

# Single Row Deep Groove Ball Bearings



Single row deep groove ball bearings are the most common bearing type and are designed as non-separable and are without a filling slot. Good conformity to raceways is achieved by optimum size and number of balls and relatively high load ratings are achieved. They accommodate both radial and axial loads in both directions and are suitable for high rotational speeds.

Outer ring design of separable single row ball bearings - type E and BO enables separate mounting of inner ring with cage and rolling elements. The bearings are produced from bore diameter  $d = 20$  mm and are suitable for smaller loads and high-rotational applications.

## Boundary Dimensions

Boundary dimensions except for separable single row ball bearings - type E and BO correspond to the standard ISO 15.

Snap ring groove dimensions comply with the standard ISO 464.

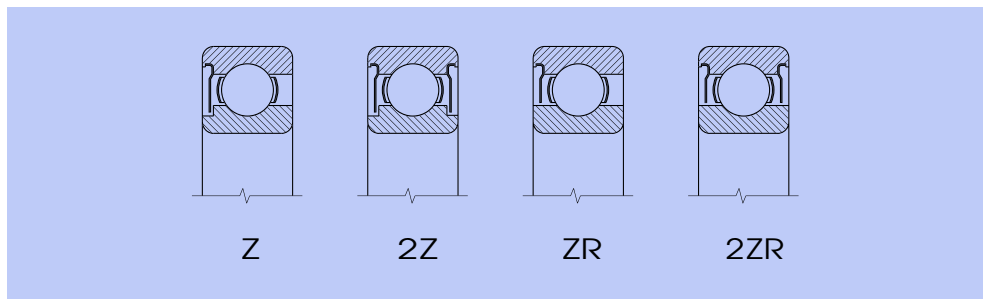
## Designation

Bearing designation in standard design and common modifications (Z, RS, ZZ, ZRS, N) are shown in the dimension tables. Deviation from standard design is designated by prefixes and suffixes [section 2.2].

## Shielded or Sealed Bearings

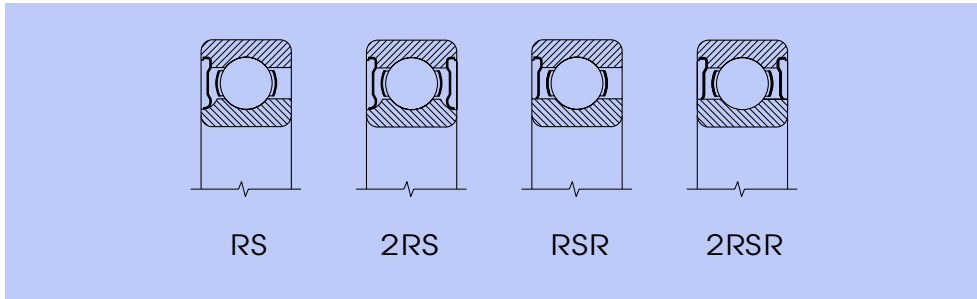
Single row deep groove ball bearings with shields or seals on one or both sides are produced with metal shields (Z, ZZ, ZR, ZZR) or seals (RS, ZRS, RSR, ZRSR) as non-separable units.

The shields create a non-contact sealing. Sealing rings are made of rubber, vulcanized on a metal reinforcing ring and act in the bearing as an effective friction type sealing.



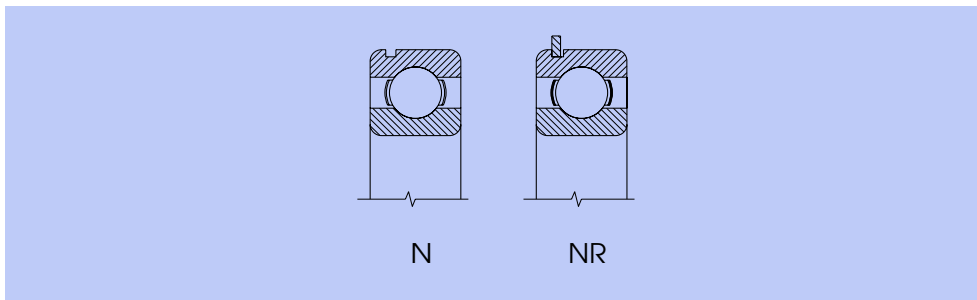
Bearings with sealings on both sides are filled with grease which assures reliable lubricating conditions for the whole bearing life. These bearings are suitable for temperature ranges

of -30°C to +110°C. Delivery of bearings with another grease must be agreed with the supplier in advance.



### Bearings with Snap Ring Groove

For simple securing against axial displacement in the housing single row ball bearings with snap groove on outer ring are manufactured (N). When the bearing is delivered with inserted snap ring, it is designated (NR). Bearings with a snap ring groove can also be delivered with assembled seals.



### Cage

Single row ball bearings in standard design usually have a cage according to the table. Material symbol (J, Y, M, F) and design of the cage are not mostly indicated.

Bearings with Pressed Steel or Brass Cage	Bearings with Machined Brass or Steel Cage
d<10mm (619/2 to 629) <sup>1)</sup>	-
-	61926
16001 to 16030	-
6000 to 6034	6036 to 6040
6200 to 6230	6232 to 6240
6300 to 6324	6326 to 6330
6403 to 6417	6418
E15 to E20, BO17	-

1) Bearing 618/8 is made with a solid cage made of polyamide (TNH)

For special arrangements bearings with different cages made of various materials are produced: polyamide (TNH, TNB) and textite (TB). Using of these bearings should be discussed in advance.

### Tolerance

Single row ball bearings are produced in normal tolerance class P0, this symbol is not indicated. Limiting values for dimension and operation accuracy comply with the standard ISO 199 and ISO 492. Exceptions are only separable single row ball bearings - type E and BO, outer diameter of which has limiting deviation  $0 +0.01/0.00$  mm.

## Radial Clearance

Single row ball bearings delivered without radial clearance designation are produced with normal radial clearance. Radial clearance values comply with the standard ISO 5753.

## Vibration Level

Commonly manufactured single row ball bearings have a normal vibration level checked by the manufacturer. Bearings in tolerance class P5 and higher have the vibration level C6. For special arrangements bearings with reduced vibration level C6, C06 and C66 are produced.

## Tapered Bore

For some less demanding arrangements some sizes of single row ball bearings - type 62 and 63 with tapered bore, taper 1:12 can be produced. Fixing of bearings on the cylindrical journal is made by means of adapter sleeves or directly on the tapered journal.

## Bearings for Arrangements at High Operating Temperatures

For arrangements working at operating temperature to 400°C single row bearings with adequately great radial clearance according to technical conditions between producer and customer are delivered.

These bearings have reduced basic dynamic load rating in average of 50% and basic static load rating of 30% in comparison with bearings in standard design.

## Misalignment

For single row ball bearings only small mutual misalignment of bearing rings is permissible, therefore alignment deviation of seating surfaces can be very small. Misalignment causes additional loading of the bearing and thus its life is shortened.

Values of permissible misalignment at normal operating conditions are shown in the table.

Bearing Type	Load	
	light ( $F_r < 0.15C_{or}$ )	heavy ( $F_r \geq 0.15C_{or}$ )
618, 619, 160, 60	2' to 6'	5' to 10'
62, 63, 64	5' to 10'	8' to 16'

## Radial Equivalent Dynamic Load

Single Row Ball Bearings

$$P_r = X F_r + Y F_a$$

[kN]

$\frac{F_a}{C_{or}}$	Radial Clearance																	
	normal						C3						C4					
	$F_a/F_r \leq e$			$F_a/F_r > e$			$F_a/F_r \leq e$			$F_a/F_r > e$			$F_a/F_r \leq e$			$F_a/F_r > e$		
e	X	Y	X	Y		e	X	Y	X	Y	e	X	Y	X	Y			
0.025	0.22	1	0	0.56	2.0	0.31	1	0	0.46	1.75	0.40	1	0	0.44	1.42			
0.040	0.24	1	0	0.56	1.8	0.33	1	0	0.46	1.62	0.42	1	0	0.44	1.36			
0.070	0.27	1	0	0.56	1.6	0.36	1	0	0.46	1.46	0.44	1	0	0.44	1.27			
0.130	0.31	1	0	0.56	1.4	0.41	1	0	0.46	1.30	0.48	1	0	0.44	1.16			
0.250	0.37	1	0	0.56	1.2	0.46	1	0	0.46	1.14	0.53	1	0	0.44	1.05			
0.500	0.44	1	0	0.56	1.0	0.54	1	0	0.46	1.00	0.56	1	0	0.44	1.00			



Factor X and Y values are valid, if the bearings on the journal and in the housing will be fitted in tolerances recommended for small and medium loads (tables 28 and 29) and during operation significant reduction of radial clearance due to operating temperature does not come into being (temperature gradient between inner and outer ring max. 10°C).

**Separable Single Row Ball Bearings:**

$$\begin{array}{lll} P_r = F_r & \text{for } F_a / F_r \leq 0.2 & [\text{kN}] \\ P_r = 0.5 F_r + 2.5 F_a & \text{for } F_a / F_r > 0.2 & [\text{kN}] \end{array}$$

**Radial Equivalent Static Load :**

**Single Row Deep Groove Ball Bearings :**

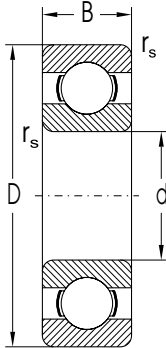
$$P_{or} = 0.6F_r + 0.5F_a \quad (P_{or} \geq F_r) \quad [\text{kN}]$$

**Separable Single Row Ball Bearings:**

$$P_{or} = 0.9F_r + 0.3F_a \quad (P_{or} \geq F_r) \quad [\text{kN}]$$

## Single Row Deep Groove Ball Bearings

d = 2 to 17 mm

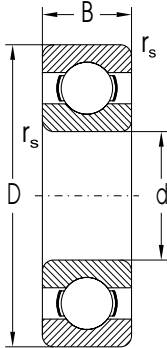


Dimensions				Basic Load Rating Dynamic C <sub>r</sub>	Static C <sub>0r</sub>	Fatigue load limit P <sub>u</sub>	Limiting Speed for Lubrication with		Bearing Designation
d	D	B	r <sub>s</sub> min				Grease	Oil	
mm				kN		kN	min <sup>-1</sup>		
2	6	2.3	0.10	0.279	0.090	0.004	63000	79000	<b>619/2</b>
3	10	4.0	0.15	0.645	0.229	0.010	40000	50000	<b>623</b>
4	13	5.0	0.20	1.168	0.412	0.019	38000	45000	<b>624</b>
	16	5.0	0.30	1.875	0.677	0.031	35000	42000	<b>634</b>
5	13	4.0	0.20	1.079	0.432	0.020	47000	56000	<b>619/5</b>
	16	5.0	0.30	1.875	0.677	0.031	35000	42000	<b>625</b>
	19	6.0	0.30	2.838	1.078	0.049	35000	42000	<b>635</b>
6	15	5.0	0.20	1.470	0.599	0.027	42000	50000	<b>619/6</b>
	19	6.0	0.30	2.838	1.078	0.049	35000	42000	<b>626</b>
7	19	6.0	0.30	2.838	1.078	0.049	35000	42000	<b>607</b>
	22	7.0	0.30	3.282	1.356	0.062	35000	42000	<b>627</b>
8	16	4.0	0.20	1.550	0.722	0.033	35000	42000	<b>618/8TNH</b>
	22	7.0	0.30	3.282	1.356	0.062	35000	42000	<b>608</b>
9	24	7.0	0.30	3.668	1.640	0.075	35000	42000	<b>609</b>
	26	8.0	0.30	4.557	1.955	0.089	35000	42000	<b>629</b>
10	26	8.0	0.30	4.557	1.955	0.089	28000	33000	<b>6000</b>
	30	9.0	0.60	6.047	2.510	0.114	25000	30000	<b>6200</b>
	30	14.0	0.60	6.047	2.510	0.114	25000	30000	<b>62200</b>
	35	11.0	0.60	8.072	3.430	0.156	22000	27000	<b>6300</b>
12	28	7.0	0.30	5.094	2.360	0.107	25000	30000	<b>16001</b>
	28	8.0	0.30	5.094	2.360	0.107	25000	30000	<b>6001</b>
	32	10.0	0.60	6.905	3.100	0.141	22000	27000	<b>6201</b>
	32	14.0	0.60	6.905	3.100	0.141	22000	27000	<b>62201</b>
	37	12.0	1.00	9.759	4.235	0.193	20000	24000	<b>6301</b>
15	32	8.0	0.30	5.594	2.860	0.130	21000	25000	<b>16002</b>
	32	9.0	0.30	5.594	2.865	0.130	21000	25000	<b>6002</b>
	35	11.0	0.60	7.718	3.745	0.170	20000	24000	<b>6202</b>
	35	14.0	0.60	7.718	3.745	0.170	20000	24000	<b>62202</b>
	42	13.0	1.00	11.310	5.330	0.242	18000	21000	<b>6302</b>
17	35	8.0	0.30	5.999	3.265	0.148	20000	24000	<b>16003</b>
	35	10.0	0.30	6.001	3.267	0.149	20000	24000	<b>6003</b>
	40	12.0	0.60	9.534	4.734	0.215	18000	21000	<b>6203</b>
	40	16.0	0.60	9.534	4.734	0.215	18000	21000	<b>62203</b>
	47	14.0	1.00	13.565	6.560	0.298	16000	19000	<b>6303</b>

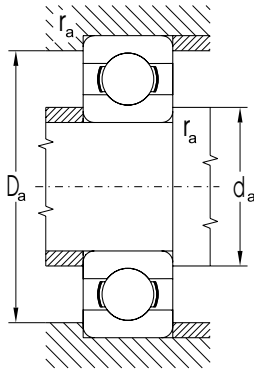


## Single Row Deep Groove Ball Bearings

d = 20 to 50 mm



Dimensions				Basic Load Rating Dynamic C <sub>r</sub>	Static C <sub>or</sub>	Fatigue load limit P <sub>u</sub>	Limiting Speed for Lubrication with		Bearing Designation
d	D	B	r <sub>s</sub> min				Grease	Oil	
mm				kN		kN	min <sup>-1</sup>		
20	42	8.0	0.30	9.371	4.972	0.226	17000	20000	<b>16004D</b>
	42	12.0	0.60	9.371	4.972	0.226	17000	20000	<b>6004</b>
	47	14.0	1.00	12.774	6.553	0.298	15000	18000	<b>6204</b>
	47	18.0	1.00	12.774	6.553	0.298	15000	18000	<b>62204</b>
	47	20.6	1.00	12.774	6.553	0.298	15000	18000	<b>63204</b>
	52	15.0	1.10	15.866	7.811	0.355	14000	17000	<b>6304</b>
25	52	21.0	1.10	15.866	7.811	0.355	14000	17000	<b>62304</b>
	47	8.0	0.30	6.950	4.550	0.207	14000	17000	<b>16005</b>
	47	8.0	0.30	10.070	5.806	0.264	14000	17000	<b>16005D</b>
	47	12.0	0.60	10.070	5.806	0.264	14000	17000	<b>6005</b>
	52	15.0	1.00	14.029	7.940	0.361	12000	15000	<b>6205</b>
	52	18.0	1.00	14.029	7.940	0.361	12600	15000	<b>62205</b>
	62	17.0	1.10	21.123	10.806	0.491	11000	13000	<b>6305</b>
	62	24.0	1.10	21.123	10.806	0.491	11000	13000	<b>62305</b>
30	80	21.0	1.50	36.000	19.200	0.873	9400	11000	<b>6405</b>
	55	9.0	0.30	11.200	7.360	0.335	12000	14000	<b>16006</b>
	55	13.0	1.00	13.243	8.250	0.375	12000	14000	<b>6006</b>
	62	16.0	1.00	19.443	11.186	0.508	11000	13000	<b>6206</b>
	62	20.0	1.00	19.443	11.186	0.508	11000	13000	<b>62206</b>
35	72	19.0	1.10	29.701	15.678	0.713	10000	12000	<b>6306</b>
	90	23.0	1.50	43.000	23.700	1.077	8400	10000	<b>6406</b>
	62	9.0	0.30	9.960	7.362	0.335	10600	12600	<b>16007</b>
	62	14.0	1.00	15.956	10.328	0.469	10600	12600	<b>6007</b>
	72	17.0	1.10	25.663	15.227	0.692	9400	11000	<b>6207</b>
40	80	21.0	1.50	33.367	19.230	0.874	8400	10000	<b>6307</b>
	100	25.0	1.50	55.200	31.000	1.409	7500	8900	<b>6407</b>
	68	9.0	0.30	12.667	9.617	0.437	9400	11000	<b>16008</b>
	68	15.0	1.00	16.824	11.493	0.522	9400	11000	<b>6008</b>
	80	18.0	1.10	32.633	19.887	0.904	8400	10000	<b>6208</b>
45	90	23.0	1.50	40.760	24.170	1.099	7900	9400	<b>6308</b>
	110	27.0	2.00	63.100	36.200	1.645	6700	7900	<b>6408</b>
	75	10.0	0.60	15.659	12.172	0.553	8400	10000	<b>16009</b>
	75	16.0	1.00	21.100	15.300	0.695	8400	10000	<b>6009</b>
	85	19.0	1.10	32.678	20.325	0.924	7900	9400	<b>6209</b>
50	100	25.0	1.50	52.804	31.715	1.442	7100	8400	<b>6309</b>
	120	29.0	2.00	76.500	44.700	2.032	6000	7100	<b>6409</b>
	80	10.0	0.60	16.092	13.147	0.598	7900	9400	<b>16010</b>
	80	16.0	1.00	21.720	16.650	0.757	7900	9400	<b>6010</b>
50	90	20.0	1.10	35.066	23.226	1.056	7100	8400	<b>6210</b>
	110	27.0	2.00	61.754	37.754	1.716	6300	7500	<b>6310</b>
	130	31.0	2.10	87.400	52.100	2.368	5600	6700	<b>6410</b>

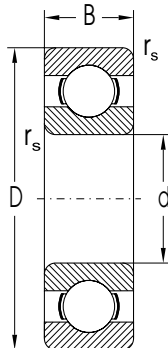


Abutment and Fillet Dimensions				Weight
d	d <sub>a min</sub>	D <sub>a max</sub>	r <sub>a max</sub>	~
mm				kg
20	22.0	40.0	0.3	0.0500
	24.0	38.0	0.6	0.0700
	25.0	42.0	1.0	0.1080
	25.0	42.0	1.0	0.1300
	25.0	42.0	1.0	0.1460
	26.0	45.0	1.0	0.1450
	26.0	45.0	1.0	0.2000
25	27.0	43.0	0.3	0.0530
	27.0	43.0	0.3	0.0530
	28.0	43.0	0.6	0.0820
	30.0	47.0	1.0	0.1290
	30.0	47.0	1.0	0.1500
	31.0	55.0	1.0	0.2300
	31.0	55.0	1.0	0.3200
30	34.0	70.0	1.5	0.5300
	32.0	53.0	0.3	0.0870
	34.0	50.0	1.0	0.1190
	35.0	57.0	1.0	0.2000
	35.0	57.0	1.0	0.2400
	36.0	65.0	1.0	0.3310
35	39.0	80.0	1.5	0.7250
	37.0	60.0	0.3	0.1110
	39.5	57.0	1.0	0.1540
	42.0	65.0	1.0	0.2840
	42.0	71.0	1.5	0.4470
40	44.0	90.0	1.5	0.9540
	42.0	62.0	0.3	0.1250
	44.0	63.0	1.0	0.1910
	47.0	73.0	1.0	0.3490
	47.0	81.0	1.5	0.6250
45	50.0	97.0	2.0	1.1230
	49.0	71.0	1.0	0.1700
	49.0	70.0	1.0	0.2410
	52.0	78.0	1.0	0.4040
	52.0	91.0	1.5	0.8280
50	55.0	107.0	2.0	1.5400
	54.0	76.0	0.6	0.1880
	54.0	75.0	1.0	0.2600
	57.0	83.0	1.0	0.4600
	60.0	100.0	2.0	1.0600
	63.0	116.0	2.0	1.8900

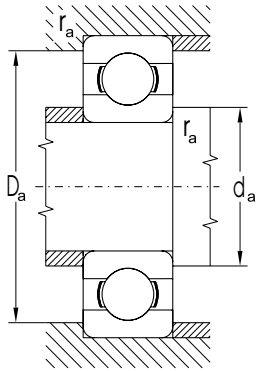


## Single Row Deep Groove Ball Bearings

d = 55 to 90 mm



Dimensions				Basic Load Rating Dynamic C <sub>r</sub>	Rating statická C <sub>or</sub>	Fatigue load limit P <sub>u</sub>	Limiting Speed for Lubrication with		Bearing Designation
d	D	B	r <sub>s</sub> min				Grease	Oil	
mm				kN		kN	min <sup>-1</sup>		
55	90	18.0	1.10	28.216	21.318	0.969	7100	8400	<b>6011</b>
	100	21.0	1.50	43.350	29.397	1.336	6700	7900	<b>6211</b>
	120	29.0	2.00	71.000	44.700	2.032	5600	6700	<b>6311</b>
	140	33.0	2.10	100.000	61.900	2.814	5300	6300	<b>6411</b>
60	95	18.0	1.10	29.343	23.256	1.057	6700	7900	<b>6012</b>
	110	22.0	1.50	52.846	35.786	1.627	6000	7100	<b>6212</b>
	130	31.0	2.10	81.500	52.100	2.368	5300	6300	<b>6312</b>
	150	35.0	2.10	110.000	69.400	3.079	4700	5600	<b>6412</b>
65	100	11.0	0.60	21.200	19.600	0.891	6300	7500	<b>16013</b>
	100	18.0	1.10	30.500	25.100	1.141	6300	7500	<b>6013</b>
	120	23.0	1.50	57.210	40.011	1.819	5300	6300	<b>6213</b>
	140	33.0	2.10	92.600	59.600	2.676	5000	6000	<b>6313</b>
	160	37.0	2.10	117.950	78.329	3.357	4500	5300	<b>6413</b>
70	110	13.0	0.60	27.600	25.100	1.141	5600	6700	<b>16014</b>
	110	20.0	1.10	37.960	30.959	1.407	5600	6700	<b>6014</b>
	125	24.0	1.50	62.000	43.800	1.991	5300	6300	<b>6214</b>
	150	35.0	2.10	104.000	63.100	2.735	4700	5600	<b>6314</b>
	180	42.0	3.00	144.000	104.000	4.228	4000	4700	<b>6414</b>
75	115	13.0	0.60	28.700	26.600	1.209	5300	6300	<b>16015</b>
	115	20.0	1.10	39.747	33.170	1.508	5300	6300	<b>6015</b>
	130	25.0	1.50	66.179	49.311	2.214	5000	6000	<b>6215</b>
	160	37.0	2.10	114.000	76.400	3.204	4200	5000	<b>6315</b>
	190	45.0	3.00	152.525	112.922	4.459	3800	4500	<b>6415</b>
80	125	14.0	0.60	32.900	31.600	1.419	5000	6000	<b>16016</b>
	125	22.0	1.10	47.500	39.800	1.787	5000	6000	<b>6016</b>
	140	26.0	2.00	72.200	53.100	2.301	4700	5600	<b>6216</b>
	170	37.0	2.10	122.850	86.226	3.506	4000	4700	<b>6316</b>
	200	48.0	3.00	163.587	124.984	4.801	3500	4200	<b>6416</b>
85	130	14.0	0.60	34.100	32.900	1.442	4700	5600	<b>16017</b>
	130	22.0	1.10	49.794	42.609	1.868	4700	5600	<b>6017</b>
	150	28.0	2.00	83.299	63.675	2.670	4200	5000	<b>6217</b>
	180	41.0	3.00	132.507	96.069	3.794	3800	4500	<b>6317</b>
	210	52.0	4.00	174.000	136.000	5.090	3300	4000	<b>6417</b>
90	140	24.0	1.50	58.400	49.200	2.085	4500	5300	<b>6018</b>
	160	30.0	2.00	96.200	70.800	2.878	4000	4700	<b>6218</b>
	190	43.0	3.00	144.000	108.000	4.149	3500	4200	<b>6318</b>
	225	54.0	4.00	192.000	158.000	5.723	3200	3800	<b>6418</b>

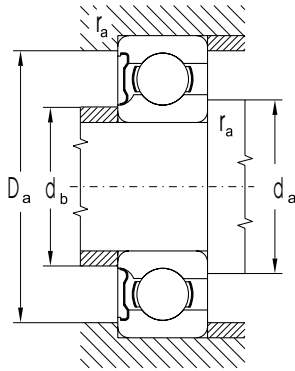


Abutment and Fillet Dimensions				Weight
d	d <sub>a</sub> min	D <sub>a</sub> max	r <sub>a</sub> max	~
mm				kg
55	60.0	84.0	1.0	0.3830
	62.0	91.0	1.5	0.5970
	65.0	110.0	2.0	1.3800
	68.0	126.0	2.0	2.2900
60	65.0	88.0	1.0	0.4110
	67.0	101.0	1.5	0.7710
	72.0	118.0	2.0	1.7200
	73.0	136.0	2.0	2.7600
65	69.0	96.0	0.6	0.3000
	70.0	93.0	1.0	0.4370
	72.0	111.0	1.5	0.9970
	76.0	128.0	2.0	2.1000
	78.0	146.0	2.0	3.2800
70	74.0	106.0	0.6	0.4330
	75.0	103.0	1.0	0.6040
	77.0	116.0	1.5	1.0700
	81.0	138.0	2.0	2.5400
	85.0	164.0	2.5	4.8500
75	79.0	111.0	0.6	0.4570
	80.0	108.0	1.0	0.6380
	82.0	122.0	1.5	1.1800
	86.0	148.0	2.0	3.0600
	90.0	174.0	2.5	5.7400
80	84.0	121.0	0.6	0.5970
	85.0	118.0	1.0	0.8450
	90.0	130.0	2.0	1.4000
	91.0	158.0	2.0	3.6300
	95.0	184.0	2.5	6.7200
85	89.0	126.0	0.6	0.6260
	90.0	123.0	1.0	0.8920
	95.0	140.0	2.0	1.8000
	98.0	166.0	2.5	4.2000
	105.0	190.0	3.0	7.8800
90	96.0	132.0	1.5	1.1700
	100.0	150.0	2.0	2.1600
	103.0	176.0	2.5	4.9500
	110.0	205.0	3.0	11.4000



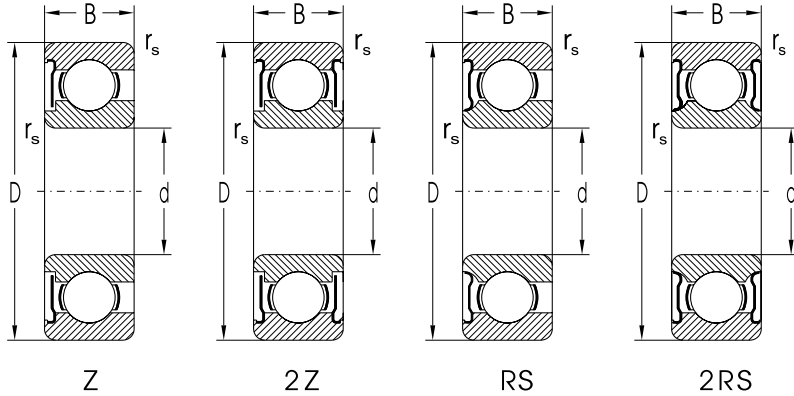




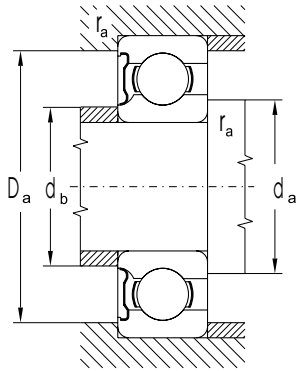


Limiting Speed for Lubrication with Grease			Abutment and Fillet Dimensions					Weight
Z, 2Z	RS, 2RS	Oil Z	d min	d <sub>a</sub> max	d <sub>b</sub> max	D <sub>a</sub> max	r <sub>a</sub>	-
min <sup>-1</sup>			mm					kg
40000		50000	3	4.2	4.8	8.5	0.1	0.0020
38000		45000	4	5.5	5.8	11.2	0.2	0.0040
35000		42000		6.2	6.5	13.4	0.3	0.0050
35000		42000	5	7.0	7.0	14.0	0.3	0.0060
35000		42000		7.2	7.5	15.8	0.3	0.0090
35000		42000	6	8.2	8.3	17.0	0.3	0.0100
35000		42000	7	9.0	9.0	17.0	0.3	0.0100
35000		42000		9.2	9.8	19.5	0.3	0.0120
35000	24000	42000	8	10.0	10.0	20.0	0.3	0.0150
35000	24000	42000	9	11.0	12.0	22.0	0.3	0.0180
35000	24000	42000		12.0	12.5	22.5	0.3	0.0200
28000	19000	33000	10	12.0	12.5	24.0	0.3	0.0200
25000	17000	30000		14.0	14.4	26.0	0.6	0.0320
25000	17000	30000		14.0	14.4	26.0	0.6	0.0400
22000	15000	27000		14.0	15.0	31.0	0.6	0.0530
25000	17000	30000	12	14.0	14.5	26.0	0.3	0.0220
22000	15000	27000		16.0	16.5	28.0	0.6	0.0370
22000	15000	27000		16.0	16.5	28.0	0.6	0.0450
20000	13000	24000		17.0	17.0	32.0	1.0	0.0600
21000	14000	25000	15	17.0	18.0	30.0	0.3	0.0310
20000	13000	24000		19.0	19.5	31.0	0.6	0.0450
20000	13000	24000		19.0	19.5	31.0	0.6	0.0540
18000	12000	21000		20.0	20.5	36.0	1.0	0.0820
20000	13000	24000	17	19.0	20.0	33.0	0.3	0.0400
18000	12000	21000		21.0	21.4	36.0	0.6	0.0650
18000	12000	21000		21.0	21.4	36.0	0.6	0.0830
16000	10600	19000		23.0	23.0	41.0	1.0	0.1160
17000	11000	20000	20	24.0	24.5	38.0	0.3	0.0700
15000	10000	18000		25.0	25.5	42.0	0.6	0.1070
15000	10000	18000		25.0	25.5	42.0	0.6	0.1300
15000	10000	18000		25.0	25.5	42.0	0.6	0.1540
14000	9400	17000		26.0	26.6	45.0	1.0	0.1440
14000	9400	17000		26.0	26.6	45.0	1.0	0.2000
14000	9400	17000	25	28.0	29.0	43.0	0.6	0.0810
12600	8400	15000		30.0	30.5	47.0	1.0	0.1280
12600	8400	15000		30.0	30.5	47.0	1.0	0.1500
11000	7500	13000		31.0	33.0	55.0	1.0	0.2320
11000	7500	13000		31.0	33.0	55.0	1.0	0.3200

**Single Row Deep Groove Ball Bearings with Seals or Shields**  
d = 30 to 100 mm



Dimensions				Basic Load Rating		Fatigue load limit	Bearing Designation			
d	D	B	r <sub>s</sub> min	Dyn. C <sub>r</sub>	Static C <sub>or</sub>	P <sub>u</sub>	Z, ZR	2Z, 2ZR	RS, RSR	2RS, 2RSR
mm				kN		kN				
30	55	13	1.00	13.243	8.253	0.38	6006Z	6006-2Z	6006RS	6006-2RS
	62	16	1.00	19.443	11.186	0.51	6206Z	6206-2Z	6206RS	6206-2RS
	62	20	1.00	19.443	11.186	0.51	62206Z	62206-2Z	62206RS	62206-2RS
	72	19	1.10	29.701	15.678	0.71	6306Z	6306-2Z	6306RS	6306-2RS
35	62	14	1.00	15.956	10.328	0.47	6007Z	6007-2Z	6007RS	6007-2RS
	72	17	1.10	25.663	15.227	0.69	6207Z	6207-2Z	6207RS	6207-2RS
	80	21	1.50	33.367	19.230	0.87	6307Z	6307-2Z	6307RS	6307-2RS
40	68	15	1.00	16.824	11.493	0.52	6008Z	6008-2Z	6008RS	6008-2RS
	80	18	1.10	32.633	19.887	0.90	6208Z	6208-2Z	6208RS	6208-2RS
	90	23	1.50	40.760	24.017	1.09	6308Z	6308-2Z	6308RS	6308-2RS
45	75	16	1.00	21.100	15.300	0.70	6009Z	6009-2Z	6009RS	6009-2RS
	85	19	1.10	32.687	20.323	0.92	6209Z	6209-2Z	6209RS	6209-2RS
	100	25	1.50	52.804	31.715	1.44	6309Z	6309-2Z	6309RS	6309-2RS
50	80	16	1.00	21.720	16.650	0.76	6010Z	6010-2Z	6010RS	6010-2RS
	90	20	1.10	35.066	23.266	1.06	6210Z	6210-2Z	6210RS	6210-2RS
	110	27	2.00	61.754	37.745	1.72	6310Z	6310-2Z	6310RS	6310-2RS
55	90	18	1.10	28.216	21.318	0.97	6011Z	6011-2Z	6011RS	6011-2RS
	100	21	1.50	43.350	29.397	1.34	6211Z	6211-2Z	6211RS	6211-2RS
	120	29	2.00	71.000	44.700	2.03	6311Z	6311-2Z	6311RS	6311-2RS
60	95	18	1.10	29.343	23.256	1.06	6012Z	6012-2Z	6012RS	6012-2RS
	110	22	1.50	52.486	35.786	1.63	6212Z	6212-2Z	6212RS	6212-2RS
	130	31	2.10	81.500	52.100	2.37	6312Z	6312-2Z	6312RS	6312-2RS
65	100	18	1.10	30.500	25.100	1.14	6013Z	6013-2Z	6013RS	6013-2RS
	120	23	1.50	57.210	40.011	1.82	6213Z	6213-2Z	6213RS	6213-2RS
	140	33	2.10	92.600	59.600	2.68	6313Z	6313-2Z	6313RS	6313-2RS
70	110	20	1.10	37.960	30.959	1.41	6014Z	6014-2Z	6014RS	6014-2RS
	125	24	1.50	62.000	43.800	1.99	6214Z	6214-2Z	6214RS	6214-2RS
	150	35	2.10	104.000	68.100	2.95	6314Z	6314-2Z	6314RS	6314-2RS
75	115	20	1.10	39.747	33.170	1.51	6015Z	6015-2Z	6015RS	6015-2RS
	130	25	1.50	66.179	49.311	2.21	6215Z	6215-2Z	6215RS	6215-2RS
	160	37	2.10	114.000	76.400	3.20	6315Z	6315-2Z	6315RS	6315-2RS
80	125	22	1.10	47.500	39.800	1.79	6016Z	6016-2Z	6016RS	6016-2RS
	140	26	2.00	72.200	53.100	2.30	6216Z	6216-2Z	6216RS	6216-2RS
	170	39	2.10	122.850	86.226	3.51	6316Z	6316-2Z		
85	130	22	1.10	49.794	42.609	1.87	6017Z	6017-2Z		
	150	28	2.00	83.299	63.675	2.67	6217Z	6217-2Z	6217RS	6217-2RS
	180	41	3.00	132.507	96.069	3.79	6317Z	6317-2Z		
90	160	30	2.00	96.200	70.800	2.88	6218Z	6218-2Z		
	190	43	3.00	143.000	104.000	4.00	6318Z	6318-2Z		
100	150	24	1.50	60.000	54.000	2.20	6020Z	6020-2Z		

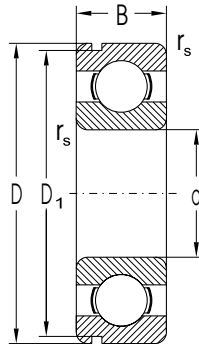
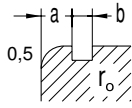


Limiting Speed for Lubrication with Grease			Abutment and Fillet Dimensions					Weight
Z, 2Z	RS, 2RS	Oil Z	d min	d <sub>a</sub> max	d <sub>b</sub> max	D <sub>a</sub> max	r <sub>a</sub>	-
min <sup>-1</sup>			mm					kg
12000	7900	14000	30	34.0	35.0	50.0	1.0	0.1190
11000	7500	13000		35.0	36.7	57.0	1.0	0.2010
11000	7500	13000		35.0	36.7	57.0	1.0	0.2400
10000	6700	12000		36.0	38.9	65.0	1.0	0.3500
10600	7100	12600	35	39.5	39.5	57.0	1.0	0.1590
9400	6300	11000		42.0	42.0	65.0	1.0	0.2900
8400	5600	10000		42.0	44.0	71.0	1.5	0.4600
9400	6300	11000	40	44.0	46.0	63.0	1.0	0.1950
8400	5600	10000		47.0	48.0	73.0	1.0	0.3670
7900	5300	9400		47.0	50.6	81.0	1.5	0.6350
8400	5600	10000	45	49.0	51.5	70.0	1.0	0.2490
7900	5300	9400		52.0	52.5	78.0	1.0	0.4100
7100	4700	8400		52.0	56.0	91.0	1.5	0.8330
7900	5300	9400	50	54.0	56.5	75.0	1.0	0.2640
7100	4700	8400		57.0	58.0	83.0	1.0	0.4640
6300	4200	7500		60.0	61.8	100.0	2.0	1.0800
7100	4700	8400	55	60.0	62.5	84.0	1.0	0.3900
6700	4500	7900		62.0	65.0	91.0	1.5	0.6100
5600	3800	6700		65.0	67.0	110.0	2.0	1.3800
6700	4500	7900	60	65.0	68.0	88.0	1.0	0.4200
6000	4000	7100		67.0	70.2	101.0	1.5	0.7870
5300	3500	6300		72.0	75.0	118.0	2.0	1.7200
6300	4200	7500	65	70.0	73.0	93.0	1.0	0.4400
5300	3500	6300		72.0	77.0	111.0	1.5	0.9950
5000	3300	6000		76.0	78.0	128.0	2.0	2.1000
5600	3800	6700	70	75.0	78.0	103.0	1.0	0.6180
5300	3500	6300		77.0	82.0	116.0	1.5	1.0900
4700	3200	5600		81.0	85.0	138.0	2.0	2.5300
5300	3500	6300	75	80.0	83.0	108.0	1.0	0.6400
5000	3300	6000		82.0	85.0	121.0	1.5	1.1900
4200	2800	5000		86.0	93.0	148.0	2.0	3.0300
5000	3300	6000	80	85.0	90.0	118.0	1.0	0.8600
4700	3200	5600		90.0	92.0	130.0	2.0	1.4100
4000		4700		91.0	99.0	158.0	2.0	3.6200
4700		5600	85	90.0	95.0	123.0	1.0	0.8900
4200	2800	5000		95.0	99.0	140.0	2.0	1.7900
3800		4500		98.0	103.0	166.0	2.5	4.2600
4000		4700	90	100.0	105.0	150.0	2.0	2.1600
3400		4200		103.0	108.0	176.0	2.5	5.1500
4200		5000	100	106.0	110.0	142.0	1.5	1.2700

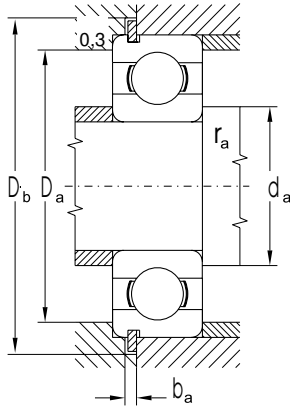


### Single Row Deep Groove Ball Bearings with Snap Ring Groove on Outer Ring

d = 12 to 50 mm



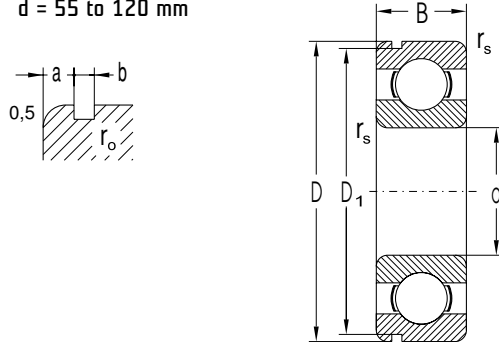
Dimensions								Basic Load Dynamic $C_r$	Rating Static $C_{or}$	Fatigue load limit $P_u$	Limiting Speed for Lubrication with	
d	D	B	$r_{s \min}$	$D_{1 \max}$	a max	b min	$r_{o \max}$				Grease	Oil
mm								kN		kN	min <sup>-1</sup>	
12	32	10	0.66	30.15	2.06	1.35	0.4	6.905	3.100	0.141	22000	27000
	32	14	0.66	30.15	2.06	1.35	0.4	6.905	3.100	0.141	22000	27000
15	35	11	0.60	33.17	2.06	1.35	0.4	7.718	3.745	0.170	20000	24000
	35	14	0.60	33.17	2.06	1.35	0.4	7.718	3.745	0.170	20000	24000
17	40	12	0.60	38.10	2.06	1.35	0.4	9.534	4.734	0.215	18000	21000
	40	16	0.60	38.10	2.06	1.35	0.4	9.534	4.734	0.215	18000	21000
	47	14	1.00	44.60	2.46	1.35	0.4	13.565	6.563	0.298	16000	19000
20	42	12	0.60	39.75	2.06	1.35	0.4	9.371	4.972	0.226	17000	20000
	47	14	1.00	44.60	2.46	1.35	0.4	12.774	6.553	0.298	15000	18000
	52	15	1.10	49.73	2.46	1.35	0.4	15.866	7.811	0.355	14000	17000
	52	21	1.10	49.73	2.46	1.35	0.4	15.866	7.811	0.355	14000	17000
25	47	12	0.60	44.60	2.06	1.35	0.4	10.070	5.806	0.264	14000	17000
	52	15	1.00	49.73	2.46	1.35	0.4	14.029	7.940	0.361	12600	15000
	52	18	1.00	49.73	2.46	1.35	0.4	14.029	7.940	0.361	12600	15000
	62	17	1.10	59.61	3.28	1.90	0.6	21.123	10.806	0.491	11000	13000
	62	24	1.10	59.61	3.28	1.90	0.6	21.123	10.806	0.491	11000	13000
	80	21	1.50	76.81	3.28	1.90	0.6	36.000	19.200	0.873	9400	11000
30	55	13	1.00	52.60	2.08	1.90	0.4	13.243	8.253	0.375	12000	14000
	62	16	2.00	59.61	3.28	1.90	0.6	19.443	11.186	0.508	11000	13000
	62	20	2.00	59.61	3.28	1.90	0.6	19.443	11.186	0.508	11000	13000
	72	19	1.10	68.81	3.28	1.90	0.6	29.701	15.678	0.713	10000	12000
	90	23	1.50	86.79	3.28	2.70	0.6	43.000	23.700	1.077	8400	10000
35	62	14	1.00	59.61	2.06	1.90	0.6	15.956	10.328	0.469	10600	12600
	72	17	1.10	68.81	3.28	1.90	0.6	25.663	15.277	0.694	9400	11000
	80	21	1.50	78.81	3.28	1.90	0.6	33.367	19.230	0.874	8400	10000
	100	25	1.50	96.80	3.28	2.70	0.6	55.200	31.000	1.409	7500	8900
40	68	15	1.00	64.82	2.49	1.90	0.6	16.824	11.493	0.522	9400	11000
	80	18	1.10	76.81	3.28	1.90	0.6	32.633	19.887	0.904	8400	10000
	90	23	1.50	86.79	3.28	2.70	0.6	40.760	24.017	1.092	7900	9400
	110	27	2.00	106.81	3.28	2.70	0.6	63.100	36.200	1.645	6700	7900
45	75	16	1.00	71.83	2.49	1.90	0.6	21.100	15.300	0.695	8400	10000
	85	19	1.10	81.81	3.28	1.90	0.6	32.687	20.325	0.924	7900	9400
	100	25	1.50	96.80	3.28	2.70	0.6	52.804	31.715	1.442	7100	8400
	120	29	2.00	115.21	4.06	3.10	0.6	76.500	44.700	2.032	6000	7100
50	80	16	1.00	76.81	2.49	1.90	0.6	21.720	16.650	0.757	7900	9400
	90	20	1.10	86.79	3.28	2.70	0.6	35.066	23.226	1.056	7100	8400
	110	27	2.00	106.81	3.28	2.70	0.6	61.900	37.600	1.709	6300	7500



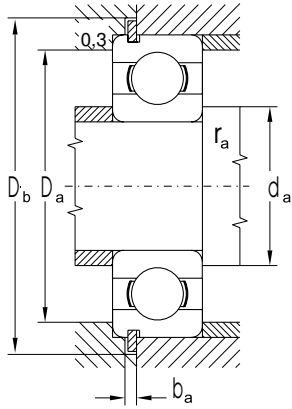
Bearing Designation	Abutment and Fillet Dimensions						Weight	Respective snap ring
	d <sub>min</sub>	d <sub>a min</sub>	D <sub>a max</sub>	D <sub>b min</sub>	b <sub>a min</sub>	r <sub>a max</sub>		
	mm						kg	
6201N	12	16.0	28.0	39.0	1.4	0.6	0.04	R32
62201N		16.0	28.0	39.0	1.4	0.6	0.05	R32
6202N	15	19.0	31.0	41.0	1.4	0.6	0.03	R35
62202N		19.0	31.0	41.0	1.4	0.6	0.05	R35
6203N	17	21.0	36.0	46.0	1.5	0.6	0.07	R40
62203N		21.0	36.0	46.0	1.5	0.6	0.08	R40
6303N		23.0	41.0	54.0	1.5	1.0	0.12	R47
6004N	20	24.0	38.0	47.5	1.5	0.6	0.07	R42
6204N		25.0	42.0	54.0	1.5	1.0	0.11	R47
6304N		26.0	45.0	59.0	1.5	1.0	0.15	R52
62304N		26.0	45.0	59.0	1.5	1.0	0.20	R52
6005N	25	28.0	43.0	54.0	1.5	0.6	0.08	R47
6205N		30.0	47.0	59.0	1.5	1.0	0.13	R52
62205N		30.0	47.0	59.0	1.5	1.0	0.15	R52
6305N		31.0	55.0	69.0	2.2	1.0	0.23	R62
62305N		31.0	55.0	69.0	2.2	1.0	0.32	R62
6405N		34.0	70.0	88.0	2.2	1.5	0.53	R80
6006N	30	34.0	50.0	62.0	1.5	1.0	0.12	R55
6206N		35.0	57.0	69.0	2.2	1.0	0.20	R62
62206N		35.0	57.0	69.0	2.2	1.0	0.24	R62
6306N		36.0	65.0	80.0	2.2	1.0	0.33	R72
6406N		39.0	80.0	98.0	3.0	1.5	0.73	R90
6007N	35	39.5	57.0	69.0	2.2	1.0	0.15	R62
6207N		42.0	65.0	80.0	2.2	1.0	0.28	R72
6307N		42.0	71.0	88.0	2.2	1.5	0.45	R80
6407N		44.0	90.0	108.0	3.0	1.5	0.95	R100
6008N	40	44.0	63.0	76.0	2.2	1.0	0.19	R68
6208N		47.0	73.0	88.0	2.2	1.0	0.35	R80
6308N		47.0	81.0	98.0	3.0	1.5	0.63	R90
6408N		50.0	97.0	118.0	3.0	3.0	1.23	R110
6009N	45	49.0	70.0	83.0	2.2	1.0	0.24	R75
6209N		52.0	78.0	93.0	2.2	1.0	0.40	R85
6309N		52.0	91.0	108.0	3.0	1.5	0.83	R100
6409N		55.0	107.0	131.0	3.5	2.0	1.54	R120
6010N	50	54.0	75.0	88.0	2.2	1.0	0.26	R80
6210N		57.0	83.0	98.0	3.0	1.0	0.46	R90
6310N		60.0	100.0	118.0	3.0	2.0	1.06	R110

### Single Row Deep Groove Ball Bearings with Snap Ring Groove on Outer Ring

d = 55 to 120 mm



Dimensions								Basic Load Dynamic $C_r$	Rating Static $C_{or}$	Fatigue load limit $P_u$	Limiting Speed for Lubrication with	
d	D	B	$r_{s \min}$	$D_1 \max$	a max	b min	$r_o \max$				Grease	Oil
mm								kN		kN	min <sup>-1</sup>	
55	90	18	1.10	86.79	2.87	2.70	0.6	28.200	21.318	0.969	7100	8400
	100	21	1.50	96.80	3.28	2.70	0.6	43.350	29.397	1.336	6700	7900
	120	29	2.00	115.21	4.06	3.10	0.6	71.000	44.700	2.032	5600	6700
	140	33	2.10	135.23	4.90	3.10	0.6	100.000	61.900	2.814	5300	6300
60	95	18	1.10	91.82	2.87	2.70	0.6	29.343	23.256	1.057	6700	7900
	110	22	1.50	106.81	3.82	2.70	0.6	52.486	35.786	1.627	6000	7100
	130	31	2.10	125.22	4.06	3.10	0.6	81.500	52.100	2.368	5300	6300
	150	35	2.10	145.24	4.90	3.10	0.6	110.000	69.400	3.079	4700	5600
65	100	18	1.10	96.80	2.87	2.70	0.6	30.500	25.100	1.141	6300	7500
	120	23	1.50	115.21	4.06	3.10	0.6	57.210	40.011	1.819	5300	6300
	140	33	2.10	135.23	4.90	3.10	0.6	92.600	59.600	2.676	5000	6000
	160	37	2.10	155.22	4.90	3.10	0.6	117.950	78.329	3.357	4500	5300
70	110	20	1.10	106.81	2.87	2.70	0.6	37.960	30.959	1.407	5600	6700
	125	24	1.50	120.22	4.06	3.10	0.6	62.000	43.800	1.991	5300	6300
	150	35	2.10	145.24	4.90	3.10	0.6	104.000	68.100	2.951	4700	5600
	180	42	3.00	173.66	5.69	3.50	0.6	114.000	104.000	4.228	4000	4700
75	115	20	1.10	111.81	2.87	2.70	0.6	39.747	33.170	1.508	5300	6300
	130	25	1.50	125.22	4.06	3.10	0.6	66.170	49.311	2.214	5000	6000
	160	37	2.10	155.22	4.90	3.10	0.6	114.000	76.400	3.204	4200	5000
	190	45	3.00	183.64	5.69	3.50	0.6	152.529	112.922	4.459	3800	4500
80	125	22	1.10	120.22	2.87	3.10	0.6	47.500	39.800	1.787	5000	6000
	140	26	2.00	135.23	4.90	3.10	0.6	72.200	53.100	2.301	4700	5600
	170	39	2.10	163.65	5.69	3.50	0.6	122.850	86.226	3.506	4000	4700
	200	48	3.00	193.65	5.69	3.50	0.6	163.587	124.984	4.801	3500	4200
85	130	22	1.10	125.22	2.87	3.10	0.6	49.794	42.609	1.868	4700	5600
	150	28	2.00	145.24	4.90	3.10	0.6	83.299	63.675	2.670	4200	5000
	180	41	3.00	173.66	5.69	3.50	0.6	132.507	96.069	3.794	3800	4500
90	140	24	1.50	135.23	3.71	3.10	0.6	58.400	49.200	2.085	4500	5300
	160	30	2.00	155.22	4.90	3.10	0.6	96.200	70.800	2.878	4000	4700
95	200	45	3.00	193.65	5.69	3.50	0.6	152.444	117.366	4.393	3300	4000
100	150	24	1.50	145.24	3.71	3.10	0.6	60.096	54.244	2.205	4200	5000
105	190	36	2.10	183.64	5.96	3.50	0.6	132.297	104.833	3.924	3300	4000
120	180	28	2.00	173.66	3.71	3.50	0.6	85.000	79.400	2.947	3300	4000

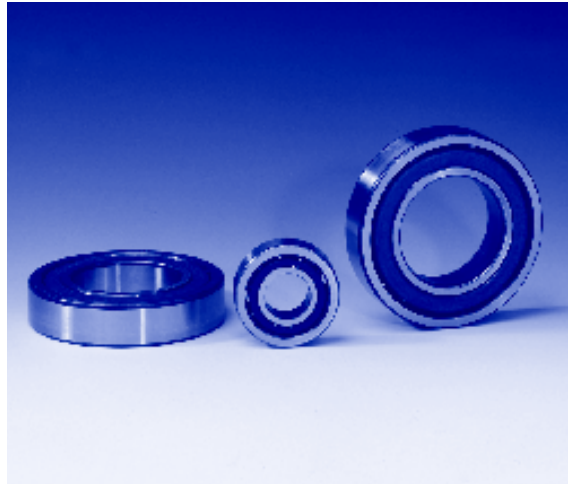


Bearing Designation	Abutment and Fillet Dimensions						Weight	Respective snap ring
	d <sub>min</sub>	d <sub>a min</sub>	D <sub>a max</sub>	D <sub>b min</sub>	b <sub>a min</sub>	r <sub>a max</sub>		
	mm						kg	
6011N	55	60.0	84.0	98.0	3.0	1.0	0.38	R90
6211N		62.0	91.0	108.0	3.0	1.5	0.60	R100
6311N		65.0	110.0	131.0	3.5	2.0	1.38	R120
6411N		68.0	126.0	151.0	3.5	2.0	2.29	R140
6012N	60	65.0	88.0	103.0	3.0	1.0	0.41	R95
6212N		67.0	101.0	110.0	3.0	1.5	0.77	R110
6312N		72.0	118.0	141.0	3.5	2.0	1.72	R130
6412N		73.0	136.0	162.0	3.5	2.0	2.76	R150
6013N	65	70.0	93.0	108.0	3.0	1.0	0.44	R100
6213N		72.0	111.0	131.0	3.5	1.5	1.00	R120
6313N		76.0	128.0	148.0	3.5	2.0	2.10	R140
6413N		78.0	146.0	172.0	3.5	2.0	3.28	R160
6014N	70	75.0	103.0	118.0	3.0	1.0	0.60	R110
6214N		77.0	116.0	136.0	3.5	1.5	1.07	R125
6314N		81.0	138.0	162.0	3.5	2.0	2.54	R150
6414N		85.0	164.0	195.0	4.5	2.5	4.85	R180
6015N	75	80.0	108.0	123.0	3.0	1.0	0.64	R115
6215N		82.0	121.0	141.0	3.5	1.5	1.18	R130
6315N		86.0	148.0	172.0	3.5	2.0	3.06	R160
6415N		90.0	174.0	205.0	4.5	2.5	5.74	R190
6016N	80	85.0	118.0	136.0	3.5	1.0	0.85	R125
6216N		90.0	130.0	151.0	3.5	2.0	1.40	R140
6316N		91.0	158.0	185.0	3.5	2.0	3.63	R170
6416N		95.0	184.0	215.0	4.5	2.5	6.72	R200
6017N	85	91.5	123.5	141.0	3.5	1.0	0.89	R130
6217N		95.0	140.0	162.0	3.5	2.0	1.80	R150
6317N		98.0	166.0	195.0	4.5	2.5	4.20	R180
6018N	90	96.0	132.0	151.0	3.5	1.5	1.17	R140
6218N		100.0	150.0	172.0	3.5	2.0	2.16	R160
6319N	95	109.0	186.0	215.0	4.5	2.5	5.72	R200
6020N	100	106.0	142.0	162.0	3.5	1.5	1.27	R150
6221N	105	117.0	178.0	205.0	4.5	2.0	3.74	R190
6024N	120	188.0	171.0	195.0	4.5	2.0	2.10	R180



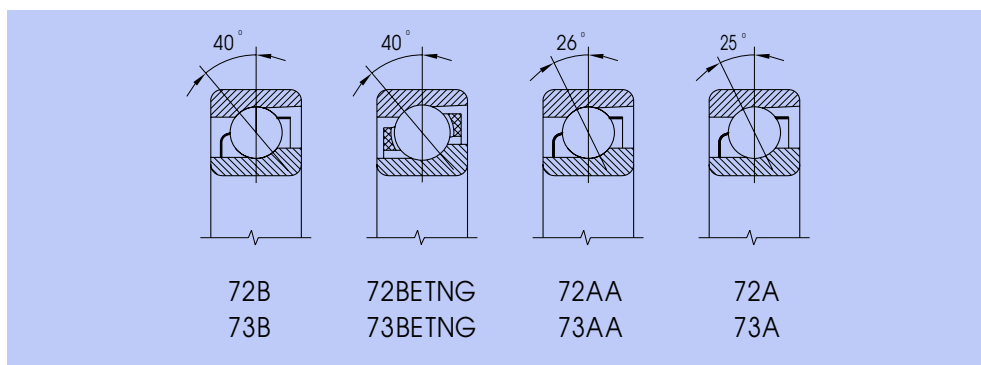


# Single Row Angular Contact Ball Bearings

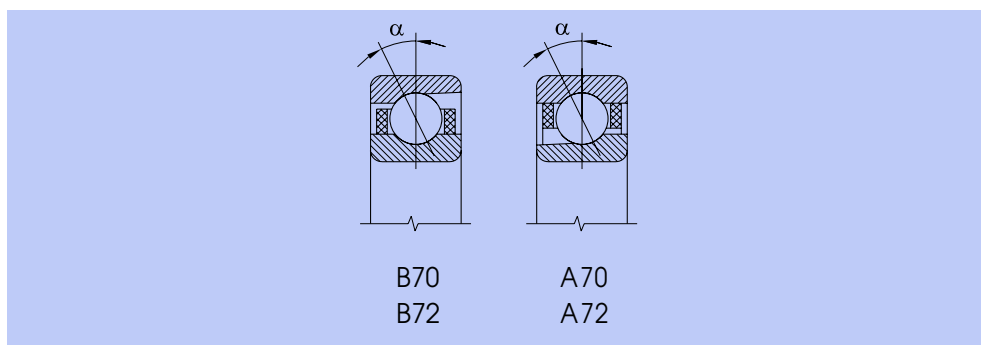


Raceways of single row angular contact ball bearings are designed in such a way that the connecting line of their contact points with the balls creates with the perpendicular line to the bearing axis an acute angle, so called contact angle and are non-separable. Bearings in B and BE design have contact angle  $\alpha = 40^\circ$ . This design allows the bearings to accommodate radial loads, acting simultaneously with a relative great axial load in one direction. For axial load accommodation in both directions, the bearings are arranged in pairs against each other.

In the production programme there are bearings in AA design where the contact angle is  $\alpha = 26^\circ$ , in A design the contact angle is  $\alpha = 25^\circ$ .



Single row angular contact bearings - type A70 and A72 or B70 and B72 are determined for high rotational speeds. They differ from standard bearings of this type by internal design, bearing ring design, contact angle





size, cage design and high tolerance class. Bearings are non-separable.

Bearings with CB designation have contact angle  $\alpha = 10^\circ$ . They are usually produced in tolerance class P4, P4A and are determined for very precision arrangements with high rotational speed, e.g. grinding electric spindles and appliances.

Bearings with designation CA have contact angle  $\alpha = 12^\circ$ .

Bearings in C design have contact angle  $\alpha = 15^\circ$ , they are produced in tolerance classes P5, P5A and P4, P4A and are predominately used for machine tool spindle arrangements and similar devices.

Bearings in AA design are produced in tolerance classes P5 and P4 and are determined for machine tool spindle arrangement and similar devices with relatively higher axial load.

## Boundary Dimensions

Boundary dimensions comply with the standard ISO 15 and are shown in the dimension tables of this publication.

## Designation

Bearing designation in standard design is a part of the data in the dimension tables. Difference from standard design is designated by additional symbols (section 2.2).

## Cage

Bearings - type 72 and 73 in B and AA design have a sheet cage which is not indicated. Bearings - type 72 and 73 in BE design have a solid cage made of polyamide strengthened by glass fibres (TNG).

Bearings - type A70 and A72 determined for high rotational speeds have a solid cage made of textite, centered on outer ring (TA) and bearings - type B70 and B72 have a solid textite cage centered on inner ring (TB), besides the bearing B7014AA which has a solid brass cage centered on inner ring (MB).

## Tolerance

Single row angular contact ball bearings - Type 72 and 73 are commonly produced in normal tolerance class P0 which is not indicated. For more demanding arrangements bearings in tolerance class P6 are delivered.

Bearings - type A70, A72, B70 and B72 in CA, C and A design are produced and delivered in tolerance classes P5, P5A and P4, P4A.

Bearings - type A72 and B72 in CB design are produced only in tolerance class P4, P4A. Deliveries of bearings in higher tolerance classes should be discussed with the supplier in advance.

Limiting deviation values of dimension and running accuracy comply with the standards ISO 199 and ISO 492 and are shown in tables 10 to 13.

## Internal Clearance

Usual utilization of single row ball bearings is in pairs. Suitable operating clearance or preload is adjusted at mounting and depends on arrangement design and operating conditions.

## Bearing Arrangement in Pairs

Bearings in A70, A72, B70 and B72 design are determined for high rotational speeds and are delivered in pairs.

### Pair in "O" Arrangement (back to back)

This pair is significant by its high rigidity against tilting and carries axial forces in both directions always only by one bearing. It is used for accommodation of tilting moments.

Arrangement scheme - see section 2.2 .

### Pair in "X" Arrangement (face to face)

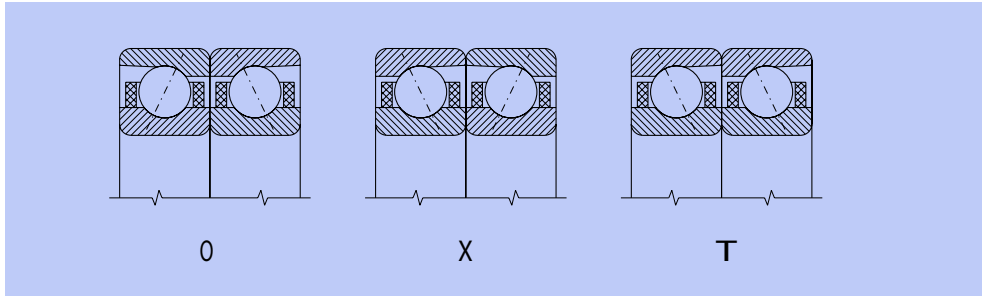
From the point of view of carrying axial forces this pair has the same properties as pair "O", but it has smaller rigidity for accommodating the tilting moment.

Arrangement scheme - see section 2.2 .



### Pair in "T" Arrangement (tandem)

This pair is significant by its rigidity against tilting, but it is capable of carrying the axial load in one direction only.



Arrangement scheme - see section 2.2.

The matched bearing pair is delivered in a common package to prevent interchange. Position of the greatest runout is marked by a line on ring faces. Mutual ring position is designated by converging lines in "V" shape on the outer cylindrical surface of the matched pair. Bearings are mounted in the arrangement so that the lines indicating the place of the greatest runout can lie on a line parallel to the shaft axis.

Matched pairs "X" and "O" are delivered with small (L), medium (M) and heavy (S) preload. Designation example of such a pair - B7204CBTB P40L or A7201AATA P5XM.

Axial preload is determined from relation :

$$F_p = k C_r \cdot 10^{-2} \quad [\text{kN}]$$

$F_p$  - axial preload [kN]

$C_r$  - radial basic dynamic load [kN]

$k$  - axial preload factor according to the table

Axial Preload		Factor k			
		Contact Angle $\alpha$			
Magnitude	Designation	10°	12°	15°	26°
		Bearing Design CB	CA	C	AA
Small	L	0.4	0.5	0.7	1.2
Medium	M	1.4	1.6	2.0	3.5
Heavy	S	2.8	3.2	4.0	7.0

Radial basic dynamic load rating of matched pair  $C_{rs}$  is :

$$C_{rs} = 1.62 \cdot C_r \quad [\text{kN}]$$

Radial basic static load rating of matched pair  $C_{ors}$  is:

$$C_{ors} = 2 \cdot C_{or} \quad [\text{kN}]$$

Values  $C_r$  and  $C_{or}$  are shown in the dimension tables of this publication.

Limiting rotational speed for matched pair is smaller than for individual bearing (shown in dimension tables) :

- pair with small preload (L) of 20%

- pair with medium preload (M) of 35%
- pair with heavy preload (S) of 60%

### Bearings Matching in Sets of Three and Four Bearings

For special accurate arrangement requiring high accuracy, rigidity, load rating and high rotational speed bearings - type A70, A72, B70 and B72 matched in sets of three or four bearings are delivered. Scheme of this arrangement - see section 2.2 .

### Universal Bearing Matching

Single row angular contact ball bearings B70...CTA in universal design (U) are determined for matching in pairs, in "X", "O" or "T" arrangements, or for matching in sets of three or four bearings. They are manufactured with a light preload (UL) by "X" and "O" matching.

Bearing deliveries in universal design should be discussed with the supplier in advance.

### Misalignment

Single row angular contact ball bearings mounted in pairs are sensitive to mutual bearing ring misalignment.

Tolerance of the arrangement surfaces for bearings in tolerance class P5 and P4 are :

Tolerance Class	Shaft Inner Ring Load		Housing Bore Outer Ring Load		
	Circumferential	Point	Point Locating Bearing	Non-Locating Bearing	Circumferential
P5	js5	h5	JS5	H5	M5
P4	js4	h4	JS5	H5	M5

### Radial Equivalent Dynamic Load

Bearings with contact angle  $\alpha = 40^\circ$ , B and BE design :

Single bearings :

$$P_r = F_r \quad \text{for } F_a/F_r \leq 1.14 \quad [\text{kN}]$$

$$P_r = 0.35F_r + 0.57F_a \quad \text{for } F_a/F_r > 1.14 \quad [\text{kN}]$$

Bearings with contact angle  $\alpha = 26^\circ$ , AA design

Bearings with contact angle  $\alpha = 25^\circ$ , A design

Single bearings and matched pairs, "T" arrangement :

$$P_r = F_r \quad \text{for } F_a/F_r \leq 0.68 \quad [\text{kN}]$$

$$P_r = 0.41F_r + 0.87F_a \quad \text{for } F_a/F_r > 0.68 \quad [\text{kN}]$$

Matched pairs, "O" and "X" arrangement :

$$P_r = F_r + 0.92F_a \quad \text{for } F_a/F_r \leq 0.68 \quad [\text{kN}]$$

$$P_r = 0.67F_r + 1.14F_a \quad \text{for } F_a/F_r > 0.68 \quad [\text{kN}]$$

Bearings with contact angle  $\alpha = 15^\circ$ , C design :

Single bearings and matched pairs, "T" arrangement :

$$P_r = F_r \quad \text{for } F_a/F_r \leq e \quad [\text{kN}]$$

$$P_r = 0.44F_r + YF_a \quad \text{for } F_a/F_r > e \quad [\text{kN}]$$



$\frac{F_a}{iC_{or}}$	e	Y
0.015	0.38	1.47
0.029	0.40	1.40
0.058	0.43	1.30
0.087	0.46	1.23
0.12	0.47	1.19
0.17	0.50	1.12
0.29	0.55	1.02
0.44	0.56	1.00
0.58	0.56	1.00

i - number of bearings  
 $C_{or}$  - radial basic load rating of bearing from dimensional tables [kN]

Matched pairs, "O" and "X" arrangement :

$$P_r = F_r + Y_1 F_a \quad \text{for } F_a / F_r \leq e \quad [\text{kN}]$$

$$P_r = 0.72 F_r + Y_2 F_a \quad \text{for } F_a / F_r > e \quad [\text{kN}]$$

$\frac{F_a}{C_{or}}$	e	Y <sub>1</sub>	Y <sub>2</sub>
0.015	0.38	1.65	2.39
0.029	0.40	1.57	2.28
0.058	0.43	1.46	2.11
0.087	0.46	1.38	2.00
0.12	0.47	1.34	1.93
0.17	0.50	1.26	1.82
0.29	0.55	1.14	1.66
0.44	0.56	1.12	1.63
0.58	0.56	1.12	1.63

Bearings with contact angle  $\alpha = 12^\circ$ , CA design :

Single bearings and matched pairs, "T" arrangement :

$$P_r = F_r \quad \text{for } F_a / F_r \leq e \quad [\text{kN}]$$

$$P_r = 0.45 F_r + Y F_a \quad \text{for } F_a / F_r > e \quad [\text{kN}]$$

$\frac{F_a}{iC_{or}}$	e	Y
0.014	0.30	1.81
0.029	0.34	1.62
0.057	0.37	1.46
0.086	0.41	1.34
0.11	0.45	1.22
0.17	0.48	1.13
0.29	0.52	1.04
0.43	0.54	1.01
0.57	0.54	1.00

i - number of bearings  
 $C_{or}$  - radial basic load rating of bearing from dimensional tables [kN]

Matched pairs, "O" and "X" arrangement :

$$P_r = F_r + Y_1 F_a \quad \text{for } F_a / F_r \leq e$$

$$P_r = 0.74 F_r + Y_2 F_a \quad \text{for } F_a / F_r > e$$

$\frac{F_a}{C_{or}}$	e	Y <sub>1</sub>	Y <sub>2</sub>
0.014	0.30	2.08	2.94
0.029	0.34	1.84	2.63
0.057	0.37	1.69	2.37
0.086	0.41	1.52	2.18
0.11	0.45	1.39	1.98
0.17	0.48	1.30	1.84
0.29	0.52	1.20	1.69
0.43	0.54	1.16	1.64
0.57	0.54	1.16	1.62



Bearings with contact angle  $\alpha = 10^\circ$ , CB design :

Single bearings and matched pairs, "T" arrangement :

$$P_r = F_r \quad \text{for } F_a / F_r \leq e \quad [\text{kN}]$$

$$P_r = 0.46 F_r + Y F_a \quad \text{for } F_a / F_r > e \quad [\text{kN}]$$

$\frac{F_a}{i C_{or}}$	e	Y
0.014	0.29	1.88
0.029	0.32	1.71
0.057	0.36	1.52
0.086	0.38	1.41
0.1100	0.40	1.34
0.1700	0.44	1.23
0.2900	0.49	1.10
0.4300	0.54	1.01
0.5700	0.54	1.00

i - number of bearings  
 $C_{or}$  - radial basic load rating of radial basic load rating of individual [kN]

Matched pairs, "O" and "X" arrangement :

$$P_r = F_r + Y_1 F_a \quad \text{for } F_a / F_r \leq e \quad [\text{kN}]$$

$$P_r = 0.46 F_r + Y_2 F_a \quad \text{for } F_a / F_r > e \quad [\text{kN}]$$

$\frac{F_a}{C_{or}}$	e	Y <sub>1</sub>	Y <sub>2</sub>
0.014	0.29	2.18	3.06
0.029	0.32	1.94	2.78
0.057	0.36	1.76	2.47
0.086	0.38	1.63	2.29
0.1100	0.40	1.55	2.18
0.1700	0.44	1.42	2.00
0.2900	0.49	1.27	1.79
0.4300	0.54	1.17	1.64
0.5400	0.54	1.16	1.63

If the shaft is arranged in two single row angular contact ball bearings, the acting radial load is resolved into radial and axial components. The axial load of one bearing depends on the load and contact angle magnitude of the other bearing. These additional inner forces must be taken into account when calculating the bearing.

The following table shows relations for various bearing arrangements, when outer axial force  $K_a$ , radial force  $F_{rA}$  or  $F_{rB}$  act. Radial forces act in the intersection point of the contact line with the shaft axis (dimension "a" in the dimension tables). Force magnitude is considered only in absolute values in calculations. Calculated force  $F_a$  is given into the calculation of radial equivalent dynamic load  $P_r$ .

Bearing Arrangement	Force Conditions	Bearing Axial Load	
		Bearing A	Bearing B
	$\frac{F_{rA}}{Y_A} \leq \frac{F_{rB}}{Y_B}$ $K_a \geq 0$	$F_{aA} = F_{aB} + K_a$	$F_{aB} = e F_{rB}$
	$\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B}$ $K_a \geq e (F_{rA} - F_{rB})$	$F_{aA} = F_{aB} + K_a$	$F_{aB} = e F_{rB}$
	$\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B}$ $K_a < e (F_{rA} - F_{rB})^1$	$F_{aA} = e F_{rA}$	$F_{aB} = F_{aA} - K_a$
	$\frac{F_{rA}}{Y_A} \leq \frac{F_{rB}}{Y_B}$ $K_a \geq 0$	$F_{aA} = e F_{rA}$	$F_{aB} = F_{aA} + K_a$
	$\frac{F_{rA}}{Y_A} < \frac{F_{rB}}{Y_B}$ $K_a \geq e (F_{rB} - F_{rA})$	$F_{aA} = e F_{rA}$	$F_{aB} = F_{aA} + K_a$
	$\frac{F_{rA}}{Y_A} < \frac{F_{rB}}{Y_B}$ $K_a < e (F_{rB} - F_{rA})^1$	$F_{aA} = F_{aB} - K_a$	$F_{aB} = e F_{rB}$
<sup>1)</sup> Valid for $K_a = 0$ For bearings with contact angle $\alpha = 40^\circ$ (BE a B) For bearings with contact angle $\alpha = 26^\circ$ (AA) For other bearings e and Y according to tables - pages 90 to 91		$e = 1.14; Y = 0.57$ $e = 0.68; Y = 0.87$	

## Radial Equivalent Static Load

Bearings with contact angle  $\alpha = 40^\circ$ , BE and B design :

$$P_{or} = 0.5F_r + 0.26F_a \quad (P_{or} \geq F_r) \quad [\text{kN}]$$

Bearings with contact angle  $\alpha = 26^\circ$ , design AA and  $\alpha = 25^\circ$ , A design :  
Single bearings and matched pairs, "T" arrangement :

$$P_{or} = 0.5F_r + 0.37F_a \quad (P_{or} \geq F_r) \quad [\text{kN}]$$

Matched pairs, "O" and "X" arrangements :

$$P_{or} = F_r + 0.74F_a \quad [\text{kN}]$$

Bearings with contact angle  $\alpha = 15^\circ$ , C design :  
Single bearings and matched pairs, "T" arrangement :

$$P_{or} = 0.5F_r + 0.46F_a \quad (P_{or} \geq F_r) \quad [\text{kN}]$$

Matched pairs, "O" and "X" arrangement :

$$P_{or} = F_r + 0.92F_a \quad [\text{kN}]$$

Bearings with contact angle  $\alpha = 12^\circ$ , CA design :  
Single bearings and matched pairs, "T" arrangement :

$$P_{or} = 0.5F_r + 0.47F_a \quad (P_{or} \geq F_r) \quad [\text{kN}]$$

Matched pairs, "O" and "X" arrangement :

$$P_{or} = F_r + 0.94F_a \quad [\text{kN}]$$

Bearings with contact angle  $\alpha = 10^\circ$ , CB design :  
Single bearings and matched pairs, "T" arrangement :

$$P_{or} = 0.6F_r + 0.5F_a \quad (P_{or} \geq F_r) \quad [\text{kN}]$$

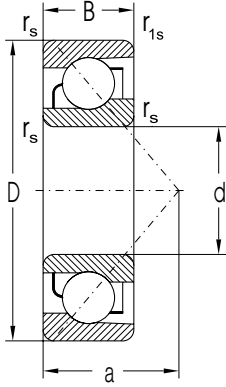
Matched pairs, "O" and "X" arrangement :

$$P_{or} = F_r + 0.97F_a \quad [\text{kN}]$$

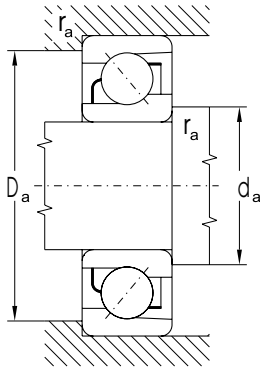


# Single Row Angular Contact Ball Bearings

d = 10 to 50 mm



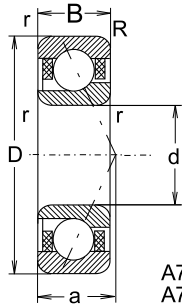
Dimensions						Basic Load Dynamic $C_r$	Rating Static $C_{or}$	Fatigue load limit $P_u$	Limiting Speed for Lubrication with		Bearing Designation
d	D	B	$r_{s \min}$	$r_{1s \min}$	a				Grease	Oil	
mm						kN		kN	min <sup>-1</sup>		
10	30	9	0,6	0,3	13,0	7,423	3,290	0,150	21000	28000	7200BETNG**
12	32	10	0,6	0,3	14,0	8,035	3,778	0,172	19000	26000	7201BETNG**
15	35	11	0,6	0,3	12,0	9,580	4,875	0,222	17000	20000	7202AA**
	35	11	0,6	0,3	16,0	8,595	4,368	0,199	17000	20000	7202B**
	42	13	1,0	0,6	18,0	13,946	6,575	0,299	14000	17000	7302BETNG**
17	47	14	1,0	0,6	15,0	16,627	7,890	0,359	12600	15000	7303AA**
	47	14	1,0	0,6	20,0	15,188	7,200	0,327	12600	15000	7303B**
	47	14	1,0	0,6	20,0	16,307	8,000	0,364	12600	15000	7303BTNG**
20	47	14	1,0	0,6	15,0	16,388	8,535	0,388	12600	15000	7204AA**
	47	14	1,0	0,6	21,0	14,691	7,645	0,348	12600	15000	7204B**
	47	14	1,0	0,6	21,0	16,663	8,645	0,393	12600	15000	7204BTNG**
25	62	17	1,1	0,6	27,0	26,818	14,570	0,662	9400	11000	7305B**
	62	17	1,1	0,6	27,0	26,842	14,570	0,662	10000	12500	7305BTNG**
35	80	21	1,5	1,0	35,0	40,388	24,100	1,095	7100	8400	7307B**
45	100	25	1,5	1,0	43,0	64,305	40,386	1,836	5600	6700	7309B**
55	100	21	1,5	1,0	29,5	58,101	40,460	1,839	5300	6300	7211AA**
	120	29	2,0	1,0	51,0	87,010	56,380	2,563	4700	5600	7311B**
60	110	22	1,5	1,0	32,0	70,120	50,625	2,301	5000	6000	7212AA**
** Bearings in the new standard NEW FORCE (see the catalogue NEW FORCE)											



Abutment and Fillet Dimensions				Weight
d	d <sub>a min</sub>	D <sub>a max</sub>	r <sub>a max</sub>	-
mm				kg
10	14,5	25,5	0,6	0,030
12	16,5	27,5	0,6	0,037
15	19,0	31,0	0,6	0,050
	19,0	31,0	0,6	0,050
	21,0	36,0	1,0	0,080
20	23,0	41,0	1,0	0,120
	23,0	41,0	1,0	0,120
	23,0	41,0	1,0	0,107
25	25,0	42,0	1,0	0,110
	25,0	42,0	1,0	0,110
	25,0	42,0	1,0	0,100
30	31,0	55,0	1,0	0,240
	31,0	55,0	1,0	0,235
35	42,0	71,0	1,5	0,480
	52,0	91,0	1,5	0,880
50	62,0	91,0	1,5	0,630
	65,0	110,0	2,0	1,450
60	67,0	101,0	1,5	0,800



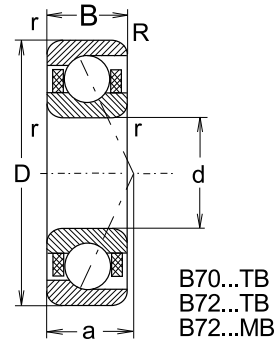
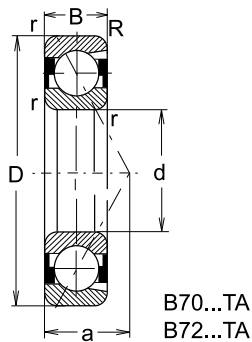
## Single Row Angular Contact Ball Bearings for High Rotational Speed d = 7 to 130 mm



A70...TA  
A72...TA

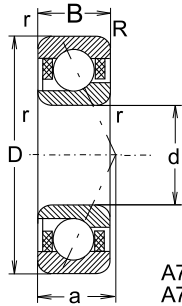
Dimensions						Basic Load Rating		Fatigue load
d	D	B	r <sub>s</sub>	r <sub>1s</sub>	a	Dynamic C <sub>r</sub>	Static C <sub>0r</sub>	limit P <sub>u</sub>
mm						kN		kN
7	22	7	0,3	0,15	5,000	2,364	0,90	0,041
9	26	8	0,6	0,30	5,500	3,891	1,64	0,075
10	30	9	0,6	0,30	6,000	5,335	2,29	0,104
	30	9	0,6	0,30	6,500	7,124	2,90	0,132
	30	9	0,6	0,30	7,000	7,729	3,28	0,149
	30	9	0,6	0,30	7,180	4,387	2,10	0,095
	30	9	0,6	0,30	9,000	7,529	3,20	0,145
	30	9	0,6	0,30	9,160	4,181	2,00	0,091
12	32	10	0,6	0,30	7,000	5,880	2,65	0,120
	32	10	0,6	0,30	7,500	7,980	3,46	0,157
	32	10	0,6	0,30	8,000	8,622	3,89	0,177
	32	10	0,6	0,30	10,000	8,275	3,78	0,172
	32	10	0,6	0,30	10,500	7,505	3,21	0,146
15	32	9	0,3	0,15	7,648	4,695	2,30	0,105
	32	9	0,3	0,15	9,980	6,622	3,20	0,145
	32	9	0,3	0,15	9,980	4,490	2,20	0,100
	32	9	0,3	0,30	7,648	6,955	3,50	0,159
	35	11	0,6	0,30	7,500	6,940	3,45	0,157
	35	11	0,6	0,30	8,000	8,855	4,18	0,190
	35	11	0,6	0,30	11,000	9,078	4,44	0,202
	35	11	0,6	0,60	9,000	9,483	4,59	0,209
17	35	10	0,3	0,15	8,480	6,235	3,40	0,155
	35	10	0,3	0,15	16,780	7,562	4,25	0,193
	35	10	0,3	0,15	16,780	5,916	3,00	0,136
	35	10	0,3	0,30	8,480	7,896	4,45	0,202
	40	12	0,6	0,30	8,500	8,362	4,25	0,193
	40	12	0,6	0,30	9,000	10,904	5,29	0,240
	40	12	0,6	0,30	13,000	11,182	5,62	0,255
	40	12	0,6	0,60	10,000	11,631	5,82	0,265
20	42	12	0,6	0,30	9,150	11,899	6,20	0,282
	42	12	0,6	0,30	9,150	7,940	4,20	0,191
	42	12	0,6	0,30	12,220	11,707	6,00	0,273
	42	12	0,6	0,30	12,220	7,740	4,00	0,182
	47	14	1,0	0,60	10,000	10,224	5,54	0,252
	47	14	1,0	0,60	10,500	14,572	7,32	0,333
	47	14	1,0	0,60	12,000	15,685	8,06	0,366
	47	14	1,0	0,60	14,000	14,952	7,77	0,353
	47	14	1,0	0,60	15,000	13,897	6,99	0,318
25	47	12	0,6	0,30	10,320	13,750	8,60	0,391
	47	12	0,6	0,30	10,320	9,532	5,70	0,259
	47	12	0,6	0,30	13,890	13,186	8,20	0,373
	47	12	0,6	0,30	13,890	9,121	5,60	0,255
	52	15	1,0	0,60	11,000	14,091	7,96	0,362
	52	15	1,0	0,60	11,500	15,921	8,63	0,392
	52	15	1,0	0,60	13,000	17,679	10,28	0,467
	52	15	1,0	0,60	16,000	16,917	9,81	0,446
	52	15	1,0	0,60	17,000	14,895	8,15	0,370
30	55	13	1,0	0,60	12,200	16,234	10,30	0,468
	55	13	1,0	0,60	12,200	11,331	7,20	0,327
	55	13	1,0	0,60	25,850	15,515	10,10	0,459
	55	13	1,0	0,60	25,850	10,817	6,90	0,314
	62	16	1,0	0,60	12,000	18,020	10,72	0,487
	62	16	1,0	0,60	13,000	22,072	12,42	0,565
	62	16	1,0	0,60	14,000	24,734	14,72	0,669
	62	16	1,0	0,60	19,000	20,877	11,58	0,526
	62	16	1,0	0,60	19,000	23,483	14,07	0,640
35	62	14	1,0	0,60	13,490	20,680	14,40	0,655
	62	14	1,0	0,60	13,490	14,298	10,00	0,455
	62	14	1,0	0,60	18,500	18,476	12,05	0,548

\*\* Bearings in the new standard NEW FORCE (see the catalogue NEW FORCE)



Limiting Speed for Lubrication with		Axial preload of coupled bearings			Bearing Designation	Weight ~ kg
Grease	Oil	L	M	S		
min <sup>-1</sup>		N				
94000	140000				A727CBTA**	0,013
71000	106000				A729CBTA**	0,020
60000	89000	20	70	140	B7200CBTB**	0,027
42000	63000	33	105	213	B7200CATB**	0,028
56000	85000	45	140	280	B7200CTA**	0,030
65000	100000	15	60	130	CB7200CTA**	0,028
50000	75000	65	240	450	B7200ATA**	0,030
55000	85000	22	80	195	CB7200ATA**	0,028
56000	84000	22	77	154	B7201CBTB**	0,035
38000	56000	37	118	235	B7201CATB**	0,036
50000	75000	50	160	320	B7201CTA**	0,037
45000	67000	75	270	540	B7201ATA**	0,037
33000	50000				AC7201ATA***	0,036
55000	85000	11	52	115	CB7002CTA**	0,043
40000	65000	37	155	355	B7002ATA**	0,043
50000	72000	18	68	170	CB7002ATA**	0,043
45000	70000	30	110	225	B7002CTA**	0,043
50000	75000	25	90	180	B7202CBTB**	0,042
33000	50000	41	132	264	B7202CATB**	0,043
40000	60000	80	290	590	B7202ATA**	0,045
45000	67000	55	170	350	B7202CTA**	0,045
55000	80000	18	75	165	CB7003CTA**	0,039
38000	56000	50	190	420	B7003ATA**	0,039
45000	65000	30	100	230	CB7003ATA**	0,039
44000	67500	40	150	260	B7003CTA**	0,039
45000	67000	31	109	219	B7203CBTB**	0,060
28000	42000	51	163	326	B7203CATB**	0,061
36000	53000	100	360	730	B7203ATA**	0,064
38000	56000	70	210	430	B7203CTA**	0,064
39000	57000	55	180	400	B7004CTA**	0,066
45000	65000	25	100	200	CB7004CTA**	0,066
35000	50000	75	290	645	B7004ATA**	0,066
35000	55000	30	120	300	CB7004ATA**	0,066
40000	60000	38	134	268	B7204CBTB**	0,098
25000	38000	68	218	437	B7204CATB**	0,100
32000	48000	90	290	580	B7204CTA**	0,103
30000	45000	140	490	950	B7204ATA**	0,103
22000	33000	156	455	910	B7204AATB**	0,102
35000	50000	65	220	470	B7005CTA**	0,080
40000	55000	30	120	250	CB7005CTA**	0,080
30000	45000	100	360	740	B7005ATA**	0,080
35000	50000	35	180	410	CB7005ATA**	0,080
33000	50000	53	183	367	B7205CBTB**	0,119
22000	33000	74	237	474	B7205CATB**	0,122
28000	43000	100	330	650	B7205CTA**	0,125
26000	40000	155	550	1100	B7205ATA**	0,125
20000	30000	167	488	977	B7205AATB**	0,124
26000	40000	75	260	555	B7006CTA**	0,115
30000	45000	37	140	300	CB7006CTA**	0,115
24000	38000	105	405	885	B7006ATA**	0,115
28000	43000	40	200	450	CB7006ATA**	0,115
28000	42000	67	235	470	B7206CBTB**	0,184
20000	30000	102	325	655	B7206CATB**	0,189
24000	38000	140	450	910	B7206CTA**	0,193
17000	25000	233	679	1740	B7206AATB**	0,192
22000	36000	220	770	1530	B7206ATA**	0,193
22000	36000	100	330	710	B7007CTA**	0,155
30000	45000	48	180	380	CB7007CTA**	0,155
9400	11000	207	605	1210	B7007AATB**	0,148

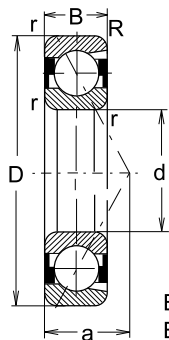
## Single Row Angular Contact Ball Bearings for High Rotational Speed d = 7 to 130 mm



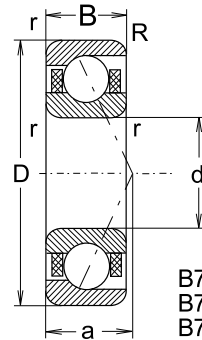
A70...TA  
A72...TA

Dimensions						Basic Load Rating		Fatigue load limit
d	D	B	r <sub>s</sub>	r <sub>1s</sub>	a	Dynamic C <sub>r</sub>	Static C <sub>0r</sub>	P <sub>0</sub>
mm						kN		kN
35	62	14	1,0	0,60	28,980	20,097	13,25	0,602
	62	14	1,0	0,60	28,980	13,910	9,40	0,427
	72	17	1,1	0,60	10,000	29,131	17,40	0,791
	72	17	1,1	0,60	13,000	22,523	14,34	0,652
	72	17	1,1	0,60	14,000	31,042	18,60	0,845
	72	17	1,1	0,60	15,000	32,929	20,29	0,922
	72	17	1,1	0,60	16,000	32,669	20,04	0,911
	72	17	1,1	0,60	21,000	31,002	19,10	0,868
40	68	15	1,0	0,60	14,730	21,960	16,10	0,732
	68	15	1,0	0,60	14,730	15,151	11,00	0,500
	68	15	1,0	0,60	20,100	20,933	15,20	0,691
	68	15	1,0	0,60	20,100	14,111	10,60	0,482
	68	15	1,0	0,60	20,500	19,859	14,13	0,642
	80	18	1,1	0,60	14,000	26,240	17,30	0,786
	80	18	1,1	0,60	15,500	39,375	23,77	1,080
	80	18	1,1	0,60	17,000	41,450	26,02	1,183
	80	18	1,1	0,60	23,000	39,759	24,90	1,132
45	68	12	0,6	0,30	13,000	16,018	12,60	0,573
	68	12	0,6	0,30	13,000	11,502	9,10	0,414
	68	12	0,6	0,30	18,190	15,137	12,00	0,545
	68	12	0,6	0,30	18,190	10,777	8,80	0,400
	75	16	1,0	0,60	0,030	27,020	20,40	0,927
	75	16	1,0	0,60	16,030	18,921	14,30	0,650
	75	16	1,0	0,60	21,980	25,680	19,30	0,877
	75	16	1,0	0,60	21,980	17,993	13,50	0,614
	85	19	1,1	0,60	15,000	30,327	20,31	0,923
	85	19	1,1	0,60	16,500	39,540	24,61	1,119
	85	19	1,1	0,60	18,000	43,841	28,81	1,310
	85	19	1,1	0,60	25,000	41,893	27,54	1,252
50	80	16	1,0	0,60	15,800	24,133	18,52	0,842
	80	16	1,0	0,60	19,730	27,716	21,80	0,991
	80	16	1,0	0,60	19,730	19,740	15,30	0,695
	80	16	1,0	0,60	23,150	26,273	20,80	0,945
	80	16	1,0	0,60	23,150	18,708	14,60	0,664
	90	20	1,1	0,60	16,000	34,593	23,56	1,071
	90	20	1,1	0,60	17,500	41,758	27,26	1,239
	90	20	1,1	0,60	19,000	45,871	31,73	1,442
	90	20	1,1	0,60	26,000	39,229	25,92	1,178
	90	20	1,1	0,60	26,000	43,970	30,08	1,367
55	90	18	1,1	0,60	26,500	33,314	25,38	1,154
	100	21	1,5	1,00	17,000	41,229	29,12	1,324
	100	21	1,5	1,00	18,500	51,719	34,50	1,568
	100	21	1,5	1,00	21,000	56,847	39,92	1,815
	100	21	1,5	1,00	29,000	54,288	38,23	1,738
60	95	18	1,1	1,00	21,660	38,610	32,00	1,455
	95	18	1,1	1,00	21,660	27,085	22,40	1,018
	95	18	1,1	1,00	27,100	36,807	30,40	1,382
	95	18	1,1	1,00	27,100	25,810	21,30	0,968
	110	22	1,5	1,00	18,000	47,450	33,80	1,536
	110	22	1,5	1,00	20,000	64,377	42,60	1,936
	110	22	1,5	1,00	22,000	70,784	49,07	2,230
	110	22	1,5	1,00	31,000	67,627	47,07	2,140
	110	22	1,5	1,00	32,000	60,741	39,96	1,816
65	120	23	1,5	1,00	21,500	78,185	54,78	2,490
	120	23	1,5	1,00	24,000	81,130	58,70	2,668
	120	23	1,5	1,00	33,000	76,670	56,06	2,548
70	110	20	1,1	0,60	22,060	53,288	45,00	2,045
	110	20	1,1	0,60	22,060	36,807	31,20	1,418
	110	20	1,1	0,60	30,990	50,628	42,90	1,950

\*\* Bearings in the new standard NEW FORCE (see the catalogue NEW FORCE)



B70...TA  
B72...TA

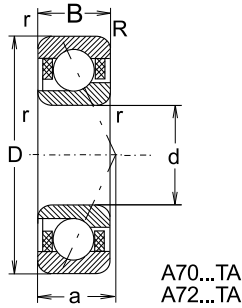


B70...TB  
B72...TB  
B72...MB

Limiting Speed for Lubrication with		Axial preload of coupled bearings			Bearing Designation	Weight ~ kg
Grease	Oil	L	M	S		
min <sup>-1</sup>		N				
20000	32000	140	530	1150	B7007ATA**	0,155
25000	40000	60	270	600	CB7007ATA**	0,155
13000	20000	326	952	1900	B7207AATB**	0,281
25000	38000	84	280	588	B7207CBTB**	0,268
16000	24000	144	462	925	B7207CATB**	0,275
16000	24000	153	490	981	B7207CAMB**	0,323
20000	34000	185	600	1200	B7207CTA**	0,280
19000	32000	290	1010	2010	B7207ATA**	0,280
20000	34000	105	350	755	B7008CTA**	0,185
26000	40000	50	190	410	CB7008CTA**	0,185
19000	30000	150	560	1200	B7008ATA**	0,185
22000	35000	60	280	630	CB7008ATA**	0,185
8400	10000	222	645	1290	B7008AATB**	0,185
22000	33000	98	343	686	B7208CBTB**	0,337
13000	20000	180	587	1170	B7208CATB**	0,347
18000	30000	235	770	1540	B7208CTA**	0,350
17000	28000	370	1100	2500	B7208ATA**	0,350
20000	32000	90	320	535	B71909CTA**	0,130
25000	38000	35	140	310	CB71909CTA**	0,110
18000	30000	100	390	840	B71909ATA**	0,130
22000	35000	70	200	450	CB71909ATA**	0,110
18000	30000	140	470	935	B7009CTA**	0,260
23000	37000	70	250	530	CB7009CTA**	0,230
17000	28000	195	750	1500	B7009ATA**	0,260
21000	33000	85	370	840	CB7009ATA**	0,230
20000	30000	113	396	792	B7209CBTB**	0,381
12600	19000	184	590	1175	B7209CATB**	0,381
17000	28000	250	810	1630	B7209CTA**	0,387
15000	24000	390	1200	2710	B7209ATA**	0,387
9500	11000	270	793	1580	B7010AATB**	0,253
17000	28000	150	510	965	B7010CTA**	0,250
22000	35000	75	280	580	CB7010CTA**	0,210
15000	24000	210	750	1550	B7010ATA**	0,250
18000	30000	90	400	880	CB7010ATA**	0,210
18000	27000	129	450	905	B7210CBTB**	0,432
12000	18000	195	623	1245	B7210CATB**	0,443
16000	26000	260	850	1710	B7210CTA**	0,448
10600	16000	438	1275	2550	B7210AATB**	0,447
14000	20000	400	1400	2810	B7210ATA**	0,448
6300	7500	371	1080	2160	B7011AATB**	0,395
17000	25000	153	538	1075	B7211CBTB**	0,567
11000	17000	241	771	1540	B7211CATB**	0,582
14000	22000	320	1010	2100	B7211CTA**	0,586
13000	20000	500	1710	3500	B7211ATA**	0,586
14000	22000	210	700	1305	B7012CTA**	0,410
18000	30000	100	360	780	CB7012CTA**	0,350
13000	20000	290	1000	2100	B7012ATA**	0,410
15000	25000	130	540	1150	CB7012ATA**	0,350
15000	22000	172	602	1200	B7212CBTB**	0,735
10000	15000	291	932	1860	B7212CATB**	0,754
13000	20000	380	1200	2500	B7212CTA**	0,754
12000	19000	610	2130	4200	B7212ATA**	0,754
8900	13000	657	1915	3830	B7212AATB**	0,759
8900	13000	352	1128	2250	B7213CATB**	0,994
12000	19000	440	1400	2900	B7213CTA**	0,999
11000	18000	700	2410	4810	B7213ATA**	0,999
13000	19000	280	930	1825	B7014CTA**	0,600
15000	25000	140	500	1020	CB7014CTA**	0,500
11000	17000	390	1390	2910	B7014ATA**	0,600



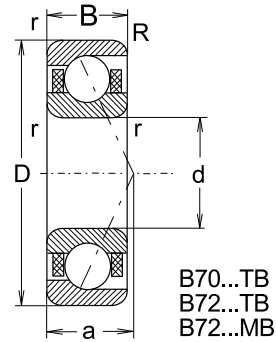
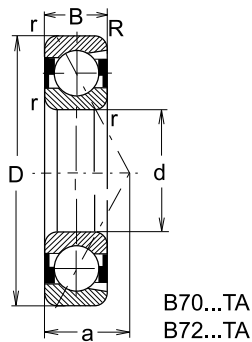
## Single Row Angular Contact Ball Bearings for High Rotational Speed d = 7 to 130 mm



Dimensions						Basic Load Rating		Fatigue load limit
d	D	B	r <sub>s</sub>	r <sub>1s</sub>	a	Dynamic C <sub>r</sub>	Static C <sub>0r</sub>	P <sub>0</sub>
mm						kN		kN
70	110	20	1,1	0,60	32,000	45,430	36,46	1,657
	125	24	1,5	1,00	20,500	64,709	47,66	2,166
	125	24	1,5	1,00	22,500	84,775	60,13	2,733
	125	24	1,5	1,00	25,000	87,597	64,55	2,934
	125	24	1,5	1,00	30,990	35,567	21,80	0,991
	125	24	1,5	1,00	35,000	83,397	61,56	2,798
75	130	25	1,5	1,00	23,500	84,948	61,39	2,756
	130	25	1,5	1,00	26,000	87,285	65,44	2,938
	130	25	1,5	1,00	36,000	83,103	62,52	2,807
	130	25	1,5	1,00	37,500	82,540	62,49	2,806
	130	25	1,5	1,00	37,500	78,887	58,32	2,618
80	125	22	1,1	0,60	22,000	61,117	50,01	2,245
	125	22	1,1	0,60	24,730	66,963	57,50	2,582
	125	22	1,1	0,60	24,730	46,894	40,20	1,805
	125	22	1,1	0,60	34,900	64,095	55,10	2,474
	125	22	1,1	0,60	34,900	44,874	38,60	1,733
	125	22	1,1	0,60	36,000	59,265	49,44	2,220
	140	26	2,0	1,00	24,500	99,345	73,05	3,166
	140	26	2,0	1,00	28,000	102,080	77,56	3,361
	140	26	2,0	1,00	39,000	97,328	73,95	3,205
	140	26	2,0	1,00	40,000	92,645	68,04	2,949
85	130	22	1,1	0,60	25,400	68,386	58,70	2,573
	130	22	1,1	0,60	25,400	47,914	41,40	1,815
	130	22	1,1	0,60	30,060	67,847	58,20	2,552
	130	22	1,1	0,60	30,060	47,558	40,70	1,784
	130	22	1,1	0,60	37,000	60,265	52,69	2,310
	130	28	1,1	0,60	37,000	62,314	55,33	2,426
	150	28	2,0	1,00	26,500	111,477	86,08	3,610
	150	28	2,0	1,00	30,000	115,662	88,55	3,713
	150	28	2,0	1,00	42,000	108,988	86,45	3,625
	150	28	1,00	1,00	42,500	103,780	80,67	3,383
90	140	24	1,5	1,00	24,000	74,528	62,47	2,648
	140	24	1,5	1,00	27,410	81,622	72,40	3,069
	140	24	1,5	1,00	27,410	57,187	57,90	2,454
	140	24	1,5	1,00	38,810	77,461	69,00	2,925
	140	24	1,5	1,00	38,810	54,305	40,50	1,717
	140	24	1,5	1,00	40,000	72,276	61,75	2,617
	180	34	2,1	1,10	51,000	156,339	120,96	4,732
100	150	24	1,5	0,60	28,750	89,607	80,80	3,285
	150	24	1,5	0,60	28,750	61,827	55,70	2,265
	150	24	1,5	0,60	41,150	84,040	76,40	3,106
	150	24	1,5	0,60	41,150	58,023	52,70	2,143
	180	34	2,1	1,10	35,760	105,682	86,00	3,304
	180	34	2,1	1,10	36,000	171,671	136,01	5,225
	180	34	2,1	1,10	49,770	98,808	83,00	3,189
	180	34	2,1	1,10	50,000	164,214	129,98	4,993
110	140	16	1,0	0,60	24,700	44,428	49,60	2,017
	140	16	1,0	0,60	34,000	42,287	46,30	1,882
120	180	28	2,0	1,00	30,000	112,019	103,66	3,847
	180	28	2,0	1,00	34,100	114,338	107,80	4,001
	180	28	2,0	1,00	34,100	78,921	75,40	2,798
	180	28	2,0	1,00	48,980	107,543	102,10	3,789
	180	28	2,0	1,00	48,980	74,299	71,50	2,654
	180	28	2,0	1,00	50,500	106,191	101,28	3,759
130	165	11	1,0	0,50	41,500	14,903	19,10	0,715

\*\* Bearings in the new standard NEW FORCE (see the catalogue NEW FORCE)

\*\*\* Separable bearing dedicated to separable arrangements of textile spindles parts



Limiting Speed for Lubrication with		Axial preload of coupled bearings			Bearing Designation	Weight ~ kg
Grease	Oil	L	M	S		
min <sup>-1</sup>		N				
7900	12000	493	1140	2050	B7014AATB**	0,597
12600	19000	234	820	1640	B7214CBTB**	1,040
7900	12000	373	1190	2350	B7214CATB**	1,070
11000	18000	480	1540	3170	B7214CTA**	1,090
14000	20000	180	720	1600	CB7014ATA**	0,500
10000	17000	760	2620	5300	B7214ATA**	1,090
7500	11000	383	1250	2450	B7215CATB**	1,160
11000	18000	480	1560	3170	B7215CTA**	1,170
9500	16000	760	2640	5210	B7215ATA**	1,170
4200	5000	898	2620	5240	B7215AAMB**	1,390
6700	10000	858	2500	500	B7215AATB**	1,260
7500	11000	276	885	1770	B7016CATB**	0,841
10000	18000	350	1140	2290	B7016CTA**	0,850
14000	22000	180	620	1350	CB7016CTA**	0,710
9000	15000	500	1800	3700	B7016ATA**	0,850
13000	20000	250	950	1950	CB7016ATA**	0,710
6700	10000	267	855	1710	B7016AATB**	0,848
6700	10000	447	1432	2860	B7216CATB**	1,410
10000	17000	560	1840	3700	B7216CTA**	1,430
9000	15000	880	3050	6110	B7216ATA**	1,430
6300	9400	1008	2940	5880	B7216AATB**	1,420
10000	17000	380	1240	2350	B7017CTA**	0,910
12000	19000	190	640	1400	CB7017CTA**	0,770
9000	15000	540	1870	3900	B7017ATA**	0,910
10000	18000	260	1000	2100	CB7017ATA**	0,770
4200	5000	653	1900	3800	B7017AATA**	0,912
6300	9400	675	1970	3940	B7017AAMB**	1,060
6300	9400	502	1608	3210	B7217CATB**	1,800
9000	15000	630	2010	4150	B7217CTA**	1,820
8000	13000	1000	3450	6910	B7217ATA**	1,820
6000	8900	1310	3290	6590	B7217AATB**	1,820
6300	9400	338	1080	2160	B7018CATB**	1,150
10000	16000	450	1450	2800	B7018CTA**	1,150
12000	19000	230	760	1590	CB7018CTA**	0,970
9000	15000	620	2200	4580	B7018ATA**	1,150
10000	17000	315	1150	2550	CB7018ATA**	0,970
4000	4700	783	2280	4570	B7018AATB**	1,160
5300	7900	1690	4930	9870	B7220AATB**	3,320
8000	14000	470	1520	3070	B7020CTA**	1,290
11000	18000	235	815	1700	CB7020CTA**	1,100
7000	12000	680	2340	4950	B7020ATA**	1,290
9000	15000	335	1265	2710	CB7020ATA**	1,100
10000	15000	450	1460	2950	CB7220CTA**	2,890
7500	12000	940	3100	6220	B7220CTA**	3,320
8000	13000	640	2200	5580	CB7220ATA**	2,890
6700	10000	1480	5200	10100	B7220ATA**	3,320
8000	13000	200	700	1500	B71822CTA**	0,500
7000	11000	350	900	2000	B71822ATA**	0,500
5000	7500	505	1617	3230	B7024CATB**	2,100
7000	10000	670	2000	4100	B7024CTA**	2,100
9000	14000	320	1100	2220	CB7024CTA**	1,850
6000	9000	950	3200	6550	B7024ATA**	2,100
8000	12000	450	1680	3550	CB7024ATA**	1,850
3000	3500	1153	3363	6727	B7024AATB**	2,090
3200	3800				B70826AAMB**	0,635