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Radial Bearings of Ball, Cylindrical Roller and Spherical Roller Types - Metric Design ANSI/ABMA 20:2011



Secretariat

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ANSI/ABMA 20:2011



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RADIAL BEARINGS OF BALL, CYLINDRICAL ROLLER AND SPHERICAL ROLLER TYPES, METRIC DESIGN

1 Scope

This standard includes:

- (a) basic plan for the boundary dimensions of metric radial ball and roller bearings;
- (b) general rules for extension of the basic plans;
- (c) dimensions and tolerances for snap ring groove and locating snap rings;
- (d) dimensions for radial ball bearings with flanged outer ring; and
- (e) tolerances for boundary dimensions, chamfers, various runouts and internal clearance.

This standard does not contain any direction pertaining to internal bearing design nor any indication as to availability of bearings.

Airframe bearings, instrument ball bearings, needle roller bearings, tapered roller bearings, thrust bearings and other bearing types and series not conforming to these basic plans for boundary dimensions are covered in other ANSI/ABMA Standards.

2 Basic plan for boundary dimensions of radial bearings

2.1 Object of the plan. The object of this plan is to reduce the number of sizes as much as possible so as to promote economic production and yet to provide a sufficient number of sizes and proportions to satisfy present and future needs of bearing users. These needs are comprehensive and varying. Therefore, the plan embraces a wide range of bearing sizes and proportions which, when the needs arise, may be extended in accordance with the general rules given in the Standard.

Bearing manufacturers should select from the basic plan those sizes and proportions that are suitable for the bearing types and applications under consideration. Bearing users should select bearings from manufacturers' specifications, giving preference to those bearings whose dimensions conform to the basic plan.

Another object of this plan is to achieve the benefits of international standardization of bearing dimensions. This has been accomplished due to the fact that this plan was developed in cooperation with the International Organization for Standardization (ISO) and generally conforms to those standards adopted by ISO. Differences from ISO standards are noted in the text or tables of this standard.

2.2 Metric and inch equivalents. Metric bearings of dimensions conforming to the plan are manufactured in plants using the metric system of measurement and also in plants using the inch system of measurement. When the inch system is used, the basic metric boundary dimensions are converted to equivalent inch dimensions in accordance with ANSI/IEEE 268 carried to four decimal places.

The metric dimensions and their equivalent inch dimensions differ by 0.00005 inch or less (except for width in radial dimensions series 32, 92, 33, and 93), an amount that is too small to be of practical significance. Therefore bearings made to either system of measurement are equally acceptable as being in accord with this standard.

Most ball and cylindrical roller bearings, manufactured in USA to the radial dimension series 32, 92, 33, and 93 have fractional inch width dimensions. When converting these to millimeters carried to one decimal place, the resulting discrepancy is 0.05 mm (0.002 inch) or less which in this case is too small to be of practical significance.

2.3 Non-ISO dimensions. In addition to those dimensions identified that differ from those in ISO standards, this standard contains chamfer dimensions and radial internal clearance limits for a radial cylindrical roller bearing which has bore and outside diameter dimensions conforming to the Basic Plan for Boundary Dimensions given in Table 1, but has an extra large chamfer on one side and a broken small corner on the other side (see Tables 18 and 21).

2.4 Symbols. The symbols (except those for tolerances) shown in the figures and the values given in the tables denote nominal dimensions unless noted otherwise.

d = bore diameter
D = outside diameter
B = inner ring width
C = outer ring width
 $r_{s \min}$ = smallest single chamfer dimension

2.5 Boundary plan for radial bearings. The boundary dimensions d, D and B or C of the plans are developed as follows:

2.5.1 Bore diameter, d. Bore diameters covering sizes from 0.6 mm to 2000 mm are established in increments sufficiently small to satisfy user requirements and at the same time sufficiently large to eliminate unnecessary sizes (see Table 1, columns 1, 29, and 48).

2.5.2 Diameter series. For most bore diameter sizes a number of progressively increasing series of *outside diameters* is provided to allow further choice of bearing design and capacity. These series are termed diameter series 7, 8, 9, 0, 1, 2, 3, and 4 and are listed in Table 1 in columns headed 2, 8, 18, 30, 40, 49, 59, and 68.

2.5.3 Width series. In addition, each diameter series is provided with a number of progressively increasing *width series* to allow even greater choice of bearing design and capacity. These width series are numbered 8, 0, 1, 2, 3, 4, 5, 6, and 9 and are listed in Table 1 in columns headed 3-6, 9-15, 19-25, 31-37, 41-45, 50-56, 60-65, and 69-70.

2.5.4 Dimension series. These width and diameter series numbers are combined into two digit numbers termed dimension series. The bore diameter size and the dimension series number that identifies all three basic dimensions of a bearing: bore, outside diameter and width.

For example, a radial bearing having a 40 mm bore in the 02 dimension series has an outside diameter of 80 mm and a width of 18 mm (See Table 1, Part 3).

Figure 1 indicates graphically how the diameter and width series each progress for a given bore size.

Table 1 shows the various bearing proportions now included in the basic plan.

2.5.5 Chamfers. The values for inner and outer ring chamfer dimensions given in Table 1 (columns headed 7, 16-17, 26-28, 38-39, 46-47, 57-58, 66-67 and 71) are minimum limits, $r_{s \min}$. The corresponding maximum limits, $r_{s \max}$, are given in Table 15. The dimensions do not necessarily apply to:

- (a) the groove side of the outer ring of bearings with snap ring groove;
- (b) the loose rib and non-rib sides of single row cylindrical roller bearing rings;
- (c) the non-thrust side of the outer ring of single row angular contact bearings; and
- (d) inner rings of radial cylindrical roller bearings with extra large bore chamfers.

See sections 5 and 6 for these exceptions.

The chamfer dimensions of inner rings of bearings with tapered bores may be smaller than those specified in Table 1.

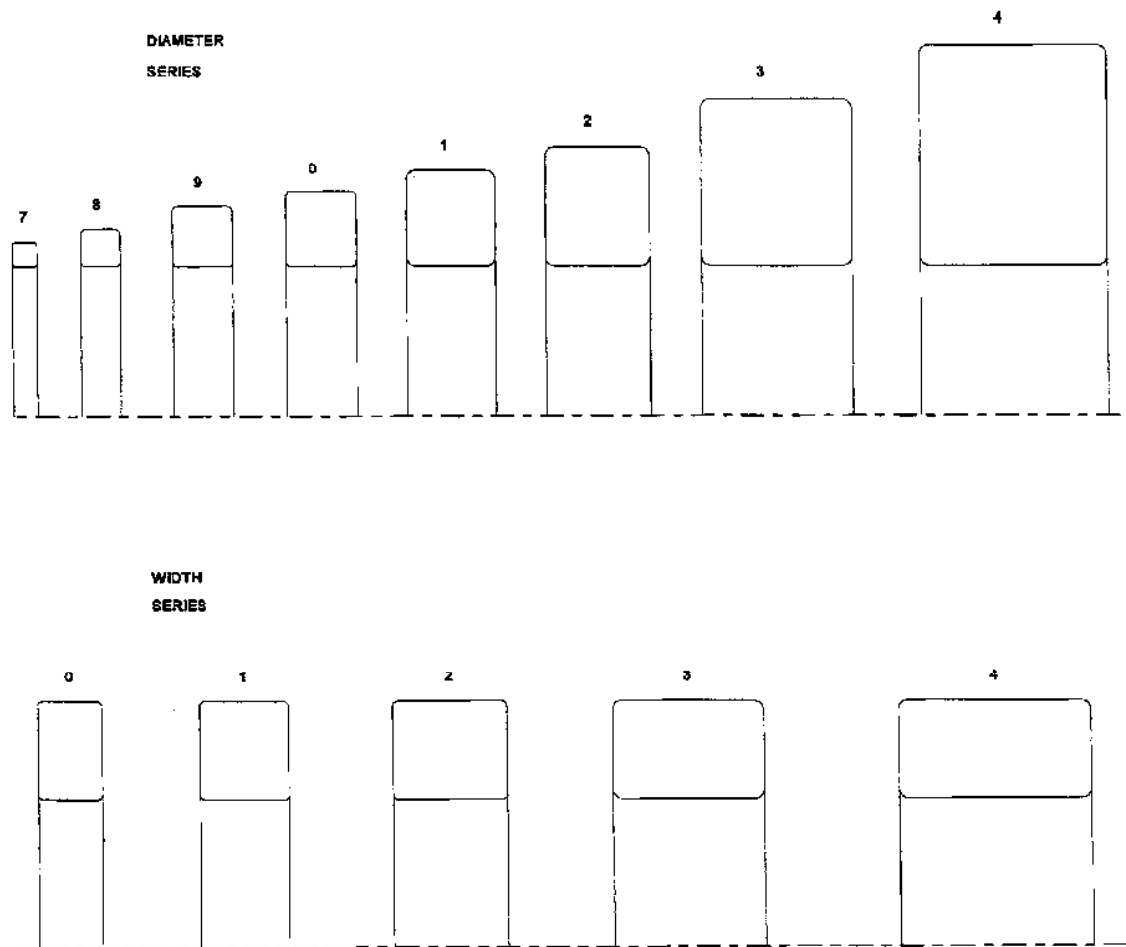


Figure 1 - Graphical representation of the diameter and width series components of the dimension series of the boundary plan for radial bearings

TABLE 1 - PART 1

BASIC PLAN FOR BOUNDARY DIMENSIONS OF METRIC RADIAL BALL AND ROLLER BEARINGS
(Except Tapered Roller Bearings)

Dimensions in millimetres

1234567							891011121314151617											1819202122232425262728															
BORE	DIAMETER SERIES 7						DIAMETER SERIES 8										DIAMETER SERIES 9																
	O.D.	WIDTH SERIES					WIDTH SERIES									Chamfer	WIDTH SERIES						Chamfer										
		1	2	3	4	Chamfer	0	1	2	3	4	5	6		0	1	2	3	4	5	6												
		DIMENSION SERIES					DIMENSION SERIES											DIMENSION SERIES															
		17	27	37	47	17 to 47									08	18	28	38	48	58	68	08 to 68		09	19	29	39	49	59	69	09 to 69	19 to 39	49 to 69
d	D	B or C				r _s min	D	B or C							r _s min	D	B or C										r _s min						
0.6	2	0.8	-	-	-	0.05	2.5	-	1	-	1.4	-	-	-	0.05	4	-	1.6	-	2.3	-	-	-	-	-	-	-	-	-	-	-	-	
1	2.5	1	-	-	-	0.05	3	-	1	-	1.5	-	-	-	0.05	5	-	2	-	2.6	-	-	-	-	-	-	-	-	-	-	-	-	
1.5	3	1	-	1.8	-	0.05	4	-	1.2	-	2	-	-	-	0.05	6	-	2.3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	
2	4	1.2	-	2	-	0.05	5	-	1.5	-	2.3	-	-	-	0.05	7	-	2.5	-	3.5	-	-	-	-	-	-	-	-	-	-	-	-	
2.5	5	1.5	1.8	2.3	-	0.08	6	-	1.8	-	2.6	-	-	-	0.08	8	-	3	-	4	-	-	-	-	-	-	-	-	-	-	-	-	
3	6	2	2.5	3	-	0.08	7	-	2	-	3	-	-	-	0.1	9	-	3	-	4	-	-	-	-	-	-	-	-	-	-	-	-	
4	7	2	2.5	3	-	0.08	9	-	2.5	3.5	4	-	-	-	0.1	11	-	4	-	5	-	-	-	-	-	-	-	-	-	-	-	-	
5	8	2	2.5	3	-	0.08	11	-	3	4	5	-	-	-	0.15	13	-	4	-	6	10	-	-	-	-	-	-	-	-	-	-	-	
6	10	2.5	3	3.5	-	0.1	13	-	3.5	5	6	-	-	-	0.15	15	-	5	-	7	10	-	-	-	-	-	-	-	-	-	-	-	
7	11	2.5	3	3.5	-	0.1	14	-	3.5	5	6	-	-	-	0.15	17	-	5	-	7	10	-	-	-	-	-	-	-	-	-	-	-	
8	12	2.5	-	3.5	-	0.1	16	-	4	5	6	8	-	-	0.2	19	-	6	-	9	11	-	-	-	-	-	-	-	-	-	-	-	
9	14	3	-	4.5	-	0.1	17	-	4	5	6	8	-	-	0.2	20	-	6	-	9	11	-	-	-	-	-	-	-	-	-	-	-	
10	16	3	-	4.5	-	0.1	19	-	5	6	7	9	-	-	0.3	22	-	6	8	10	13	16	22	-	-	-	-	-	-	-	-	-	
12	18	4	-	5	-	0.2	21	-	5	6	7	9	-	-	0.3	24	-	6	8	10	13	16	22	-	-	-	-	-	-	-	-	-	
15	21	4	-	5	-	0.2	24	-	5	6	7	9	-	-	0.3	28	-	7	8.5	10	13	18	23	-	-	-	-	-	-	-	-	-	
17	23	4	-	5	-	0.2	26	-	5	6	7	9	-	-	0.3	30	-	7	8.5	10	13	18	23	-	-	-	-	-	-	-	-	-	
20	27	4	-	5	7	0.2	32	4	7	8	10	12	16	22	0.3	37	7	9	11	13	17	23	30	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
22	30	4	-	5	7	0.2	34	4	7	-	10	-	16	22	0.3	39	7	9	11	13	17	23	30	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
25	32	4	-	5	7	0.2	37	4	7	8	10	12	16	22	0.3	42	7	9	11	13	17	23	30	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
28	35	4	-	5	7	0.2	40	4	7	-	10	-	-	22	0.3	45	7	9	11	13	17	23	30	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
30	37	4	-	5	7	0.2	42	4	7	8	10	12	16	22	0.3	47	7	9	11	13	17	23	30	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
32	40	4	-	6	8	0.2	44	4	7	-	10	-	16	22	0.3	52	7	10	13	15	20	27	36	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
35	44	5	-	7	9	0.3	47	4	7	8	10	12	16	22	0.3	55	7	10	13	15	20	27	36	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
40	50	6	-	8	10	0.3	52	4	7	8	10	12	16	22	0.3	62	8	12	14	16	22	30	40	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
45	55	6	-	8	10	0.3	58	4	7	8	10	13	18	23	0.3	68	8	12	14	16	22	30	40	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
50	62	6	-	10	12	0.3	65	5	7	10	12	15	20	27	0.3	72	8	12	14	16	22	30	40	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
55	68	7	-	10	13	0.3	72	7	9	11	13	17	23	30	0.3	80	9	13	16	19	25	34	45	0.3	1	1	1	1	1	1	1	1	
60	75	7	-	12	15	0.3	78	7	10	12	14	18	24	32	0.3	85	9	13	16	19	25	34	45	0.3	1	1	1	1	1	1	1	1	
65	80	7	-	12	15	0.3	85	7	10	13	15	20	27	36	0.3	90	9	13	16	19	25	34	45	0.3	1	1	1	1	1	1	1	1	
70	85	7	-	12	15	0.3	90	8	10	13	15	20	27	36	0.3	100	10	16	19	23	30	40	54	0.6	1	1	1	1	1	1	1	1	
75	90	7	-	12	15	0.3	95	8	10	13	15	20	27	36	0.3	105	10	16	19	23	30	40	54	0.6	1	1	1	1	1	1	1	1	
80	95	7	-	12	15	0.3	100	8	10	13	15	20	27	36	0.3	110	10	16	19	23	30	40	54	0.6	1	1	1	1	1	1	1	1	
85	105	10	-	15	-	0.6	110	9	13	16	19	25	34	45	0.3	120	11	18	22	25	35	45	63	0.6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
90	110	10	-	15	-	0.6	115	9	13	16	19	25	34	45	0.3	125	11	18	22	25	35	45	63	0.6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
95	115	10	-	15	-	0.6	120	9	13	16	19	25	34	45	0.3	130	11	18	22	25	35	45	63	0.6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
100	120	10	-	15	-	0.6	125	9	13	16	19	25	34	45	0.3	140	13	20	24	30	40	54	71	0.8	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
105	125	10	-	15	-	0.6	130	9	13	16	19	25	34	45	0.3	145	13	20	24	30	40	54	71	0.8	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
110	135	13	-	19	-	1	140	10	16	19	23	30	40	54	0.6	150	13	20	24	30	40	54	71	0.6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
120	145	13	-	19	-	1	150	10	16	19	23	30	40	54	0.6	165	14	22	27	34	45	60	80	0.6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
130	160	16	-	23	-	1	165	11	18	22	26	35	45	63	0.6	180	16	24	30	37	50	67	90	1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
140	170	16	-	23	-	1	175	11	18	22	26	35	45	63	0.6	190	16	24	30	37	50	67	90	1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
150	180	16	-	23	-	1	190	13	20	24	30	40	54	71	0.6	210	19	28	36	45	60	80	109	1	2	2	2	2	2	2	2	2	
160	190	16	-	23	-	1	200	13	20	24	30	40	54	71	0.6	220	19	28	36	45	60	80	109	1	2	2	2	2	2	2	2	2	
170	200	16	-	23	-	1	215	14	22	27	34	45	60	80	0.6	230	19	28	36	45	60	80	109	1	2	2	2	2	2	2	2	2	
180	215	18	-	26	-	1.1	225	14	22	27	34	45	60	80	0.6	250	22	33	42	52	69	95	125	1.1	2	2	2	2	2	2	2	2	

TABLE 1 - PART 1 (Continued)

BASIC PLAN FOR BOUNDARY DIMENSIONS OF METRIC RADIAL BALL AND ROLLER BEARINGS
(Except Tapered Roller Bearings)

Dimensions in millimetres

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
BORE	DIAMETER SERIES 7						DIAMETER SERIES 8										DIAMETER SERIES 9											
	WIDTH SERIES						WIDTH SERIES										WIDTH SERIES											
	1	2	3	4	Chamfer		0	1	2	3	4	5	6	Chamfer		0	1	2	3	4	5	6	Chamfer					
	DIMENSION SERIES						DIMENSION SERIES										DIMENSION SERIES											
	17	27	37	47	to 47		08	18	28	38	48	58	68	08	18	to 68	09	19	29	39	49	59	69	09	19	to 39	49	to 69
d	D	B or C				r s mm	D	B or C							r s mm	D	B or C								r s mm			
190	230	20	-	30	-	1.1	240	16	24	30	37	50	67	90	1	1.5	280	22	33	42	52	69	95	125	1.1	2	2.1	2.1
200	240	20	-	30	-	1.1	250	16	24	30	37	50	67	90	1	1.5	290	25	38	48	60	80	109	145	1.5	2.1	2.1	2.1
220	-	-	-	-	-	-	270	16	24	30	37	50	67	90	1	1.5	300	25	38	48	60	80	109	145	1.5	2.1	2.1	2.1
240	-	-	-	-	-	-	300	19	28	36	45	60	80	109	1	2	320	25	38	48	60	80	109	145	1.5	2.1	2.1	2.1
260	-	-	-	-	-	-	320	19	28	36	45	60	80	109	1	2	360	31	46	60	75	100	136	180	2	2.1	2.1	2.1
280	-	-	-	-	-	-	350	22	32	42	52	69	95	125	1.1	2	380	31	46	60	75	100	136	180	2	2.1	2.1	2.1
300	-	-	-	-	-	-	380	25	38	48	60	80	109	145	1.5	2.1	420	37	56	72	90	118	160	218	2.1	3	3	3
320	-	-	-	-	-	-	400	25	38	48	60	80	109	145	1.5	2.1	440	37	56	72	90	118	160	218	2.1	3	3	3
340	-	-	-	-	-	-	420	25	38	48	60	80	109	145	1.5	2.1	460	37	56	72	90	118	160	218	2.1	3	3	3
360	-	-	-	-	-	-	440	25	38	48	60	90	109	145	1.5	2.1	480	37	56	72	90	118	160	218	2.1	3	3	3
380	-	-	-	-	-	-	480	31	46	60	75	100	136	180	2	2.1	520	44	65	82	106	140	190	250	3	4	4	4
400	-	-	-	-	-	-	500	31	46	60	75	100	136	180	2	2.1	540	44	65	82	106	140	190	250	3	4	4	4
420	-	-	-	-	-	-	520	31	46	60	75	100	136	180	2	2.1	560	44	65	82	106	140	190	250	3	4	4	4
440	-	-	-	-	-	-	540	31	46	60	75	100	136	180	2	2.1	600	50	74	95	118	160	218	290	4	4	4	4
460	-	-	-	-	-	-	580	37	56	72	90	118	160	218	2.1	3	620	50	74	95	118	160	218	290	4	4	4	4
480	-	-	-	-	-	-	600	37	56	72	90	118	160	218	2.1	3	650	54	78	100	128	170	230	308	4	5	5	5
500	-	-	-	-	-	-	620	37	56	72	90	118	160	218	2.1	3	670	54	78	100	128	170	230	308	4	5	5	5
530	-	-	-	-	-	-	650	37	56	72	90	118	160	218	2.1	3	710	57	82	106	136	180	243	325	4	5	5	5
560	-	-	-	-	-	-	680	37	56	72	90	118	160	218	2.1	3	750	60	85	112	140	190	258	345	5	5	5	5
600	-	-	-	-	-	-	730	42	60	78	98	128	175	236	3	3	800	63	90	118	150	200	272	355	5	5	5	5
630	-	-	-	-	-	-	780	48	69	88	112	150	200	272	3	4	850	71	100	128	165	218	300	400	5	6	6	6
670	-	-	-	-	-	-	820	48	69	88	112	150	200	272	3	4	900	73	103	136	170	230	308	412	5	6	6	6
710	-	-	-	-	-	-	870	50	74	95	118	160	218	290	4	4	950	78	106	140	180	243	325	438	5	6	6	6
750	-	-	-	-	-	-	920	54	78	100	128	170	230	308	4	5	1000	80	112	145	185	250	335	450	6	6	6	6
800	-	-	-	-	-	-	980	57	82	106	136	180	243	325	4	5	1060	82	115	150	195	258	355	462	6	6	6	6
850	-	-	-	-	-	-	1030	57	82	106	136	180	243	325	4	5	1120	85	118	155	200	272	365	488	6	6	6	6
900	-	-	-	-	-	-	1090	60	85	112	140	190	258	345	5	5	1180	88	122	165	206	280	375	500	6	6	6	6
950	-	-	-	-	-	-	1150	63	90	118	150	200	272	355	6	6	1260	96	132	175	224	300	400	545	6	7.5	7.5	7.5
1000	-	-	-	-	-	-	1220	71	100	128	165	218	300	400	5	6	1320	103	140	185	236	315	438	580	6	7.5	7.5	7.5
1060	-	-	-	-	-	-	1280	71	100	128	165	218	300	400	5	6	1400	109	150	195	250	335	462	615	7.5	7.5	7.5	7.5
1120	-	-	-	-	-	-	1360	78	106	140	180	243	325	438	5	6	1460	109	150	195	250	335	462	615	7.5	7.5	7.5	7.5
1180	-	-	-	-	-	-	1420	78	106	140	180	243	325	438	5	6	1540	115	160	206	272	355	488	650	7.5	7.5	7.5	7.5
1250	-	-	-	-	-	-	1500	80	112	145	185	250	335	450	6	6	1630	122	170	218	280	375	515	690	7.5	7.5	7.5	7.5
1320	-	-	-	-	-	-	1600	88	122	165	206	280	375	500	6	6	1720	128	175	230	300	400	545	710	7.5	7.5	7.5	7.5
1400	-	-	-	-	-	-	1700	95	132	175	224	300	400	545	6	7.5	1820	-	185	243	315	425	-	-	-	9.5	9.5	9.5
1500	-	-	-	-	-	-	1820	-	140	185	243	315	-	-	7.5	1950	-	195	258	335	450	-	-	-	-	9.5	9.5	9.5
1600	-	-	-	-	-	-	1950	-	155	206	265	345	-	-	7.5	2060	-	200	265	345	462	-	-	-	-	9.5	9.5	9.5
1700	-	-	-	-	-	-	2060	-	160	206	272	355	-	-	7.5	2180	-	212	280	355	475	-	-	-	-	9.5	9.5	9.5
1800	-	-	-	-	-	-	2180	-	165	218	290	375	-	-	9.5	2300	-	218	290	375	500	-	-	-	-	12	12	12
1900	-	-	-	-	-	-	2300	-	175	230	300	400	-	-	9.5	2430	-	230	308	400	530	-	-	-	-	12	12	12
2000	-	-	-	-	-	-	2430	-	190	250	325	425	-	-	9.5	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 1 - PART 2

BASIC PLAN FOR BOUNDARY DIMENSIONS OF METRIC RADIAL BALL AND ROLLER BEARINGS
(Except Tapered Roller Bearings)

Dimensions in millimetres

29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47		
BORE	DIAMETER SERIES 0										DIAMETER SERIES 1									
	O.D.	WIDTH SERIES							Chamfer		O.D.	WIDTH SERIES					Chamfer			
		0	1	2	3	4	5	6				0	1	2	3	4				
		DIMENSION SERIES										DIMENSION SERIES								
		00	10	20	30	40	50	60	00	10 to 60		01	11	21	31	41	01	11 to 41		
d	D	B or C								r s min	D	B or C							r s min	
0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1.5	6	-	2.5	-	3	-	-	-	-	0.15	-	-	-	-	-	-	-	-		
2	7	-	2.8	-	3.5	-	-	-	-	0.15	-	-	-	-	-	-	-	-		
2.5	8	-	2.8	-	4	-	-	-	-	0.15	-	-	-	-	-	-	-	-		
3	9	-	3	-	5	-	-	-	-	0.15	-	-	-	-	-	-	-	-		
4	12	-	4	-	6	-	-	-	-	0.2	-	-	-	-	-	-	-	-		
5	14	-	5	-	7	-	-	-	-	0.2	-	-	-	-	-	-	-	-		
6	17	-	6	-	9	-	-	-	-	0.3	-	-	-	-	-	-	-	-		
7	19	-	6	8	10	-	-	-	-	0.3	-	-	-	-	-	-	-	-		
8	22	-	7	9	11	14	19	25	-	0.3	-	-	-	-	-	-	-	-		
9	24	-	7	10	12	15	20	27	-	0.3	-	-	-	-	-	-	-	-		
10	26	-	8	10	12	16	21	29	-	0.3	-	-	-	-	-	-	-	-		
12	28	7	8	10	12	16	21	29	0.3	0.3	-	-	-	-	-	-	-	-		
15	32	8	9	11	13	17	23	30	0.3	0.3	-	-	-	-	-	-	-	-		
17	35	8	10	12	14	18	24	32	0.3	0.3	-	-	-	-	-	-	-	-		
20	42	8	12	14	16	22	30	40	0.3	0.6	-	-	-	-	-	-	-	-		
22	44	8	12	14	16	22	30	40	0.3	0.6	-	-	-	-	-	-	-	-		
25	47	8	12	14	16	22	30	40	0.3	0.6	-	-	-	-	-	-	-	-		
28	52	8	12	15	18	24	32	43	0.3	0.6	-	-	-	-	-	-	-	-		
30	55	9	13	16	19	25	34	45	0.3	1	-	-	-	-	-	-	-	-		
32	58	9	13	16	20	26	35	47	0.3	1	-	-	-	-	-	-	-	-		
35	62	9	14	17	20	27	36	48	0.3	1	-	-	-	-	-	-	-	-		
40	68	9	15	18	21	28	38	50	0.3	1	-	-	-	-	-	-	-	-		
45	75	10	16	19	23	30	40	54	0.6	1	-	-	-	-	-	-	-	-		
50	80	10	16	19	23	30	40	54	0.6	1	-	-	-	-	-	-	-	-		
55	90	11	18	22	26	35	46	63	0.6	1.1	-	-	-	-	-	-	-	-		
60	95	11	18	22	26	35	46	63	0.6	1.1	-	-	-	-	-	-	-	-		
65	100	11	18	22	26	35	46	63	0.6	1.1	-	-	-	-	-	-	-	-		
70	110	13	20	24	30	40	54	71	0.6	1.1	-	-	-	-	-	-	-	-		
75	115	13	20	24	30	40	54	71	0.6	1.1	-	-	-	-	-	-	-	-		
80	125	14	22	27	34	45	60	80	0.6	1.1	-	-	-	-	-	-	-	-		
85	130	14	22	27	34	45	60	80	0.6	1.1	-	-	-	-	-	-	-	-		
90	140	16	24	30	37	50	67	90	1	1.5	150	-	-	-	-	60	-	2		
95	145	16	24	30	37	50	67	90	1	1.5	160	-	-	-	-	65	-	2		
100	150	16	24	30	37	50	67	90	1	1.5	165	21	30	39	52	65	1.1	2		
105	160	18	26	33	41	56	75	100	1	2	175	22	33	42	56	69	1.1	2		
110	170	19	28	36	45	60	80	109	1	2	180	22	33	42	56	69	1.1	2		
120	180	19	28	36	45	60	80	109	1	2	200	25	38	48	62	80	1.5	2		
130	200	22	33	42	52	69	95	125	1.1	2	210	25	38	48	64	80	1.5	2		
140	210	22	33	42	53	69	95	125	1.1	2	225	27	40	50	68	85	1.5	2.1		
150	225	24	35	45	56	75	100	136	1.1	2.1	250	31	46	60	80	100	2	2.1		
160	240	25	38	48	60	80	109	145	1.5	2.1	270	34	51	66	86	109	2	2.1		
170	260	28	42	54	67	90	122	160	1.5	2.1	280	34	51	66	88	109	2	2.1		
180	280	31	46	60	74	100	136	180	2	2.1	300	37	56	72	96	118	2.1	3		

TABLE 1 - PART 2 (Continued)

BASIC PLAN FOR BOUNDARY DIMENSIONS OF METRIC RADIAL BALL AND ROLLER BEARINGS
(Except Tapered Roller Bearings)

Dimensions in millimetres

29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47								
BORE	DIAMETER SERIES 0										DIAMETER SERIES 1															
	O.D.	WIDTH SERIES						Chamfer		WIDTH SERIES						Chamfer										
		0	1	2	3	4	5	6	0	1	2	3	4													
		DIMENSION SERIES										DIMENSION SERIES														
		00	10	20	30	40	50	60	00	10	20	30	40	50	60	01	11	21	31	41	01	11	21	31	41	11
d	D	B or C										r s min	D	B or C										r s min		
190	290	31	46	60	75	100	138	180	2	2.1	320	42	60	78	104	128	3	3								
200	310	34	51	66	82	109	150	200	2	2.1	340	44	65	82	112	140	3	3								
220	340	37	56	72	90	118	160	218	2.1	3	370	48	69	89	120	150	3	4								
240	360	37	56	72	92	118	160	218	2.1	3	400	50	74	95	128	160	4	4								
260	400	44	65	82	104	140	190	250	3	4	440	57	82	106	144	180	4	4								
280	420	44	65	82	106	140	190	250	3	4	460	57	82	106	146	180	4	5								
300	460	50	74	95	118	160	218	290	4	4	500	63	90	118	160	200	5	5								
320	480	50	74	95	121	160	218	290	4	4	540	71	100	128	176	218	5	5								
340	520	57	82	106	133	180	243	325	4	5	580	78	106	140	190	243	5	5								
360	540	57	82	106	134	180	243	325	4	5	600	78	106	140	192	243	5	5								
380	560	57	82	106	135	180	243	325	4	5	620	78	106	140	194	243	5	5								
400	600	63	90	118	148	200	272	355	5	5	650	80	112	145	200	250	6	6								
420	620	63	90	118	150	200	272	355	5	5	700	88	122	165	224	280	6	6								
440	650	67	94	122	157	212	280	375	5	6	720	88	122	165	228	280	6	6								
460	680	71	100	128	163	218	300	400	5	6	760	95	132	175	240	300	6	7.5								
480	700	71	100	128	165	218	300	400	5	6	790	100	136	180	248	308	6	7.5								
500	720	71	100	128	167	218	300	400	5	6	830	106	145	190	264	325	7.5	7.5								
530	780	80	112	145	185	250	335	450	6	6	870	109	150	195	272	335	7.5	7.5								
560	820	82	115	150	195	258	355	462	6	6	920	115	160	208	280	355	7.5	7.5								
600	870	85	118	155	200	272	365	488	6	6	980	122	170	218	300	375	7.5	7.5								
630	920	92	128	170	212	290	388	515	6	7.5	1,030	128	175	230	315	400	7.5	7.5								
670	980	100	136	180	230	309	425	560	6	7.5	1,090	136	185	243	336	412	7.5	7.5								
710	1,030	103	140	185	236	315	438	580	6	7.5	1,150	140	195	250	345	438	9.5	9.5								
750	1,090	109	150	195	250	335	462	615	7.5	7.5	1,220	150	206	272	365	475	9.5	9.5								
800	1,150	112	155	200	258	345	475	630	7.5	7.5	1,280	155	212	272	375	475	9.5	9.5								
850	1,220	118	165	212	272	365	500	670	7.5	7.5	1,360	165	224	290	400	500	12	12								
900	1,280	122	170	218	280	375	515	690	7.5	7.5	1,420	165	230	300	412	515	12	12								
950	1,360	132	180	236	300	412	560	730	7.5	7.5	1,500	175	243	315	438	545	12	12								
1,000	1,420	136	185	243	308	412	560	750	7.5	7.5	1,580	185	258	335	462	580	12	12								
1,060	1,500	140	195	250	325	438	600	800	9.5	9.5	1,660	190	265	345	475	600	12	15								
1,120	1,580	145	200	265	345	462	615	825	9.5	9.5	1,750	-	280	365	475	630	-	15								
1,180	1,660	155	212	272	355	475	650	875	9.5	9.5	1,850	-	290	368	500	670	-	15								
1,250	1,750	-	218	290	375	500	-	-	-	9.5	1,850	-	308	400	530	710	-	15								
1,320	1,850	-	230	300	400	530	-	-	-	12	2,060	-	325	425	560	750	-	15								
1,400	1,950	-	243	315	412	545	-	-	-	12	2,180	-	345	450	580	775	-	19								
1,500	2,120	-	272	355	462	615	-	-	-	12	2,300	-	355	462	600	800	-	19								
1,600	2,240	-	280	385	475	630	-	-	-	12	-	-	-	-	-	-	-	-								
1,700	2,360	-	290	375	500	650	-	-	-	15	-	-	-	-	-	-	-	-								
1,800	2,500	-	308	400	530	690	-	-	-	15	-	-	-	-	-	-	-	-								
1,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
2,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								

TABLE 1 - PART 3

BASIC PLAN FOR BOUNDARY DIMENSIONS OF METRIC RADIAL BALL AND ROLLER BEARINGS
(Except Tapered Roller Bearings)

Dimensions in millimetres

48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71					
BORE	DIAMETER SERIES 2										DIAMETER SERIES 3										DIAMETER SERIES 4							
	O.D.	WIDTH SERIES							Chamfer	O.D.	WIDTH SERIES							Chamfer	O.D.	W. SERIES		Chamfer						
		8	0	1	2	3	4	9			8	0	1	2	3	9	0			2								
		DIMENSION SERIES										DIMENSION SERIES										DIMENSION SERIES						
		82	02	12	22	32	42	92	82		02 to 42	92	83	03	13	23	33	03 to 83		83	03 to 33	93	04	24	04 to 24			
d	D	B or C										r _s min	D	B or C										r _s min	D	B or C		r _s min
0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
3	10	2.5	4	-	-	5	-	-	0.1	0.15	13	-	5	-	-	7	-	-	0.2	-	-	-	-					
4	13	3	5	-	-	7	-	-	0.15	0.2	16	-	5	-	-	9	-	-	0.3	-	-	-	-					
5	16	3.5	5	-	-	8	-	-	0.15	0.3	19	-	6	-	-	10	-	-	0.3	-	-	-	-					
6	19	4	6	-	-	10	-	-	0.2	0.3	22	-	7	-	-	11	13	-	0.3	-	-	-	-					
7	22	5	7	-	-	11	-	-	0.3	0.3	26	-	9	-	-	13	15	-	0.3	-	-	-	-					
8	24	5	8	-	-	12	-	-	0.3	0.3	28	-	9	-	-	13	15	-	0.3	30	10	14	0.6					
9	26	6	8	-	-	13	-	-	0.3	0.3	30	-	10	-	-	14	16	-	0.6	32	11	15	0.6					
10	30	7	9	-	-	14	14.3	-	0.3	0.6	35	9	11	-	-	17	19	0.3	0.6	37	12	16	0.6					
12	32	7	10	-	-	14	15.9	-	0.3	0.6	37	9	12	-	-	17	19	0.3	1	42	13	19	1					
15	35	8	11	-	-	14	15.9	20	0.3	0.6	42	9	13	-	-	17	19	0.3	1	52	15	24	1.1					
17	40	8	12	-	-	16	17.5	22	0.3	0.6	47	10	14	-	-	19	22.2	0.6	1	62	17	29	1.1					
20	47	9	14	-	-	18	20.6	27	0.3	1	52	10	15	-	-	21	22.2	0.6	1.1	72	19	33	1.1					
22	50	9	14	-	-	18	20.6	27	0.3	1	56	11	16	-	-	21	25	0.6	1.1	-	-	-	-					
25	52	10	15	-	-	18	20.6	27	0.3	1	62	12	17	-	-	24	25.4	0.6	1.1	80	21	36	1.5					
28	58	10	16	-	-	19	23	30	0.6	1	68	13	18	-	-	24	30	0.6	1.1	-	-	-	-					
30	62	10	16	-	-	20	23.8	32	0.6	1	72	13	19	-	-	27	30.2	0.6	1.1	90	23	40	1.5					
32	65	11	17	-	-	21	25	33	0.6	1	75	14	20	-	-	28	32	0.6	1.1	-	-	-	-					
35	72	12	17	-	-	23	27	37	0.6	1.1	80	14	21	-	-	31	34.9	0.6	1.5	100	25	43	1.5					
40	80	13	18	-	-	23	30.2	40	0.6	1.1	90	16	23	-	-	33	36.5	1	1.5	110	27	46	2					
45	85	13	19	-	-	23	30.2	40	0.6	1.1	100	17	25	-	-	36	39.7	1	1.5	120	29	50	2					
50	90	13	20	-	-	23	30.2	40	0.6	1.1	110	19	27	-	-	40	44.4	1	2	130	31	53	2.1					
55	100	14	21	-	-	25	33.3	45	0.6	1.5	120	21	29	-	-	43	49.2	1.1	2	140	33	57	2.1					
60	110	16	22	-	-	28	38.5	50	1	1.5	130	22	31	-	-	46	54	1.1	2.1	150	35	60	2.1					
65	120	18	23	-	-	31	38.1	56	1	1.5	140	24	33	-	-	48	58.7	1.1	2.1	160	37	64	2.1					
70	125	18	24	-	-	31	39.7	56	1	1.5	150	25	35	-	-	51	63.5	1.5	2.1	180	42	74	3					
75	130	18	25	-	-	31	41.3	56	1	1.5	160	27	37	-	-	55	68.3	1.5	2.1	190	45	77	3					
80	140	19	26	-	-	33	44.4	60	1	2	170	28	39	-	-	58	68.3	1.5	2.1	200	48	80	3					
85	150	21	28	-	-	36	49.2	65	1.1	2	180	30	41	-	-	60	73	2	3	210	52	86	4					
90	160	22	30	-	-	40	52.4	69	1.1	2	190	30	43	-	-	64	73	2	3	225	54	90	4					
95	170	24	32	-	-	43	55.6	75	1.1	2.1	200	33	45	-	-	67	77.8	2	3	240	55	95	4					
100	180	25	34	-	-	46	60.3	80	1.5	2.1	215	36	47	51	73	82.6	2.1	3	250	58	98	4						
105	190	27	35	-	-	50	65.1	85	1.5	2.1	225	37	49	53	77	87.3	2.1	3	260	60	100	4						
110	200	28	38	-	-	53	69.8	90	1.5	2.1	240	42	50	57	80	92.1	3	3	280	65	108	4						
120	215	-	40	42	58	76	95	78.2	-	2.1	260	44	55	62	86	106	104.8	3	3	310	72	118	5					
130	230	-	40	46	64	80	100	79.4	-	3	280	48	58	66	93	112	111.1	3	4	340	78	128	5					
140	250	-	42	50	68	88	109	82.6	-	3	300	50	62	70	102	118	114.3	4	4	360	82	132	5					
150	270	-	45	54	73	96	118	88.9	-	3	320	-	65	75	108	128	123.8	-	4	380	85	138	5					
160	290	-	48	58	80	104	128	98.4	-	3	340	-	68	79	114	136	133.4	-	4	400	88	142	5					
170	310	-	52	62	86	110	140	106.8	-	4	360	-	72	84	120	140	139.7	-	4	420	92	145	5					
180	320	-	52	62	86	112	140	108	-	4	380	-	75	88	126	150	144	-	4	440	95	150	6					

NOTE: Values not in ISO 15 are shaded

TABLE 1 - PART 3 (Continued)

BASIC PLAN FOR BOUNDARY DIMENSIONS OF METRIC RADIAL BALL AND ROLLER BEARINGS
(Except Tapered Roller Bearings)

Dimensions in millimetres

48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71		
BORE	DIAMETER SERIES 2										DIAMETER SERIES 3										DIAMETER SERIES 4				
	O.D.	WIDTH SERIES							Chamfer	WIDTH SERIES							Chamfer	W. SERIES		Chamfer					
		8	0	1	2	3	4	9		8	0	1	2	3	9	0		2							
		DIMENSION SERIES										DIMENSION SERIES									DIMENSION SERIES				
		82	02	12	22	32	42	92	82	02 to 42	92	83	03	13	23	33	83	03 to 33	93	04	24	04 to 24			
d	D	B or C							r s min		D	B or C							r s min		D	B or C		r s min	
190	340	-	55	65	92	120	150	114.3	-	4	400	-	78	82	132	155	182.4	-	5	480	98	155	6		
200	360	-	58	70	98	128	160	120.7	-	4	420	-	80	97	138	165	185.1	-	5	480	102	160	6		
220	400	-	65	78	108	144	180	133.4	-	4	460	-	88	109	145	180	-	-	5	540	115	180	6		
240	440	-	72	85	120	160	200	148.0	-	4	500	-	95	114	155	195	-	-	5	580	122	190	6		
260	480	-	80	90	130	174	218	158.8	-	5	540	-	102	123	165	206	-	-	6	620	132	206	7.5		
280	500	-	80	90	130	176	218	165.1	-	5	580	-	108	132	175	224	-	-	6	670	140	224	7.5		
300	540	-	85	98	140	192	243	177.8	-	5	620	-	109	140	185	236	-	-	7.5	710	150	236	7.5		
320	580	-	92	105	150	208	258	190.5	-	5	670	-	112	155	200	258	-	-	7.5	750	155	250	9.5		
340	620	-	92	118	165	224	280	-	-	6	710	-	118	165	212	272	-	-	7.5	800	165	265	9.5		
360	650	-	95	122	170	232	290	-	-	6	750	-	125	170	224	290	-	-	7.5	850	180	280	9.5		
380	680	-	95	132	175	240	300	-	-	6	780	-	128	175	230	300	-	-	7.5	900	190	300	9.5		
400	720	-	103	140	185	256	315	-	-	6	820	-	136	185	243	308	-	-	7.5	950	200	315	12		
420	760	-	109	150	195	272	335	-	-	7.5	850	-	136	190	250	315	-	-	9.5	980	206	325	12		
440	790	-	112	155	200	280	345	-	-	7.5	900	-	145	200	265	345	-	-	9.5	1,030	212	335	12		
460	830	-	118	165	212	298	365	-	-	7.5	950	-	155	212	280	365	-	-	9.5	1,060	218	345	12		
480	870	-	125	170	224	310	388	-	-	7.5	980	-	160	218	290	375	-	-	9.5	1,120	230	365	15		
500	920	-	136	185	243	336	412	-	-	7.5	1,030	-	170	230	300	388	-	-	12	1,150	236	375	15		
530	980	-	145	200	258	355	450	-	-	9.5	1,090	-	180	243	325	412	-	-	12	1,220	250	400	15		
560	1,030	-	150	206	272	365	475	-	-	9.5	1,150	-	190	258	335	438	-	-	12	1,280	258	412	15		
600	1,090	-	155	212	280	388	488	-	-	9.5	1,220	-	200	272	355	462	-	-	15	1,360	272	438	15		
630	1,150	-	165	230	300	412	515	-	-	12	1,280	-	206	280	375	488	-	-	15	1,420	280	450	15		
670	1,220	-	175	243	315	438	545	-	-	12	1,360	-	218	300	400	515	-	-	15	1,500	290	475	15		
710	1,280	-	180	250	325	450	560	-	-	12	1,420	-	224	308	412	530	-	-	15	-	-	-	-		
750	1,360	-	185	265	345	475	615	-	-	15	1,500	-	236	325	438	560	-	-	15	-	-	-	-		
800	1,420	-	200	272	355	488	615	-	-	15	1,600	-	258	355	462	600	-	-	15	-	-	-	-		
850	1,500	-	206	280	375	515	650	-	-	15	1,700	-	272	375	488	630	-	-	19	-	-	-	-		
900	1,580	-	218	300	388	515	670	-	-	15	1,780	-	280	388	500	650	-	-	19	-	-	-	-		
950	1,660	-	230	315	412	530	710	-	-	15	1,850	-	290	400	515	670	-	-	19	-	-	-	-		
1,000	1,750	-	243	330	425	560	750	-	-	15	1,950	-	300	412	545	710	-	-	19	-	-	-	-		
1,060	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1,120	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1,180	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1,250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1,320	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
2,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

NOTE: Values not in ISO 15 are shaded

2.5.6 Rules for extension of plan. For any new dimensions not numerically determined in the basic plan the following rules shall serve as a guide. However, the formulas given below for outside diameter and width cannot be used alone for the final determination of boundary dimension values. They must frequently be slightly modified to maintain continuity of the plan, to obtain suitable proportions for very small bearings and to permit selection of preferred dimensions.

2.5.6.1 Bore diameters. Bearing bore diameters, d , above 500 mm shall be taken from the number series R40 given in ISO 3, *Preferred numbers - Series of preferred numbers*.

2.5.6.2 Outside diameters. Bearing outside diameters, D , shall be calculated from the formula:

$$D = d + f_D d^{0.9} \text{ mm}$$

Values of the factor f_D are:

Dia. series	7	8	9	0	1	2	3	4
f_D	0.34	0.45	0.62	0.84	1.12	1.48	1.92	2.56

Outside diameter dimensions already appearing in the Plan shall be preferred.

New outside diameter dimensions shall be rounded off:

D		Rounded off to nearest
over	incl.	
-	3	0.5 mm
3	80	1 mm
80	230	5 mm
230	-	10 mm

2.5.6.3 Widths. Ring widths, B or C , shall be calculated from the formula:

$$B \text{ or } C = f_B \frac{D - d}{2} \text{ mm}$$

Values of the factor f_B are:

Width series	0	1	2	3	4	5	6	7
f_B	0.64	0.88	1.15	1.5	2	2.7	3.6	4.8

New width dimension shall be taken from the preferred series R80 (see ISO 3) and rounded off:

B or C		Rounded off to nearest
over	incl.	
-	3	0.1 mm
3	4	0.5 mm
4	500	1 mm
500	-	5

2.5.6.4 Chamfers. The smallest single chamfer dimension, $r_{s \min}$, shall not exceed 7 percent of the ring width B or C nor

7 percent of the sectional height $\frac{D - d}{2}$ and shall be rounded off:

r_s min		Rounded off to nearest
over	incl.	
-	0.15	0.05 mm
0.15	0.3	0.1 mm
0.3	2.5	0.5 mm
2.5	-	1 mm

3 Radial bearings with locating snap ring

3.1 Symbols. The symbols shown in the figures and the values given in the tables denote nominal dimensions unless otherwise specified. See Figure 22.

d = bore diameter
 D = outside diameter
 D_1 = snap ring groove diameter
 a = snap ring groove location
 b = snap ring groove width
 e = snap ring section height
 f = snap ring thickness
 g = snap ring gap (mounted)
 r_o = fillet radii at snap ring groove bottom
 D_a = diameter of end cover counter bore

3.2 Dimensions. For snap ring groove dimensions, see Table 2. For snap ring dimensions, see Table 3.

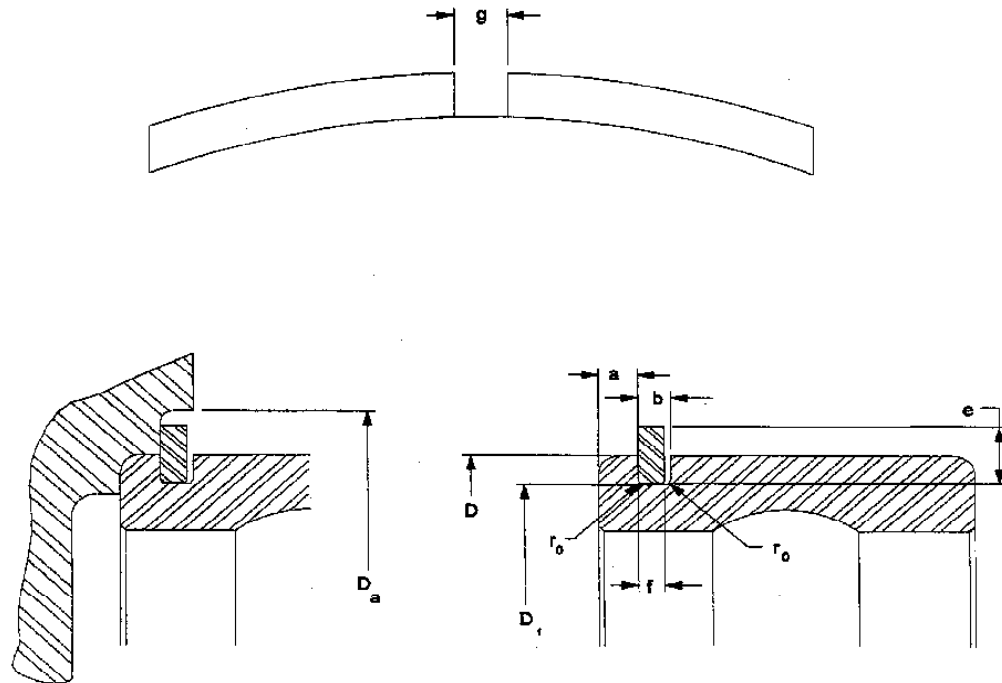


Figure 2 - Snap ring and snap ring groove dimensions

TABLE 2 - PART 1

SNAP RING GROOVE DIMENSIONS FOR DIMENSION SERIES 18 AND 19

Dimensions in millimetres											
d		D	D ₁		a				b		r _o
Dimension series					Dimension series						
					18		19				
18	19		max.	min.	max.	min.	max.	min.	max.	min.	max.
-	5	13	12	11.9	-	-	1.05	0.9	1.05	0.8	0.2
-	10	22	20.8	20.5	-	-	1.05	0.9	1.05	0.8	0.2
-	12	24	22.8	22.5	-	-	1.05	0.9	1.05	0.8	0.2
-	15	28	26.7	26.4	-	-	1.3	1.15	1.2	0.95	0.25
-	17	30	28.7	28.4	-	-	1.3	1.15	1.2	0.95	0.25
20	-	32	30.7	30.4	1.3	1.15	-	-	1.2	0.95	0.25
22	-	34	32.7	32.4	1.3	1.15	-	-	1.2	0.95	0.25
25	20	37	35.7	35.4	1.3	1.15	1.7	1.55	1.2	0.95	0.25
-	22	39	37.7	37.4	-	-	1.7	1.55	1.2	0.95	0.25
28	-	40	38.7	38.4	1.3	1.15	-	-	1.2	0.95	0.25
30	25	42	40.7	40.4	1.3	1.15	1.7	1.55	1.2	0.95	0.25
32	-	44	42.7	42.4	1.3	1.15	-	-	1.2	0.95	0.25
-	28	45	43.7	43.4	-	-	1.7	1.55	1.2	0.95	0.25
35	30	47	45.7	45.4	1.3	1.15	1.7	1.55	1.2	0.95	0.25
40	32	52	50.7	50.4	1.3	1.15	1.7	1.55	1.2	0.95	0.25
-	35	55	53.7	53.4	-	-	1.7	1.55	1.2	0.95	0.25
45	-	58	56.7	56.4	1.3	1.15	-	-	1.2	0.95	0.25
-	40	62	60.7	60.3	-	-	1.7	1.55	1.2	0.95	0.25
50	-	65	63.7	63.3	1.3	1.15	-	-	1.2	0.95	0.25
-	45	68	66.7	66.3	-	-	1.7	1.55	1.2	0.95	0.25
55	50	72	70.7	70.3	1.7	1.55	1.7	1.55	1.2	0.95	0.25
60	-	78	76.2	75.8	1.7	1.55	-	-	1.6	1.3	0.4
-	55	80	77.9	77.5	-	-	2.1	1.9	1.6	1.3	0.4
65	60	85	82.9	82.5	1.7	1.55	2.1	1.9	1.6	1.3	0.4
70	65	90	87.9	87.5	1.7	1.55	2.1	1.9	1.6	1.3	0.4
75	-	95	92.9	92.5	1.7	1.55	-	-	1.6	1.3	0.4
80	70	100	97.9	97.5	1.7	1.55	2.5	2.3	1.6	1.3	0.4
-	75	105	102.6	102.1	-	-	2.5	2.3	1.6	1.3	0.4
85	80	110	107.6	107.1	2.1	1.9	2.5	2.3	1.6	1.3	0.4
90	-	115	112.6	112.1	2.1	1.9	-	-	1.6	1.3	0.4
95	85	120	117.6	117.1	2.1	1.9	3.3	3.1	1.6	1.3	0.4
100	90	125	122.6	122.1	2.1	1.9	3.3	3.1	1.6	1.3	0.4
105	95	130	127.6	127.1	2.1	1.9	3.3	3.1	1.6	1.3	0.4
110	100	140	137.6	137.1	2.5	2.3	3.3	3.1	2.2	1.9	0.6
-	105	145	142.6	142.1	-	-	3.3	3.1	2.2	1.9	0.6
120	110	150	147.6	147.1	2.5	2.3	3.3	3.1	2.2	1.9	0.6
130	120	165	161.8	161.3	3.3	3.1	3.7	3.5	2.2	1.9	0.6
140	-	175	171.8	171.3	3.3	3.1	-	-	2.2	1.9	0.6
-	130	180	176.8	176.3	-	-	3.7	3.5	2.2	1.9	0.6
150	140	190	186.8	186.3	3.3	3.1	3.7	3.5	2.2	1.9	0.6
160	-	200	196.8	196.3	3.3	3.1	-	-	2.2	1.9	0.6

NOTE: Values that are not in or differ from those in ISO 464 are shaded.

TABLE 2 - PART 2

SNAP RING GROOVE DIMENSIONS FOR DIAMETER SERIES 0, 2, 3 AND 4
(Except Dimension Series 00, 82 and 83)

Dimensions in millimetres													
d				D	D ₁		a				b		r _o
Dimension series							Diameter series						
							0		2, 3 and 4				
0	2	3	4		max.	min.	max.	min.	max.	min.	max.	min.	max.
-	4	-	-	13	12.04	11.91	-	-	1.1	0.95	1.05	0.8	0.2
-	-	4	-	16	15.16	15.04	-	-	1.2	1.05	1.05	0.8	0.2
7	6	5	-	19	18.25	18.1	1.73	1.55	1.73	1.55	1.05	0.8	0.2
8	7	6	-	22	21.11	20.95	1.73	1.55	1.73	1.55	1.05	0.8	0.2
9	8	-	-	24	23	22.85	1.73	1.55	1.73	1.55	1.05	0.8	0.2
10	9	7	-	26	25.15	25	1.73	1.55	1.73	1.55	1.05	0.8	0.2
12	-	8	-	28	26.7	26.4	1.73	1.55	1.73	1.55	1.2	0.95	0.25
-	10	9	8	30	28.17	27.91	-	-	2.06	1.9	1.65	1.35	0.4
15	12	-	9	32	30.15	29.9	2.06	1.9	2.06	1.9	1.65	1.35	0.4
17	15	10	-	35	33.17	32.92	2.06	1.9	2.06	1.9	1.65	1.35	0.4
-	-	12	10	37	34.77	34.52	-	-	2.06	1.9	1.65	1.35	0.4
-	17	-	-	40	38.1	37.85	-	-	2.06	1.9	1.65	1.35	0.4
20	-	15	12	42	39.75	39.5	2.06	1.9	2.06	1.9	1.65	1.35	0.4
22	-	-	-	44	41.75	41.5	2.06	1.9	-	-	1.65	1.35	0.4
25	20	17	-	47	44.6	44.35	2.06	1.9	2.46	2.31	1.65	1.35	0.4
-	22	-	-	50	47.6	47.35	-	-	2.46	2.31	1.65	1.35	0.4
28	25	20	15	52	49.73	49.48	2.06	1.9	2.46	2.31	1.65	1.35	0.4
30	-	-	-	55	52.6	52.35	2.08	1.88	-	-	1.65	1.35	0.4
-	-	22	-	56	53.6	53.35	-	-	2.46	2.31	1.65	1.35	0.4
32	28	-	-	58	55.6	55.35	2.08	1.88	2.46	2.31	1.65	1.35	0.4
35	30	25	17	62	59.61	59.11	2.08	1.88	3.28	3.07	2.2	1.9	0.6
-	32	-	-	65	62.6	62.1	-	-	3.28	3.07	2.2	1.9	0.6
40	-	28	-	68	64.82	64.31	2.49	2.29	3.28	3.07	2.2	1.9	0.6
-	35	30	20	72	68.81	68.3	-	-	3.28	3.07	2.2	1.9	0.6
45	-	32	-	75	71.83	71.32	2.49	2.29	3.28	3.07	2.2	1.9	0.6
50	40	35	25	80	76.81	76.3	2.49	2.29	3.28	3.07	2.2	1.9	0.6
-	45	-	-	85	81.81	81.31	-	-	3.28	3.07	2.2	1.9	0.6
55	50	40	30	90	86.79	86.28	2.87	2.67	3.28	3.07	3	2.7	0.6
60	-	-	-	95	91.82	91.31	2.87	2.67	-	-	3	2.7	0.6
65	55	45	35	100	96.8	96.29	2.87	2.67	3.28	3.07	3	2.7	0.6
70	60	50	40	110	106.81	106.3	2.87	2.67	3.28	3.07	3	2.7	0.6
75	-	-	-	115	111.81	111.3	2.87	2.67	-	-	3	2.7	0.6
-	65	55	45	120	115.21	114.71	-	-	4.06	3.86	3.4	3.1	0.6
80	70	-	-	125	120.22	119.71	2.87	2.67	4.06	3.86	3.4	3.1	0.6
85	75	60	50	130	125.22	124.71	2.87	2.67	4.06	3.86	3.4	3.1	0.6
90	80	65	55	140	135.23	134.72	3.71	3.45	4.9	4.65	3.4	3.1	0.6
95	-	-	-	145	140.23	139.73	3.71	3.45	-	-	3.4	3.1	0.6
100	85	70	60	150	145.24	144.73	3.71	3.45	4.9	4.65	3.4	3.1	0.6
105	90	75	65	160	155.22	154.71	3.71	3.45	4.9	4.65	3.4	3.1	0.6
110	95	80	-	170	163.65	163.14	3.71	3.45	5.69	5.44	3.8	3.5	0.6
120	100	85	70	180	173.66	173.15	3.71	3.45	5.69	5.44	3.8	3.5	0.6
-	105	90	75	190	186.64	183.13	-	-	5.69	5.44	3.8	3.5	0.6
130	110	95	80	200	193.65	193.14	5.69	5.44	5.69	5.44	3.8	3.5	0.6
140	-	-	85	210	203.66	203.15	5.69	5.44	5.69	5.44	3.8	3.5	0.6
-	120	100	-	215	208.66	208.15	-	-	5.69	5.44	3.8	3.5	0.6
150	-	105	90	225	218.64	218.14	5.69	5.44	5.69	5.44	3.8	3.5	0.6
-	130	-	-	230	223.65	223.14	-	-	5.69	5.44	3.8	3.5	0.6
160	-	110	95	240	233.65	233.15	5.69	5.44	5.69	5.44	3.8	3.5	0.6
-	140	-	100	250	243.56	243.05	-	-	5.69	5.44	3.8	3.5	0.6
-	150	-	-	270	263.55	263.04	-	-	5.69	5.44	3.8	3.5	0.6

NOTE: Values that are not in or differ from those in ISO 464 are shaded.

TABLE 3 - PART 1

SNAP RING DIMENSIONS FOR DIMENSION SERIES 18 AND 19

Dimension in millimetres								
d		D	e		f		g ¹⁾	D _a
Dimension series			max.	min.	max.	max.	=	min.
18	19							
-	5	13	1.15	1	0.7	0.6	2	15
-	10	22	2	1.85	0.7	0.6	2	25.8
-	12	24	2	1.85	0.7	0.6	2	27.8
-	15	28	2.05	1.9	0.85	0.75	3	31.3
-	17	30	2.05	1.9	0.85	0.75	3	33.3
20	-	32	2.05	1.9	0.85	0.75	3	35.3
22	-	34	2.05	1.9	0.85	0.75	3	37.7
25	20	37	2.05	1.9	0.85	0.75	3	40.5
-	22	39	2.05	1.9	0.85	0.75	3	42.5
28	-	40	2.05	1.9	0.85	0.75	3	43.7
30	25	42	2.05	1.9	0.85	0.75	3	45.2
32	-	44	2.05	1.9	0.85	0.75	4	46.6
-	28	45	2.05	1.9	0.85	0.75	4	48.9
35	30	47	2.05	1.9	0.85	0.75	4	50.4
40	32	52	2.05	1.9	0.85	0.75	4	55.6
-	35	55	2.05	1.9	0.85	0.75	4	58.7
45	-	58	2.05	1.9	0.85	0.75	4	61.5
-	40	62	2.05	1.9	0.85	0.75	4	65.9
50	-	65	2.05	1.9	0.85	0.75	4	68.3
-	45	68	2.05	1.9	0.85	0.75	5	71.8
55	50	72	2.05	1.9	0.85	0.75	5	75.8
60	-	78	3.25	3.1	1.12	1.02	5	84.1
-	55	80	3.25	3.1	1.12	1.02	5	85.7
65	60	85	3.25	3.1	1.12	1.02	5	90.9
70	65	90	3.25	3.1	1.12	1.02	5	95.7
75	-	95	3.25	3.1	1.12	1.02	5	100.8
80	70	100	3.25	3.1	1.12	1.02	5	106
-	75	105	4.04	3.89	1.12	1.02	5	112.3
85	80	110	4.04	3.89	1.12	1.02	5	117.1
90	-	115	4.04	3.89	1.12	1.02	5	122.2
95	85	120	4.04	3.89	1.12	1.02	7	127
100	90	125	4.04	3.89	1.12	1.02	7	132.2
105	95	130	4.04	3.89	1.12	1.02	7	136.9
110	100	140	4.04	3.89	1.12	1.6	7	147.2
-	105	145	4.04	3.89	1.7	1.6	7	152
120	110	150	4.04	3.89	1.7	1.6	7	157.2
130	120	165	4.85	4.7	1.7	1.6	7	173
140	-	175	4.85	4.7	1.7	1.6	10	183
-	130	180	4.85	4.7	1.7	1.6	10	188
150	140	190	4.85	4.7	1.7	1.6	10	198
160	-	200	4.85	4.7	1.7	1.6	10	208

1) The dimensions shown for g apply to mounted snap rings. The rings shall fit in the grooves without radial looseness and are therefore somewhat expanded in the mounted condition.

NOTE: Values that are not in or differ from those in ISO 464 are shaded.

TABLE 3 - PART 2

SNAP RING DIMENSIONS FOR DIAMETER SERIES 0, 2, 3 AND 4
(Except Dimension Series 00, 82 and 83)

Dimension in millimetres										
d				D	e		f		g ¹⁾	D _a
Dimension series					max.	min.	max..	min.	=	min.
0	2	3	4							
-	4	-	-	13	1.15	1	0.7	0.6	3	15
-	-	4	-	16	1.65	1.5	0.7	0.6	3	19.2
7	6	5	-	19	1.65	1.5	0.7	0.6	3	22.2
8	7	6	-	22	2	1.85	0.7	0.6	3	25.8
9	8	-	-	24	2	1.85	0.7	0.6	3	27.8
10	9	7	-	26	2	1.85	0.7	0.6	3	29.8
12	-	8	-	28	2.05	1.9	0.85	0.74	3	31.8
-	10	9	8	30	3.25	3.1	1.12	1.02	3	35.3
15	12	-	9	32	3.25	3.1	1.12	1.02	3	37.3
17	15	10	-	35	3.25	3.1	1.12	1.02	3	40
-	-	12	10	37	3.25	3.1	1.12	1.02	3	41.7
-	17	-	-	40	3.25	3.1	1.12	1.02	3	45.2
20	-	15	12	42	3.25	3.1	1.12	1.02	3	46.8
22	-	-	-	44	3.25	3.1	1.12	1.02	3	49.1
25	20	17	-	47	4.04	3.89	1.12	1.02	4	53.2
-	22	-	-	50	4.04	3.89	1.12	1.02	4	56.5
28	25	20	15	52	4.04	3.89	1.12	1.02	4	58.3
30	-	-	-	55	4.04	3.89	1.12	1.02	4	61.1
-	-	22	-	56	4.04	3.89	1.12	1.02	4	62.5
32	28	-	-	58	4.04	3.89	1.12	1.02	4	64.5
35	30	25	17	62	4.04	3.89	1.7	1.6	4	68.3
-	32	-	-	65	4.04	3.89	1.7	1.6	4	71.5
40	-	28	-	68	4.85	4.7	1.7	1.6	5	75.8
-	35	30	20	72	4.85	4.7	1.7	1.6	5	79.8
45	-	32	-	75	4.85	4.7	1.7	1.6	5	83
50	40	35	25	80	4.85	4.7	1.7	1.6	5	88.1
-	45	-	-	85	4.85	4.7	1.7	1.6	5	92.9
55	50	40	30	90	4.85	4.7	2.46	2.36	5	98
60	-	-	-	95	4.85	4.7	2.46	2.36	5	102.9
65	55	45	35	100	4.85	4.7	2.46	2.36	5	108
70	60	50	40	110	4.85	4.7	2.46	2.36	5	117.9
75	-	-	-	115	4.85	4.7	2.46	2.36	5	123
-	65	55	45	120	7.21	7.06	2.82	2.72	7	131
80	70	-	-	125	7.21	7.06	2.82	2.72	7	136.1
85	75	60	50	130	7.21	7.06	2.82	2.72	7	141.3
90	80	65	55	140	7.21	7.06	2.82	2.72	7	151.2
95	-	-	-	145	7.21	7.06	2.82	2.72	7	156
100	85	70	60	150	7.21	7.06	2.82	2.72	7	161.1
105	90	75	65	160	7.21	7.06	2.82	2.72	7	171
110	95	80	-	170	9.6	9.45	3.1	3	10	184.2
120	100	85	70	180	9.6	9.45	3.1	3	10	194.5
-	105	90	75	190	9.6	9.45	3.1	3	10	204.4
130	110	95	80	200	9.6	9.45	3.1	3	10	214.3
140	-	-	85	210	9.6	9.45	3.1	3	10	224.2
-	120	100	-	215	9.6	9.45	3.1	3	10	229.4
150	-	105	90	225	9.6	9.45	3.1	3	10	239.3
-	130	-	-	230	9.6	9.45	3.1	3	10	244.5
160	-	110	95	240	9.6	9.45	3.1	3	10	254.4
-	140	-	100	250	9.6	9.45	3.1	3	10	264.3
-	150	-	-	270	9.6	9.45	3.1	3	10	284.6

¹⁾ The dimensions shown for g apply to mounted snap rings. The rings shall fit in the grooves without radial looseness and are therefore somewhat expanded in the mounted condition.

NOTE: Values that are not in or differ from those in ISO 464 are shaded.

4 Radial ball bearings with flanged outer ring

4.1 Symbols. The symbols shown in the figures and the values given in the tables denote nominal dimensions unless otherwise specified. See Figure 3.

D = outside diameter

D_1 = outside diameter of outer ring flange

C_1 = outer ring flange width

4.2 Dimensions. Flange dimensions for radial ball bearings grouped by diameter series and dimension series in accordance with Table 1 given in Table 4.

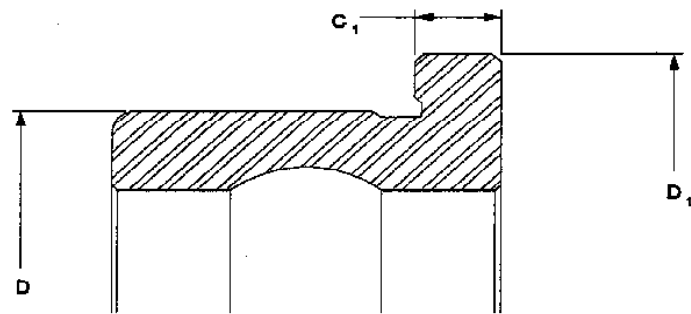


Figure 3 - Flanged outer ring dimensions

TABLE 4
FLANGE DIMENSIONS FOR RADIAL BALL BEARINGS

Dimension in millimetres

D	Diameter series 7		Diameter series 8				Diameter series 9			Diameter series 0		Diameter series 2		Diameter series 3	
	D ₁	Dim. series	D ₁	Dimension series			D ₁	Dimension series		D ₁	Dim. series	D ₁	Dim. series	D ₁	Dim. series
		17		18	28	38		19	39		10		02		03
		C ₁		C ₁				C ₁			C ₁		C ₁		C ₁
2.5	-	-	3.3	0.3	-	-	-	-	-	-	-	-	-	-	-
3	-	-	3.8	0.3	-	0.45	-	-	-	-	-	-	-	-	-
4	4.8	0.35	5	0.4	-	0.6	5	0.5	0.6	-	-	-	-	-	-
5	6	0.4	6.1	0.5	-	0.6	6.5	0.6	0.8	-	-	-	-	-	-
6	7.2	0.6	7.1	0.5	-	0.8	7.5	0.6	0.8	7.5	0.6	-	-	-	-
7	8.2	0.6	8.1	0.5	-	0.8	8.5	0.7	0.9	8.5	0.7	-	-	-	-
8	9.2	0.6	-	-	-	-	9.5	0.7	0.9	9.5	0.7	-	-	-	-
9	-	-	10.3	0.6	1	1	-	-	-	10.5	0.7	-	-	-	-
10	11.2	0.6	-	-	-	-	-	-	-	-	-	11.5	1	-	-
11	12.2	0.6	12.5	0.8	1	1	12.5	1	1.2	-	-	-	-	-	-
12	13.2	0.6	-	-	-	-	-	-	-	13.5	1	-	-	-	-
13	-	-	15	1	1.1	1.1	15	1	1.2	-	-	15	1	15	1
14	15.5	0.8	16	1	1.1	1.1	-	-	-	16	1	-	-	-	-
15	16.5	0.8	-	-	-	-	17	1.2	1.5	-	-	-	-	-	-
16	-	-	18	1	1.1	1.3	-	-	-	-	-	18	1	18	1
17	-	-	19	1	1.1	1.3	19	1.2	1.5	19	1.2	-	-	-	-
19	-	-	21	1	1.3	1.5	22	1.5	1.8	22	1.5	22	1.5	22	1.5
20	-	-	-	-	-	-	23	1.5	1.8	-	-	-	-	-	-
22	-	-	-	-	-	-	25	1.5	2	25	1.5	25	1.5	25	1.5
24	-	-	-	-	-	-	-	-	-	27	1.5	26	2	-	-
26	-	-	-	-	-	-	-	-	-	28	2	28	2	29	2
28	-	-	-	-	-	-	-	-	-	30	2	-	-	30.25	2.25
30	-	-	-	-	-	-	-	-	-	-	-	32.25	2.25	32.5	2.5
32	-	-	-	-	-	-	-	-	-	34.25	2.25	34.5	2.5	-	-
35	-	-	-	-	-	-	-	-	-	37.5	2.5	37.75	2.75	37.75	2.75
37	-	-	-	-	-	-	-	-	-	-	-	-	-	40	3
40	-	-	-	-	-	-	-	-	-	-	-	43	3	-	-
42	-	-	-	-	-	-	-	-	-	45	3	-	-	45	3
44	-	-	-	-	-	-	-	-	-	47	3	-	-	-	-
47	-	-	-	-	-	-	-	-	-	50	3	50.5	3.5	50.5	3.5
50	-	-	-	-	-	-	-	-	-	-	-	53.5	3.5	-	-
52	-	-	-	-	-	-	-	-	-	55	3	55.75	3.75	55.75	3.75
55	-	-	-	-	-	-	-	-	-	58.25	3.25	-	-	-	-
56	-	-	-	-	-	-	-	-	-	-	-	-	-	60	4

TABLE 4 (Continued)

FLANGE DIMENSIONS FOR RADIAL BALL BEARINGS

Dimensions in millimetres

D	Diameter series 0		Diameter series 2		Diameter series 3	
	D ₁	Dim. series	D ₁	Dim. series	D ₁	Dim. series
		10		02		03
		C ₁		C ₁		C ₁
58	61.25	3.25	62	4	-	-
62	65.5	3.5	66	4	66	4
65	-	-	69.25	4.25	-	-
68	71.75	3.75	-	-	72.25	4.25
72	-	-	76.25	4.25	76.5	4.5
75	79	4	-	-	79.5	4.5
80	84	4	84.5	4.5	85	5
85	-	-	89.75	4.75	-	-
90	94.5	4.5	95	5	95	5
95	99.5	4.5	-	-	-	-
100	104.5	4.5	105.5	5.5	105.5	5.5
110	115	5	115.5	5.5	115.5	5.5
115	120	5	-	-	-	-
120	-	-	126	6	126	6
125	130.5	5.5	131	6	-	-
130	135.5	5.5	136.5	6.5	136.5	6.5
140	146	6	146.5	6.5	147	7
145	151	6	-	-	-	-
150	156	6	157	7	157.5	7.5
160	166.5	6.5	167.5	7.5	167.5	7.5
170	177	7	178	8	178.5	8.5
180	187	7	188.5	8.5	188.5	8.5
190	-	-	199	9	199	9
200	208.5	8.5	209.5	9.5	209.5	9.5
210	218.5	8.5	-	-	-	-
215	-	-	225	10	225	10
225	234	9	-	-	236	11
230	-	-	240	10	-	-
240	249.5	9.5	-	-	251	11
250	-	-	261	11	-	-
260	270.5	10.5	-	-	272	12
270	-	-	282	12	-	-
280	291.5	11.5	-	-	294	14

5 Special case chamfer dimension limits

5.1 Symbols. The symbols shown in the figures and the values given in the tables denote nominal dimensions unless otherwise specified. See Figures 4, 5, and 6.

α = contact angle
 d = bore diameter
 D = outside diameter
 $r_{1s \min}$ = smallest single chamfer dimension (outer ring)

5.2 Chamfer dimension limits. Minimum limits, $r_{1s \min}$, of chamfers for (a) the groove side of the outer ring of a bearing with a snap ring groove are given in Table 5; (b) the non-thrust side of the outer ring of single row, angular contact bearings are given in Table 6; (c) the loose rib and non-rib sides of single-row cylindrical roller bearing rings are given in Table 7. These dimensions may differ from the minimum chamfer limits specified in the Boundary Dimension Plan given in Table 1. For Dimension series 09, 00, 82 and 83, when the $r_{1s \min}$ specified in Tables 6 or 7 is greater than the $r_{1s \min}$ specified in the Boundary Dimension Plan given in Table 1, the smaller chamfer applies. The chamfer dimensions of inner rings of bearings with tapered bores may be smaller than those specified in Table 1. The largest single shaft and housing fillet radius must not exceed these minimum chamfer limits.

The corresponding maximum chamfer limits, $r_{1s \max}$, are given in Tables 16 and 17.

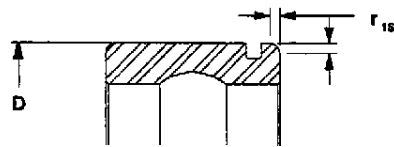


Figure 4 - Bearing with locating snap ring

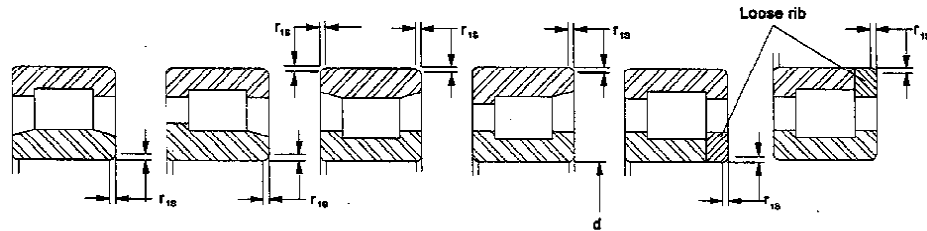


Figure 5 - Cylindrical roller bearings

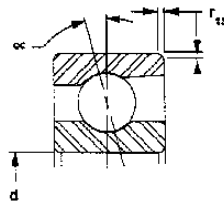


Figure 6 - Angular contact bearing

TABLE 5

**CHAMFER DIMENSIONS FOR THE GROOVE SIDE
OF THE OUTER RING OF BEARINGS WITH SNAP RING GROOVE**

Dimensions in millimetres												
r _{1s min}	Dimension series				Diameter series							
	18		19		0		2		3		4	
	D											
	over	incl.	over	incl.	over	incl.	over	incl.	over	incl.	over	incl.
0.2	-	-	22 ¹⁾	24	-	-	-	= 16	-	= 16	-	-
0.3	32 ¹⁾	78	24	47	19 ¹⁾	35	16	26	16	28	-	-
0.5	78	200	47	190	35	240	26	270	28	240	30 ¹⁾	250

¹⁾ This diameter is included in the group.

TABLE 6

**CHAMFER DIMENSIONS FOR THE NON-THRUST SIDE
OF THE OUTER RING OF SINGLE-ROW, ANGULAR CONTACT BEARINGS**

Dimension in millimetres												
r _{1s min}	α ≤ 30°								α > 30°			
	Diameter series											
	8		9		0		2		2		3	
	d											
	over	incl.	over	incl.	over	incl.	over	incl.	over	incl.	over	incl.
0.1	8 ¹⁾	50	8 ¹⁾	17	8 ¹⁾	17	-	-	-	-	-	-
0.15	50	60	17	50	-	-	-	-	-	-	-	-
0.3	60	120	50	80	17	50	10 ¹⁾	35	10 ¹⁾	15	9 ¹⁾	10
0.6	120	180	80	140	50	100	35	75	15	50	12	30
1	180	240	140	220	100	160	75	90	50	90	30	55
1.1	-	-	-	-	160	240	90	130	90	160	55	120
1.5	-	-	-	-	-	-	-	-	160	240	120	170
2	-	-	-	-	-	-	-	-	-	-	170	190

¹⁾ This diameter is included in the group.

NOTE: Values that are not in ISO 12044 are shaded.

For Dimension Series 09, 00, 82 and 83, when the $r_{1s\ min}$ is greater than the $r_{1s\ min}$ given in Table 1, the small chamfer applies.

TABLE 7

**CHAMFER DIMENSIONS FOR THE LOOSE RIB AND
NON-RIB SIDES OF THE OUTER RING OF
SINGLE-ROW, CYLINDRICAL ROLLER BEARINGS**

Dimension in millimeters

r _{1s min}	Diameter series					
	0		2		3	
	d					
	over	incl.	over	incl.	over	incl.
0.3	20 ¹⁾	25	15 ¹⁾	17	-	-
0.6	25	50	17	35	15 ¹⁾	20
1	50	85	-	-	-	-
1.1	85	140	-	= 55	-	= 35
1.5	140	160	-	-	-	-

¹⁾ This diameter is included in the group.

NOTE: For Dimension Series 00, 82 and 83, when the $r_{1s\ min}$ is greater than the $r_{1s\ min}$ given in Table 1, the small chamfer applies.