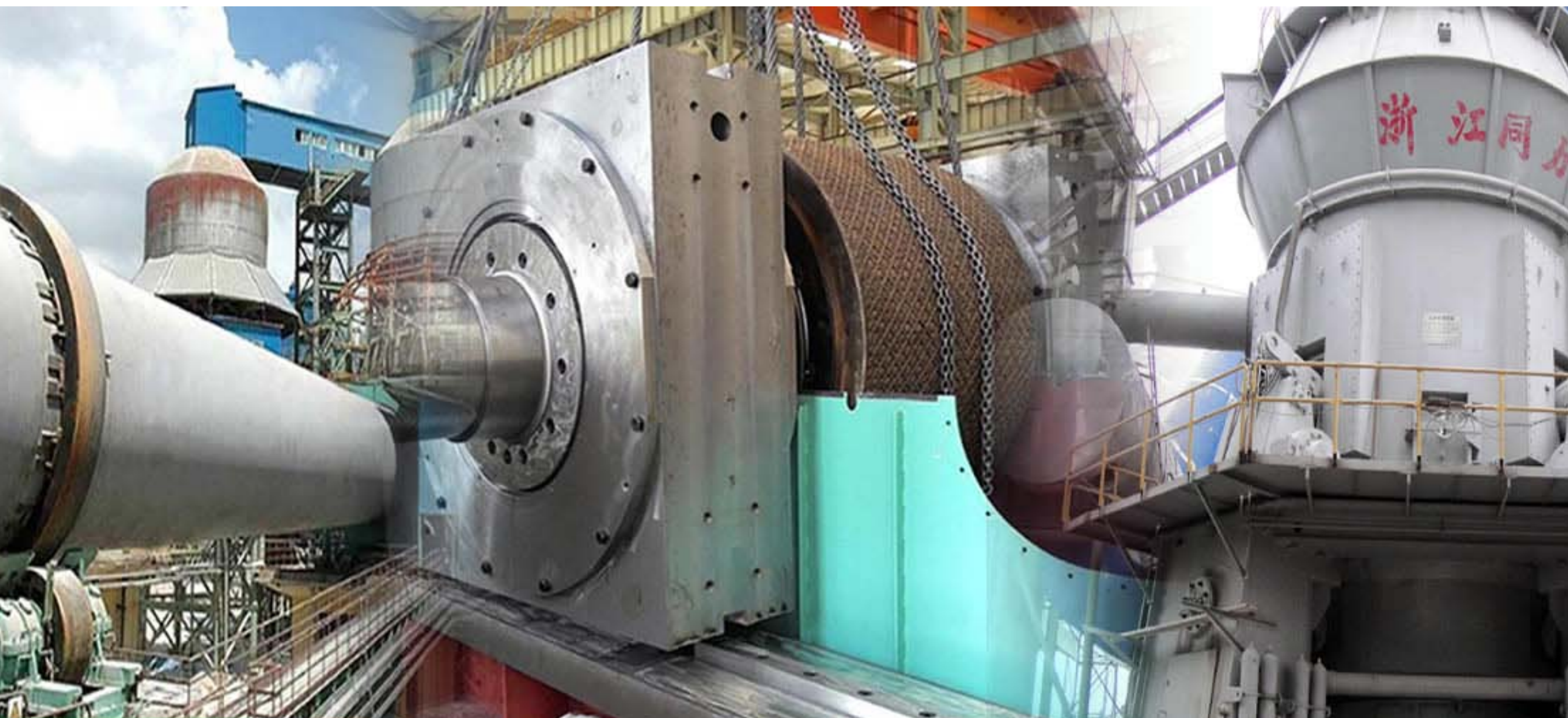




ROLLING BEARINGS
For Cement Industry



Selection of cement bearings

Preface

FV fully understands demands and requirements from customers in cement industry. We establish cooperation relationship with cement machinery manufacturers and maintenance team for cement factory, aiming at helping our customers improve properties of machines, reduce stop time of machines and increase productivity. We endeavor to solve problems in production with customers. Deep-groove ball bearings, angular contact ball bearings, cylindrical roller bearings, tapered roller bearings, spherical roller bearings, thrust bearings, etc. we provided are all manufactured with good quality steel and art-to-the-state manufacture techniques. They hold strong steadiness and long service life. Our unified manufacture specifications endure uniform of bearing design and quality. Meanwhile, our professional service team can eliminate your trouble in the first place. Cement machinery is one of the most challenging

industries for supplying bearings, especially in vertical mills, where the bearings must rotate anti-dusting under low speed, high temperature and insufficient lubrication. In order to conquer those problems, FV carries special design and manufacture to the bearings. We think with the customers' thought and worry customers' trouble by providing excellent service for cement customers with our truly heart. This pamphlet introduces bearing types and the characteristics common used in cement industry. Customers can select bearings according to property of specific machine. We collect bearing tolerances, clearances and other technical data in the pamphlet for customers' reference. In bearing specification and data chart, we list bearing dimensions, loads, rotation speed and recommended dimensions for installation. For further demands and requirements, you can feel free to contact us.

Deep groove ball bearing

Product Characteristics

Deep groove ball bearing consists of four basic parts, which are inner raceway (inner ring), outer raceway (outer ring), steel balls and cage. With normal rotation, inner raceway, outer raceway and steel balls accommodate the load while the cage plays a role in separating the balls and keeping stable. Single-row deep groove ball bearing has a simple structure, non-split inner ring and outer ring and easy to be used so it is widely used bearing in machinery industry such as precision meter, low noise electric motor, automobile, motorcycle, woodworker, transmission shaft of textile machinery, mining machinery, electromechanical equipments, plastic machinery, office equipments, medical equipments, fitness equipments, national defense industry, aeronautic industry, aerospace industry, excise equipments and other general machinery. Single-row deep groove ball bearing is mainly used for accommodating radial load and certain axial load. When this bearing is given a larger

radial clearance, this bearing will have a feature as radial thrust bearing to carry larger axial load and also can limit the axial movement in two directions. Different clearances allow a relative misalignment of inner ring and outer ring ranging from 8' to16'.
Product Category:
FV manufactures following kinds of Deep groove ball bearing currently:
Single-row deep groove ball bearing
Single-row deep groove ball bearing with shield(s)
Single-row deep groove ball bearing with seal(s) or shield(s)
Single-row deep groove ball bearing with snap groove or snap ring on outer ring
Single-row deep groove ball bearing is used for the applications without special requirements for mounting, sealing and interface.

Single-row deep groove ball bearing with shield(s) is used for the applications with difficulties in lubricating and checking lubrication or special situations. There is gap between shield(s) and inner ring. Single-row deep groove ball bearing with two shields has been filled with lubricant when manufacturing so it is unnecessary to wash and fill lubricant before mounting. It is also unnecessary to add lubricant within lubricating period during operating. Single-row deep groove ball bearing with seal(s) has a seal or seals with steel frame. The seal is contact type and has a more superior waterproof property than Single-row deep groove ball bearing with shield(s). However, the rotational speed of this bearing is lower than Single-row deep groove ball bearing with shield(s) due to the larger friction force. Single-row deep groove ball bearing with snap groove

or snap ring on outer ring simplifies the mounting in housing as a result of positioning with snap ring in axial direction.
Size range
Basic dimensions for FV deep-groove ball bearing have been listed in dimension data chart.
ID size range:10mm~1320mm
OD size range: 30mm~1600mm
width size range:9mm~300 mm
Tolerance:
The stangard to lernace of deep groove ball bearing manufactureg by FV is Normal class, which conforms to GB307.1, Please refer to tolerance value please see Table1~Table 10. Radial bearing (Tapered roller bearing is not included).
0 Class tolerance(Table 1, Table 2)

Table 1 0 class tolerance of inner ring

d mm		Δ d _{mp}		V _{dp} ²⁾			V _{dmp}	K _{ia}	Δ _{Bs}			V _{Bs}
				Diameter serie					All	Normal	Revise ³⁾	
				9	0、 1	2、 3、 4						
Over	To	Upper deviation	Lower deviation	max			max	max	Upper deviation	Lower deviation		max
0.6	2.5	0	-8	10	8	6	6	10	0	-40	-	12
2.5	10	0	-8	10	8	6	6	10	0	-120	-250	15
10	18	0	-8	10	8	6	6	10	0	-120	-250	20
18	30	0	-10	13	10	8	8	13	0	-120	-250	20
30	50	0	-12	15	12	9	9	15	0	-120	-250	20
50	80	0	-15	19	19	11	11	20	0	-150	-380	25
80	120	0	-20	25	25	15	15	25	0	-200	-380	25
120	180	0	-25	31	31	19	19	30	0	-250	-500	30
180	250	0	-30	38	38	23	23	40	0	-300	-500	30
250	315	0	-35	44	44	26	26	50	0	-350	- 500	35
315	400	0	-40	50	50	30	30	60	0	-400	-630	40
400	500	0	-45	56	56	34	34	65	0	-450	-	50
500	630	0	-50	63	63	38	38	70	0	-500	-	60
630	800	0	-75	-	-	-	-	80	0	-750	-	70
800	1000	0	-100	-	-	-	-	90	0	-1000	-	80
1000	1250	0	-125	-	-	-	-	100	0	-1250	-	100
1250	1600	0	-160	-	-	-	-	120	0	-1600	-	120
1600	2000	0	-200	-	-	-	-	140	0	-2000	-	140

Notes: 1) 0, 6 are included.
2) The values are not given for bearing diameter series 7 and 8.
3) Suitable for the inner ring and outer ring of a single bearing in matched pair or combined arrangement. Suitable for the inner ring of the bearing which d≥50mm with bore.

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Table 2 Class 0 tolerance of outer ring u m

d mm				V _{dp} ^{2) 4)}				V _{Dmp} ⁴⁾	K _{ia}		
				Open bearing		Closed bearing				⁵⁾	⁵⁾
				Diameter series							
				9	0、1	2、3	2、3、4				
Over	To	Upper deviation	Lower deviation	max				max	max	Same as the  Bs and V _{Bs} of the inner ring for the same bearing I.D	
2.5 ¹⁾	6	0	-8	10	8	6	10	6	15		
6	18	0	-8	10	8	6	10	6	15		
18	30	0	-9	12	9	7	12	7	15		
30	50	0	-11	14	11	8	16	8	20		
50	80	0	-13	16	13	10※	20	10	25		
80	120	0	-15	19	19	11	26	11	35		
120	150	0	-18	23	23	14	30	14	40		
150	180	0	-25	31	31	19	38	19	45		
180	250	0	-30	38	38	23	-	23	50		
250	315	0	-35	44	44	26	-	26	60		
315	400	0	-40	50	50	30	-	30	70		
400	500	0	-45	56	56	34	-	34	80		
500	630	0	-50	63	63	38	-	38	100		
630	800	0	-75	94	94	55	-	55	120		
800	1000	0	-100	125	125	75	-	75	140		
1000	1250	0	-125	-	-	-	-	-	160		
1250	1600	0	-160	-	-	-	-	-	190		
1600	2000	0	-200	-	-	-	-	-	220		
2000	2500	0	-250	-	-	-	-	-	250		

Notes:1)2,5 are included.
2) The values are not given for bearing diameter series 7 and 8.
3) The values are not given for bearing diameter series 9,0 and 1.
4)Suitable before mounting and after dismounting the inner or outer snap ring.
5)Only applicable for deep groove bearings.

Class tolerance(Table 3,Table 4)

Table 3 Class6 tolerance of inner ring u m

d mm		△ d _{mp}		V _{dp} ²⁾			V _{dmp}	K _{ia}	△ _{Bs}			V _{Bs}
				Diameter series					All	Normal	Revise ³⁾	
				9	0、1	2、3、4						
Over	To	Upper deviation	Lower deviation	max			max	max	Upper deviation	Lower deviation		max
0.6 ¹⁾	2.5	0	-7	9	9	5	5	5	0	-40	-	12
2.5	10	0	-7	9	9	5	5	6	0	-120	-250	15
10	18	0	-7	9	9	5	5	7	0	-120	-250	20
18	30	0	-8	10	10	6	6	8	0	-120	-250	20
30	50	0	-10	13	13	8	8	10	0	-120	-250	20
50	80	0	-12	15	15	9	9	10	0	-150	-380	25
80	120	0	-15	19	19	11	11	13	0	-200	-380	25
120	180	0	-18	23	23	14	14	18	0	-250	-500	30
180	250	0	-22	28	28	17	17	20	0	-300	-500	30
250	315	0	-25	31	31	19	19	25	0	-350	-500	35
315	400	0	-30	38	38	23	23	30	0	-400	-630	40
400	500	0	-35	44	44	26	26	35	0	-450	-	45
500	630	0	-40	50	50	30	30	40	0	-500	-	50

Notes:1)0,6 are included.
2) The values are not given for bearing diameter series 7 and 8.
3) Suitable for the inner ring and outer ring of a single bearing in matched pair or combined arrangement. Suitable for the inner ring of the bearing which d≥50mm with tapered bore.

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Table 4 Class 6 tolerance of outer ring u m

d mm				V _{dp} ^{2) 4)}				V _{Dmp} ⁴⁾	K _{la}		
				Open bearing		Closed bearing				⁵⁾	⁵⁾
				Diameter serie							
				9	0、1	2、3、4	0、1、2、3、4				
Over	To	Upper deviation	Lower deviation	max				max	max	Same as the  Bs and V _{Bs} of the inner ring for the same bearing I.D	
2.5 ¹⁾	6	0	-7	9	7	5	9	5	8		
6	18	0	-7	9	7	5	9	5	8		
18	30	0	-8	10	8	6	10	6	9		
30	50	0	-9	11	9	7	13	7	10		
50	80	0	-11	14	11	8	16	8	13		
80	120	0	-13	16	16	10	20	10	18		
120	150	0	-15	19	19	11	25	11	20		
150	180	0	-18	23	23	14	30	14	23		
180	250	0	-20	25	25	15	-	15	25		
250	315	0	-25	31	31	19	-	19	30		
315	400	0	-28	35	35	21	-	21	35		
400	500	0	-33	41	41	25	-	25	40		
500	630	0	-38	48	48	29	-	29	50		
630	800	0	-45	56	56	34	-	34	60		
800	1000	0	-60	75	75	45	-	45	75		

Notes:1)2.5 is included.
2) The values are not given for bearing diameter series 7 and 8.
3) The values are not given for bearing diameter series 9.
4)Suitable before mounting and after dismounting the inner or outer snap ring.
5)Only applicable for deep groove bearings.

Class 5 tolerance(Table 5,Table 6)

Table 5 5 class tolerance of inner ring u m

d mm		Δ d _{mp}		V _d ²⁾		V _{dmp}	K _{la}	S _d	S _{la} ³⁾	Δ _{Bs}			V _{Bs}
				Diameter serie						All	Normal	4)	
				9	0,1,2,3,4								
Over	To	Upper deviation	Lower deviation	max		max	max	max	max	Upper deviation	Lower deviation		max
0.6 ¹⁾	2.5	0	-5	5	4	3	4	7	7	0	-40	-250	5
2.5	10	0	-5	5	4	3	4	7	7	0	-40	-250	5
10	18	0	-5	5	4	3	4	7	7	0	-80	-250	5
18	30	0	-6	6	5	3	4	8	8	0	-120	-250	5
30	50	0	-8	8	6	4	5	8	8	0	-120	-250	5
50	80	0	-9	9	7	5	5	8	8	0	-150	-250	6
80	120	0	-10	10	8	5	6	9	9	0	-200	-380	7
120	180	0	-13	13	10	7	8	10	10	0	-250	-380	8
180	250	0	-15	15	12	8	10	11	13	0	-300	-500	10
250	315	0	-18	18	14	9	13	13	15	0	-350	-500	13
315	400	0	-23	23	18	12	15	15	20	0	-400	-630	15

Notes:1)0,6 are included.
2) The values are not given for bearing diameter series 7 and 8.
3)Only applicable for deep groove ball bearings.
4) Suitable for the inner ring and outer ring of a single bearing in matched pair or combined arrangement.
Suitable for the inner ring of the bearing which $d \geq 50\text{ mm}$ with bore .

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Table 6 Class 5 tolerance of outer ring

D mm		Δ_{Dmp}		$V_{dp}^{2) 3)}$		V_{Dmp}	K_{ea}	$S_D^{4)}$	$S_{ea}^{4)}$	$S_{ea1}^{6)}$	Δ_{Cs}		$V_{Cs}^{5)}$
				Diameter serie				$S_{d1}^{5)}$		$\Delta_{Cs}^{5)}$		V_{Cs1s}	
				9	0, 1, 2, 3, 4								
Over	To	Upper deviation	Lower deviation	max		max	max	max	max	max	Upper deviation	Lower deviation	max
2.5 ¹⁾	6	0	-5	5	4	3	5	8	8	11	Same as the Δ_{Bs} and of the inner ring for the same bearing I.D		5
6	18	0	-5	5	4	3	5	8	8	11			5
18	30	0	-6	6	5	3	6	8	8	11			5
30	50	0	-7	7	5	4	7	8	8	11			5
50	80	0	-9	9	7	5	8	8	10	14			6
80	120	0	-10	10	8	5	10	9	11	16			8
120	150	0	-11	11	8	6	11	10	13	18			8
150	180	0	-13	13	10	7	13	10	14	20			8
180	250	0	-15	15	11	8	15	11	15	21			10
250	315	0	-18	18	14	9	18	13	18	25			11
315	400	0	-20	20	15	10	20	13	20	28			13
400	500	0	-23	23	17	12	23	15	23	33			15
500	630	0	-28	28	21	14	25	18	25	35			18
630	800	0	-35	35	26	18	30	20	30	42			20

Notes:1)2, 5 are included.
2) The values are not given for bearing diameter series 7 and 8.
3) The values are not given for capped bearing.
4) No suitable for bearings with flanged outer ring.
5)Only applicable for deep groove ball bearings.

Class 4 tolerance(Table 7,Table 8)

Table 7 Class 4 tolerance inner ring

d mm		$\triangle d_{mp}$		$\triangle d_s^{2)}$		$V_{dp}^{3)}$		V_{dmp}	K_{ia}	S_d	$S_{ia}^{4)}$	$\triangle B_s$			V_{Bs}
						Diameter serie						All	Normal	Revise ⁵⁾	
Over	To	Upper deviation	Lower deviation	Upper deviation	Lower deviation	max		max	max	max	max	Upper deviation	Lower deviation		max
0.6 ¹⁾	2.5	0	-4	0	-4	4	3	2	2.5	3	3	0	-40	-250	2.5
2.5	10	0	-4	0	-4	4	3	2	2.5	3	3	0	-40	-250	2.5
10	18	0	-4	0	-4	4	3	2	2.5	3	3	0	-80	-250	2.5
18	30	0	-5	0	-5	5	4	2.5	3	4	4	0	-120	-250	2.5
30	50	0	-6	0	-6	6	5	3	4	4	4	0	-120	-250	3
50	80	0	-7	0	-7	7	5	3.5	4	5	5	0	-150	-250	4
80	120	0	-8	0	-8	8	6	4	5	5	5	0	-200	-380	4
120	180	0	-10	0	-10	10	8	5	6	6	7	0	-250	-380	5
180	250	0	-12	0	-12	12	9	6	8	7	8	0	-300	-500	6

Notes:1)0,6 are included.
2)Only applicable for diameter series 0,1,2,3,4.
3) The values are not given for bearing diameter series 7 and 8.
4) Only applicable for deep groove ball bearings.
5)Suitable for single bearing's inner or outer ring which by pair or group mounting.

Table 8 4 class tolerance of outer ring

D mm		Δ_{Dmp}		$\Delta_{Ds}^{2)}$		$V_{dp}^{3) 4)}$		V_{Dmp}	K_{ea}	$S_D^{5)}$	$S_{ea}^{5)6)}$	$S_{ea1}^{6)}$	Δ_{Cs}		V_{Cs}
						Diameter serie				$S_{d1}^{6)}$			$\Delta_{C1s}^{6)}$		$V_{C1s}^{6)}$
						9	0, 1, 2, 3, 4								
Over	To	Upper deviation	Lower deviation	Upper deviation	Lower deviation	max		max	max	max	max	max	Upper deviation	Lower deviation	max
2.5 ¹⁾	6	0	-4	0	-4	4	3	2	3	4	5	7	Same as the Δ_{Bs} and of the inner ring for the same bearing I.D		2.5
6	18	0	-4	0	-4	4	3	2	3	4	5	7			2.5
18	30	0	-5	0	-5	5	4	2.5	4	4	5	7			2.5
30	50	0	-6	0	-6	6	5	3	5	4	5	7			2.5
50	80	0	-7	0	-7	7	5	3.5	5	4	5	7			3
80	120	0	-8	0	-8	8	6	4	6	5	6	8			4
120	150	0	-9	0	-9	9	7	5	7	5	7	10			5
150	180	0	-10	0	-10	10	8	5	8	5	8	11			5
180	250	0	-11	0	-11	11	8	6	10	7	10	14			7
250	315	0	-13	0	-13	13	10	7	11	8	10	14			7
315	400	0	-15	0	-15	15	11	8	13	10	13	18			8

Notes:1)2.5 is included.
2)Only applicable for diameter series 0,1,2,3 and 4.
3) The values are not given for bearing diameter series 7 and 8.
4) The values are not given for capped bearing.
5) No suitable for bearings with flanged outer ring.
6) Only applicable for deep groove ball bearings.

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Class 2 tolerance(Table 9,Table 10)

Table 9 Class 4 tolerance of inner ring um

d mm		Δd_{mp}		Δd_s		$V_{dp}^{2)}$	V_{dmp}	K_{α}	S_d	$S_{\alpha}^{3)}$	$\Delta_{Bs}^{5)}$			V_{Bs}
											All	Normal	Revise	
Over	To	Upper deviation	Lower deviation	Upper deviation	Lower deviation	max	max	max	max	max	Upper deviation	Lower deviation		max
0.6 ¹⁾	2.5	0	-2.5	0	-2.5	2.5	1.5	1.5	1.5	1.5	0	-40	-250	1.5
2.5	10	0	-2.5	0	-2.5	2.5	1.5	1.5	1.5	1.5	0	-40	-250	1.5
10	18	0	-2.5	0	-2.5	2.5	1.5	1.5	1.5	1.5	0	-80	-250	1.5
18	30	0	-2.5	0	-2.5	2.5	1.5	2.5	1.5	2.5	0	-120	-250	1.5
30	50	0	-2.5	0	-2.5	2.5	1.5	2.5	1.5	2.5	0	-120	-250	1.5
50	80	0	-4	0	-4	4	2	2.5	1.5	2.5	0	-150	-250	1.5
80	120	0	-5	0	-5	5	2.5	2.5	2.5	2.5	0	-200	-380	2.5
120	150	0	-7	0	-7	7	3.5	2.5	2.5	2.5	0	-250	-380	2.5
150	180	0	-7	0	-7	7	3.5	5	4	5	0	-250	-380	4
180	250	0	-8	0	-8	8	4	5	5	5	0	-300	-500	5

Notes:1)0,6 are included.
2) The values are not given for bearing diameter series 7,8 and 9.
3)Only applicable for deep groove bearings.
4) Suitable for with deviation of the inner ring and outer ring of a single bearing in matched pair or combined arrangement.

Table 10 Class 2 tolerance of outer ring um

D mm		Δ_{Dmp}		$\Delta_{Ds}^{2)}$		$V_{Dp}^{2)}$	V_{Dmp}	K_{α}	$S_D^{3)}$	$S_{\alpha}^{3)4)}$	$S_{\alpha 1}^{4)}$	Δ_{Cs}		V_{Cs}
												$\Delta_{C1s}^{4)}$		$V_{C1s}^{4)}$
Over	To	Upper deviation	Lower deviation	Upper deviation	Lower deviation	max	max	max	max	max	max	Upper deviation	Lower deviation	max
2.5 ¹⁾	6	0	-2.5	0	-2.5	2.5	1.5	1.5	1.5	1.5	3	Same as the Δ_{Bs} and of the inner ring for the same bearing I.D		1.5
6	18	0	-2.5	0	-2.5	2.5	1.5	1.5	1.5	1.5	3			1.5
18	30	0	-4	0	-4	4	2	2.5	1.5	2.5	4			1.5
30	50	0	-4	0	-4	4	2	2.5	1.5	2.5	4			1.5
50	80	0	-4	0	-4	4	2	4	1.5	4	6			1.5
80	120	0	-5	0	-5	5	2.5	5	2.5	5	7			2.5
120	150	0	-5	0	-5	5	2.5	5	2.5	5	7			2.5
150	180	0	-7	0	-7	7	3.5	5	2.5	5	7			2.5
180	250	0	-8	0	-8	8	4	7	4	7	10			4
250	315	0	-8	0	-8	8	4	7	5	7	10			5
315	400	0	-10	0	-10	10	5	8	7	8	11			7

Notes:1)2.5 is included.
2)Suitable for diameter series 0,1,2,3 and 4 of the open bearings and capped bearings..
3) No suitable for bearings with flanged outer ring.
4) Only applicable for deep groove ball bearings.

Radial Clearance
The standard internal clearances of deep groove ball bearing manufactured by FV are C2,Standard(CN), C3,C4 AND C5,which conforms to GB4604.The values are available for the bearings before mounting or without load. The bearing with internal clearance large or lower than standard values also can be produced based on users’ requirements.

Table 11 clearance of deep groove ball bearing (Cylindrical bore) um

Nominal inner ring diamete d mm		Clearance									
		Group 2		Group 0 (CN)		Group 3		Group 4		Group5	
Over	to	min	max	min	max	min	max	min	max	min	max
2.5	6	0	7	2	13	8	23	-	-	-	-
6	10	0	7	2	13	8	23	14	29	20	37
10	18	0	9	3	18	11	25	18	33	25	45
18	24	0	10	5	20	13	28	20	36	28	48
24	30	1	11	5	20	13	28	23	41	30	53
30	40	1	11	6	20	15	33	28	46	40	64
40	50	1	11	6	23	18	36	30	51	45	73
50	65	1	15	8	28	23	43	38	61	55	90
65	80	1	15	10	30	25	51	46	71	65	105
80	100	1	18	12	36	30	58	53	84	75	120
100	120	2	20	15	41	36	66	61	97	90	140
120	140	2	23	18	48	41	81	71	114	105	160
140	160	2	23	18	53	46	91	81	130	120	180
160	180	2	25	20	61	53	102	91	147	135	200
180	200	2	30	25	71	63	117	107	163	150	230
200	225	2	35	25	85	75	140	125	195	175	265
225	250	2	40	30	95	85	160	145	225	205	300
250	280	2	45	35	105	90	170	155	245	225	340
280	315	2	55	40	115	100	190	175	270	245	370
315	355	3	60	45	125	110	210	195	300	275	410
355	400	3	70	55	145	130	240	225	340	315	460
400	450	3	80	60	170	150	270	250	380	350	510
450	500	3	90	70	190	170	300	280	420	390	570
500	560	10	100	80	210	190	330	310	470	440	630
560	630	10	110	90	230	210	360	340	520	490	690
630	710	20	130	110	260	240	400	380	570	540	760
710	800	20	140	120	290	270	450	430	630	600	840
800	900	20	160	140	320	300	500	480	700	670	940
900	1000	20	170	150	350	330	550	530	770	740	1040
1000	1120	20	180	160	380	360	600	580	850	820	1150
1120	1250	20	190	170	410	390	650	630	920	890	1260

Selection of cement bearings

Angular contact ball bearings

Product Characteristics

Single-row angular contact ball bearing consists of outer ring, inner ring, one-row balls and cage. This bearing can carry radial load and axial load simultaneously, even pure axial load operating with higher rotational speed. However, single row angular contact ball bearing only can carry axial load in one direction. When this bearing carry radial load, an additional axial force will occur and only can limit the axial movement of shaft and housing in one direction. Although this bearing only can carry axial load in one direction, yet it can be mounted with the other bearing carrying a load in contrary direction. If paired mounting, make the end faces of outer rings of two bearings face to face, i.e. wide end face to wide end face (DB type) and narrow end face to narrow end face (DF type). This arrangement can avoid the occurrence of additional axial force and limit the movement of shaft and housing within axial end play of bearing in two directions.

Single-row angular contact ball bearing has more balls than deep groove ball bearing with the same boundary dimensions and therefore this kind of bearing has the highest load rating among ball bearings, strong rigidity and operates steadily. The radial clearance can be adjusted by the relative movement of inner ring and outer ring. The rigidity of system can be improved by the pre-interference amount generated by placing several bearings face to face or back to back arrangement. Angular contact ball bearing can not be separated and has poor self-aligning property.

The contact angle of this bearing is not zero. The standard contact angle of single-row angular contact ball bearing is 15° , 25° , 30° and 40° . Contact angle determines the radial load and axial load the

bearing can carry. The bigger the contact angle is, the bigger axial load can carry. But the smaller contact angle is beneficial to high speed rotation.

Single-row angular contact ball bearing doesn’ t have clearance. Internal clearance can only be achieved through stack mounting. According to applications, stack mounting bearings are preloaded or have pre-clearance. The internal clearance of preloaded stack mounting bearings is zero or negative. This bearing is often used on main shaft of machine tool to improve the rigidity and rotational precision of main shaft. The clearance or preload of matched pair angular contact bearing has been set in FV and customer is free to adjust. The width tolerance and end surface convexity of an individual single-row angular contact ball bearing is produced as per normal class so these bearings can not be stack-mounted in random.

F V also can produce universal stack mounting Angular-contact ball bearings with DB, DF or in tandem arrangement. The universal stack mounting bearings have two types, which are preloaded or have pre-clearance. Except universal stack mounting bearings, all individual bearings of other kinds of stack mounting bearings are not interchangeable.

Product Category

FV can manufacture four types of Angular contact ball bearing:

Single-row angular contact ball bearing
7000C、7000AC、7000A 、7000B

Stack mounting angular contact ball bearing
Face to Face (DB) ; Back to Back (DF) ;
Tandem (DT) ; Triplet
Double-row angular contact ball bearing

One inner ring with two -raceway and two outer rings with single raceway
One outer ring with two -raceway and two inner rings with single raceway
One outer ring with two -raceway and one inner ring with two - raceway
Four - point contact ball bearing
QJ0000、QJF0000

Dimension range:

The basic size of FV angular contact ball bearing has been listed in the dimension data sheet.

Single - row angular contact ball bearing
Dimension range of bore diameter:
25mm - 1180mm
Dimension range of outer diameter:
62mm - 1420mm
Dimension range of overall width:
16mm - 106mm

Matched pair angular contact ball bearing
Dimension range of bore diameter:
30mm - 1320mm
Dimension range of outer diameter:
62mm - 1600mm
Dimension range of overall width:
32mm - 244mm

Double - row angular contact ball Bearing
Dimension range of bore diameter:
35mm - 320mm

Dimension range of outer diameter:
72mm - 460mm
Dimension range of overall width:
27mm - 160mm

Four - point contact ball bearing
Dimension range of bore diameter:
30mm - 560mm
Dimension range of outer diameter:
72mm - 780mm
Dimension range of overall width:
19mm - 90mm

Tolerance:
The standard tolerance of single-row angular contact ball bearing manufactured by P0 class , but FV can also supply the bearings meeting precision Class P6 or higher. For a single bearing with contact angle (α) of 15° and 25° used for paired mounting, the precision class meets P5 or above. For a single bearing with contact angle (α) of 40° used for paired mounting, the precision class meets P6 or above. F V also can supply the bearings with special precision standard such as4A , 2A or other precision requirement. The specific standard tolerances please refer to Table 1 to Table 10.

Selection of cement bearings

Angular contact ball bearings

Table 12 Axial clearance in microns of 7200B series and 7300B series matched pair bearing u m

d mm		CA		CB		CC	
Over	To	min	max	min	max	min	max
-	10	4	12	14	22	22	30
10	18	5	13	15	23	24	32
18	30	7	15	18	26	32	40
30	50	9	17	22	30	40	48
50	80	11	23	26	38	48	60
80	120	14	26	32	44	55	67
120	180	17	29	35	47	62	74
180	250	21	37	45	61	74	90

Notes:
Pre-clearance: CA- Small axial clearance
CB-Moderate axial clearance
CC- Large axial clearance

Table 13 Axial clearance of Four-point contact ball bearing u m

Nominal inner ring diamete d mm		Clearance							
		Group 2		Group 0		Group 3		Group 4	
Over	To	min	max	min	max	min	max	min	max
-	18	15	55	45	85	75	115	105	145
18	40	26	66	56	106	96	146	136	186
40	60	36	86	76	126	116	166	156	206
60	80	46	96	86	136	126	176	166	216
80	100	56	116	96	156	136	196	176	236
100	140	66	136	116	176	156	216	196	256
140	180	76	156	136	196	176	236	216	276
180	220	96	176	156	216	196	256	236	296
220	260	115	195	175	235	215	295	275	335
260	300	135	215	195	275	255	335	295	355
300	350	155	235	215	295	275	355	335	415
350	400	175	265	245	325	305	385	365	465
400	500	205	305	285	385	355	455	435	525
500	600	255	355	335	445	425	545	525	615

Cylindrical Roller Bearing

Product characteristic:
Cylindrical rollers linear contact with raceway , radial load capacity improved. Suitable for impact load and heavy load, also applicable for high speed rotation.

installation error, most suitable for free end bearing. This type of bearings cannot limit axle and housing's axial displacement, can only bear radial load.

After improved design for geometrical shape of cylindrical roller bearing raceway and rollers, the bearing have higher load carrying capacity, new structure designed for ribs and roller surface improved bearing axial load carrying capacity, and further more improve lubrication condition for contact area between roller surface and rib, improve bearing application capacity.

This kind of bearings are mainly used for medium and large size electromotor, electric generator, combustion motor, gas turbine, machine tool spindle, speed reducer, loading/unloading machine, and all kinds of machinery.

Product classification:
FV cylindrical roller bearing can be classified into following series:
Single row cylindrical roller bearing
Double row cylindrical roller bearing
Four row cylindrical roller bearing
Single row cylindrical roller bearing

NU type, N type
NU type cylindrical roller bearing outer ring has two ribs on the outer ring, the outer ring, rollers and cage can be separated from inner ring. N type cylindrical roller bearing inner ring has two ribs, outer ring, rollers and cage can be separated from inner ring.

NU type and N type cylindrical roller bearing allows axle can move along axial direction in a limited area to the shell, can be used to position changes between shaft and housing that caused by the thermal expansion or

NJ type and NF type:
NJ type with two ribs on outer ring , inner ring with single rib.
NJ type and NF type can bear certain direction axial load.
NUP Type, NH Type:
NUP type cylindrical roller bearings have double ribs on the outer ring and single rib and loose rib on inner ring. NH type cylindrical roller bearings have double ribs on the outer ring, single rib and angular ring on the inner ring. The inner rings and outer rings can be mounted separately (with complete roller and cage assembly). These bearings can limit the axial movement of shaft and housing in double direction within the bearing axial clearance, besides radial load, this type bearing can carry small amount of axial load in two directions so they can be used on the fixed end bearing. .

NCL—V Type:
Outer ring with no rib, but has double retaining snap ring without cage.
This type with no cage, with larger amount of roller, can bear much more radial load than any other cylindrical roller bearing with same dimensions, but it's limit rotation speed is low. The inner ring and outer ring cannot be separated, and can not be assembled separately, can limit the axial displacement of shaft and housing in double direction within the bearing axial clearance. NB Type:
NB Type bearings has no ribs on inner or outer ring, there are oil lubrication holes on outer rings, inner ring, outer ring and cage with full set of rollers can be assembled separately. It cannot limit axial displacement of bearing

Selection of cement bearings

Cylindrical Roller Bearing

NJ—V Type:
Cylindrical roller bearing with single rib on the inner ring and without cage
This type have no cage, roller number is more, has better radial load capacity than other cylindrical roller bearings then other cylindrical roller bearing with same dimensions. Limit speed is low, cannot limit axial displacement of shaft or housing, cannot bear axial load.

NCF—V Type:
Centripetal short cylindrical roller bearing without cage, but outer ring has rib.
This type with no cage, complement rollers, has better radial load capacity than other cylindrical roller bearings with same dimensions. Limit speed is low.
The shaft and the shell of the two directions of the axial displacement limit in bearing axial clearance limit.

N type(with snap ring groove)
Part of cylindrical roller bearings' outer rings with snap ring groove, with suffix code "N". With snap ring, which can make axial location to bearings in bearing housing. Simplify axial fixture in bore of housing, can make through-hole in housing, to reduce axial dimension of part.

NJ—V Type:
Cylindrical roller bearing with single rib on the inner ring and without cage
This type have no cage, roller number is more, has better radial load capacity than other cylindrical roller bearings then other cylindrical roller bearing with same dimensions. Limit speed is low, cannot limit axial displacement of shaft or housing, cannot bear axial load.

NCF—V Type:
Centripetal short cylindrical roller bearing without cage, but outer ring has rib.

This type with no cage, complement rollers, has better radial load capacity than other cylindrical roller bearings with same dimensions. Limit speed is low.
The shaft and the shell of the two directions of the axial displacement limit in bearing axial clearance limit.
N type(with snap ring groove)
Part of cylindrical roller bearings' outer rings with snap ring groove, with suffix code "N". With snap ring, which can make axial location to bearings in bearing housing. Simplify axial fixture in bore of housing, can make through-hole in housing, to reduce axial dimension of part.

Table 14 Radial clearance of Cylindrical roller bearing with cylindrical bore

Nominal inner ring diameter d mm		Clearance										um
		C2		Standard		C3		C4		C5		
over	To	min	max	min	max	min	max	min	max	min	max	
	10	0	25	20	45	35	60	50	75	-	-	
10	24	0	25	20	45	35	60	50	75	65	90	
24	30	0	25	20	45	35	60	50	75	70	95	
30	40	5	30	25	50	45	70	60	85	80	105	
40	50	5	35	30	60	50	80	70	100	95	125	
50	65	10	40	40	70	60	90	80	110	110	140	
65	80	10	45	40	75	65	100	90	125	130	165	
80	100	15	50	50	85	75	110	105	140	155	190	
100	120	15	55	50	90	85	125	125	165	180	220	
120	140	15	60	60	105	100	145	145	190	200	245	
140	160	20	70	70	120	115	165	165	215	225	275	
160	180	25	75	75	125	120	170	170	220	250	300	
180	200	35	90	90	145	140	195	195	250	275	330	
200	225	45	105	105	165	160	220	220	280	305	365	
225	250	45	110	110	175	170	235	235	300	330	395	
250	280	55	125	125	195	190	260	260	330	370	440	
280	315	55	130	130	205	200	275	275	350	410	485	
315	355	65	145	145	225	225	305	305	385	455	535	
355	400	100	190	190	280	280	370	370	460	510	600	
400	450	110	210	210	310	310	410	410	510	565	665	
450	500	110	220	220	330	330	440	440	550	625	735	

Selection of cement bearings

Cylindrical Roller Bearing

Table 15 Radial clearance of Fore-row cylindrical roller bearing with cylindrical bore

Nominal inner ring diameter d mm		Clearance										um
		2		0		Group 3		Group 4		Group 5		
Over	To	min	max	min	max	min	max	min	max	min	max	
80	100	15	50	50	85	75	110	105	140	155	190	
100	120	15	55	50	90	85	125	125	165	180	220	
120	140	15	60	60	105	100	145	145	190	200	245	
140	160	20	70	70	120	115	165	165	215	225	275	
160	180	25	75	75	125	120	170	170	220	250	300	
180	200	35	90	90	145	140	195	195	250	275	330	
200	225	45	105	105	165	160	220	220	280	305	365	
225	250	45	110	110	175	170	235	235	300	330	395	
250	280	55	125	125	195	190	260	260	330	370	440	
280	315	55	130	130	205	200	275	275	350	410	485	
315	355	65	145	145	225	225	305	305	385	455	535	
355	400	100	190	190	280	280	370	370	460	510	600	
400	450	110	210	210	310	310	410	410	510	565	665	
450	500	110	220	220	330	330	440	440	550	625	735	
500	560	120	240	240	360	360	480	480	600	—	—	
560	630	140	260	260	380	380	500	500	620	—	—	
630	710	145	285	285	425	425	565	565	705	—	—	
710	800	150	310	310	470	470	630	630	790	—	—	
800	900	180	350	350	520	520	690	690	860	—	—	
900	1000	200	390	390	580	580	770	770	960	—	—	
1000	1120	220	430	430	640	640	850	850	1060	—	—	
1120	1250	230	470	470	710	710	950	950	1190	—	—	
1250	1400	270	530	530	790	790	1050	1050	1310	—	—	

Tapered roller bearing

Product Characteristics:

The inner ring and outer ring of taper roller bearings have tapered raceways which are filled with tapered rollers. When extended, the sliding surfaces will converge towards to the same point on the bearing axle. Taper roller bearings can carry combined radial and axial loads and the radial load should be primary. The capacity of carrying axial load varies from the contact angle , the greater the is, the bigger capacity of the bearing have. Taper roller bearings are separable and the cone assembly consists by inner rings, rollers and cages can be installed separably with cup.

This kind of bearings can limit the axial movement of either the shaft or the housing in one direction and not allow the shaft relatively leaning to housing hole. Under the function of radial load, additional axial load will form inside the bearing, so the outer ring and inner ring in the two supportings of bearing should be installed relatively to end faces.

Product Type:

FV manufactures both metric and inch-sized single-row, double-row and four-row taper roller bearings.Single-row tapered roller bearing

These bearings can only limit the axial displacement of either the shaft or the housing in one direction, and can carry axial load in one direction. When only radial load, the auxiliary axial force can be formed, the axial load shall be balanced which generated internally of the bearing. It is suggested that two of the bearings be put in face-to-face or back-to-back arrangements in application.

Double-row tapered roller bearing

These taper roller bearing can carry radial load and carries the axial load in double direction simultaneously. It is possible to limit the axial movement of the shaft or the housing in double directions within the scope of the axial load clearance.

Four-row tapered roller bearing

The functions of these bearings are basically the same as those of the double-row roller bearing. However, they

can carry heavier load than the double-row tapered roller bearings but with slightly slower rotation speed. Applications of these bearings can be found in the heavy machines such as the rolling mills.

Multi-sealed double row or four row tapered roller bearings

FV manufactures double row and four row tapered roller bearings with longer life, multiple seals. Their seal performances are improved by amending traditional design method of full seal bearings, adopting new type seal structure. Comparing to open type bearings, the life of multiple seals double four row tapered bearings can be increased by 20 to 40%, and the lubricating consumption is decreased by 80%.

Dimension range:

FV taper roller bearing basic dimension has been listed in the dimension data table:

Single-row tapered roller bearing:

Inner ring dimension range: 20mm~1270mm

Outer ring dimension range: 40mm~1465mm

Width dimension range: 15mm~240 mm

Double-row tapered roller bearing:

Inner ring dimension range: 38mm~1560mm

Outer ring dimension range: 70mm~1800mm

Width dimension range: 50mm~460 mm

Four-row tapered roller bearing

Inner ring dimension range: 130mm~1600mm

Outer ring dimension range: 200mm~2000mm

Width dimension range: 150mm~1150 mm

Tolerance :

FV provides metric-series tapered roller bearing with common tolerance, and also products with P6X、P6、P5、P4、P2 level tolerance.All of tolerances values conform to GB307.1 Standard. The detailed tolerance value is listed in Table 16 - Table 25 .

FV manufactures inch-series tapered roller bearings with normal tolerance class; also manufacture inch-series tapered roller bearings with CL2, CL3, CL10 and CL00 tolerance level.

Selection of cement bearings

Tapered roller bearing

Metric tapered roller bearing
Class 0 tolerance (Table 16, Table 17, Table 18)

Table 16 Inner ring Diameter tolerance and radial runout u m

d mm		Δd_{mp}		V_{dp}	V_{dmp}	K_{ia}
Over	To	Upper deviation	Lower deviation	max	max	max
10	18	0	-12	12	9	15
18	30	0	-12	12	9	18
30	50	0	-12	12	9	20
50	80	0	-15	15	11	25
80	120	0	-20	20	15	30
120	180	0	-25	25	19	35
180	250	0	-30	30	23	50
250	315	0	-35	35	26	60
315	400	0	-40	40	30	70
400	500	0	-45	45	34	80
500	630	0	-60	60	40	90
630	800	0	-75	75	45	100
800	1000	0	-100	100	55	115
1000	1250	0	-125	125	65	130
1250	1600	0	-160	160	80	150
1600	2000	0	-200	200	100	170

Able 17 Outer ring Diameter and radial runout u m

d mm		ΔD_{mp}		V_{dp}	V_{dmp}	K_{ea}
Over	To	Upper deviation	Lower deviation	max	max	max
18	30	0	-12	12	9	18
30	50	0	-14	14	11	20
50	80	0	-16	16	12	25
80	120	0	-18	18	14	35
120	150	0	-20	20	15	40
150	180	0	-25	25	19	45
180	250	0	-30	30	23	50
250	315	0	-35	35	26	60
315	400	0	-40	40	30	70
400	500	0	-45	45	34	80
500	630	0	-50	50	38	100
630	800	0	-75	80	55	120
800	1000	0	-100	100	75	140
1000	1250	0	-125	130	90	160
1250	1600	0	-160	170	100	180
1600	2000	0	-200	210	110	200
2000	2500	0	-250	265	120	220

Selection of cement bearings

Tapered roller bearing

Table 18 Width—Inner and outer ring,single-row bearing and components

d mm		$\triangle B_s$		$\triangle C_s$		$\triangle T_s$		$\triangle T_{1s}$		$\triangle T_{2s}$		um
Over	To	Upper deviation	Lower deviation	Upper deviation	Lower deviation	Upper deviation	Lower deviation	Upper deviation	Lower deviation	Upper deviation	Lower deviation	
10	18	0	-120	0	-120	+200	0	+100	0	+100	0	
18	30	0	-120	0	-120	+200	0	+100	0	+100	0	
30	50	0	-120	0	-120	+200	0	+100	0	+100	0	
50	80	0	-150	0	-150	+200	0	+100	0	+100	0	
80	120	0	-200	0	-200	+200	-200	+100	-100	+100	-100	
120	180	0	-250	0	-250	+350	-250	+150	-150	+200	-100	
180	250	0	-300	0	-300	+350	-250	+150	-150	+200	-100	
250	315	0	-350	0	-350	+350	-250	+150	-150	+200	-100	
315	400	0	-400	0	-400	+400	-400	+200	-200	+200	-200	
400	500	0	-450	0	-450	+450	-450	+225	-225	+225	-225	
500	630	0	-500	0	-500	+500	-500	-	-	-	-	
630	800	0	-750	0	-750	+600	-600	-	-	-	-	
800	1000	0	-1000	0	-1000	+750	-750	-	-	-	-	
1000	1250	0	-1250	0	-1250	+900	-900	-	-	-	-	
1250	1600	0	-1600	0	-1600	+1050	-1050	-	-	-	-	
1600	2000	0	-2000	0	-2000	+1200	-1200	-	-	-	-	

Class 6X tolerance

The diameter and runout tolerance of the inner and outer ring in this tolerance level are the same as the values in Table 16 and Table 17 of Level 0.The width tolerance is specified in Table 19.

Table 19 Width—Inner and outer ring,single-row bearing and components

d mm		$\triangle B_s$		$\triangle C_s$		$\triangle T_s$		$\triangle T_{1s}$		$\triangle T_{2s}$		um
Over	To	Upper deviation	Lower deviation	Upper deviation	Lower deviation	Upper deviation	Lower deviation	Upper deviation	Lower deviation	Upper deviation	Lower deviation	
10	18	0	-50	0	-100	+100	0	+50	0	+50	0	
18	30	0	-50	0	-100	+100	0	+50	0	+50	0	
30	50	0	-50	0	-100	+100	0	+50	0	+50	0	
50	80	0	-50	0	-100	+100	0	+50	0	+50	0	
80	120	0	-50	0	-100	+100	0	+50	0	+50	0	
120	180	0	-50	0	-100	+150	0	+50	0	+100	0	
180	250	0	-50	0	-100	+150	0	+50	0	+100	0	
250	315	0	-50	0	-100	+200	0	+100	0	+100	0	
315	400	0	-50	0	-100	+200	0	+100	0	+100	0	
400	500	0	-50	0	-100	+200	0	+100	0	+100	0	

Class 5 tolerance (Table 20,Table 21)

Table 20 Width of inner ring and single-row bearing

d mm		$\triangle d_{mp}$		V_{dp}	V_{dmp}	K_{ia}	S_d	S_{ia}	$\triangle B_s$		$\triangle T_s$		um
Over	To	Upper deviation	Lower deviation	max	max	max	max	max	Upper deviation	Lower deviation	Upper deviation	Lower deviation	
10	18	0	-7	5	5	5	5	5	0	-200	+200	-200	
18	30	0	-8	6	5	5	5	5	0	-200	+200	-200	
30	50	0	-10	8	5	6	6	6	0	-240	+200	-200	
50	80	0	-12	9	6	7	7	7	0	-300	+200	-200	
80	120	0	-15	11	8	8	8	8	0	-400	+200	-200	
120	180	0	-18	14	9	11	11	11	0	-500	+350	-250	
180	250	0	-22	17	11	13	13	13	0	-600	+350	-250	
250	315	0	-25	19	13	13	13	13	0	-700	+350	-250	
315	400	0	-30	23	15	15	15	15	0	-800	+400	-400	
400	500	0	-35	28	17	20	20	20	0	-900	+450	-450	
500	630	0	-40	35	20	25	25	25	0	-1100	+500	-500	
630	800	0	-50	45	25	30	30	30	0	-1600	+600	-600	
800	1000	0	-60	60	30	37	37	37	0	-2000	+750	-750	
1000	1250	0	-75	75	37	45	45	45	0	-2000	+750	-750	
1250	1600	0	-90	90	45	55	55	55	0	-2000	+900	-900	

Selection of cement bearings

Tapered roller bearing

Table 21 Outer ring

D mm		Δ_{Dmp}		V_{dp}	V_{dmp}	K_{ea}	$S_D^{1)}$ S_{d1}	Δ_{CS}		um
Over	To	Upper deviation	Lower deviation	max	max	max	max	Upper deviation	Lower deviation	
18	30	0	-8	6	5	6	8	The same as the inner ring Δ_{Bs} of the same bearing		
30	50	0	-9	7	5	7	8			
50	80	0	-11	8	6	8	8			
80	120	0	-13	10	7	10	9			
120	150	0	-15	11	8	11	10			
150	180	0	-18	14	9	13	10			
180	250	0	-20	15	10	15	11			
250	315	0	-25	19	13	18	13			
315	400	0	-28	22	14	20	13			
400	500	0	-33	26	17	24	17			
500	630	0	-38	30	20	30	20			
630	800	0	-45	38	25	36	25			
800	1000	0	-60	50	30	43	30			
1000	1250	0	-80	65	38	52	38			
1250	1600	0	-100	90	50	62	50			
1600	2000	0	-125	120	65	73	65			

1)Not applicable to the flanged outer ring bearing

Class 4 tolerance(Table 22,Table 23)

Table 22 Width of inner ring and single-row bearing

d mm		Δ_{dmp}		Δ_{ds}		V_{dp}	V_{dmp}	K_{ia}	S_d	S_{ia}	Δ_{Bs}		Δ_{Ts}		um
Over	To	Upper deviation	Lower deviation	Upper deviation	Lower deviation	max	max	max	max	max	Upper deviation	Lower deviation	Upper deviation	Lower deviation	
10	18	0	-5	0	-5	4	4	3	3	3	0	-200	+200	-200	
18	30	0	-6	0	-6	5	4	3	4	4	0	-200	+200	-200	
30	50	0	-8	0	-8	6	5	4	4	4	0	-240	+200	-200	
50	80	0	-9	0	-9	7	5	4	5	4	0	-300	+200	-200	
80	120	0	-10	0	-10	8	5	5	5	5	0	-400	+200	-200	
120	180	0	-13	0	-13	10	7	6	6	7	0	-500	+350	-250	
180	250	0	-15	0	-15	11	8	8	7	8	0	-600	+350	-250	
250	315	0	-18	0	-18	12	9	9	8	9	0	-700	+350	-250	

Table 23 Outer ring

D mm		Δ_{Dmp}		Δ_{Ds}		V_{Dp}	V_{Dmp}	K_{ea}	$S_D^{1)}$ S_{D1}	S_{ea}	$S_{eal}^{1)}$	Δ_{Cs}		um
Over	To	Upper deviation	Lower deviation	Upper deviation	Lower deviation	max	max	max	max	max	max	Upper deviation	Lower deviation	
18	30	0	-6	0	-6	5	4	4	4	5	7	The same as the inner ring Δ_{Bs} of the same bearing		
30	50	0	-7	0	-7	5	5	5	4	5	7			
50	80	0	-9	0	-9	7	5	5	4	5	7			
80	120	0	-10	0	-10	8	5	6	5	6	8			
120	150	0	-11	0	-11	8	6	7	5	7	10			
150	180	0	-13	0	-13	10	7	8	5	8	11			
180	250	0	-15	0	-15	11	8	10	7	10	14			
250	315	0	-18	0	-18	14	9	11	8	10	14			
315	400	0	-20	0	-20	15	10	13	10	13	18			

1) Not applicable to the flanged outer ring bearing

Selection of cement bearings

Tapered roller bearing

Class 2 tolerance(Table 24,Table 25)
Table 24 Width of inner ring and single-row bearing

um														
d mm		Δ_{dmp}		Δ_{ds}		V_{dp}	V_{dmp}	K_{ia}	S_d	S_{ia}	Δ_{Bs}		Δ_{Ts}	
Over	To	Upper deviation	Lower deviation	Upper deviation	Lower deviation	max	max	max	max	max	Upper deviation	Lower deviation	Upper deviation	Lower deviation
10	18	0	-4	0	-4	2.5	1.5	2	1.5	2	0	-200	+200	-200
18	30	0	-4	0	-4	2.5	1.5	2.5	1.5	2.5	0	-200	+200	-200
30	50	0	-5	0	-5	3	2	2.5	2	2.5	0	-240	+200	-200
50	80	0	-5	0	-5	4	2	3	2	3	0	-300	+200	-200
80	120	0	-6	0	-6	5	2.5	3	2.5	3	0	-400	+200	-200
120	180	0	-7	0	-7	7	3.5	4	3.5	4	0	-500	+200	-250
180	250	0	-8	0	-8	7	4	5	5	5	0	-600	+200	-300
250	315	0	-8	0	-8	8	5	6	5.5	6	0	-700	+200	-300

Table 25 Outer ring

um														
D mm		$\triangle_{Dmp}$		$\triangle_{Ds}$		V_{Dp}	V_{Dmp}	K_{ea}	$S_D^{1)}$ S_{D1}	S_{ea}	$S_{ea}^{1)}$	$\triangle_{Cs}$		
Over	To	Upper deviation	Lower deviation	Upper deviation	Lower deviation	max	max	max	max	max	max	Upper deviation	Lower deviation	
18	30	0	-5	0	-5	4	2.5	2.5	1.5	2.5	4	The same as the inner ring $\triangle Bs$ of the same bearing		
30	50	0	-5	0	-5	4	2.5	2.5	2	2.5	4			
50	80	0	-6	0	-6	4	2.5	4	2.5	4	6			
80	120	0	-6	0	-6	5	3	5	3	5	7			
120	150	0	-7	0	-7	5	3.5	5	3.5	5	7			
150	180	0	-7	0	-7	7	4	5	4	5	7			
180	250	0	-8	0	-8	8	5	7	5	7	10			
250	315	0	-9	0	-9	8	5	7	6	7	10			
315	400	0	-10	0	-10	10	6	8	7	8	11			

1)Not applicable to the flanged outer ring bearing

Inch tolerance value of tapered roller bearing shown in Table 26 to Table 28

Table 26 Tolerance of inner ring inner diameter of bearing

d mm		Δ_{ds}							
		CL4、CL2		CL3		CL0		CL00	
Over	To	Upper deviation	Lower deviation	Upper deviation	Lower deviation	Upper deviation	Lower deviation	Upper deviation	Lower deviation
-	76.200	+13	0	+13	0	+13	0	+8	0
76.200	101.600	+25	0	+13	0	+13	0	+8	0
101.600	266.700	+25	0	+13	0	+13	0	+8	0
266.700	304.800	+25	0	+13	0	+13	0	-	-
304.800	609.600	+51	0	+25	0	+25	0	-	-

Table 27 Tolerance of inner ring and radial runout of inner and outer ring

d mm		Δ_{ds}						K_{ia} 、 K_{ea} 、 S_{ia} 、 S_{ea}				
		CL4、CL2		CL3、CL0		CL00		CL4	CL2	CL3	CL0	CL00
Over	To	Upper deviation	Lower deviation	Upper deviation	Lower deviation	Upper deviation	Lower deviation	MAX	MAX	MAX	MAX	MAX
-	266.700	+25	0	+13	0	+8	0	51	38	8	4	2
266.700	304.800	+25	0	+13	0	-	-	51	38	8	4	-
304.800	609.600	+51	0	+25	0	-	-	51	38	18	-	-

Table 28 Width tolerance of bearing

d mm		Δ_{Ts}					
		CL4、CL2		CL3、CL0		CL00	
Over	To	Upper deviation	Lower deviation	Upper deviation	Lower deviation	Upper deviation	Lower deviation
-	101.600	+203	0	+203	-203	+203	-203
101.60	266.700	+356	-254	+203	-203	+203	-203
266.700	304.800	+356	-254	+203	-203	+203	-203
304.800	609.600	+381	-381	+203	-203	+203	-203

Selection of cement bearings

Tapered roller bearing

Radial clearance
FV single-row tapered roller bearings have clearance only after installation,and it is only can be confirmed after adjusted by another bearing which is located in the opposite direction.The radial clearance of double-row and four-row tapered roller bearing shown in Table 29.

Table 29 Clearance of double - row and four - row tapered roller bearing um

Nominal inner ring diameter d mm		Group1		Group2		Group0		Group3		Group4		Group5	
Over	To	min	max	min	max	min	max	min	max	min	max	min	max
-	30	0	10	10	20	20	30	40	50	50	60	70	80
30	40	0	12	12	25	25	40	45	60	60	75	80	95
40	50	0	15	15	30	30	45	50	65	65	80	90	110
50	65	0	15	15	30	30	50	50	70	70	90	90	120
65	80	0	20	20	40	40	60	60	80	80	110	110	150
80	100	0	20	20	45	45	70	70	100	100	130	130	170
100	120	0	25	25	50	50	80	80	110	110	150	150	200
120	140	0	30	30	60	60	90	90	120	120	170	170	230
140	160	0	30	30	6	65	100	100	140	140	190	190	260
160	180	0	35	35	70	70	110	110	150	150	210	210	280
180	200	0	40	40	80	80	120	120	170	170	230	230	310
200	225	0	40	40	90	90	140	140	190	190	260	260	340
225	250	0	50	50	100	100	150	150	210	210	290	290	380
250	280	0	50	50	110	110	170	170	230	230	320	320	420
280	315	0	60	60	120	120	180	180	250	250	350	350	460
315	355	0	70	70	140	140	210	210	280	280	390	390	510
355	400	0	70	70	150	150	230	230	310	310	440	440	580
400	450	0	80	80	170	170	260	260	350	350	490	490	650
450	500	0	90	90	190	190	290	290	390	390	540	540	720
500	560	0	100	100	210	210	320	320	430	430	590	590	790
560	630	0	110	110	230	230	350	350	480	480	660	660	880
630	710	0	130	130	260	260	400	400	540	540	740	740	910
710	800	0	140	140	290	290	450	450	610	610	830	830	1100
800	900	0	160	160	330	330	500	500	670	670	920	920	1240
900	1000	0	180	180	360	360	540	540	720	720	980	980	1300
1000	1120	0	200	200	400	400	600	600	820				
1120	1250	0	220	220	450	450	670	670	900				
1250	1400	0	250	250	500	500	750	750	980				

Spherical roller bearing

Product Characteristic:
Spherical roller bearing have double row spherical roller, outer ring with a common concave type spherical raceway, inner ring with two concave type spherical raceway leans specific angle with bearing axis, the center of curvature of outer raceway is same as the center of the bearing. Spherical roller bearing is self-aligning, so the misalignment of axle & bearing housing or the deformation of axle will not be affected, can compensate the concentricity caused by previous issues. This type of bearing can not only carrying the radial load, but also can carrying double direction axial load, and the combined load, with large load carrying capacity, meanwhile this type of bearing have well vibration and shock resistance ability.

Product classification:
The spherical roller bearings manufactured by FV can be classified into following types:
Self-aligning roller bearings with cylindrical bore
Self-aligning roller bearings with tapered bore
Self-aligning roller bearings for vibrating riddles
Split self-aligning roller bearing

Self-aligning roller bearing with cylindrical bore

These bearings can be divided into CA and C types according to inner ring (with or without ribs) and cages. The CA type self-aligning roller bearings with two small ribs at the end face of the inner ring, without rib in the middle of the inner ring, Solid cage with double claws integrated structure, material are normally made by brass or carbon steel, this type of material is widely used for large or extra large bearings; C type of self-aligning roller bearings without big or small rib on the end face of inner ring, the roller is “self guided ”, there is a movable guide ring in the middle of the inner ring, cage is made by

pressed steel, The load ratings of this structure of bearing increased due to longer length of rollers, also this type of bearing have higher limit rotational speed and lower friction consumption.

Self-aligning roller bearings with tapered bore
The features of self-aligning roller bearings with tapered bore are same as self-aligning roller bearings with cylindrical bore. The difference is that their inner bore is tapered, normally the tapered is 1:12, and is denoted with the suffix K; The tapered 1:30 is applicable for 240 and 241 series, denoted with suffix K30. Self-aligning roller bearing with tapered bore can be mounted directly on conical shaft necks by nuts, and also can be fixed on shafts with cylindrical bore by adapter sleeve or withdrawal sleeve.

Vibration riddles spherical roller bearings
The new type vibration resistance self-aligning roller bearings are developed by FV especially for vibration machinery. They can be used on universal machinery. They have heavier load carrying capacity, shock resistant capacity, lower friction, lower temperature rise, and longer service life.

These bearings have the same boundary dimension as the basic type, have fixed center ribs on the inner ring, can carry axial load; cage adopts special structure, guided by bore and OD, in double direction, control the guide clearance and the movement with cage, inner ring and outer ring, can prevents from vibration and reduces vibration. The code name of vibration riddles self-aligning roller bearings is denoted with the suffix VB.

Selection of cement bearings

Spherical roller bearing

Split spherical roller bearings

This type of bearing are mainly used in the applications where it is difficult to touch bearings or separable bearings are used, and the broken down cost is expensive. For example, the cranks.

FV can manufacture different structures of split self-aligning roller bearings according to customer’s demands. In order to meet the requirements of mounting, the split inner rings and outer rings are normally adopted. The jamming rings on the two sides of wide inner rings make the mounting easy. The code name of split self-aligning roller bearings is denoted with the suffix D.

Dimension Scope:
The boundary dimensions of FV spherical roller bearing are listed in the bearing dimensions datasheet.
Bore diameter dimension range: 30mm ~ 1800mm
Outer diameter dimension range: 68mm ~ 2180mm
Width dimension range: 20mm ~ 530mm

Tolerance
FV manufactures self-aligning roller bearings with P0 and P6 precision grades. FV also can manufacture self-aligning roller bearings with P5 level products according to customer’s demands. All the tolerance values conform to GB307.1 standard. All the tolerance values are listed in the previous Table 1~ Table 6

Radial clearance
FV manufactures self-aligning roller bearings with C2, Standard (CN), C3, C4 and C5 level clearance, which all conform to GB4604 standard. The C3 group clearances are taken as standard clearance for self-aligning roller bearings with tapered bores. The radial clearance values are listed in the Table 30 & 31 the values are adapted to bearings which not mounted and without load applied.

For the bearing over or smaller than the standard clearance, can be manufactured according to customer’s demand. The clearance of self-aligning roller bearings applied to vibration riddles is C4 group clearance.

Table 30 Radial clarence of spherical roller baring with cylindrical bore

Nominal inner ring diameter d mm		Clearance										unit
		Group2		Group0		Group3		Group4		Group5		
Over	To	min	max	min	max	min	max	min	max	min	max	
14	18	10	10	20	35	35	45	45	60	60	75	
18	24	10	10	20	35	35	45	45	60	60	75	
24	30	15	15	25	40	40	55	55	75	75	95	
30	40	15	15	30	45	45	60	60	80	80	100	
40	50	20	20	35	55	55	75	75	100	100	125	
50	65	20	20	40	65	65	90	90	120	120	150	
65	80	30	30	50	80	80	110	110	145	145	180	
80	100	35	35	60	100	100	135	135	180	180	225	
100	120	40	40	75	120	120	160	160	210	210	260	
120	140	50	50	95	145	145	190	190	240	240	300	
140	160	60	60	110	170	170	220	220	280	280	350	
160	180	65	65	120	180	180	240	240	310	310	390	
180	200	70	70	130	200	200	260	260	340	340	430	
200	225	80	80	140	220	220	290	290	380	380	470	
225	250	90	90	150	240	240	320	320	420	420	520	
250	280	100	100	170	260	260	350	350	460	460	570	
280	315	110	110	190	280	280	370	370	500	500	630	
315	355	120	120	200	310	310	410	410	550	550	690	
355	400	130	130	220	340	340	450	450	600	600	750	
400	450	140	140	240	370	370	500	500	660	660	820	
450	500	140	140	260	410	410	550	550	720	720	900	
500	560	150	150	280	440	440	600	600	780	780	1000	
560	630	170	170	310	480	480	650	650	850	850	1100	
630	710	190	190	350	530	530	700	700	920	920	1190	
710	800	210	210	390	580	580	770	770	1010	1010	1300	
800	900	230	230	430	650	650	860	860	1120	1120	1440	
900	1000	260	260	480	710	710	930	930	1220	1220	1570	

Selection of cement bearings

Spherical roller bearing

Table 31 Axial clearance of spherical roller bearing with tapered bore

Nominal inner ring diameter d mm		Clearance									
		Group2		Group0		Group3		Group4		Group5	
Over	To	min	max	min	max	min	max	min	max	min	max
18	24	15	25	25	35	35	45	45	60	60	75
24	30	20	30	30	40	40	55	55	75	75	95
30	40	25	35	35	50	50	65	65	85	85	105
40	50	30	45	45	60	60	80	80	100	100	130
50	65	40	55	55	75	75	95	95	120	120	160
65	80	50	70	70	95	95	120	120	150	150	200
80	100	55	80	80	110	110	140	140	180	180	230
100	120	65	100	100	135	135	170	170	220	220	280
120	140	80	120	120	160	160	200	200	260	260	330
140	160	90	130	130	180	180	230	230	300	300	380
160	180	100	140	140	200	200	260	260	340	340	430
180	200	110	160	160	220	220	290	290	370	370	470
200	225	120	180	180	250	250	320	320	410	410	520
225	250	140	200	200	270	270	350	350	450	450	570
250	280	150	220	220	300	300	390	390	490	490	620
280	315	170	240	240	330	330	430	430	540	540	680
315	355	190	270	270	360	360	470	470	590	590	740
355	400	210	300	300	400	400	520	520	650	650	820
400	450	230	330	330	440	440	570	570	720	720	910
450	500	260	370	370	490	490	630	630	790	790	1000
500	560	290	410	410	540	540	680	680	870	870	1100
560	630	320	460	460	600	600	760	760	980	980	1230
630	710	350	510	510	670	670	850	850	1090	1090	1360
710	800	390	570	570	750	750	960	960	1220	1220	1500
800	900	440	640	640	840	840	1070	1070	1370	1370	169
900	1000	490	710	710	930	930	1190	1190	1520	1520	1860

Thrust ball bearing

Product characteristics

Thrust ball bearing consists of shaft washer, housing washer, steel balls and cage. The ring matches with shaft called shaft washer, the ring matches with housing called housing washer. If the housing washer's installation surface profile is spherical, then the bearing can be self aligned, which can reduce deviation of installation.

Thrust ball bearing, mainly bear axial loads, and can transfer massive axial loads. It can not bear radial loads. This type bearing mainly applied to steering system of automobile and machine tool spindle.

product classification

The thrust ball bearing produced by FV can be generally divided into two types:

Single direction thrust ball bearing

Double-direction thrust ball bearing

Single direction thrust ball bearing

Consists of one shaft washer, two housing washers, one center shaft washer, steel balls - cage unit. Bearing can be separated. Shaft washer, housing washers, steel ball - cage unit can be installed individually. These bearings covering 3 types:

Thrust ball bearing with plane housing washer

Thrust ball bearing with self-aligning housing washer

Thrust ball bearing with self-aligning housing washer and

self-aligning washer

Single direction trust ball bearing can carry load from single -direction and can make axial

Location in single -direction.

Double-direction thrust ball bearing

It consists of one shaft washer, two housing washers, a Center washer and ball-cage components. The bearing is detachable and shaft washer, housing washer, ball-cage components can be separately installed. It can be divided into three types:

Thrust ball bearing with plane housing washer

Thrust ball bearing with self-aligning housing washer

Thrust ball bearing with self-aligning housing washer and self-aligning washer

Double-direction trust ball bearing can carry load from double -direction and positioning axial location in double -direction.

Dimension range

The basic dimension of FV thrust ball bearing has been listed in the table

Inner ring dimension range: 25mm~1380mm

Outer ring dimension range: 42mm~1540mm

Width ring dimension range: 11mm~160 mm

Tolerance

FV standard thrust ball bearings precisions covering

Thrust bearing tolerance value,see table 32-39

Table 32 P0 tolerance shaft and bearing height

d and d2/mm		$\Delta d_{mp}, \Delta d_{mp}$		V_{dp}	V_{d2p}	S_i	ΔT_s		ΔT_{1s}	
Over	To	Upper deviation	Lower deviation	max	max	max	Upper deviation	Lower deviation	Upper deviation	Lower deviation
-	18	0	-8	6	10	10	+20	-250	+150	-400
18	30	0	-10	8	10	10	+20	-250	+150	-400
30	50	0	-12	9	10	10	+20	-250	+150	-400
50	80	0	-15	11	10	10	+20	-300	+150	-500
80	120	0	-20	15	15	15	+25	-300	+200	-500
120	180	0	-25	19	15	15	+25	-400	+200	-600
180	250	0	-30	23	20	20	+30	-400	+250	-600
250	315	0	-35	26	25	25	+40	-400		
315	400	0	-40	30	30	30	+40	-500		
400	500	0	-45	34	30	30	+50	-500		
500	630	0	-50	38	35	35	+60	-600		
630	800	0	-75	55	40	40	+70	-750		
800	1000	0	-100	75	45	45	+80	-1000		
1000	1250	0	-125	95	50	50	+100	-1400		
1250	1600	0	-160	120	60	60	+120	-1600		
1600	2000	0	-200	150	75	75	+140	-1900		
2000	2500	0	-250	190	90	90	+160	-2300		

Note: For double-direction bearing tolerance value only applicable to the bearing which $d2 \leq 190$ mm

Selection of cement bearings

Thrust ball bearing

Table 33 P0 tolerance Shaft Washer u m

D/mm		ΔD_{mp}		V_{DP}	S_e
Over	To	Upper deviation	Lower deviation	max	max
10	18	0	-11	8	The same value as the Si with the same bearing shaft washer.
18	30	0	-13	10	
30	50	0	-16	12	
50	80	0	-19	14	
80	120	0	-22	17	
120	180	0	-25	19	
180	250	0	-30	23	
250	315	0	-35	26	
315	400	0	-40	30	
400	500	0	-45	34	
500	630	0	-50	38	
630	800	0	-75	55	
800	1000	0	-100	75	
1000	1250	0	-125	95	
1250	1600	0	-160	120	
1600	2000	0	-200	150	
2000	2500	0	-250	190	
2500	2850	0	-300	225	

Note: For double-direction bearing, tolerance value only applicable to the bearing that D≤360mm

Table 35 P6 Level tolerance shaft washer u m

D/mm		ΔD_{mp}		V_{DP}	S_e
Over	To	Upper deviation	Lower deviation	max	max
10	18	0	-11	8	The same value as the Si with the same bearing shaft washer.
18	30	0	-13	10	
30	50	0	-16	12	
50	80	0	-19	14	
80	120	0	-22	17	
120	180	0	-25	19	
180	250	0	-30	23	
250	315	0	-35	26	
315	400	0	-40	30	
400	500	0	-45	34	
500	630	0	-50	38	
630	800	0	-75	55	
800	1000	0	-100	75	
1000	1250	0	-125	95	
1250	1600	0	-160	120	
1600	2000	0	-200	150	
2000	2500	0	-250	190	
2500	2850	0	-300	225	

Note: For double-direction bearing tolerance value only applicable to the bearing that D≤360mm

Table 34 P6 tolerance shaft washer and bearing height u m

d and d2/mm		$\Delta d_{mp}, \Delta d_{mp}$		V_{dp}	V_{d2p}	S_i	ΔT_s		ΔT_{1s}	
Over	To	Upper deviation	Lower deviation	max	max	max	Upper deviation	Lower deviation	Upper deviation	Lower deviation
-	18	0	-8	6	5	+20	-250	+150	-400	
18	30	0	-10	8	5	+20	-250	+150	-400	
30	50	0	-12	9	6	+20	-250	+150	-400	
50	80	0	-15	11	7	+20	-300	+150	-500	
80	120	0	-20	15	8	+25	-300	+200	-500	
120	180	0	-25	19	9	+25	-400	+200	-600	
180	250	0	-30	23	10	+30	-400	+250	-600	
250	315	0	-35	26	13	+40	-400			
315	400	0	-40	30	15	+40	-500			
400	500	0	-45	34	18	+50	-500			
500	630	0	-50	38	21	+60	-600			
630	800	0	-75	55	25	+70	-750			
800	1000	0	-100	75	30	+80	-1000			
1000	1250	0	-125	95	35	+100	-1400			
1250	1600	0	-160	120	40	+120	-1600			
1600	2000	0	-200	150	45	+140	-1900			
2000	2500	0	-250	190	50	+160	-2300			

Note: For double-direction bearing tolerance value only applicable to the bearing that d2≤190mm

Table 36 P5 tolerance shaft washer and bearing height u m

d and d2/mm		$\Delta d_{mp}, \Delta d_{mp}$		V_{dp}	V_{d2p}	S_i	ΔT_s		ΔT_{1s}	
Over	To	Upper deviation	Lower deviation	max	max	max	Upper deviation	Lower deviation	Upper deviation	Lower deviation
-	18	0	-8	6	3	+20	-250	+150	-400	
18	30	0	-10	8	3	+20	-250	+150	-400	
30	50	0	-12	9	3	+20	-250	+150	-400	
50	80	0	-15	11	4	+20	-300	+150	-500	
80	120	0	-20	15	4	+25	-300	+200	-500	
120	180	0	-25	19	5	+25	-400	+200	-600	
180	250	0	-30	23	5	+30	-400	+250	-600	
250	315	0	-35	26	7	+40	-400			
315	400	0	-40	30	7	+40	-500			
400	500	0	-45	34	9	+50	-500			
500	630	0	-50	38	11	+60	-600			
630	800	0	-75	55	13	+70	-750			
800	1000	0	-100	75	15	+80	-1000			
1000	1250	0	-125	95	18	+100	-1400			
1250	1600	0	-160	120	25	+120	-1600			
1600	2000	0	-200	150	30	+140	-1900			
2000	2500	0	-250	190	40	+160	-2300			

Note: For double-direction bearing tolerance value only applicable to the bearing that d2≤190mm

Selection of cement bearings

Thrust ball bearing

Table 37 P5 tolerance housing washer u m

D/mm		ΔD_{mp}		V_{DP}	S_e
Over	To	Upper deviation	Lower deviation	max	max
10	18	0	-11	8	The same value as the Si with the same bearing shaft washer.
18	30	0	-13	10	
30	50	0	-16	12	
50	80	0	-19	14	
80	120	0	-22	17	
120	180	0	-25	19	
180	250	0	-30	23	
250	315	0	-35	26	
315	400	0	-40	30	
400	500	0	-45	34	
500	630	0	-50	38	
630	800	0	-75	55	
800	1000	0	-100	75	
1000	1250	0	-125	95	
1250	1600	0	-160	120	
1600	2000	0	-200	150	
2000	2500	0	-250	190	
2500	2850	0	-300	225	

Note: For double-direction bearing tolerance value only applicable to the bearing that Diameters≤360mm

Table38 P4 tolerance shaft washer and bearing height u m

d and d2/mm		$\Delta d_{mp}, \Delta d_{mp}$		V_{dp}	V_{d2p}	S_i	ΔT_s		ΔT_{1s}	
Over	To	Upper deviation	Lower deviation	max	max	max	Upper deviation	Lower deviation	Upper deviation	Lower deviation
-	18	0	-7	5	2	+20	-250	+150	-400	-400
18	30	0	-8	6	2	+20	-250	+150	-400	-400
30	50	0	-10	8	2	+20	-250	+150	-400	-400
50	80	0	-12	9	3	+20	-300	+150	-500	-500
80	120	0	-15	11	3	+25	-300	+200	-500	-500
120	180	0	-18	14	4	+25	-400	+200	-600	-600
180	250	0	-22	17	4	+30	-400	+250	-600	-600
250	315	0	-25	19	5	+40	-400			
315	400	0	-30	23	5	+40	-500			
400	500	0	-35	26	6	+50	-500			
500	630	0	-40	30	7	+60	-600			
630	800	0	-50	40	8	+70	-750			

Note: For double-direction bearing tolerance value only applicable to the bearing that d2≤190mm

Table 39 P4 tolerance housing washer um

D/mm		ΔD_{mp}		V_{DP}	S_e
Over	To	Upper deviation	Lower deviation	max	max
10	18	0	-7	5	The same value as the Si with the same bearing shaft washer.
18	30	0	-8	6	
30	50	0	-9	7	
50	80	0	-11	8	
80	120	0	-13	10	
120	180	0	-15	11	
180	250	0	-20	15	
250	315	0	-25	19	
315	400	0	-28	21	
400	500	0	-33	25	
500	630	0	-38	29	
630	800	0	-45	34	
800	1000	0	-60	45	

Note: For double-direction bearing tolerance value only applicable to the bearing that D≤360mm.

Selection of cement bearings

Thrust Cylindrical Roller Bearings

Product Characteristics

This type of bearings consists of raceway washers (shaft washer and housing washer) and roller cage unit. Cylindrical rollers are produced with crown profile. Therefore, the pressure is distributed evenly between rollers and raceway surface.

The structure of this type of bearings is separable, bearing shaft washer, housing washer and rolling elements can be assembled separately. When assembled, the axle lines of the shaft and housing are not allowed to be skew.

This type of bearings is for the low rotation speed applications and can bear the axial loads from single direction, can not limit the radial displacements. The axial load capacity is large and the rigidity is also strong.

Type of bearing

Single direction thrust cylindrical roll bearing

Double direction thrust cylindrical roll bearing

Dimension range

I.D. range: 30mm~1180mm

O.D. range: 52mm~1400mm

Width diameter range: 16mm~100mm

Tolerance

The tolerance of such bearings conforms to GB307.4 standard. FV can provide this type of bearings with P0, P6, P5 tolerance. The detailed tolerance please refer to Table 32~ Table 37.

Thrust Cylindrical Roller Bearings

Product Characteristics

The tapered rollers (with larger spherical end) of these bearings are guided precisely by the integral flanges of the washers (shaft washer and housing washer) with raceways.

When extended, the design makes the tapered raceway surfaces of the shaft washer and housing washer and the sliding surface of the rollers converge towards to the same single point of the bearing axle line.

Single direction bearings can carry axial load from one direction

Double direction bearings can carry axial load from two directions

The middle washer of double direction bearings is connected with the shaft, but due to the clearance inside, a sleeve must be used to fix the middle washer in the axial direction.

The thrust tapered roller bearings with housing can avoid dirt entering and roller failing. As without cage, more rollers can be putted in, the bearings can carry bigger axial load, but due to lower limit rotation speed, they can only carry axial load in one direction.

Applications of thrust tapered roller bearings

Single direction bearings: Shaft washer is same as housing washer (all with ribs), suitable for radial direction fixing, are mainly found in crane hooks and rotating platform of oil drillings etc.

Full rollers bearings will be used when axial load is large.

During rotation, little shaft eccentric can be allowed for the bearings with plane housing washer raceway.

Double direction : in the mill roll necks.

Types of bearing

Single-direction thrust tapered roller bearings

Double-direction thrust tapered roller bearings

Thrust tapered roller bearings with housing

Dimension range

I.D. range: 50mm~670mm

O.D. range: 85mm~900mm

Width Diameter range: 22mm~230mm

Tolerance

The tolerance of FV thrust tapered roller bearings are standardized in GB307.4. FV can supply bearings with P0, P6 and P5 class. The tolerance dimensions please refer to Table 32~ Table 37.

Selection of cement bearings

Thrust Spherical Roller Bearings

Product Characteristics

Same as aligning roller bearings, housing washer raceway surface is a spherical one which takes the same point of bearing central axle as the spherical center point. The rollers of these bearings are of spherical shape, therefore they are self-aligning and they are not so sensitive to eccentricity and bending of the shaft.

Different with other thrust bearings, these bearings are featured by the extremely big axial load carrying capacity and meanwhile they can also carry certain radial load, however, the radial load should not exceed 55% of the axial load.

Types of bearings

Symmetric thrust spherical roller bearings

Asymmetric thrust spherical roller bearings

Dimension scope

The principal dimensions of FV thrust spherical roller bearings have been listed in dimension table.

I.D. range: 60mm~1120mm

O.D. range: 130mm~1460mm

Width dimension range: 39mm~354 mm

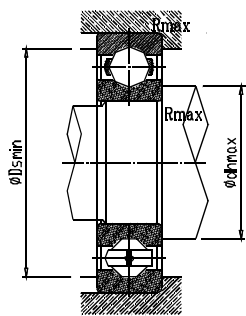
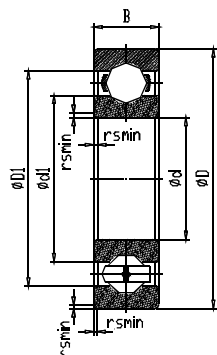
Tolerance

FV can supply bearings with P0, P6 and P5 class please refer to Table 32~ Table 37.

Cement Bearings Catalogue

Cement bearings

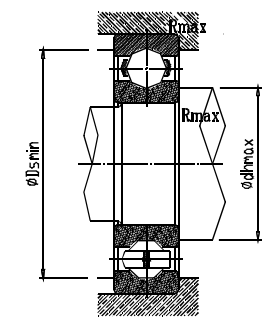
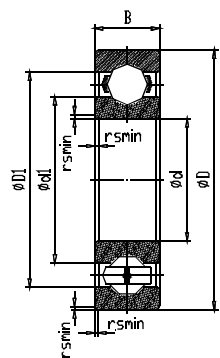
Deep groove ball bearing



Dimensions				Basic load ratings		Limit speed		Designations	Mounting related dimensions					Weight
d	D	B	rsmin	Cr	C0r	Grease	Oil		d1	D1	Dsmin	dhmax	Rmax	
mm				KN		r/min			mm					Kg
50	110	27	2	57.5	35	6300	7500	6310	68.6	91	63	97	2	1.07
110	240	50	3	195	167	2400	3000	6322	150.2	198.8	140	208	2.5	9.72
120	165	22	1.1	53	54	3600	4300	61924	133.3	151.7	130	154	1	1.21
190	340	55	4	265	305	1700	2000	6238	242	296	231	305	3	18.1
200	360	58	4	285	335	1700	2000	6240	256	310	245	320	3	22.3
200	360	58	4	288	335	1700	2000	6240-Z	256	310	245	320	3	22.5
220	300	38	2.1	133	158	1900	2400	61944M	248.8	275.2	242	280	2	8.37
240	320	38	2.1	153	186	1800	2200	61948M	265.8	298.2	260	302	2	8.5
240	360	56	3	255	315	1700	2000	6048M	276.3	323.7	269	330	2.5	20.7
260	360	46	2.1	212	269	1600	1900	61952M	290.5	330	284	336	2	14.4
260	400	65	4	294	373	1500	1800	6052M	304.3	355.7	295	364	3	28.4
280	380	46	2.1	215	282	1500	1800	61956M	309.5	350.5	303	356	2	16.4
300	460	74	4	340	480	1200	1500	6060	351.2	408	341	418	3	48.4
	420	56	3	205	370	1300	1600	61960	335.2	384.8	328	392	2.5	20.7
320	480	74	4	345	510	1100	1400	6064	371.1	428.9	361	439	3	50.3
340	460	56	3	282	420	1100	1400	61968MA	378	422	370	429	2.5	27.6
360	440	38	2.1	163	242	1100	1400	61872	384.9	415.1	380	420	2	12.2
400	540	65	4	350	580	950	1200	61980	442.7	497.3	434	506	3	43.6
400	540	65	4	350	580	950	1200	61980F3	442.7	497.3	434	506	3	39.4
400	600	90	5	480	780	900	1100	6080F3	462.9	537.1	450	550	4	86.5
400	600	90	5	475	780	900	1100	6080M	462.9	537.1	450	550	4	87.9
440	650	94	6	525	880	850	1000	6088	505.8	584.2	493	597	5	108

Cement bearings

Deep groove ball bearing

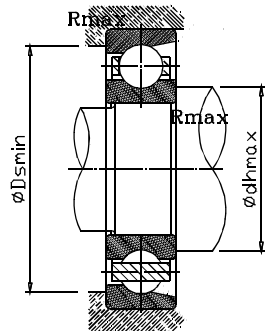
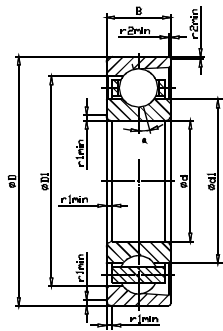


Dimensions				Basic load ratings		Limit speed		Designations	Mounting related dimensions					Weight
d	D	B	rsmin	Cr	C0r	Grease	Oil		d1	D1	Dsmin	dhmax	Rmax	
mm				KN		r/min			mm					Kg
460	580	56	3	266	435	900	1100	61892	498.4	541.6	491	549	2.5	34.3
530	650	56	3	276	480	750	900	618/530MA	570	610	562	618	2.5	42.1
710	870	74	4	435	905	530	630	618/710MA	759	821	749	831	3	98.8
800	1060	115	6	800	1900	220	280	619/800F3	880.5	979	864	995	5	289
850	1030	82	5	545	1260	430	500	618/850MA	907	973	896	984	4	141
1060	1500	195	9.5	1310	3750	250	330	60/1060	1209	1351	1179	1381	8	1141
1060	1500	195	9.5	1310	3750	250	330	60/1060/HBYB2	1209	1351	1179	1381	8	1141
1250	1750	218	9.5	1590	5000	200	250	60/1250M/P53	1418	1582	1384	1615	8	1708

Cement bearings

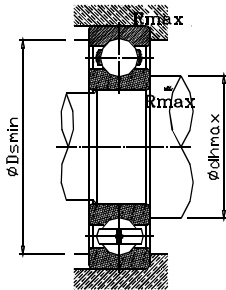
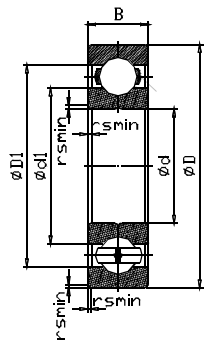
Angular contact ball bearings

Single row angular contact ball bearing



Dimensions					Basic load ratings		Limit speed		Designations	Mounting related dimensions					Weight
d	D	B	r1min	r2min	Cr	C0r	Grease	Oil		d1	D1	dhmax	Dsmin	Rmax	
mm					KN		r/min			mm					
131	264	84	3	1	280	310	2050	2730	76/131ACV	199	146	169	185	2	18.8
530	650	56	3	1.1	350	715	620	840	718/530AC/P5	570	610	562	618	2	40.1
710	870	74	4	1.5	555	1350	440	580	718/710AC/P5	763	816.9	752	827	3	96.4
850	1030	82	5	2	670	1800	330	440	718/850AC/P5	907	972	896	983	4	140
1250	1750	218	9.5	5	1670	5900	160	220	70/1250BM/P5	1435.6	1565	1398	1602	8	1625

Our point contact ball bearing

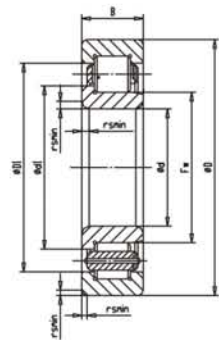


Dimensions					Basic load ratings		Limit speed		Designations	Mounting related dimensions					Weight
d	D	B	rsmin	rsmin	Cr	C0r	脂润滑	油润滑		d1	D1	dhmax	Dsmin	Rmax	
mm					KN		r/min			mm					
120	200	38	2	2	147	140	2130	2850	Qj1124	147.9	172.7	142	178	1	5.15
1060	1500	195	9.5	9.5	2620	10800	90	120	QJ10/1060A/HBP6YB2	1225	1335	1192	1368	8	1190

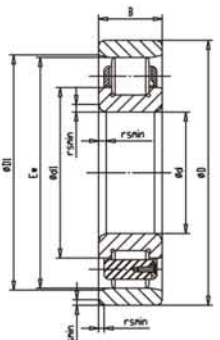
Cement bearings

Cylindrical Roller Bearing

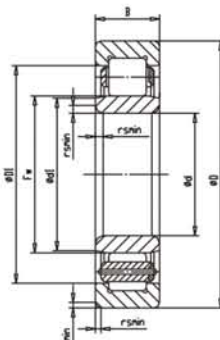
Single row cylindrical roller bearing



NJ type



N type



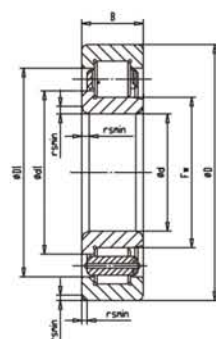
NU type

Dimensions			Basic load ratings				Limit speed		Designations	Mounting related dimensions		Weight
d	D	B	rsmin	Ew.Fw	Cr	C0r	Grease	Oil		d1	D1	
mm			mm	KN			rpm			mm		Kg
50	110	27	2	65	94.6	97	5000	6000	NJ310M	71	89.6	1.36
50	110	40	2	65	171	198	5000	6000	NJ2310EM	71.2	91.7	1.92
55	120	43	2	70.5	210	246	4800	5600	NJ2311E	77.4	100.7	2.62
60	110	22	1.5	73.5	80.3	93	5300	6300	NJ212M	78.3	93	0.952
60	130	31	2.1	77	141	150	4300	5000	NJ312M	83	107.2	2.1
60	130	46	2.1	77	188	217	4300	5000	NJ2312M	83.3	107.2	3.38
60	150	35	2.1	83	193	202	4300	5000	NJ412M	90	119.8	3.36
65	140	33	2.1	82.5	173	211	4000	4800	NJ313E	90.6	118.8	2.51
65	140	48	2.1	83.5	211	248	4000	4800	NJ2313M	90.2	121.5	3.67
70	150	51	2.1	90	248	300	3600	4300	NJ2314M	98	123.6	4.62
75	130	25	1.5	88.5	107	127	4500	5300	NJ215M	92.7	111.4	1.45
75	160	37	2.1	95.5	255	226	3400	4000	NJ315M	102.7	132.5	3.63
80	140	33	2	95.3	167	238	4000	4800	NJ2216EM	101.1	123	2.43
80	170	39	2.1	101	275	285	3200	3800	NJ316EM	110.1	144.2	4.32
80	170	58	2.1	103	304	380	3200	3800	NJ2316M	110.4	139.6	6.38
80	170	58	2.1	101	374	460	3200	3800	NJ2316E	110	143	6.94
85	180	60	3	108	375	515	3000	3600	NJ2317EM	117.5	151.5	7.64
85	210	52	4	115.5	385	425	3000	3600	NJ417M	126.3	167.5	9.83
90	160	30	2	107	171	207	3600	4300	NJ218M	114.2	136.4	2.72
90	190	64	3	115	396	505	2800	3400	NJ2318M	123.5	155.5	9.29
95	200	67	3	121.5	435	565	2600	3200	NJ2319M	130.9	165	10.2
95	200	45	3	177.5	358	420	2600	3200	N319EM	131.7	179.9	7
100	180	46	2.1	120	274	385	3200	3800	NJ2220M	127	152.6	5.86
100	215	41	3	125.1	391	440	2400	3000	NJ320EM	139.1	182.3	9.82
100	215	73	3	129.5	479	625	2400	3000	NJ2320M			
100	215	73	3	129.5	490	640	2400	3000	NJ2320M/C3YA8			

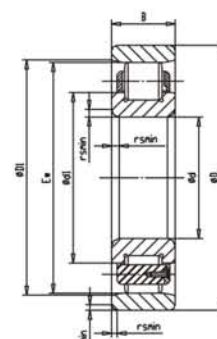
Cement bearings

Cylindrical Roller Bearing

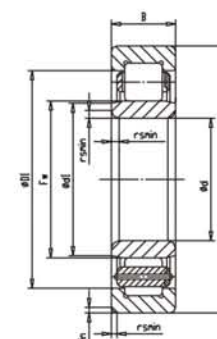
Single row cylindrical roller bearing



NJ type



N type



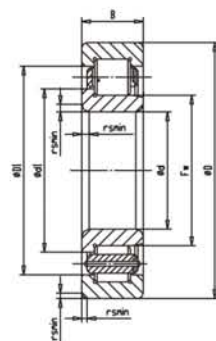
NU type

Dimensions			Basic load ratings				Limit speed		Designations	Mounting related dimensions		Weight
d	D	B	rsm	Ew.Fw	Cr	C0r	Grease	Oil		d1	D1	
mm			mm		KN		rpm			mm		Kg
110	240	80	3	143	666	800	2000	2600	NJ2322EM	155	200	18.8
120	260	86	3	154	780	1040	1900	2400	NJ2324M/C3YA8-1	166.6	214.5	24.6
130	230	93	4	243	869	1180	1800	2200	N2326M	182.2	248.4	29
130	280	93	4	167	869	1180	1800	2200	NU2326M	161.6	230.8	28.7
130	280	93	4	167	869	1180	1800	2200	NJ2326M	180	230.8	29.4
130	280	93	4	167	870	1180	1800	2200	NJ2326M/C3YA8-2	180	230.8	29.4
140	250	42	3	169	363	490	2000	2600	NJ228M	178.1	212.7	9.38
140	300	102	4	180	960	1310	1800	2200	NJ2328M	194	247	34.8
140	300	102	4	180	1000	1400	1800	2200	NJ2328M/C3YA8	194	247	34.8
150	320	108	4	193	1070	1480	1700	2000	NJ2330M	208	263.6	42.4
150	320	108	4	193	1120	1590	1700	2000	NJ2330M/C3YA8-1	208	263.6	42.4
170	360	120	4	220	1280	1850	1400	1700	NU2334M	212	295	61.3
180	320	52	4	217	615	830	1700	2000	NU236EM	214.6	276	18.7
180	380	126	4	232	1360	1850	1300	1600	NJ2336M	251	308	72
190	340	55	4	231	622	885	1600	1900	NJ238M	242.5	288	22
200	310	51	2.1	227	468	705	1900	2400	NJ1040M	238	273.2	14.7
220	400	108	4	265	1490	2280	1300	1600	NU2244EM	259.8	343	62.8
220	460	145	5	284	2040	2780	1000	1300	NU2344M	274.2	376	120
240	360	56	3	270	512	775	1700	2000	NJ1048M	280.5	320	21.1
260	480	150	5	320	2100	3600	900	1150	NU2252X2M	310.4	400	128
280	460	123.825	5	321	1900	3300	900	1150	NU2156X2M/C3YA4-1	314.9	398.1	85.5
320	580	170	5	390	2940	5200	900	1100	NU2264X2M-1	382.4	485	212
320	670	200	7.5	410	4590	7200	810	950	NU2364/HCR	397.7	562	349

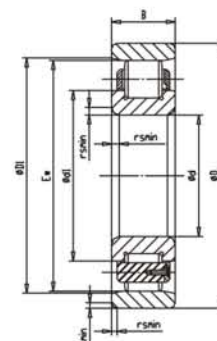
Cement bearings

Cylindrical Roller Bearing

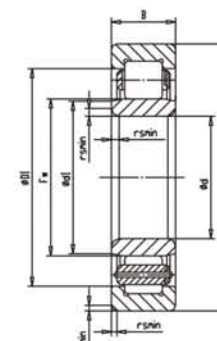
Single row cylindrical roller bearing



NJ type



N type



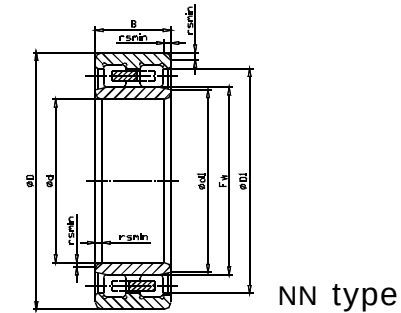
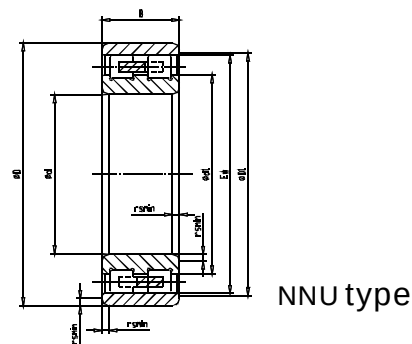
NU type

Dimensions			Basic load ratings				Limit speed		Designations	Mounting related dimensions		Weight
d	D	B	rsmin	Ew.Fw	Cr	C0r	Grease	Oil		d1	D1	
mm			mm		KN		rpm			mm		Kg
340	580	190	5	399	3300	5900	760	910	NU3168E	389	506	211
340	580	190	5	399	3300	5900	760	910	NU3168EF3	389	506	211
340	580	190	5	400	3550	6650	760	910	NU3168WB/C3	392	500	213
340	620	165	6	416	2950	4900	810	950	NU2268MA	403.2	520.8	230
360	650	232	6	435	4400	8050	800	950	NU3272M/HC	421.6	552	352
380	680	240	6	458	5860	9290	760	850	NU3276/HC	441.9	580	383
420	700	224	6	485	4950	8950	650	780	NU3184EM	473.8	609	366
440	720	226	6	508	5130	9820	600	750	NU3188F3	500.2	636	374
440	790	255	7.5	530	5760	10700	400	480	NU3288X2/HC	516.1	666	583
460	760	240	7.5	531	5450	10400	400	480	NU3192MA	520.3	665	481
460	830	212	7.5	554	5700	10000	580	670	NU2292/HCC3YAD	541.2	706	505
500	830	264	7.5	581	7500	12200	480	580	NU31/500/HCC9YA3	563.6	721	602
500	900	210	7.5	600	6500	11800	540	650	NU12/500X3/HCP6	587.9	765	606
500	920	185	7.5	605	5800	9800	540	650	NU12/500/HCERC9	592.1	778	572
500	920	185	7.5	605	5800	9800	540	650	NU12/500/HCEC9	592.1	778	572
530	710	106	5	580	2000	4600	400	500	NUP29/530F3	596	648	125
530	870	272	7.5	612	7500	13500	460	550	NU31/530/HCEC3	595.1	763	670
530	870	272	7.5	612	6900	13500	460	550	NU31/530/HG2C3	595.1	763	670
530	870	272	7.5	612	7500	13500	460	550	NU31/530/HCC3YA6	595.1	763	670
530	870	272	7.5	612	7500	13500	460	550	NU31/530	595.1	763	670
560	750	112	5	607	2400	5450	650	780	NJ29/560F3	624	687	148
600	730	60	3	696	1080	2620	620	730	NCF18/600V/HCER	644	684	49.7
700	930	160	6	760	3200	8500	500	600	NU6/700F3	750.4	851	306
850	1220	212	7.5	935	7300	15400	320	430	NU20/850EM/HC	920.5	1104	835
1400	1700	175	7.5	1637	6030	18400	175	210	N28/1400F3	1506	1644.4	836

Cement bearings

Cylindrical Roller Bearing

Double row cylindrical bearings

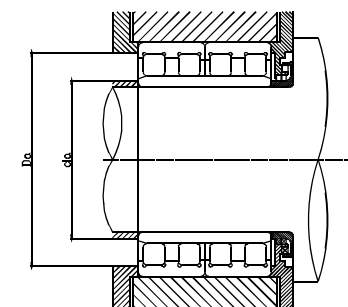
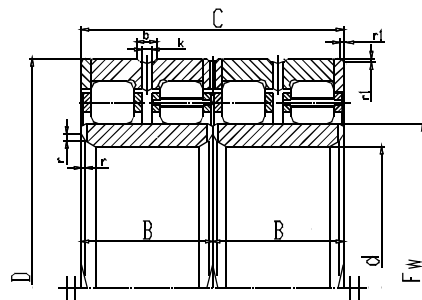


Dimensions			Basic load ratings				Limit speed			Designations	Mounting related dimensions				Weight
d	D	B	rsmin	Ew.Fw	Cr	C0r	Grease	Oil	d1		D1	b	k		
mm			mm KN				rpm				mm				Kg
220	370	150	4	258	1660	3030	1200	1400	NNU4144/W33	252.6	321	13.9	6	64.3	
260	400	140	4	295	1570	3000	1150	1500	NNU4052/W33	290.7	358	13.9	7.5	63.3	
280	420	190	4	390	2740	5650	1150	1500	NNCF5056V	323	375	9.4	5	89.4	
380	560	135	5	431	1860	3800	1300	1500	NNU3076/C3	424.6	498			113.6	
400	650	250	6	463	4700	9550	1000	1250	NNU4180/HC	454.4	568			328	
400	650	250	6	463	4700	9550	1000	1250	NNU4180/HG2C3S1W33	454.4	568	22.3	12	326	
420	620	150	5	469	2750	5570	1000	1250	NNU3084/C3	463.3	556			152	
420	760	280	7.5	507	5610	10400	810	950	NNU3284/C3	496.3	645			559	
460	680	218	6	513	4250	9300	650	780	NNU4092/W33	503.9	614	22.3	12	281	
480	790	308	7.5	557	7000	14400	500	600	NNU4196/C3W33	546.3	701	22.3	12	613	
480	790	308	7.5	557	6550	13400	500	600	NNU4196/HCW33YB2	546.3	691	27.5	12	613	
500	720	218	6	554	4900	9300	620	740	NNU40/500/HCW33	546	647	22.3	12	288	
505	820	290	6	582	6750	14100	620	740	NND6/505/HCC3YA3	571.2	713			614	
560	750	190	5	623	3210	8950	630	750	NNU49/560K/W33	615	689	22.3	12	235	
575	950	270	7.5	672.5	8250	15700	600	750	NNU6/575/HCC3	662.3	822.5			802	
600	870	200	6	805	4460	9850	600	800	NN30/600KF1/YA8	701	813.574			384	
600	980	375	7.5	699	9800	21000	600	800	NNU41/600/HCCNHW33YA3	693.4	864	22.3	12	1123	
670	1090	412	7.5	774	13700	25300	500	600	NNU41/670/HCW33	759.5	948	23.5	12	1530	

Cement bearings

Cylindrical Roller Bearing

Four row cylindrical roller bearings

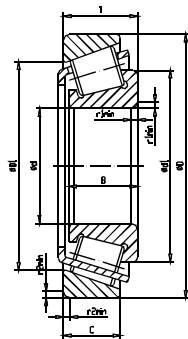


Dimensions			Basic load ratings				Limit speed		Designations	Mounting related dimensions				Weight
d	D	B	C	rmin	r1min	Fw	Cr	C0r		Da	da	b	k	
mm							KN			mm				
710	1000	715	715	7.5	7.5	780	16700	54200	FCDP142200715/HCYA4	963.5	749	22.3	12	1851
710	1050	715	715	7.5	7.5	791	21300	51000	FCDP142210715/HCEC4YAD	963.5	749	22.3	12	1851
750	1000	670	670	3	20×20°	813	17000	48500	FCDP150200670/HC	972.5	781	23.5	12	1496
800	1080	700	700	3	3	878	18800	48500	FCDP160216700/HC	1042.5	830	23.5	12	1850

Cement bearings

Tapered roller bearing

Single-row Tapered Roller Bearing (Metric Series)

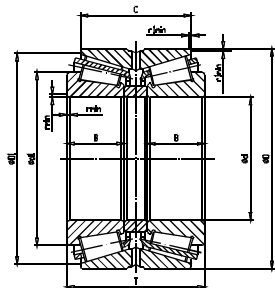


Dimensions							Limit speed		Basic load ratings		Designations	Mounting related dimensions		Weight
d	D	T	B	C	r1min	r2min	Grease	Oil	Cr	C0r		d1	D1	
mm	mm	mm	mm	mm	mm	mm	KN	KN	rpm	rpm		mm	mm	
45	85	32	32	25	1.5	1.5	4000	5300	115	150	33209	65.5	68.075	0.789
85	150	30.5	28	24	2.5	2	2400	3400	167	204	30217	113	126.685	2.05
90	160	55	55	42	2.5	2	2000	3000	330	495	33218	126	129.82	4.77
130	200	45.5	42	36	2.5	2	1500	2000	271	420	32026X2A	162.5	172.406	4.66
130	230	67.75	64	54	4	3	1500	2000	555	845	32226	177	187.088	11.5
150	270	77	73	60	4	3	1200	1700	735	1140	32230	206	219.157	18.4
160	290	84	80	67	4	3	1100	1600	925	1490	32232	222	234.942	23.3
170	360	127	120	100	3.7	3.7	950	1400	1300	2120	32334/YA6	260	282.916	63.5
170	360	127	120	100	5	5	950	1400	1440	2140	32334/YA6 - 1	260	282.916	63.5
200	360	104	98	82	5	4	900	1300	1350	2144	32240	273	294.88	42.6
200	420	146	138	115	5	5	800	1200	1820	2850	32340	300	328	90.5
220	340	76	76	57	4	3	900	1300	850	1520	32044	279	292.464	23.9
220	400	114	108	90	5	4	900	1300	1650	2770	32244	308	326.455	62.7
240	440	79	72	60	5	4	750	1000	1070	1550	30248	330	370	46.8
240	500	165	155	132	6	5	750	1000	2360	4100	32348	358.2	394	146
260	400	87	87	65	5	4	800	1100	1100	2030	32052	332	344.432	37.5
260	400	87	87	65	5	4	800	1100	1100	2030	32052/HC	332	344.432	37.5
280	420	87.7	82	71	5	4	750	1000	1000	1840	32056X2A	345.5	365.46	39.6
300	460	100	100	74	5	4	670	900	1460	2740	32060	381.5	395.676	56.6
420	620	95	90	67	5	5	600	800	1420	2940	T3GB420	512.7	547.12	88.3
510	880	350	175	121	7.5	7.5	350	450	8400	17600	306/510/HCC9DF	596	740	914
580	990	390	195	145	7.5	7.5	180	270	10600	24000	306/580/HCC9DFYB2	690	846	1297
900	1180	124	122	87	6	6	180	260	3500	9000	319/900X2	1028	1089	327

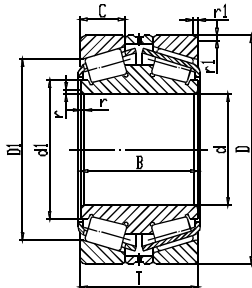
Cement bearings

Tapered roller bearing

Double row Tapered Roller Bearing (Metric series)



350000 type



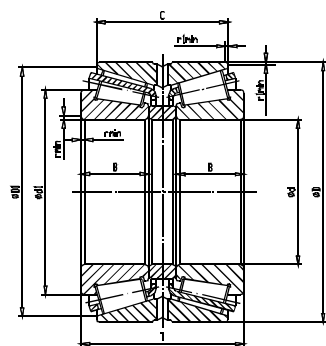
370000 type

Dimensions							Limit speed		Basic load ratings		Mounting related dimensions		Weight		
d	D	T	B	C	r1min	r2min	Grease	Oil			Cr	C0r		d1	D1
mm							KN				rpm			mm	
70	150	83	35	57	3	1	2000	2800	330	450	351314	110.5	140.949	6.25	
180	250	95	42	74	2.5	0.7	1000	1300	505	1060	352936X2	216	239.001	13.3	
220	370	195	88	150	4	1.3	760	1000	1680	3200	352144	288	343.511	76.3	
240	440	294	294	240	5	1.3	650	950	3300	6500	32248/HCDB	337	413.8	184	
260	400	155	72	108	9.5	1.6	630	840	1400	2630	352052X2 - 3	322	374.5	62.2	
340	580	243	243	94	4	4	370	500	4150	8500	370668/HC	395	488	271	
360	680	330	300	128	4	7.5	380	500	6300	12000	370672/HC	388	436	523	
360	680	330	300	128	2.5	7.5	380	500	6300	12000	370672/HCYAD	388	436	523	
360	540	185	82	140	5	1.5	460	620	2880	6300	351072	440	508.93	120	
380	560	190	82	140	5	1.5	410	540	2880	6300	351076/HCERP6XHC9	458	526.794	137	
400	780	380	380	135	5	6	360	480	7300	14800	370680X3/YAB	485	603	856	
420	740	330	330	135	3	6	350	460	6500	16000	370684/HC	502	620	642	
440	820	360	360	135	4	7.5	320	420	6100	11000	370688/HC	532	653	892	
460	860	420	380	162	6	5	340	450	10600	20600	370692 - 1/HCC3YA6	545	659.5	1130	
460	950	480	450	180	6	5	300	420	11600	24800	370692/HCP69YAD	568	708.5	1668	
480	950	480	450	180	4	7.5	250	320	11200	25100	370696/C3YB2	583	707.5	1640	
480	950	480	450	180	4	7.5	250	320	11200	25100	370696/HCEC3YB2	583	707.5	1640	
480	950	430	400	160	7.5	5	250	320	11700	22100	370696X2/HCEC9	593	751	1431	
480	950	440	440	160	9.5	9.5	250	320	11700	22100	370696X2/HCC9YB2	593	751	1467	
480	950	440	440	160	9.5	9.5	250	320	11700	22100	30696/HCDF	593	751	1468	
480	950	500	500	185	9	9	250	320	13600	25000	370696/HCP69YB2 - 2	582	713	1720	
620	1030	370	370	148	15	10	220	300	12600	23600	3706/620/HCC9	725	886.5	1265	
1370	1605	210	96	150	7.5	4	80	120	5150	20700	3506/1370	1478	1558.152	673	

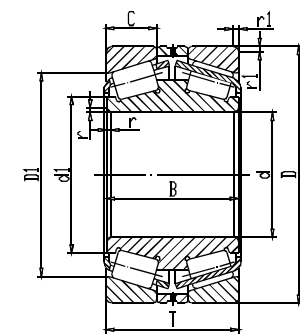
Cement bearings

Tapered roller bearing

Tapered Roller Bearing (Inch Series)



The outer ring with double raceway

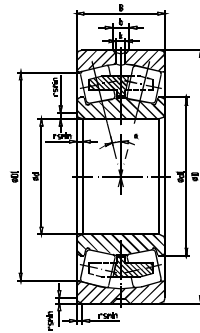


The inner ring with double raceway

Dimensions												Limit speed		Basic load ratings		Designations	Mounting related dimensions		Weight
d		D		T		B		C		r1min	rmin	Grease	Oil	Cr	Cor		d1	D1	
mm	in	mm	in	mm	in	mm	in	mm	in	mm		rpm		KN			mm		Kg
114.3	4.5	212.725	8.375	142.875	5.625	66.675	2.625	117.475	4.625	1.5	7	1500	2000	810	1390	K938/K932CD	156.8	192.759	20.8
174.625	6.875	247.65	9.75	103.188	4.0625	47.625	1.875	84.138	3.3125	0.8	3.5	940	1300	710	1500	K67787/K67720CD	216.4	237.648	15.5
177.8	7	288.925	11.375	142.875	5.625	63.5	2.5	111.125	4.375	1.5	7	940	1300	1080	1940	KHM237545/KHM237510CD/C3YA1	226	270.886	32.9
260.35	10.25	444.5	17.5	196.85	7.75	196.85	7.75	73.025	2.875	6.4	5	650	900	2560	5050	EE823103D/823175A6/YB2	298.5	370	126
260.35	10.25	419.1	16.5	184.15	7.25	84.138	3.31	136.525	5.375	1.5	6.4	650	900	1770	3890	EE435102/435165CD/C3YA1	345	396.926	92.1
279.982	11.023	380.898	14.996	139.7	5.5	65.088	2.56	107.95	4.25	1.5	3.5	600	800	1130	2830	KLM654642/KLM654610CD/C3YA1	335	370.223	41.6
288.925	11.375	406.6	16	165.1	6.5	77.788	3.0625	130.175	5.125	1	6.4	580	770	1720	4150	KM255449/KM255410CD	345	387.19	64.1
304.8	12	501.65	19.75	161.922	6.3749	161.925	6.375	61.117	2.4062	6.4	3.3	500	660	2800	4700	HM258949D/HM258910	357.8	433.3	129

Cement bearings

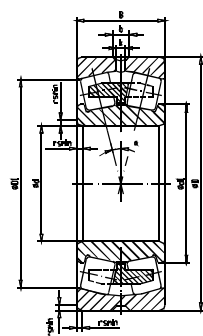
Spherical roller bearing



Dimensions				Basic load ratings			Designations	Other dimensions			
d	D	B	rsmin	Cr	C0r	d1		D1	b	k	
mm				KN				mm			
40	80	23	1.1	91.7	85.5	22208C	22208C/W33	50.4	68.9	5.5	2
55	100	25	1.5	119	120	22211CA	22211CA/W33	68.8	87.3	5.5	2
60	130	46	2.1	295	318	22312CA	22312CA/W33	81.4	108	5.5	3
65	120	31	1.5	183	205	22213CA	22213CA/W33	81.5	103	5.5	2.5
65	140	48	2.1	323	342	22313CA	22313CA/W33	88.6	116	5.5	3
75	130	31	1.5	201	228	22215CA	22215CA/W33	92	114	5.5	2.5
80	170	58	2.1	466	513	22316CA	22316CA/W33	109	142	8.3	4
90	160	40	2	269	356	22218CA	22218CA/W33	111	139	8.3	2.5
90	190	64	3	580	660	22318CA	22318CA/W33	123	159	8.3	5
90	190	43	3	580	660	21318CA/C3W33		112	150	8.3	4.5
95	200	45	3	404	466	21319CA/C3W33		112	150	8.3	4.5
100	215	73	3	774	903	22320CA	22320CA/W33	138	179	11.1	5
110	200	69.8	2.1	570	727	23222CA	23222CA/W33	138	168	12	5
120	180	60	2	410	640	24024CA	24024CA/W33	139	158	5.5	4
120	260	86	3	840	1100	22324CA/C3		165	215	13.9	6
130	230	80	3	740	1000	23226CA	23226CA/W33	161	194	12	5
140	225	68	2.1	600	860	23128CA	23128CA/W33	166	196	8.3	5
140	250	88	3	1000	1365	23228CA/W33		173	215	15	6
150	270	73	3	810	1030	22230CS/W33		179	234	13.9	7.5
160	340	114	4	1520	1860	22332CAK	22332CA/W33	201	284		
160	340	114	4	1520	1860	22332CA		201	284	16.7	7
180	320	86	4	1030	1550	22236CAK/C3W33T	22236CA/W33	223	278	14	8
180	380	126	4	1900	2330	22336CA		242	316	22.3	8
190	340	92	4	1210	1620	22238C	22238C/W33	235	293	16.7	6

Cement bearings

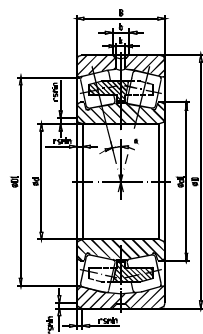
Spherical roller bearing



Dimensions				Basic load ratings				Other dimensions			
d	D	B	rsmin	Cr	C0r	Designations		d1	D1	b	k
mm				KN				mm			
200	340	112	3	1300	2240	23140CA	23140CA/W33	243	292	16.7	7
220	340	90	3	1160	1770	23044CA	23044CA/W33	260	303	13.9	6
220	340	118	3	1270	2500	24044CA/W33		257	295	11.1	5
220	370	120	4	1510	2710	23144CA/C3W33		268	320	16.7	7
220	370	150	4	1800	3410	24144CA/C3W33		262	308	11.1	6
220	400	108	4	1490	2400	22244CA/C3W33		275	344	16.7	8
220	400	108	4	1550	2400	22244CAK/C3W33		275	344	16.7	9
220	400	108	4	1550	2400	22244CAK/C3W33T		275	344	16.0	10
240	360	92	3	1230	1980	23048CA	23048CA/W33	278	322	13.9	6
240	360	92	3	1130	2080	23048C/W33		271	325	13.9	7.5
240	400	160	4	2010	3400	24148CA/C3W33		285	336	11.1	6
240	440	160	4	2950	3800	23248CA/W33		292	369	22.3	8
260	400	140	4	1710	3500	24052CA/W33		300	347	11.1	6
260	440	144	4	2420	3700	23152CA	23152CA/W33	310	379	16.7	9
260	480	130	5	2520	3370	22252CA	22252CA/W33	330	414	22.3	12
260	480	174	5	3090	4510	23252CA/W33		320	404	22.3	8
260	480	174	5	3090	4510	23252CA/W33X	23252CA/W33T	320	404	22.3	12
280	460	146	5	2520	4040	23156CA	23156CA/W33	333	400	16.7	8
280	460	180	5	2900	4840	24156CA/HCW33	24156CA/W33	327	388	13.9	8
280	500	176	5	2580	5100	23256CA/C3YA1W33		349	424	22.3	8
280	500	180	5	2400	4400	24156/W33+MT24156		329	391.5	19.5	8
280	580	175	6	3800	4940	22356CA/W33	22356CA	364	485	22.3	8
280	580	175	6	3800	5250	22356/W33		372	485	22.3	8
300	460	160	4	2570	4510	24060CA	24060CA/W33	342	399	13.9	7
300	500	160	5	3040	4850	23160CAF1/C3		356	433	16.7	9
300	500	200	5	3560	5990	24160CA	24160CA/W33	356	420	13.9	6
300	540	192	5	3700	5560	23260CA	23260CA/W33T	373	455	22	10
300	540	192	5	3600	5950	23260CA/C3YA1W33		372	455	22.3	10
300	580	218	5	3280	6250	24164/W33+MT24164		377.1	453.5	19.5	8
320	480	121	4	2130	3610	23064CA	23064CA/W33	368	431	16.7	8
320	480	160	4	2700	4850	24064CA	24064CA/W33	368	421	22	8
320	480	160	4	2700	4850	24064CAF3	24064CAF3/W33	368	421	22	8
320	540	210	5	4040	6750	24164CA/W33	24164CA/W33T	382	457.4	16.7	9

Cement bearings

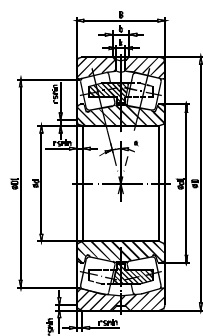
Spherical roller bearing



Dimensions				Basic load ratings				Other dimensions			
d	D	B	rsmin	Cr	C0r	Designations					
mm				KN							
								mm			
320	540	218	5	3450	6500	24164CAK30/W33		382	457.4	16.7	9
320	580	150	5	3420	4660	22264CA	22264CA/W33	400	502	22.3	8
320	580	208	5	4180	6370	23264CA	23264CA/W33	400	490	24	10
340	520	180	5	3280	5890	24068CA/W33	24068CA/C9W33	394	451	16.7	8
340	540	210	5	4040	6750	24164CA/W33	24164CA/W33T	364	455	16.7	9
340	540	210	5	4040	6750	24164CAK30/C3W33		364	455	16.7	9
340	580	190	5	4040	6460	23168CA	23168CA/W33	412	497	22.3	8
340	580	208	5	4180	6370	23264CA/C3YA1W33	23264/W33	400	490	24	10
340	580	243	5	5040	8220	24168CAK30/W33		408	486	22.3	10
340	580	243	5	5040	8220	24168CA/W33		408	486	22.3	10
360	600	192	5	4080	6600	23172CAK/W33		434	518	22.3	12
360	600	243	5	5320	8840	24172CA	24172CA/W33	430	511	20	12
360	600	192	5	3350	6200	23172K/C3W33		432	517	22.3	12
360	650	232	6	5050	9050	23272CA/C3YA1W33		443	547	22.3	10
360	650	232	6	5050	9050	23272CA/HC		443	547		
360	750	224	7.5	5650	8600	22372CA/W33		471	631	22.3	12
380	560	135	5	2750	4750	23076CA	23076CA/W33	441	505	22.3	8
380	620	194	5	4180	6750	23176/W33		457	540	22	8
380	620	194	5	4180	6750	23176CA/W33	23176CA/W33T	457	540	22	8
380	620	243	5	4600	9200	24176CAK30/W33		448	531	16.7	9
380	680	240	6	5560	8690	23276CA/C3YA1W33		471	581	22.3	12
400	600	148	5	3090	5420	23080CA	23080CA/P5W33	460	538	22	12
400	600	200	5	4090	7600	24080CA/W33		458	524	22	12
400	650	200	6	4420	7270	23180CA	23180CA/W33	480	568	22.3	8
400	650	200	6	4140	7860	23180/C3W33		475	568	22.3	8
400	650	250	6	5890	10070	24180CA	24180CA/W33	476	563	22.3	8
400	650	250	6	5890	10070	24180CA/HG2C3S1W33		476	563	22.3	8
400	720	256	6	6220	9880	23280CA	23280CA/W33	499	606	22	10
400	820	243	7.5	7120	9880	22380CA		520	694		
440	720	226	6	5700	9500	23188CA		522	626		
460	680	163	6	3705	6602.5	23092CA	23092CA/W33	531	613	23.5	12
480	870	310	7.5	8835	14250	23296CA/W33		581	732	22.3	12

Cement bearings

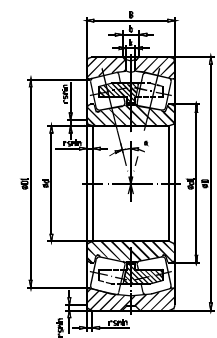
Spherical roller bearing



Dimensions				Basic load ratings				Other dimensions			
d	D	B	rsmin	Cr	C0r	Designations					
mm				KN				mm			
480	870	310	7.5	8835	14250	23296CAKF3	23296CAKF3/W33	581	732	22.3	12
530	780	185	6	4845	8835	230/530CAF3	230/530CAF3/W33X	614	703	24	12
530	980	335	9.5	10545	19380	232/530CAK30/W33		656	818	22.3	12
560	920	280	7.5	8692.5	15200	231/560CA/W33	231/560CAF3/W33	677	803	22.3	12
560	920	355	7.5	9350	19700	241/560/W33YA3		662	784	22.3	12
600	870	272	6	7742.5	16150	240/600CA/W33	232/600CAK/W33	682	770	22.3	12
600	980	375	7.5	10925	22420	241/600CAK30/W33		709	827	22	8
600	1090	388	9.5	12445	24225	232/600CAKF3/YA2W33		750	920	22.3	12
630	920	212	7.5	5150	12800	230/630CA/C3W33		721	831	22.3	9
670	980	230	7.5	7267.5	13870	230/670CA/W33		760	885	22.3	12
670	1090	336	7.5	10355	21280	231/670CA/C3W33		801	958	22.3	12
670	1090	412	7.5	14000	31500	241/670CAK30/C3W33		786	928	22.3	12
700	950	180	6	4970	11900	206/700CAF3/C3W33		780	877	13.3	12
750	1220	475	9.5	16435	35625	241/750CAK30/W33	232/750CAK30/W33	872	1039	22.3	12
750	1220	475	9.5	16435	35625	241/750CA/W33		872	1039	22.3	12
750	1360	475	15	17765	34675	232/750CAKF3/W33		930	1145	22.3	12
750	1360	475	15	17765	34675	232/750CAK/W33		930	1145	22.3	12
800	1150	258	7.5	9500	19000	230/800CA/W33	230/800X3CAF3/C3W33	900	1029	22.3	12
800	1420	488	15	19900	41000	232/800CAK30/C3W33		989	1198	22.3	12
900	1420	515	12	20330	46550	241/900CAK30/W33	241/900CAK30F3/W33	1042	1233	22.3	12
900	1580	515	15	23600	49000	232/900CAK30/C3W33		1114	1353		20
900	1580	515	15	23600	49000	232/900CAK30F3/C3W33		1114	1353		20
950	1500	438	12	18500	41600	231/950CA		1121	1319		
1000	1320	315	7.5	9880	27550	249/1000CA/C3W33	230/1000CAF3/W33	1108	1211	22.3	12
1000	1420	260	7.5	10600	24000	220/1000X2CAF3/C3W33		1129	1304	22.3	12
1000	1420	308	7.5	12065	28975	230/1000CAF1/W33		1140	1303	22.3	12
1060	1400	260	7.5	9450	25400	239/1060X2CAF3/W33		1172	1299	22.3	12

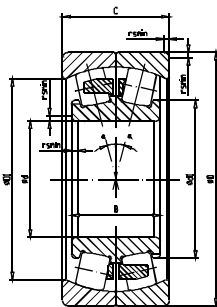
Cement bearings

Spherical roller bearing



Dimensions				Basic load ratings			Designations	Other dimensions			
d	D	B	rsmin	Cr	C0r	d1		D1	b	k	
mm				KN				mm			
1120	1750	630	15	29500	72000	241/1120K30F3/W33X	249/1320CAF3/W33	1297	1509		16
1320	1600	280	6	9291	31825	248/1320CA/C4W33		1418	1513	22.3	12
1320	1720	400	7.5	15295	46550	249/1320CA/W33		1446	1588	24	12
1350	1650	315	7.5	11600	39500	206/1350CAF3/C4W33		1450	1553	22.3	12
1440	1760	315	7.5	11500	39700	206/1440F3/C3W20		1545	1650		12

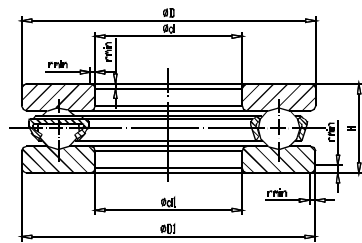
Split spherical roller bearing



Dimensions					Basic load ratings			Other dimensions		Weight		
d	D	B	C	rsmin				Cr	C0r		d1	D1
mm								KN			mm	
110	180	69	82	2	440	740	24122X2D-TC	130	147	7.81		
120	215	76	98	2	580	920	23224X2D-TC	150	171	14.2		

Cement bearings

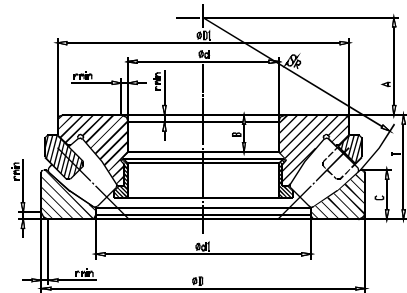
Thrust ball bearing



Dimensions				Basic load ratings		Limit speed		Designations	Mounting related dimensions		Weight
d	D	H	rmin	Ca	C0a	Grease	Oil		d1	D1	
mm				KN		rpm			mm		
55	105	35	1.1	119	174	1600	2200	51311	105	57	1.35
65	100	27	1	75.4	151	1800	2600	51213	100	67	0.733
110	190	63	2	304	588	850	1200	51322M	187	113	7.36
360	440	65	2	430	1890	560	750	51172	436	364	23.9
600	710	85	3	720	4450	380	500	511/600	705	604	64.9

Cement bearings

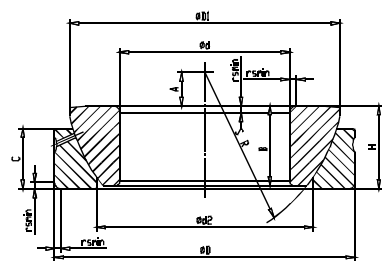
Thrust self-aligning roller bearings (asymmetric)



Dimensions				Basic load ratings		Limit speed		Designations	Mounting related dimensions					Weight
d	D	T	rmin	Ca	C0a	Grease	Oil		d1	D1	B	C	A	
mm				KN		r/min			mm					
130	225	58	2.1	715	2260	1000	1500	29326	168	206.7	19	27.8	76	8.48
160	320	95	5	1650	5330	700	1000	29432	218.5	285	34	46.9	99	32.8
190	380	115	5	2280	3900	630	850	29438	263	345	41	53.7	117	75.6
300	480	109	5	2530	10500	700	750	29360	371.5	448	37	53	168	72.7
320	580	155	7.5	4500	17600	430	560	29464	420	534	55	75	191	182
400	620	132	6	3500	16800	440	620	29380	489	582	44	64.7	225	153
530	710	109	5	5000	16600	350	500	292/530	604	680	35	54	288	118
750	1120	224	9.5	10300	49100	160	200	293/750	910	1055	76	108	415	703
950	1250	180	705	8430	46900	180	240	292/950	1081	1185	58	88	507	537
1060	1400	206	9.5	10500	62000	180	260	292/1060	1208	1335	66	100	566	767

Cement bearings

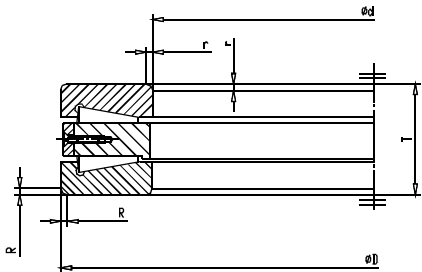
Thrust joint bearing



Dimensions						Basic load ratings		Designations	Other dimensions		Weight
d	D	H	B	C	rsmin	Ca	C0a		d2	D1	
mm						KN			mm		
35	90	28	22	22	0.6	254	1520	GX35	52	84	1.04
40	105	32	27	20	0.6	365	2200	Gx40	58	98	1.65

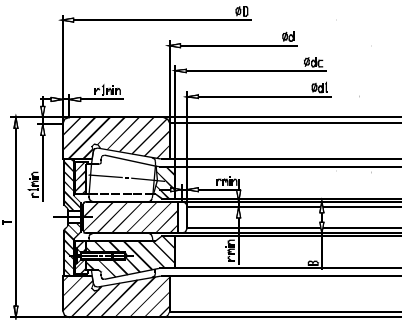
Thrust tapered roller bearing

Dimensions							Designations	Weight
d	D	T	R	r	Ca	C0a		Kg
mm								
320	580	155	7.5	7.5	0.6	0.6	99464	193
600	860	125	6	6	0.6	0.6	917/600/HC	269



Bidirectional thrust conical roller bearing

Dimensions					Designations	Other dimensions					Weight
d	D	T	Ca	C0a		B	d1	Dc	rmin	rlmin	
KN						mm					Kg
470	620	185	2700	13000	92784/YA2	50	420	463	1.5	3	187



Note:



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