



Cylindrical Roller Thrust Bearings

Standards, Boundary dimensions

Standard plans	DIN 616
Cylindrical roller thrust bearings	DIN 722

General

Cylindrical Roller Thrust Bearings series 811 and 812 are single direction acting separable axial bearings.

Cylindrical roller thrust bearings are insensitive to shock loading and feature much higher load carrying capacity compared to thrust ball bearings. They accommodate very high axial loads but no radial forces. They provide a very rigid bearing assembly for high thrust loading with less space requirement.

Cylindrical roller thrust bearings are of simple design, they consist of a shaft washer (WS), a housing washer (GS), and a cylindrical roller and cage thrust assembly (K), see Abb. 1.

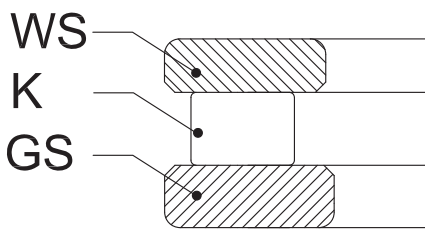
With all cylindrical roller thrust bearings, increased sliding friction can occur at the end of the cylindrical rollers.

In order to minimize this negative effect, URB cylindrical roller thrust bearings with wider sectional widths are produced using several short rollers in each cage pockets instead of using individual longer rollers.

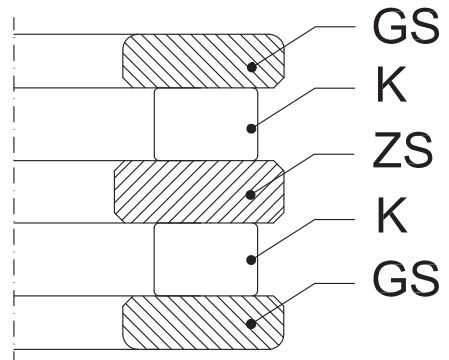
Due to their specific kinematic behavior, cylindrical roller thrust bearings are only suitable for low speed applications only. Furthermore, they require minimal axial loads for their optimum function.

Design variants

URB cylindrical roller thrust bearings are produced in single direction design only as standard (see Abb. 1a)



a



b



Double direction acting cylindrical roller thrust bearings are built using a combination of the components from single direction acting cylindrical roller thrust bearings together with intermediate washers ZS, (see Abb. 1 b).

Such intermediate washers are part of URB supplementary product range and are available on request. For application designs with space restrictions the cylindrical roller and cage thrust assemblies may be used without washers providing the contact faces of adjacent machine parts are machined as bearing raceways, (e.g. hardened and ground, etc.).

The components of cylindrical roller thrust bearing are frequently used either separately or in conjunction with other components in several applications (e.g. to build needle roller thrust assemblies) therefore, they are available as loose parts.

Misalignment

All cylindrical roller thrust bearing type do not allow any misalignment.

The contacting surfaces of both shaft and housing seats must be parallel.

Gages

Small URB cylindrical roller thrust bearings are fitted with shaft – centered polyamide cages as standard.

Polyamide cages are suitable for operating temperatures up to +120°C. Large cylindrical roller thrust bearings are produced with either solid brass cages (suffix MP), or with solid steel cages, (suffix FP).

Tolerances

URB cylindrical roller thrust bearings are produced to normal class tolerance (PN) as standard.

For applications of higher accuracy these bearings are produced to precision tolerance class (e.g. P6) on order request. For detailed values of the tolerance

classes see chapter “Bearing tolerances” (see page 39-40).

Minimum load:

All cylindrical roller thrust bearing require a certain minimum axial load to ensure a satisfactory operating function. To prevent excessive sliding friction, the minimum axial load applied should be greater than 5% of the axial bearing dynamic load rating C_a . Where such a minimum axial load is not possible the load must be increased by effective measures, (i.e. preloading the bearing) using pressure washers or springs.

Equivalent dynamic bearing load

Cylindrical roller thrust bearings are pure axial bearings; they are not able to accommodate any radial loads, therefore:

$$P = F_a$$

Equivalent static bearing load

For cylindrical roller thrust bearings:

$$P_0 = F_a$$

Design of adjacent machine parts

When cylindrical roller and cage thrust assemblies are used without washers, adjacent machines parts must be designed and machined as bearing raceways (e.g. hardened and ground etc.). The maximum permissible axial runout of the adjacent surfaces acting as raceway must also meet the requirements of the respective washers. The bore diameters of URB cylindrical roller and cage thrust assemblies have tolerances according to ISO Tolerance field (E11), whilst the tolerance of their outer diameters lies in the tolerance field (a13).

Cylindrical roller and cage thrust assemblies require an effective guidance when operating at

higher speeds.

To avoid excessive wear, at higher speeds, the guiding surface must be ground.

Bearing seats for cylindrical roller thrust bearings

For the design of cylindrical roller thrust bearing seats the following of tolerance fields have proven to be satisfactory in practice:

Centered at	Tolerance field	
	Shaft	Housing
Cylindrical roller and thrust assembly	h8	H9
Shaft washer	h6	-
Housing washer	-	H7

Abutment and Fillet dimensions for cylindrical roller thrust bearings

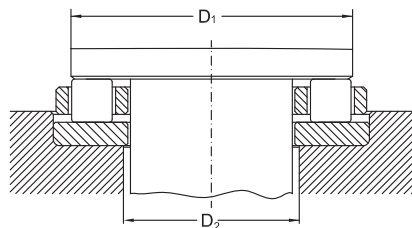
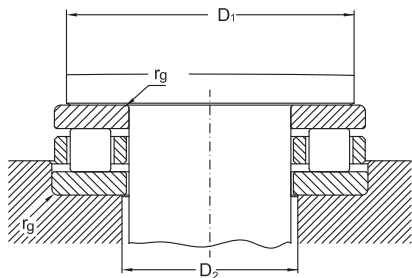
In case of cylindrical roller thrust bearings, an effective support of the bearing washers over the total width of their raceways by adjacent machine parts is necessary.

The bearing washer must contact adjacent parts with their side face only. The fillet radii of bearing corners must not touch the shoulder fillet radii of the shaft or housing shoulders.

Therefore, the largest fillet radius (r_g) must be smaller than the minimum fillet dimension of the bearing rings (r_b) as listed in the following tables.



Abutment and Fillet dimensions for cylindrical roller thrust bearings, series 811 and 812 [mm]



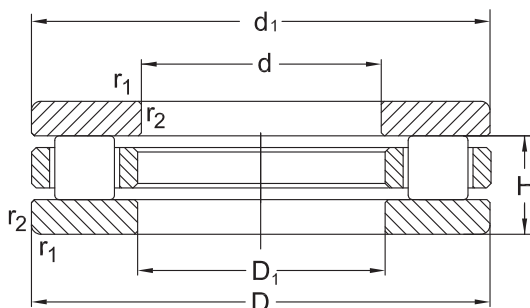
Shaft $\emptyset d$	Bore reference number	Bearing Series					
		811			812		
		D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max
mm							
15	2	25	18	0,3	-	-	-
17	3	27	20	0,3	-	-	-
20	4	32	23	0,3	-	-	-
25	5	39	28	0,6	-	-	-
30	6	44	33	0,6	49	33	0,6
35	7	49	38	0,6	56	41	1
40	8	56	44	0,6	63	45	1
45	9	61	49	0,6	68	50	1
50	10	66	54	0,6	73	55	1
55	11	73	60	0,6	84	61	1
60	12	80	65	1	89	66	1
65	13	85	70	1	94	71	1
70	14	90	75	1	99	76	1
75	15	95	80	1	104	81	1
80	16	100	85	1	109	86	1
85	17	105	90	1	117	93	1
90	18	114	96	1	127	98	1
100	20	129	106	1	140	110	1
110	22	139	116	1	150	120	1
120	24	149	126	1	160	130	1
130	26	162	138	1	179	141	1,5
140	28	172	148	1	189	151	1,5
150	30	182	158	1	204	161	1,5

Abutment and Fillet dimensions for cylindrical roller thrust bearings, series 811 and 812 [mm]

Shaft $\emptyset d$	Bore reference number	Bearing Series					
		811			812		
		D_1 min	D_2 min	r_g max	D_1 min	D_2 min	r_g max
mm							
160	32	192	168	1	214	171	1,5
170	34	207	178	1	227	183	1,5
180	36	217	188	1	237	193	1,5
190	38	230	200	1	256	204	2
200	40	240	210	1	266	214	2
220	44	260	230	1	286	234	2
240	48	288	252	1,5	322	258	2,1
260	52	308	272	1,5	342	278	2,1
280	56	337	293	1,5	362	298	2,1
300	60	365	315	2	398	322	2,5
320	64	385	335	2	418	342	2,5
340	68	405	355	2	438	362	2,5
360	72	425	375	2	475	385	3
380	76	445	395	2	495	405	3
400	80	465	415	2	515	425	3
420	84	485	435	2	552	448	4
440	88	522	458	2,1	572	468	4
460	92	542	478	2,1	592	488	4
480	96	562	498	2,1	621	509	4
500	/500	582	518	2,1	641	529	4
530	/530	619	551	2,5	680	560	4
560	/560	649	581	2,5	715	595	4
600	/600	689	621	2,5	764	636	4

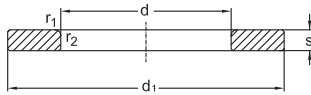


Cylindrical Roller Thrust Bearings



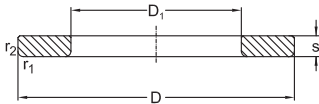
Dimension				Designation	Basical axial load		Speed limit	
d	D	H	r_1, r_2 min.		dyn. C_a	stat. C_{0a}	grease	oil
mm					kN		min^{-1}	
30	47	11	0,6	81106	28	83	2600	6700
	52	16	0,6	81206	50	132	2400	6300
35	52	12	0,6	81107	30	93	2200	6000
	62	18	1	81207	54	156	1900	5300
40	60	13	0,6	81108	42,5	137	1900	5300
	68	19	1	81208	76,5	220	1700	4800
45	65	14	0,6	81109	45	150	1700	4800
	73	20	1	81209	83	255	1600	4500
50	70	14	0,6	81110	42,5	143	1500	4300
	78	22	1	81210	88	285	1400	4000
55	78	16	0,6	81111	52	193	1400	4000
	90	25	1	81211	122	390	1200	3600
60	85	17	1	81112	73,5	265	1200	3600
	95	26	1	81212	114	335	1100	3400
65	90	18	1	81113	76,5	285	1100	3400
	100	27	1	81213	118	390	950	3000
70	95	18	1	81114	71	265	1000	3200
	105	27	1	81214	122	440	950	3000
75	100	19	1	81115	75	285	950	3000
	110	27	1	81215	125	440	900	2800
80	105	19	1	81116	76,5	300	900	2800
	115	28	1	81216	129	455	850	2600

Cylindrical Roller Thrust Bearings

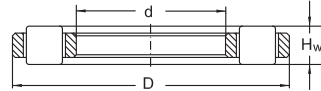


WS 8...

Abutment and fillet dimensions
see on page 488



GS 8...

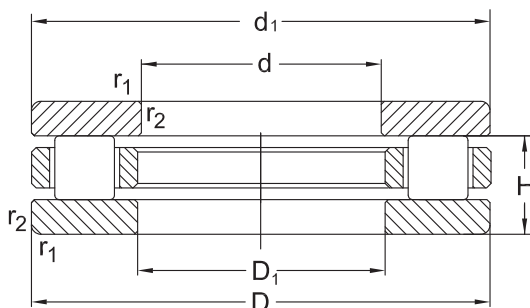


K 8...

Dimensions				Designation of Bearing Components			Mass
d	d ₁	D ₁	S	Cylindrical Roller and Cage thrust assembly	Shaft Washer	Housing Washer	
mm							
30	47	32	3	K81106	WS81106	GS81106	0,06
	52	32	4,25	K81206	WS81206	GS81206	0,13
35	52	37	3,5	K81107	WS81107	GS81107	0,08
	62	37	5,25	K81207	WS81207	GS81207	0,23
40	60	42	3,5	K81108	WS81108	GS81108	0,12
	68	42	5	K81208	WS81208	GS81208	0,27
45	65	47	4	K81109	WS81109	GS81109	0,14
	73	47	5,5	K81209	WS81209	GS81209	0,31
50	70	52	4	K81110	WS81110	GS81110	0,16
	78	52	6,5	K81210	WS81210	GS81210	0,38
55	78	57	5	K81111	WS81111	GS81111	0,23
	90	57	7	K81211	WS81211	GS81211	0,60
60	85	62	4,75	K81112	WS81112	GS81112	0,28
	95	62	7,5	K81212	WS81212	GS81212	0,74
65	90	67	5,25	K81113	WS81113	GS81113	0,33
	100	67	8	K81213	WS81213	GS81213	0,82
70	95	72	5,25	K81114	WS81114	GS81114	0,36
	105	72	8	K81214	WS81214	GS81214	0,87
75	100	77	5,75	K81115	WS81115	GS81115	0,43
	110	77	8	K81215	WS81215	GS81215	0,92
80	105	82	5,75	K81116	WS81116	GS81116	0,46
	115	82	8,5	K81216	WS81216	GS81216	1,02

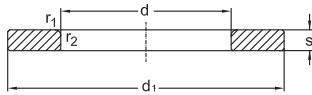


Cylindrical Roller Thrust Bearings



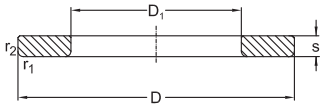
Dimension				Designation	Basical axial load		Speed limit	
d	D	H	r_1, r_2 min.		dyn. C_a	stat. C_{0a}	grease	oil
mm					kN		min^{-1}	
85	110	19	1	81117	76,5	310	850	2600
	125	31	1	81217	153	550	800	2400
90	120	22	1	81118	104	415	800	2400
	135	35	1,1	81218	190	670	800	2400
100	135	25	1	81120	146	585	750	2200
	150	38	1,1	81220	224	815	700	2000
110	145	25	1	81122	160	655	700	2000
	160	38	1,1	81222	232	865	670	1900
120	155	25	1	81124	160	680	670	1900
	170	39	1,1	81224	245	950	630	1800
130	170	30	1	81126	186	780	600	1700
	190	45	1,5	81226	365	1400	560	1600
140	180	31	1	81128	196	865	560	1600
	200	46	1,5	81228	375	1460	530	1500
150	190	31	1	81130	204	930	530	1500
	215	50	1,5	81230	455	1800	500	1400
160	200	31	1	81132	212	980	500	1400
	225	51	1,5	81232	465	1900	500	1400
170	215	34	1,1	81134	265	1220	500	1400
	240	55	1,5	81234	520	2080	480	1300
180	225	34	1,1	81136	275	1290	480	1300
	250	56	1,5	81236	520	2160	450	1200

Cylindrical Roller Thrust Bearings

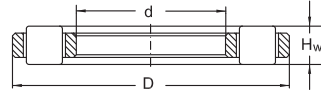


WS 8...

Abutment and fillet dimensions
see on page 488



GS 8...

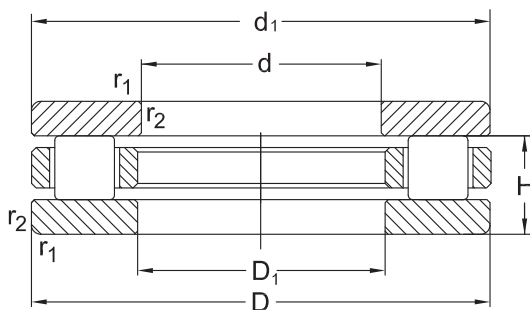


K 8...

Dimensions				Designation of Bearing Components			Mass
d	d ₁	D ₁	S	Cylindrical Roller and Cage thrust assembly	Shaft Washer	Housing Washer	
mm							
85	110	87	5,75	K81117	WS81117	GS81117	0,48
	125	88	9,5	K81217	WS81217	GS81217	1,36
90	120	92	6,5	K81118	WS81118	GS81118	0,72
	135	93	10,5	K81218	WS81218	GS81218	1,85
100	135	102	7	K81120	WS81120	GS81120	1,07
	150	103	11,5	K81220	WS81220	GS81220	2,45
110	145	112	7	K81122	WS81122	GS81122	1,12
	160	113	11,5	K81222	WS81222	GS81222	2,70
120	155	122	7	K81124	WS81124	GS81124	1,25
	170	123	12	K81224	WS81224	GS81224	2,98
130	170	132	9	K81126	WS81126	GS81126	1,72
	187	133	13	K81226	WS81226	GS81226	4,37
140	178	142	9,5	K81128	WS81128	GS81128	2,02
	197	143	13,5	K81228	WS81228	GS81228	4,76
150	188	152	9,5	K81130	WS81130	GS81130	2,15
	212	153	14,5	K81230	WS81230	GS81230	6,04
160	198	162	9,5	K81132	WS81132	GS81132	2,28
	222	163	15	K81232	WS81232	GS81232	6,52
170	213	172	10	K81134	WS81134	GS81134	3,01
	237	173	16,5	K81234	WS81234	GS81234	8,12
180	222	183	10	K81136	WS81136	GS81136	3,07
	247	183	17	K81236	WS81236	GS81236	8,69

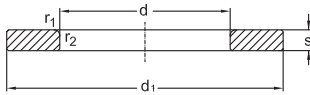


Cylindrical Roller Thrust Bearings



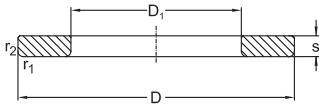
Dimension				Designation	Basical axial load		Speed limit	
d	D	H	r_1, r_2 min.		dyn. C_a	stat. C_{0a}	grease	oil
mm					kN		min^{-1}	
190	240	37	1,1	81138	315	1500	450	1200
	270	62	2	81238	655	2650	430	1100
200	250	37	1,1	81140	325	1600	450	1200
	280	62	2	81240	695	2900	430	1100
220	270	37	1,1	81144	355	1830	430	1100
	300	63	2	81244	735	3200	400	1000
240	300	45	1,5	81148	465	2360	380	950
	340	78	2,1	81248	980	4250	360	900
260	320	45	1,5	81152	500	2650	360	900
	360	79	2,1	81252	1040	4650	340	850
280	350	53	1,5	81156	670	3450	340	850
	380	80	2,1	81256	1060	4900	320	800
300	380	62	2	81160	800	4000	300	750
	420	95	3	81260	1400	6200	280	700
360	440	65	2	81172	900	4900	240	630
	500	110	4	81272	1960	9150	220	600
380	460	65	2	81176	880	4900	240	630
	520	112	4	81276	2000	9500	200	560

Cylindrical Roller Thrust Bearings

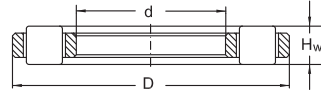


WS 8...

Abutment and fillet dimensions
see on page 488



GS 8...



K 8...

Dimensions				Designation of Bearing Components			Mass [kg]
d	d ₁	D ₁	S	Cylindrical Roller and Cage thrust assembly	Shaft Washer	Housing Washer	
mm							
190	237	193	11	K81138	WS81138	GS81138	3,99
	267	194	18	K81238	WS81238	GS81238	11,70
200	247	203	11	K81140	WS81140	GS81140	4,17
	277	204	18	K81240	WS81240	GS81240	12,2
220	267	223	11	K81144	WS81144	GS81144	4,65
	297	224	18,5	K81244	WS81244	GS81244	13,4
240	297	243	13,5	K81148	WS81148	GS81148	7,43
	335	244	23	K81248	WS81248	GS81248	23,10
260	317	263	13,5	K81152	WS81152	GS81152	7,99
	355	264	23,5	K81252	WS81252	GS81252	25,1
280	347	283	15,5	K81156	WS81156	GS81156	12
	375	284	24	K81256	WS81256	GS81256	27,1
300	376	304	18,5	K81160	WS81160	GS81160	17,2
	415	304	28,5	K81260	WS81260	GS81260	42,50
360	436	364	20	K81172	WS81172	GS81172	21,4
	495	365	32,5	K81272	WS81272	GS81272	68,7
380	456	384	20	K81176	WS81176	GS81176	22,4
	515	385	33,5	K81276	WS81276	GS81276	73,3



Cylindrical roller thrust bearings, single direction Non standardized

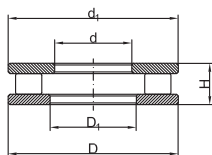


Fig. 1

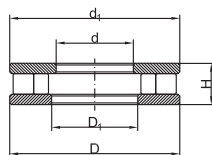


Fig. 2

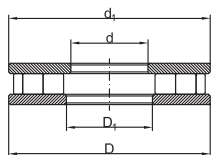


Fig. 3

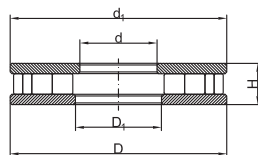


Fig. 4

Dimensions						Fig.	Basic axial load		Speed limit		Designation	Mass
d	D	H	r_s min.	d_1	D_1		dyn C_a	stat. C_{0a}	grease	oil		
mm							kN		min^{-1}			
25	49	15	0,6	49	25,2	1	37,1	92,7	3400	4800	85205 M	0,131
	52	18	0,5	52	25,2	1	36,8	92,4	3000	4300	85105 M	0,181
34,925	79	15.875	1,5	78	37	2	80	316	2200	3200	892007 M	0,43
40	91.035	15,5	0,3	87	45	3	92	378	2400	3400	85108M	0,500
	105	16	0,5	105	48	10	141	591	2800	4000	86208 M	0,859
46	112.035	19	0,3	105	53	3	139	591	2000	2800	85109 M	1,04
50	105	20	0,5	105,5	54,5	9	172	776	2300	3300	85110 TN	0,655
	105	16	0,5	105,5	52	8	172	776	2800	4000	85210 TN	0,633
62	138,04	22	0,6	134	70	3	215	950	1700	2400	85112M	1,87
70	95	6	0,3	-	72	1	46,2	234	3400	4800	85114M	0,154
76,2	228,6	35	1	227	77,7	1	436	1996	1000	1500	85115M	7,64
85	110	6	0,3	-	87	7	50	274	3000	4300	85117 M	0,18
96,15¹⁾	181,6 ¹⁾	17,2	0,3	175,05	96,15	4	286	1774	1700	2400	85119M	2,39
100	210	67	3	208,5	103	2	669	2711	750	1100	85320 M	12,7
160	345	120	4	314	160,3	2	1836	7603	450	630	85132 M	66,8
200	280	62	2	277	204	1	735	3146	700	1000	81240 M	66,8
210	420	120	4	420	212	2	2380	11616	400	560	85142 M	95,6
	460	120	4	460	212	3	2500	12144	380	530	85242 M	117
240	540	125 ¹⁾	5	540	242	4	5308	34918	360	500	85148M	248
270	520	125	5	520	274	3	8239	16840	360	500	85154 M	148
272	480	132	5	480	274	3	2681	13010	360	500	85254 M	122
280	520	145	6	520	284	3	3296	16005	340	480	85156 M	160
340	620	170	6	620	344	3	4258	20698	280	400	85168M	265

[1] Cage diameters: dc=82; Dc=181,6

[2] Available with compensator ring, h=55

Cylindrical roller thrust bearings, single direction Non standardized

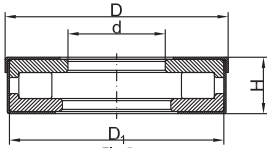


Fig. 5

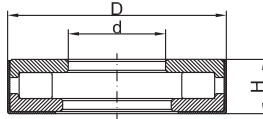


Fig. 6

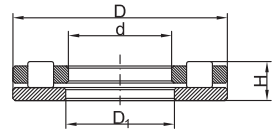


Fig. 7

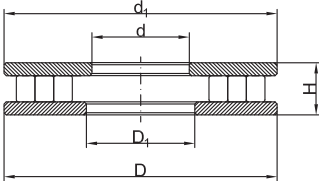


Fig. 8

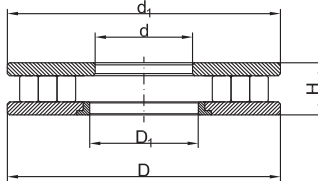


Fig. 9

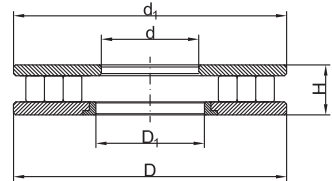


Fig. 10

Dimensions							Fig.	Basic axial load		Speed limit		Designation	Mass
d	D	H	r_s min.	r_{1s} min.	d_1	D_1		dyn C_a	stat. C_{0a}	grease	oil	Bearing	
mm								kN		min ⁻¹			
22,45	48,02	15,9	0,3				6	38,5	87,1	2500	3200	851Z04	0,222
25,8	50,5	15,9	0,3				6	41	97	2400	3400	861Z05	0,139
32	61	17				55	5	27,3	72,6	2600	3800	851Z06	0,20
	61	17				55	5	27,3	72,6	2600	3800	851Z06TN	0,20
39	73	20,5				69,5	6	67,7	190	2200	3200	851Z08	0,38
44	110	20		0,5	105	50	10	141	591	2300	3300	86108M	1,147
50.952	74,74	15.875	0,6				6	52,2	155	2400	3600	851Z10	0,217
70	95	6	0,3		95	72	7	46	234	4900	7000	890614M	0,154
85	110	6	0,3		110	87	7	50	273	4900	7000	890717M	0,180



Cylindrical roller thrust bearings, double direction Non standardized

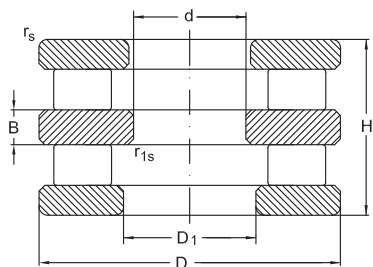


fig. 1

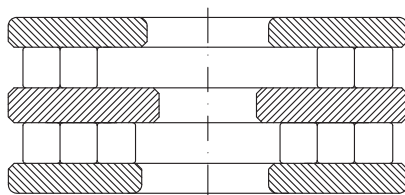


fig. 2

Dimensions							Fig.	Basic axial load		Speed limit		Designation	Mass
d	D	H	B	r _s min.	r _{1s} min.	D1		dyn C _a	stat. C _{0a}	grease	oil		
mm								kN		min ⁻¹		kg	
35	71,85	33	8	1	1	62	1	44	118	2800	4000	86107	0,535
85	230	100	29	1,5	1,5	113	2	626	3086	700	1000	86117M	21,82
140	200	72	19	1	1	154	1	253	1061	900	1300	86228 M	6,87
141	200	68	24	1	1	162,4	-	192	878	900	1300	86128 M	6.392
150	215	78	20	0,6	0,6	166	-	287	1217	900	1300	86130 M	8,82
210	400	262,7	95	3	3	242	-	2390	7770	430	630	86142 M	157

Cylindrical roller and cage thrust assemblies

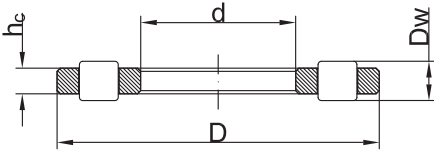


Fig. 3

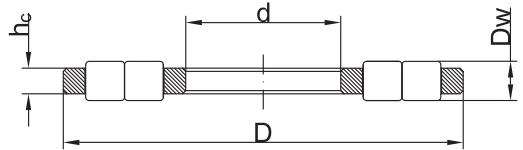


Fig. 4

Dimensions				Fig.	Basic axial load		Speed limit		Designation	Mass
d	D	D _w	h _c		dyn C _a	stat. C _{0a}	grease	oil	Bearing	
mm					kN		min ⁻¹			kg
30,04	60	5,5	3,75	4	51,3	176	4000	5600	K89306 M	0,066
35,05	68	6	4,2	4	59	214	3100	4400	K89307 M	0,096
40,05	81	7	5	4	88,6	333	3000	4300	K85108 TN	0,084
60,06	85	7,5	5,2	3	71,7	257	2800	4000	K81112M	0,129
65,06	90	7,5	5,2	3	72,8	268	2600	3800	K81113M	0,134
70,05	100	11	7,5	3	127	432	2200	3000	K81214M	0,319
75	169	19	15,5	4	480	1806	1300	1800	K891215M	2,35
75,06	100	7,5	5,75	3	68,7	268	2000	2800	K81115M	0,146
85	179	19	15,5	4	501	1956	1200	1700	K891117M	2,54
90,06	120	9	6,5	3	106	416	1500	2200	K81115M	0,209