	7,9	38,0	330	165



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						Axial		Radial		Bearing play	Pre-load
						Dyn.	Stat.	Dyn.	Stat.		
						C _a	C _{oa}	C _r ²⁾	C _{or} ²⁾	n _{Gfett}	n _{Ggrease}
	mm	mm	mm	mm	kg	kN	kN	kN	kN	min ⁻¹	min ⁻¹
PSA 270 08	270	286	275,6	280,4	0,37	19,40	200,0	8,1	40,0	320	160
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PSA 300 08	300	316	305,6	310,4	0,43	20,40	222,0	8,6	44,5	290	145
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PSA 320 08	320	336	325,6	330,4	0,47	21,00	234,0	8,8	47,0	270	135
PSA 330 08	330	346	335,6	340,4	0,49	21,50	244,0	9,0	48,5	260	130
PSA 340 08	340	356	345,6	350,4	0,50	21,80	250,0	9,1	50,0	250	125
PSA 350 08	350	366	355,6	360,4	0,52	22,00	256,0	9,2	51,0	250	125
PSA 360 08	360	376	365,6	370,4	0,53	22,20	266,0	9,4	53,0	240	120
PSA 370 08	370	386	375,6	380,4	0,55	22,60	272,0	9,5	54,0	230	115
PSA 380 08	380	396	385,6	390,4	0,56	22,80	278,0	9,6	56,0	230	115
PSA 390 08	390	406	395,6	400,4	0,58	23,50	288,0	9,8	57,0	220	110
PSA 400 08	400	416	405,6	410,4	0,59	23,70	294,0	9,9	59,0	220	110
PSA 410 08	410	426	415,6	420,4	0,61	23,80	300,0	10,0	60,0	210	105
PSA 420 08	420	436	425,6	430,4	0,62	24,30	308,0	10,2	62,0	210	105
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PSA 440 08	440	456	445,6	450,4	0,65	25,00	324,0	10,5	65,0	194	97
PSA 450 08	450	466	455,6	460,4	0,67	25,20	330,0	10,6	66,0	190	95
PSA 460 08	460	476	465,6	470,4	0,68	25,50	336,0	10,7	67,0	186	93
PSA 470 08	470	486	475,6	480,4	0,70	25,90	346,0	10,9	69,0	182	91
PSA 480 08	480	496	485,6	490,4	0,71	26,00	352,0	10,9	70,0	178	89
PSA 490 08	490	506	495,6	500,4	0,73	26,40	358,0	11,0	72,0	174	87
PSA 500 08	500	516	505,6	510,4	0,74	26,70	368,0	11,2	74,0	172	86

1) Other dimensions on request

2) Load capacities only for absolut radial loads

With in pairs arranged camps is valid: C_{or} x 2 und C_r x 1,625

Initial operation and maintenance





Mounting and dismounting of bearings

Due to its opened bearing rings and the cage with held and guided rolling elements, the fitting of the SLIM-SPLIT-BEARING is simple. Compared to common massive bearings it is not necessary to press fit slimsplit bearings. Due to the structural shape of this bearing. It easily can be mounted and dismounted. It also does not require certain tools or thermal support. So, turned bearing fits with H- or h7-fits for shaft and bore tolerances (see fitted dimensions) suffice to contain a bearing.

Precision

The bearing rings of the type series SLIM-SPLIT-BEARING are very accurate in shape. The difference of the even-thickness between raceway and inside or outside diameter is really small.

That's why the axial radial precision of the bearings is greatly influenced by the precision of the connecting parts. The connecting parts should be constructed in a way that all diameters and faces that stay in relation to each other are machined in one spanning operation, if possible. So, the customer is able to define and manufacture the demands on precision on his own.

Bearing clearance

The SLIM-SPLIT-BEARING has no fixed clearance in the bearing and the preload of the bearing is not defined. Either this can be adjusted by the customer directly by determining the shaft and bore tolerances of the bearing fits.

In the standard version and with given fitted tolerances, the SLIM-SPLIT-BEARING is slightly preloaded in the raceway system. This means that even if tolerances are used to the maximum, no clearance in the bearing is given. Depending on the application and the specific demands, a clearance can be given by adjusting the shaft and bore tolerances in order to reduce the starting torques. Also the tolerances can be adjusted in order to increase the preload, which increases the starting torque of the bearings drastically. If insert rooms should be given e. g. a competitive products shall be replaced, and therefore can't be adjusted, the clearance in the bearing can be adjusted. This adjustment is achieved by using slightly bigger or smaller rolling elements.

Important notices for all types of bearings

For different demands on a bearing type, differently colored cage strips with different sorts of rolling elements can be used.

These different colors make it easy to find the most suitable bearing version.

Lubrication

In order to increase the nominal service life, Lubrication is an important criteria.

For 90 % of all bearing applications in standard operations, grease is sufficient.

Grease of the consistency-class 2 and 3 (acc. to DIN 51818) is preferred. The grease prevents the direct contact between rolling element, raceway and cage and minimises therefore the friction. This minimises the abrasion and increases lifetime.

As the lubricant for KMF-SLIM-SPLIT-BEARING has not the function to protect the bearing from corrosion, relatively small amounts of grease is sufficient for a reliable function.

The KMF-SLIM-SPLIT-BEARING is equipped standardly with a pregreasing using ALVANIA EP2 (Shell), which functions as a permanent lubrication at normal operating conditions. That's why no targets for lubricating intervals or lubricating amounts are given. KMF-bearings require low maintenance and can be considered for normal slewing operations as maintenance free. For special applications, the KMF-SLIM-SPLIT-BEARING can be equipped with special greases according to customers demands.

In order to differ these versions from the standard bearings, a short sign is added to the KMF-type. Some examples at the right side:

Short sign	Lubricant
G04	Solid lubrication with MOS2
G22	High temperature grease +260°C
G23	Dynamic light bearing grease for low torques
G24	For applications in high vacuum
G25	Radiation resistant grease for medical applications



Filling of the bearing



Integration of the snap-over separator strip



The Conrad-Filling-Method

The picture on the left side shows how conventional bearings have to be assembled; this way is also known as the Conrad-Filling-Method. The bearing inner ring is placed excentrically in order to cause a bigger bearing gap on the opposite side. Using this bigger bearing gap, the balls are integrated into the raceway system. This bearing gap determines and fixes the maximum amount and the maximum diameter of the balls that can be integrated into the bearing.

After that a snap-over cage strip with large ball divisions is integrated in order to place the balls equally in the raceway system and prevent them of touching and running against each other.

Due to this only possibility of assembling a conventional bearing, only a few, and compared to the bearing cross-cut, relatively small balls can be integrated. This fact influences the static dynamic load capacities negatively.

Important notices for all types of bearings



The cage strips are filled with different ball diameters.
Different colors help in distinguishing the individual diameters.



End assembly



The KMF- Method

The SLIM-SPLIT-BEARING is only manufactured with splitted bearing rings. Beneath the adjustability of the bearing clearance and the bearing preload, there are additional advantages: The bearing can be fitted more easily in the connecting parts and great advantages are given during the assembly.

Besides the quality advantages that are offered by our products, they also offer price advantages due to our manufacturing technology and easy assembly.

An automatically filled cage strip is placed on the inner ring, the outer ring is placed in assembly condition and has just to be pressed slightly over the inner ring and the separator. Due to this filling method, KMF is able to integrate much more and much bigger balls in the same cross-cut of the bearing.

This greatly influences our static and dynamic load capacities compared to the equivalent competition bearings.