



Features:

AGS-TECH four-row cylindrical roller bearings are used almost exclusively for the roll necks of rolling mill stands, calenders and roller presses. Their friction is low compared with other roller bearings. As they are normally mounted with an interference fit on the roll neck, they are particularly suitable for rolling mill applications where the rolling speed is high.

The low bearing cross section allows for relatively large roll neck diameters in comparison with the roll diameter. Since very many rollers can be incorporated, the radial load carrying capacity is exceptionally high.

AGS-TECH four-row cylindrical roller bearings are only able to accommodate radial loads. They are therefore mounted together with deep groove or angular contact ball bearings, or with tapered roller bearings, either radial or thrust designs, which take up the axial loads.

Internal clearance:

AGS-TECH four-row cylindrical roller bearings are normally produced with the C3 or C4 radial internal clearance required for rolling mill bearings. Bearings mounted with a loose fit on the roll necks generally have C2 radial internal clearance.

The clearance values, where standardized, conform to ISO 5753:1991 and are given in the following tables for bearings with cylindrical bore and bearings with tapered bore. They are valid for unmounted bearings under zero measuring loads.

Working temperature:

AGS-TECH multi-row cylindrical roller bearing are subjected to a special heat treatment as standard so that they can be operated at temperatures up to +150 °C without any inadmissible dimensional changes occurring. To order, and against a surcharge, bearings can be dimensionally stabilized for operating temperatures up to +200 °C (designation suffix S1) or up to +250 °C (designation suffix S2). An advantage of this special heat treatment is that the bearings can be mounted with a greater degree of interference than is possible with standard bearings. For further information please contact our application engineering service.

Cages:

AGS-TECH four-row cylindrical roller bearings, depending on size and also application, are produced with the following cages:

- Two or three double pronged machined brass cages
- Two double row window-type brass cages
- Four pronged machined brass cages





Table 1: Radial internal clearance of cylindrical roller bearings with cylindrical bore

Bore Diameter		Radial Internal clearance													
d		C1		SPC2		C2		Normal		C3		C4		C5	
over	incl.	min	max	min	max	min	max	min	max	min	max	min	max	min	max
mm		μ m													
–	24	–	–	–	–	0	25	20	45	35	60	50	75	65	90
24	30	5	15	10	25	0	25	20	45	35	60	50	75	70	95
30	40	5	15	12	25	5	30	25	50	45	70	60	85	80	105
40	50	5	18	15	30	5	35	30	60	50	80	70	100	95	125
50	65	5	20	15	35	10	40	40	70	60	90	80	110	110	140
65	80	10	25	20	40	10	45	40	75	65	100	90	125	130	165
80	100	10	30	25	45	15	50	50	85	75	110	105	140	155	190
100	120	10	30	25	50	15	55	50	90	85	125	125	165	180	220
120	140	10	35	30	60	15	60	60	105	100	145	145	190	200	245
140	160	10	35	35	65	20	70	70	120	115	165	165	215	225	275
160	180	10	40	35	75	25	75	75	125	120	170	170	220	250	300
180	200	15	45	40	80	35	90	90	145	140	195	195	250	275	330
200	225	15	50	45	90	45	105	105	165	160	220	220	280	305	365
225	250	15	50	50	100	45	110	110	175	170	235	235	300	330	395
250	280	20	55	55	110	55	125	125	195	190	260	260	330	370	440
280	315	20	60	60	120	55	130	130	205	200	275	275	350	410	485
315	355	20	65	65	135	65	145	145	225	225	305	305	385	455	535
355	400	25	75	75	150	100	190	190	280	280	370	370	460	510	600
400	450	25	85	85	170	110	210	210	310	310	410	410	510	565	665
450	500	25	95	95	190	110	220	220	330	330	440	440	550	625	735
500	560	25	105	105	210	120	240	240	360	360	480	480	600	690	810
560	630	25	115	115	230	140	260	260	380	380	500	500	620	780	900
630	710	30	130	130	260	145	285	285	425	425	565	565	705	865	1005
710	800	35	145	145	290	150	310	310	470	470	630	630	790	975	1135
800	900	40	160	160	320	180	350	350	520	520	690	690	860	1095	1265
900	1000	–	–	–	–	200	390	390	580	580	770	770	960	1215	1405
1000	1120	–	–	–	–	220	430	430	640	640	850	850	1060	1355	1565
1120	1250	–	–	–	–	230	470	470	710	710	950	950	1190	1510	1750
1250	1400	–	–	–	–	270	530	530	790	790	1050	1050	1310	1680	1940
1400	1600	–	–	–	–	330	610	610	890	890	1170	1170	1450	1920	2200
1600	1800	–	–	–	–	380	700	700	1020	1020	1340	1340	1660	2160	2480
1800	2000	–	–	–	–	400	760	760	1120	1120	1480	1480	1840	2390	2760

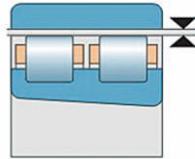


Table 2: Radial internal clearance of cylindrical roller bearings with tapered bore

Bore Diameter		Radial Internal clearance													
D		C1		SPC2		C2		Normal		C3		C4		C5	
over	incl.	min	max	min	max	min	max	min	max	min	max	min	max	min	max
mm		μ m													
–	24	–	–	–	–	15	40	30	55	40	65	50	75	70	95
24	30	15	25	25	35	20	45	35	60	45	70	55	80	75	100
30	40	15	25	25	40	20	45	40	65	55	80	70	95	90	115
40	50	17	30	30	45	25	55	45	75	60	90	75	105	105	135
50	65	20	35	35	50	30	60	50	80	70	100	90	120	125	155
65	80	25	40	40	60	35	70	60	75	85	120	110	145	145	180
80	100	35	55	45	70	40	75	70	105	95	130	120	155	175	210
100	120	40	60	50	80	50	90	90	130	115	155	140	180	200	240
120	140	45	70	60	90	55	100	100	145	130	175	160	205	225	270
140	160	50	75	65	100	60	110	110	160	145	195	180	230	255	305
160	180	55	85	75	110	75	125	125	175	160	210	195	245	280	330
180	200	60	90	80	120	85	140	140	195	180	235	220	275	305	360
200	225	60	95	90	135	95	155	155	215	200	260	245	305	340	400
225	250	65	100	100	150	105	170	170	235	220	285	270	335	375	440
250	280	75	110	110	165	115	185	185	255	240	310	295	365	415	485
280	315	80	120	120	180	130	205	205	280	265	340	325	400	465	540
315	355	90	135	135	200	145	225	225	305	290	370	355	435	515	595
355	400	100	150	150	225	165	255	255	345	330	420	405	495	580	670
400	450	110	170	170	255	185	285	285	385	370	470	455	555	650	750
450	500	120	190	190	285	205	315	315	425	410	520	505	615	720	830
500	560	130	210	210	315	230	350	350	470	455	575	560	680	800	920
560	630	140	230	230	345	260	380	380	500	500	620	620	740	900	1020
630	710	160	260	260	390	295	435	435	575	565	705	695	835	1005	1145
710	800	180	290	290	435	325	485	485	645	630	790	775	935	1125	1285
800	900	200	320	320	480	370	540	540	710	700	870	860	1030	1265	1435
900	1000			355	540	410	600	600	790	780	970	960	1150		
1000	1120			395	600	455	665	665	875	865	1075	1065	1275		
1120	1250			440	670	490	730	730	970	960	1200	1200	1440		
1250	1400			490	740	550	810	810	1070	1070	1330	1330	1590		
1400	1600			560	840	640	920	920	1200	1200	1480	1480	1760		
1600	1800			630	950	700	1020	1020	1340	1340	1660	1660	1980		
1800	2000			700	1060	760	1120	1120	1480	1480	1840	1840	2200		

Minimum load:

In order to provide satisfactory operation, single row cylindrical roller bearings, like all ball and roller bearings, must always be subjected to a given minimum load, particularly when they are operated at high speeds or are subjected to high accelerations or rapid changes in the direction of load. Under such conditions, the inertia forces of the rollers and cage, and the friction in the lubricant, can have a detrimental influence on the rolling conditions in the bearing arrangement and may cause damaging sliding movements between rollers and raceways.

The requisite minimum load applied to single row cylindrical roller bearings can be estimated using

$$F_{m} = K_r \left[6 + \frac{4n}{N_r} \right] \left[\frac{d_m}{100} \right]^2$$

F_{m}	=	minimum radial load, kN
k_r	=	minimum load factor (see product table)
n	=	rotational speed, r/min
N_r	=	reference speed, r/min (see product table)
d_m	=	mean diameter of bearing
	=	$0,5 (d + D)$, mm

When starting up at low temperatures or when the lubricant is highly viscous, even greater loads may be required. The weights of the components supported by the bearing, together with the external forces, generally exceed the requisite minimum load. If this is not the case, the AGS-TECH multi-row cylindrical roller bearing must be subjected to an additional radial load.

Equivalent dynamic bearing load: $P = F_r$

Equivalent static bearing load: $P_0 = F_r$

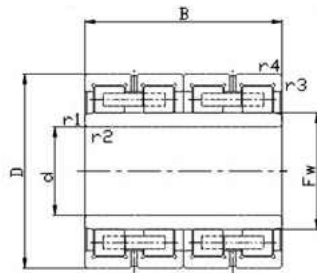
Mounting instructions:

Knowledge and experience are of particular importance where AGS-TECH four-row cylindrical roller bearings are concerned. The individual components must be mounted in the correct order. Parts which belong together are marked with letters. In addition, all components of the bearing are marked with the same serial number, so that there is no risk of mixing components if several bearings are to be mounted at the same time. However, the inner rings and inner ring pairs are fully interchangeable and need not to have the same serial number as the outer ring(s).

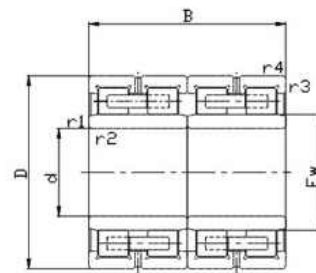
In the majority of applications the load is of constant direction, so that approximately only a quarter of the outer ring is under load. For this reason, the side faces of the outer rings are divided into four zones indicated by I to IV. The markings for load zone I are also joined by a line across the outside surface of the outer rings.

When the bearing is mounted for the first time it is usual to position zone I in the direction of action of the load. Depending on the operating conditions, the outer rings should be turned through 90° after a period of service so that a new zone comes under load.





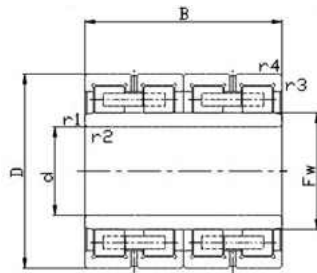
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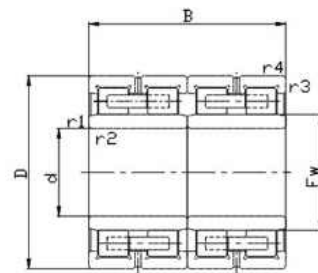
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Technical Parameters:

Bearing Code	Dimensions				r_{1sim}	r_{3sim}	Basic Load Rating		Mass
	d	D	B	Fw	r_{2sim}	r_{4sim}	Cr	Cor	
	mm						KN		kg
FCD4464210	220	320	210	246	2.1	2.1	1820	3600	61
FCD4464210E	220	320	210	248	2.1	2.1	1550	3650	56
FCD4466230	220	330	230	249	2.1	2.1	2050	4000	68.5
FCD4468192	220	340	192	246	2.1	2.1	1820	3600	64.2
FCD4468210	220	350	210	250	2.1	2.1	1909	3846	70.2
FCD4464290	220	340	290	250	2.1	2.1	2980	5010	96.3
FCD4469210	220	345	210	250	2.1	2.1	1909	3846	73.8
FC4666170	230	330	170	260	2.1	2.1	1140	2970	47.4
FC4666206E	230	330	206	258	2.1	2.1	1520	3800	58.6
FC4666206	230	330	206	260	2.1	2.1	1870	4000	58
FCD4668260	230	340	260	261	2.1	2.1	205	5100	81
FCD4673250	230	365	250	266	2.1	2.1	2640	4900	100
FC4866180	240	330	180	265	2.1	2.1	1720	3800	49.5
FCD4866220	240	330	220	264	2.1	2.1	1639	4340	56.4
FCD4866220E	240	330	220	270	2.1	2.1	1720	4300	58
FC4868192	240	340	192	268	2.1	2.1	1474	3582	55.4
FCD4868220	240	340	220	268	2.1	2.1	1670	4200	71
FCD4870220	240	350	220	270	2.1	2.1	1576	4073	71
FCD4772220E	240	360	220	272	2.1	2.1	1912	4374	78.8
FCD4872220	240	360	220	274	2.1	2.1	1760	4050	79.6
FC5068170	250	340	170	274	3	3	1392	3488	45
FC5068220	250	340	220	274	3	3	1329	3123	52.8
FCD5068230	250	340	230	270	3	3	1700	4350	65
FCD5070220E	250	350	220	274	3	3	1700	4350	58
FC5070220	250	350	220	278	3	3	1700	4350	65
FCD5070230	250	350	230	278	3	3	1700	4350	68.7
FC5072220	250	360	220	282	3	3	1700	4240	73
FC5272192	260	360	192	288	3	3	1609	3874	60
FC5272204	260	360	204	287	3	3	1980	4400	64.5
FC5272230	260	360	230	292	3	3	1980	4650	73.5
FCD5272260	260	360	260	287	3	3	2300	5320	80
FC5274192	260	370	192	291	3	3	1670	4012	66
FC5274200	260	370	200	292	3	3	1771	4120	68.9
FC5274220	260	370	220	292	3	3	2160	4650	76.5



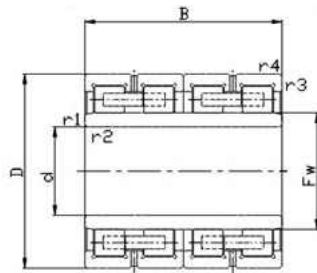
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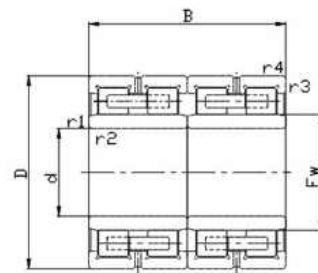
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Technical Parameters:

Bearing Code	Dimensions				r_{1sim}	r_{3sim}	Basic Load Rating		Mass
	d	D	B	Fw	r_{2sim}	r_{4sim}	Cr	Cor	
	mm						KN		kg
FC5274230	260	370	230	292	3	3	1760	4450	79.3
FC5276220	260	380	220	292	3	3	2104	4900	85
FCD5276280E	260	380	280	294	3	3	2420	6250	108
FCD5276280	260	380	280	295	3	3	2720	6250	108
FCD5280290	260	400	290	296	3	3	3520	7100	135
FCD5280235	260	400	335	294	3	3	3750	7340	149
FCD5374234	265	370	234	300	3	3	2240	5400	80
FC5476230	270	380	230	298	3	3	2000	5050	81.8
FCD5476275E	270	380	275	298	3	3	3080	6990	97.8
FCD5476275	270	380	275	300	3	3	3080	6990	101.3
FC5478220	270	390	220	306	3	3	1800	4803	86.7
FCD5478240	270	390	240	298	3	3	2236	5330	94
FC5480220	270	400	220	305	3	3	1822	4600	95.3
FC5675200	280	375	200	307	3	3	1500	4310	63.5
FC5676170	280	380	170	306	3	3	1710	3590	55
FC5676192	280	380	192	310	3	3	1560	4580	64.6
FCD5678290	280	380	290	308.5	3	3	2750	6950	75
FC5678220	280	390	220	312	3	3	2240	5000	81.5
FC5678240	280	390	240	312	3	3	2008	5331	90
FCD5678275	280	390	275	308	3	3	2424	6350	105
FCD5678275Y	280	390	275	312	3	3	2010	5330	105
FCD5680285	280	400	385	316	3	3	3140	7350	120
FCD5682300	280	410	300	313	3	3	3520	7450	133.9
FCD5684280	280	420	280	318	3	3	2945	7212	136.5
FCD5684300	280	420	300	319	3	3	3410	7180	150
FC5878190	290	390	190	316	4	4	2050	4550	67
FC5878234	290	390	234	320	4	4	1990	5400	79.6
FC5880180	290	400	180	320	4	4	2189	5385	68
FC5882240	290	410	240	320	4	4	2340	5600	102.3
FCD5884300	290	420	300	327	4	4	2790	7369	141
FCD5888310	290	440	310	328	4	4	4300	9700	170
FCD6080300	300	400	300	328	4	4	2330	6900	104



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Technical Parameters:

Bearing Code	Dimensions				r _{1sim}	r _{3sim}	Basic Load Rating		Mass
	d	D	B	Fw	r _{2sim}	r _{4sim}	Cr	Cor	
	mm						KN		kg
FCD6084180	300	420	180	332	4	4	2200	6780	92.4
FC6084218	300	420	218	332	4	4	2014	4956	93.7
FC6084240	300	420	240	332	4	4	2264	5644	103
FC6084240E	300	420	240	334	4	4	2020	5450	106
FCD6084300	300	420	300	332	4	4	3250	7270	130
FCD6092270	300	460	270	344	4	4	2670	5800	162
FCD6092350	300	460	350	341	4	4	5500	9700	250
FCD6286240	310	430	240	344.5	4	4	2244	5950	107
FC6488240	320	440	240	351	4	4	2169	5051	112.9
FCD6488286	320	440	286	350	4	4	6900	8564	142
FCD6488300	320	440	300	351	4	4	2193	5364	142
FC6490180	320	450	180	355	4	4	2193	5364	90.1
FC6490240	320	450	240	354	4	4	2320	5750	125
FC6490240E	320	450	240	355	4	4	2320	5750	116
FCD6492300	320	460	300	357	4	4	2567	6087	163
FCD6492240	320	460	240	364	4	4	2920	7200	140