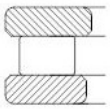
Cylindrical and needle roller thrust bearings

Cylindrical roller and needle roller thrust bearings are generally intendent to take over heavy pure axial loads.
They can also carry shock loads.
Cylindrical roller and needle roller thrust bearings are simple in design and this is why they are windely used.
Cylindrical roller and needle roller thrust bearings are manufactured in various designs, as shown below:

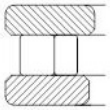
Cylindrical roller and needle roller thrust bearings
- single direction

pe un rand



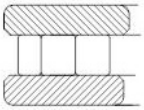
811
812

pe doua randuri



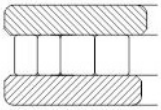
893

pe trei randuri



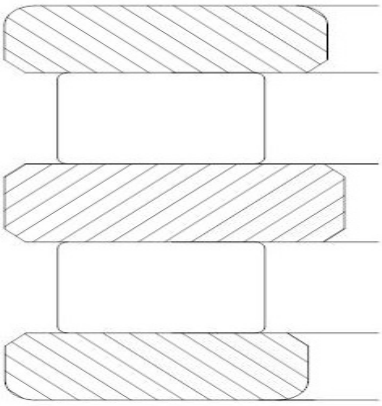
851

pe patru randuri



851

- double direction



861

Needle roller and cage assembly

pe un rand

K 811

pe doua randuri

K 893

Suffixes

AR	-grinding addition on raceways
M	-machined cage guided on rolling elements and shaft
P6	-tolerance class more accurate than normal
P5	- tolerance class more accurate than P6
P4	- tolerance class more accurate than P5
V	-bearing without cage

Cylindrical and needle roller thrust bearings

Cylindrical roller thrust bearings 811 and 812 consist of a cylindrical roller and cage thrust assembly K811 and K812, shaft washer (WS) and housing washer (GS). If the support shaft shoulder is heat treated and ground, it can be used as a raceway for roller cage. Double (893) or more (851) row cylindrical roller bearings consist of the same parts, i.e. cylindrical roller and cage thrust assembly, shaft washer and housing washer.

In case of more row roller thrust bearings, the roller have various lengths and are alternatively mounted, i.e. the long roller is followed by a short roller. To avoid dide friction, one of the side faces of the roller is a sphered one.

Cylindrical roller with diameters selected in accordance to the normal tolerance class, ensure an uniform distribution of load.

Shaft and housing washers are generally manufactured by bearings steels, heat treated, with hardness between 58 and 65 HRC, ground and lapped, if necessary.

The washers can also be manufactured of case-hardening steel. In this case, a hardness between 58 and 65 HRCshould be observed and also the case-hardened layer after grinding should be of minimum 0.3 mm.

Needler roller bearings (ANK) have the same parts as cylindrical roller thrust bearings, i.e. an ANK, needle cage, WS811 shaft and GS housing washer.

For less accurate applications (low speeds, oscilations etc.) axial washer(AS) can be used.

LS washers are manufactured of heat treated steels for bearings, as WS and GS washers, but the shaft and housing surfaces are not ground.

Thin punched washers of AS sheet, with a thickness 1mm, are manufactured of spring steels and are used where space is limited and the support shoulder cannot be heat treated, but has proper stiffness and accuracy.

Tolerances

Cylindrical roller and needle roller thrust bearings are generally manufactured to the normal tolerance class and P6 or P5, at request. The values of the tolerances for d and D are giving on *BEARINGS TOLERANCES*.

Cages

Cylindrical roller thrust bearings are fitted with pressed sheet cages or machined brass cages guided on the rolling elements and shaft.

Needle roller bearings are fitted only with punched sheet cages.

Minimum axial load

In order to guarantee a proper arrangement of balls on bearing raceways; these bearings should always be subjected to a minimum axial load. In case of light loads, the bearings should be subjected to a minimum load calculated using the equation:

$F_{a\,min}=4.5C_0 10^{-5}$, kN, for cylindrical roller bearings

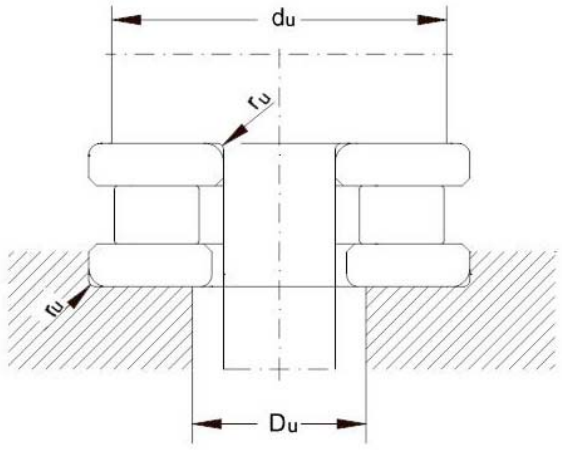
$F_{a\,max}=4.5C_0 10^{-4}$, kN, for needle roller bearings

where:
C_0 – basic static load (see bearing table).

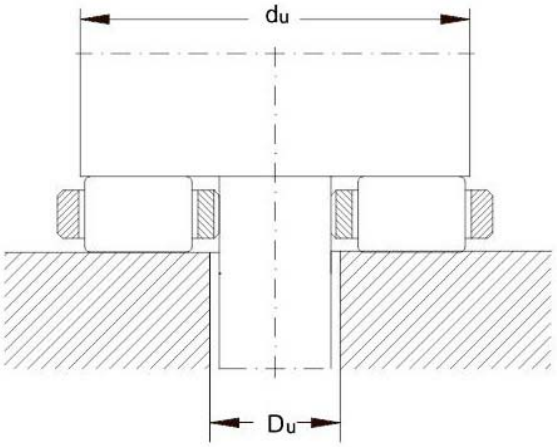
Equivalent dynamic axial load
$P_a = F_a$, kN

Equivalent static axial load
$P_{0a} = F_a$, kN

Abutment dimensions
For a proper location of the bearing washers on the shaft and housing shoulder respectively, shaft (housing) maximum connection radius $r_{umax.}$ should be less than bearing minimum mounting chamfer $r_{smin.}$.
Shoulder height should also be properly sized in case of bearing maximum mounting chamfer.
The values of the connection radius r_u and mounting dimensions are given in table 1, for cylindrical roller thrust bearings and in table 2 for needle roller thrust bearings.



811
812



K 811
K 812

Table 1

Bore symbol	Shaft diameter	Diameter series					
		811			**812**		
	d	d_u min.	D_u max.	r_u max.	d_u min.	D_u max.	r_u max.
-	mm						
04	20	32	23	0.3			
05	25	39	28	0.6			
06	30	44	33	0.6	49	33	0.6
07	35	49	38	0.6	56	41	1
08	40	56	44	0.6	63	45	1
09	45	61	49	0.6	68	50	1
10	50	66	54	0.6	73	55	1
11	55	73	60	0.6	84	61	1

12	60	80	65	1	89	66	1
13	65	85	70	1	94	71	1
14	70	90	75	1	99	76	1
15	75	95	80	1	104	81	1
16	80	100	85	1	109	86	1
17	85	105	90	1	117	93	1
18	90	114	96	1	127	98	1
20	100	129	106	1	140	110	1
22	110	139	116	1	150	120	1
24	120	149	126	1	160	130	1
26	130	162	138	1	179	141	1.5
28	140	172	148	1	189	151	1.5
30	150	182	158	1	204	161	1.5
32	160	192	168	1	214	171	1.5
34	170	207	178	1	227	183	1.5
36	180	217	188	1	237	193	1.5
38	190	230	200	1	256	204	2
40	200	240	210	1	266	214	2
44	220	260	230	1	286	234	2
48	240	288	252	1.5	322	258	2.1
52	260	308	272	1.5	342	278	2.1
56	280	337	293	1.5	362	298	2.1
60	300	365	315	2	398	322	2.5
64	320	385	335	2	418	342	2.5
68	340	405	355	2	438	362	2.5
72	360	425	375	2	475	385	3
76	380	445	395	2	495	405	3
80	400	465	415	2	515	425	3
84	420	485	435	2	552	448	4
88	440	522	458	2.1	572	468	4
92	460	542	478	2.1	592	488	4
96	480	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
/750	750	795	725	4			
/800	800	925	825	4	1035	825	4
/900	900	955	925	2			
/1060	1060	1120	1090	2.1			
/1600	1600	1820	1630	4			

Table 2

Bearing symbol	Mounting dimensions		
	d_u min.	D_u max.	r_u max.
-	mm		
ANK1730	29	19	0.3
ANK2035	34	22	0.3
ANK2542	41	29	0.6
ANK3047	46	35	0.6
ANK3552	51	40	0.6
ANK4060	58	45	0.6
ANK4565	63	50	0.6
ANK5070	68	55	0.6
ANK5578	76	60	0.6
ANK6085	83	65	1
ANK6590	88	70	1
ANK7095	93	74	1
ANK75100	98	79	1
ANK80105	103	84	1
ANK85110	108	89	1
ANK90120	118	94	1