

# ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

## ISO RECOMMENDATION R 1002

ROLLING BEARINGS  
AIRFRAME BEARINGS

INTRODUCTION, GENERAL,  
BOUNDARY DIMENSIONS, TOLERANCES, PERMISSIBLE LOAD

1st EDITION

March 1969

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## BRIEF HISTORY

The ISO Recommendation R 1002, *Rolling bearings – Airframe bearings – Introduction, General, Boundary dimensions, Tolerances, Permissible load*, was drawn up by Technical Committee ISO/TC 4, *Rolling bearings*, the Secretariat of which is held by the Sveriges Standardiseringskommission (SIS).

Work on this question led, in 1963, to the adoption of three Draft ISO Recommendations.

In October 1963, these Draft ISO Recommendations (Nos. 474, 558 and 559) were circulated to all the ISO Member Bodies for enquiry.

Draft ISO Recommendation No. 474, on which the part of this ISO Recommendation dealing with dimensions is based, was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Australia	Hungary	Sweden
Austria	India	Switzerland
Canada	Japan	U.A.R.
Chile	Korea, Rep. of	United Kingdom
Czechoslovakia	Netherlands	U.S.S.R.
Germany	Romania	Yugoslavia
Greece	Spain	

One Member Body opposed the approval of the Draft :

France

Draft ISO Recommendation No. 558, on which the part dealing with internal clearance is based, was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Australia	Hungary	Switzerland
Austria	India	U.A.R.
Canada	Japan	United Kingdom
Chile	Korea, Rep. of	U.S.A.
Czechoslovakia	Netherlands	U.S.S.R.
France	Romania	Yugoslavia
Germany	Spain	
Greece	Sweden	

No Member Body opposed the approval of the Draft.

Draft ISO Recommendation No. 559, on which the part dealing with static load ratings is based, was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Australia	Greece	Sweden
Austria	Hungary	Switzerland
Canada	India	U.A.R.
Chile	Japan	United Kingdom
Colombia	Korea, Rep. of	U.S.A.
Czechoslovakia	Netherlands	U.S.S.R.
France	Romania	Yugoslavia
Germany	Spain	

No Member Body opposed the approval of the Draft.

The three Drafts were combined by the ISO/TC 4 Secretariat into a single document and submitted by correspondence to the ISO Council, which decided, in March 1969, to accept them as an ISO RECOMMENDATION.

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ROLLING BEARINGS  
AIRFRAME BEARINGS

INTRODUCTION, GENERAL,  
BOUNDARY DIMENSIONS, TOLERANCES, PERMISSIBLE LOAD

INTRODUCTION

This ISO Recommendation relates to airframe bearings. An airframe is defined here as the general structure of an aircraft, and includes its control surfaces and all flaps and doors and their respective mechanisms. Airframe bearings are designed to be subjected under load to slow rotations or oscillations only.

1. GENERAL

1.1 Scope

This ISO Recommendation is confined to bearings other than tapered roller bearings, used in airframes, as distinct from those used in connection with power plants, auxiliary drives and instruments in aircraft. Both metric and inch series bearings are included in this ISO Recommendation because of established usage in the aircraft industry.

These bearings are usually made without cage and are filled with balls or rollers, except for those in Table 12. All bearings are shielded or sealed, except those in Table 12. Except for those in Tables 5 and 12, the bearings have a projecting inner ring. The bearings are normally supplied adequately charged with suitable grease, and the exterior surfaces of the bearings may be protected by the same grease.

Because of the following design requirements, it is generally not possible to select standard bearings from ISO Recommendation R 15\*, *Rolling bearings – Radial bearings – Boundary dimensions – General plan*, for airframe applications but, in the case of metric bearings, the basic dimensions of the above-mentioned ISO Recommendation have been used where possible.

\* 2nd edition – 1968.

## 1.2 Essential characteristics

The lubricant and the seals should be capable of withstanding temperatures ranging from  $-55$  to  $+121^{\circ}\text{C}$  without losing their effectiveness.

NOTE. — Special operational conditions may necessitate wider extremes of temperature, in which case special greases and/or sealing materials may be required.

Bearings should be capable of withstanding repeated loads of variable intensity, normally without making a complete revolution. Bearings are generally made with a projecting inner ring in order to make it easier to assemble the bearings in position without adding washers.

## 1.3 Shields and seals

(a) A shielded bearing is a bearing in which the rolling elements and raceways are enclosed, except for a small clearance, between the shield and the opposite ring. Bearings in Tables 1, 2, 3, 5, 6, 7, 9, 10, 11, 13, 14, 17, 18 and 19 may be provided with shields.

(b) A sealed bearing is a bearing in which the rolling elements and raceways are enclosed by a flexible seal rubbing on one ring, the sealing element being secured to the other ring. Bearings in Tables 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15 and 16 may be provided in a fully sealed condition.

Choice of shields or seals will be governed by the nature of the particular application since the sealed bearing gives improved protection at the expense of greater friction.

## 1.4 Plating

External steel surfaces of the bearing may be protected by cadmium plating, or provided with an approved alternative surface protection. The thickness of cadmium plating should not be less than  $0.008$  mm ( $0.0003$  in) nor more than  $0.018$  mm ( $0.0007$  in). Treatments other than cadmium plating should be the subject of agreement between purchaser and manufacturer.

The surfaces to be plated are detailed in the tables for inch series bearings. For the metric series bearings attention is drawn to the note under Table 20.

## 1.5 Basic static load rating

In order that airframe bearings made by different manufacturers and designated with identical complete bearing numbers according to ISO Recommendation R 300, Part III : *ISO Identification Code for rolling bearings – Group V : Airframe bearings*, may be made interchangeable not only dimensionally but also functionally, every bearing should have a certain minimum basic static load rating,  $C_0$ . Therefore, no bearing should be coded as an ordinary airframe bearing unless its  $C_0$  value is equal to or greater than the value indicated in this ISO Recommendation. In cases where the carrying properties of the basic static load rating  $C_0$  differ from those of ordinary airframe bearings made of regular hardened rolling bearing steel, this should be shown by a particular supplementary code number or symbol.

Definitions, symbols and methods of evaluating basic static load ratings are given in ISO Recommendation R 76, *Ball and roller bearings – Methods of evaluating static load ratings*.

The values of the basic static load rating  $C_0$  demanded from ordinary airframe bearings made of regular hardened rolling bearing steel are indicated in Tables 1 to 19 inclusive, in section 2.

The use of special materials, such as corrosion-resisting steels or heat-stabilized steels, may affect the load carrying capacity and may call for special tests. These tests should be agreed between the manufacturer and the user.

## 2. BOUNDARY DIMENSIONS

### 2.1 General

The boundary dimensions of the bearings are given in Tables 1 to 19. The dimensions of plated parts are measured after plating.

A chamfer dimension of a bearing ring is the distance in radial and axial directions from the imaginary sharp ring corner, over which ring material is removed (see Fig. 1, 2 and 3).

The exact form of radiusing or chamfering at the corners is not specified but it should be somewhere between a chamfer with co-ordinates  $r$  maximum and a perfectly circular arc of  $r$  minimum tangential to the face and to the cylindrical bore or outside surface. Where no chamfer dimension at a corner is indicated, the sharp edge is removed.

The values for angles  $\delta$  indicated under Tables 10, 11, 12, 13, 14, 15 and 16 are to be regarded by the user as maxima. For the bearing manufacturer these values should be regarded as minima, so that in service the angles shown may be achieved normally without causing any damage to the parts of the bearing.

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## 2.2 Symbols

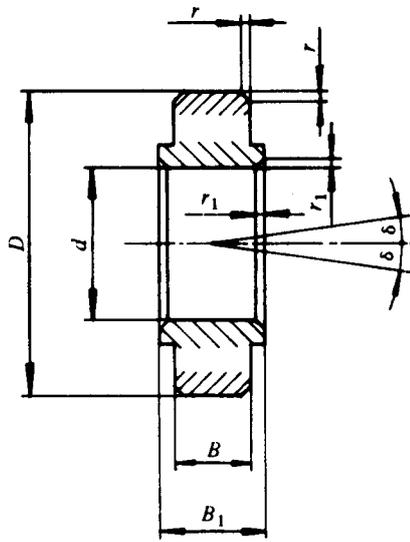


FIG. 1

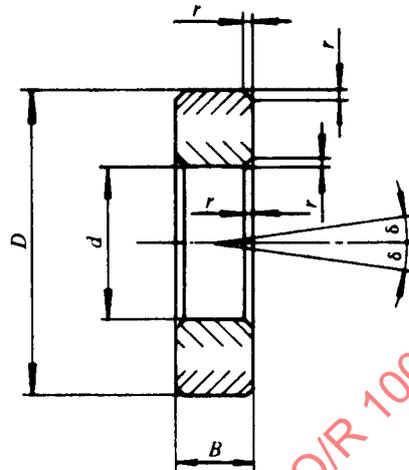


FIG. 2

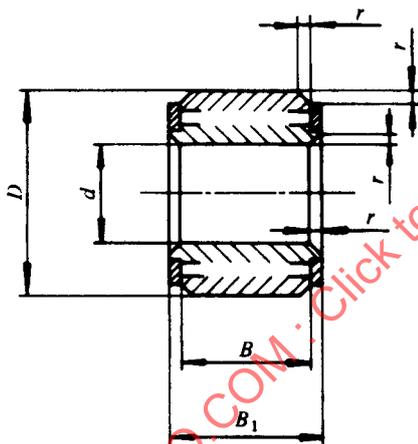


FIG. 3

- $d$  = bearing bore diameter  
 $D$  = bearing outside diameter  
 $B$  = outer ring width  
 $B_1$  ( $B$ ) = inner ring width  
 $r$  ( $r_1$ ) = chamfer dimension  
 $d_m$  = arithmetical mean of the largest and the smallest single diameters of the bore  
 $D_m$  = arithmetical mean of the largest and the smallest single diameters of the outside surface  
 $\delta$  = angular displacement between inner and outer ring axes, for self-aligning bearings  
 $C_o$  = basic static load rating

## 2.3 Boundary dimension plans

TABLE 1 – Single row, rigid ball bearings (see Fig. 1)  
(sealed or shielded)

Metric series

Dimensions in millimetres

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension		Basic static load rating $C_0$	
				Inner and outer ring $r$ and $r_1$		kg	lb
				min.	max.		
5	16	7	5	0.3	0.8	125	275
6	19	8	6	0.3	0.8	175	390
8	22	9	7	0.3	0.8	215	470
10	26	10	8	0.3	0.8	310	685
12	28	10	8	0.3	0.8	355	785
15	32	11	9	0.3	0.8	425	935
17	35	12	10	0.3	0.8	490	1 080
20	42	14	12	0.3	0.8	750	1 650
25	47	14	12	0.3	0.8	850	1 870
30	55	15	13	0.3	1.0	1 140	2 500

TABLE 2 – Single row, rigid ball bearings (see Fig. 1)  
(sealed or shielded)

Metric series

Dimensions in millimetres

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension		Basic static load rating $C_0$	
				Inner and outer ring $r$ and $r_1$		kg	lb
				min.	max.		
10	30	11	9	0.3	0.8	365	805
12	32	12	10	0.3	0.8	490	1 080
15	35	13	11	0.3	0.8	585	1 290
17	40	14	12	0.3	0.8	735	1 560
20	47	16	14	0.3	0.8	1 020	2 240
25	52	17	15	0.3	0.8	1 270	2 800
30	62	18	16	0.3	1.0	1 700	3 740

TABLE 3 – Single row, rigid ball bearings (see Fig. 1)  
(sealed or shielded)

Inch series

Dimensions in inches

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension				Basic static load rating $C_o$	
				Inner ring $r_1$		Outer ring $r$			
				min.	max.	min.	max.	lb	kg
0.1900	0.6250	0.297	0.234	0.005	0.020	0.016	0.031	275	125
0.2500	0.7500	0.281	0.219	0.005	0.020	0.016	0.031	330	150
0.3125	0.8125	0.297	0.234	0.015	0.030	0.016	0.031	390	175
0.3750	0.8750	0.313	0.250	0.015	0.030	0.016	0.031	445	200
0.5000	1.1250	0.375	0.313	0.015	0.030	0.016	0.031	695	315
0.6250	1.3750	0.406	0.344	0.015	0.030	0.032	0.047	1 190	540
0.7500	1.6250	0.437	0.375	0.015	0.030	0.032	0.047	1 660	755
1.0000	2.0000	0.500	0.437 5	0.015	0.030	0.032	0.047	2 110	960
1.2500	2.2500	0.500	0.437 5	0.015	0.030	0.032	0.047	2 440	1 110

NOTE. – The outside cylindrical surface and sides of the bearings in this Table are plated.

TABLE 4 – Single row, rigid ball bearings (see Fig. 1)  
(sealed)

Inch series

Dimensions in inches

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension				Basic static load rating $C_o$	
				Inner ring $r_1$		Outer ring $r$			
				min.	max.	min.	max.	lb	kg
0.1900	0.777 4	0.297	0.270	0.005	0.020	0.022	0.037	335	150
0.2500	0.901 4	0.484	0.335	0.005	0.020	0.032	0.047	480	220
0.3125	1.2500	0.557 5	0.375	0.015	0.030	0.032	0.047	1 000	455
0.3750	1.437 5	0.620	0.469	0.015	0.030	0.032	0.047	1 410	640
0.5000	1.687 5	0.620	0.500	0.015	0.030	0.044	0.059	2 100	955
0.6250	1.937 5	0.620	0.500	0.015	0.030	0.044	0.059	2 500	1 140

NOTE. – The outside cylindrical surface and sides of the bearings in this Table are plated.

TABLE 5 – Single row, rigid torque tube ball bearings (see Fig. 2)  
(sealed or shielded)

## Metric series

Dimensions in millimetres

Bore diameter $d$	Outside diameter $D$	Inner and outer ring width $B$	Chamfer dimension		Basic static load rating $C_o$	
			Inner and outer ring $r$			
			min.	max.	kg	lb
10	22	6	0.3	0.8	195	430
12	24	6	0.3	0.8	225	495
15	28	7	0.3	0.8	295	650
17	30	7	0.3	0.8	320	705

NOTE. – For bore diameter over 17 mm the boundary dimensions should be chosen from ISO 4 dimension series 18.

TABLE 6 – Single row, rigid torque tube ball bearings (see Fig. 1)  
(sealed or shielded)

## Inch series

Dimensions in inches

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension		Basic static load rating $C_o$	
				Inner and outer ring $r$ and $r_1$			
				min.	max.	lb	kg
0.625 0	1.062 5	0.281	0.250	0.015	0.030	585	265
0.750 0	1.187 5	0.281	0.250	0.015	0.030	670	305
0.875 0	1.312 5	0.281	0.250	0.015	0.030	750	340
1.062 5	1.500 0	0.281	0.250	0.015	0.030	890	400
1.312 5	1.750 0	0.281	0.250	0.015	0.030	1 060	480
1.562 5	2.000 0	0.281	0.250	0.015	0.030	1 220	555
1.812 5	2.250 0	0.281	0.250	0.015	0.030	1 420	645
2.062 5	2.625 0	0.281	0.250	0.015	0.030	1 640	745
2.312 5	2.875 0	0.281	0.250	0.015	0.030	1 810	820

NOTE. – The outside cylindrical surface and sides of the bearings in this Table are plated. The bore may be plated if required.

TABLE 7 – Single row, rigid torque tube ball bearings (see Fig. 1)  
(sealed or shielded)

Inch series

Dimensions in inches

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension		Basic static load rating $C_o$	
				Inner and outer ring $r$ and $r_1$			
				min.	max.	lb	kg
0.7500	1.5000	0.437	0.375	0.024	0.039	1 120	510
0.8750	1.6250	0.437	0.375	0.024	0.039	1 250	565
1.0000	1.7500	0.437	0.375	0.024	0.039	1 380	625
1.0630	1.8125	0.437	0.375	0.024	0.039	1 500	680
1.3130	2.0625	0.437	0.375	0.024	0.039	1 750	795
1.4380	2.1875	0.437	0.375	0.024	0.039	1 880	855
1.5630	2.3125	0.437	0.375	0.024	0.039	2 000	910
1.8130	2.5625	0.437	0.375	0.024	0.039	2 250	1 020
2.0630	2.8125	0.437	0.375	0.024	0.039	2 560	1 160
2.3130	3.0625	0.437	0.375	0.024	0.039	2 800	1 270
2.9380	3.8750	0.531	0.469	0.039	0.054	4 450	2 020
3.0630	4.0000	0.531	0.469	0.039	0.054	4 900	2 220

NOTE. – The outside cylindrical surface and sides of the bearings in this Table are plated. The bore may be plated if required.

TABLE 8 – Double row, rigid angular contact ball bearings (see Fig. 1)  
(sealed)

Inch series

Dimensions in inches

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension				Basic static load rating $C_o$	
				Inner ring $r_1$		Outer ring $r$			
				min.	max.	min.	max.	lb	kg
0.1900	0.777 4	0.495	0.473	0.005	0.020	0.022	0.037	815	370
0.2500	0.901 4	0.620	0.491	0.005	0.020	0.032	0.047	900	410
0.3125	1.2500	0.745	0.687	0.015	0.030	0.032	0.047	2 020	915
0.3750	1.437 5	0.870	0.794	0.015	0.030	0.032	0.047	2 650	1 200
0.5000	1.687 5	0.932	0.856	0.015	0.030	0.044	0.059	3 950	1 790
0.6250	1.937 5	0.995	0.920	0.015	0.030	0.044	0.059	4 740	2 150

NOTE. – The outside cylindrical surface and sides of the bearings in this Table are plated.

TABLE 9 – Double row, rigid ball bearings (see Fig. 1)  
(sealed or shielded)

Metric series

Dimensions in millimetres

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension		Basic static load rating $C_o$	
				Inner and outer ring $r$ and $r_1$			
				min.	max.	kg	lb
6	19	12	10	0.3	0.8	330	725
8	24	14	12	0.3	0.8	430	945
10	30	16	14	0.3	0.8	830	1 830
12	32	16	14	0.3	0.8	920	2 020
15	35	16	14	0.3	0.8	1 060	2 340
17	40	18	16	0.3	0.8	1 400	3 080
20	47	20	18	0.3	0.8	1 900	4 180

TABLE 10 – Double row, self-aligning ball bearings (see Fig. 1)  
(sealed or shielded)

Metric series

Dimensions in millimetres

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension		Basic static load rating $C_o$	
				Inner and outer ring $r$ and $r_1$			
				min.	max.	kg	lb
5	16	12	8	0.3	0.8	48	105
6	19	14	10	0.3	0.8	72	160
7	22	14	10	0.3	0.8	93	205
8	24	15	10	0.3	0.8	116	255
9	26	16	12	0.3	0.8	118	260
10	30	20	14	0.3	0.8	180	395
12	32	20	14	0.3	0.8	205	450
15	35	20	14	0.3	0.8	240	530
17	40	22	16	0.3	0.8	310	685
20	47	24	18	0.3	0.8	415	915

NOTE. – Permissible angular displacement ( $\delta$ ) between ring axes is  $7^\circ$ .

TABLE 11 – Double row, self-aligning ball bearings (see Fig. 1)  
(sealed or shielded)

Inch series

Dimensions in inches

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension				Basic static load rating $C_o$	
				Inner ring $r_1$		Outer ring $r$			
				min.	max.	min.	max.	lb	kg
0.1900	0.777 4	0.500	0.392	0.005	0.020	0.022	0.037	175	80
0.2500	0.901 4	0.687	0.464	0.005	0.020	0.032	0.047	220	100
0.3125	1.2500	0.812	0.656	0.015	0.030	0.032	0.047	465	210
0.375 0	1.437 5	0.937	0.750	0.015	0.030	0.032	0.047	630	285
0.5000	1.687 5	1.000	0.812	0.015	0.030	0.044	0.059	890	405
0.625 0	1.937 5	1.125	0.937	0.015	0.030	0.044	0.059	1 130	510

NOTES

1. Permissible angular displacement ( $\delta$ ) between ring axes is  $10^\circ$ .
2. The outside cylindrical surface and sides of the bearings in this Table are plated.

TABLE 12 – Double row, self-aligning roller bearings (see Fig. 2)

Metric series

Dimensions in millimetres

Bore diameter $d$	Outside diameter $D$	Inner and outer ring width $B$	Chamfer dimension		Basic static load rating $C_o$	
			Inner and outer ring $r$			
			min.	max.	kg	lb
25	52	18	1.0	2.2	2 080	4 550
30	62	20	1.0	2.2	3 000	6 550
35	72	23	1.0	2.7	4 050	9 000
40	80	23	1.0	2.7	4 500	9 800
45	85	23	1.0	2.7	5 000	11 000
50	90	23	1.0	2.7	5 400	11 800

NOTE. – Permissible angular displacement ( $\delta$ ) between ring axes is  $1.5^\circ$ .

TABLE 13 – Single row, self-aligning roller bearings (see Fig. 1)  
(sealed or shielded)

Metric series

Dimensions in millimetres

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension		Basic static load rating $C_0$	
				Inner and outer ring $r$ and $r_1$			
				min.	max.	kg	lb
8	30	17	14	0.3	0.8	750	1 660
10	35	21	17	0.3	0.8	1 100	2 420
12	37	21	17	0.3	0.8	1 230	2 700
15	42	21	17	0.3	0.8	1 420	3 150
17	47	23	19	0.3	0.8	1 930	4 250
20	52	26	21	0.3	1.0	2 310	5 100
25	62	29	24	0.3	1.0	3 300	7 200
30	72	34	27	0.3	1.0	4 400	9 650

NOTE. – Permissible angular displacement ( $\delta$ ) between ring axes is  $7^\circ$ .

TABLE 14 – Double row, self-aligning roller bearings (see Fig. 1)  
(sealed or shielded)

Metric series

Dimensions in millimetres

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension		Basic static load rating $C_0$	
				Inner and outer ring $r$ and $r_1$			
				min.	max.	kg	lb
8	30	17	14	0.3	0.8	560	1 230
10	35	21	17	0.3	0.8	840	1 850
12	37	21	17	0.3	0.8	930	2 050
15	42	21	17	0.3	0.8	1 100	2 420
17	47	23	19	0.3	0.8	1 480	3 260
20	52	26	21	0.3	1.0	1 700	3 740
25	62	29	24	0.3	1.0	2 320	5 100
30	72	34	27	0.3	1.0	3 200	7 050

NOTE. – Permissible angular displacement ( $\delta$ ) between ring axes is  $5^\circ$ .

TABLE 15 – Single row, self-aligning roller bearings (see Fig. 1)  
(sealed)

Inch series

Dimensions in inches

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension				Basic static load rating $C_o$	
				Inner ring $r_1$		Outer ring $r$		lb	kg
				min.	max.	min.	max.		
0.2500	0.9014	0.625	0.464	0.005	0.020	0.032	0.047	885	400
0.3125	1.2500	0.812	0.656	0.015	0.030	0.032	0.047	2 240	1 020
0.3750	1.4375	0.937	0.750	0.015	0.030	0.032	0.047	3 000	1 360
0.5000	1.6875	1.000	0.812	0.015	0.030	0.044	0.059	3 660	1 660
0.6250	1.9375	1.125	0.937	0.015	0.030	0.044	0.059	5 380	2 440
0.7500	2.3750	1.312	1.125	0.015	0.030	0.044	0.059	7 900	3 590

NOTES

1. Permissible angular displacement ( $\delta$ ) between ring axes is  $10^\circ$ .
2. The outside cylindrical surface and sides of the bearings in this Table are plated.

TABLE 16 – Double row, self-aligning roller bearings (see Fig. 1)  
(sealed)

Inch series

Dimensions in inches

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension				Basic static load rating $C_o$	
				Inner ring $r_1$		Outer ring $r$		lb	kg
				min.	max.	min.	max.		
0.2500	0.9014	0.625	0.464	0.005	0.020	0.032	0.047	885	400
0.3125	1.2500	0.812	0.656	0.015	0.030	0.032	0.047	2 240	1 020
0.3750	1.4375	0.937	0.750	0.015	0.030	0.032	0.047	3 000	1 360
0.5000	1.6875	1.000	0.812	0.015	0.030	0.044	0.059	3 660	1 660
0.6250	1.9375	1.125	0.937	0.015	0.030	0.044	0.059	5 380	2 440
0.7500	2.3750	1.312	1.125	0.015	0.030	0.044	0.059	7 900	3 590

NOTES

1. Permissible angular displacement ( $\delta$ ) between ring axes is  $10^\circ$ .
2. The outside cylindrical surface and sides of the bearings in this Table are plated.

TABLE 17 – Rigid needle roller bearings (see Fig. 3)  
(shielded)

Inch series

Dimensions in inches

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension		Basic static load rating $C_o$	
				Inner and outer ring $r$			
				min.	max.	lb	kg
0.2500	0.7500	0.375	0.281	0.022	0.037	1 255	570
0.3125	0.8125	0.437	0.344	0.022	0.037	1 750	795
0.3750	0.8750	0.562	0.469	0.022	0.037	2 760	1 250
0.4375	0.9375	0.625	0.531	0.032	0.047	3 420	1 550
0.5000	1.1250	0.750	0.656	0.032	0.047	5 100	2 310
0.6250	1.2500	1.000	0.906	0.032	0.047	8 080	3 660
0.7500	1.3750	1.125	1.000	0.032	0.047	10 120	4 600
0.8750	1.6250	1.250	1.125	0.032	0.047	13 250	6 000
1.0000	1.7500	1.250	1.125	0.032	0.047	14 600	6 620
1.2500	2.0000	1.250	1.049	0.032	0.047	16 000	7 255
1.5000	2.2500	1.250	1.049	0.032	0.047	18 450	8 370

NOTE. – The outside cylindrical surface and sides of the bearings in this Table are plated.

TABLE 18 – Rigid needle roller bearings, track roller, single row (see Fig. 3)  
(shielded)

Inch series

Dimensions in inches

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension		Track contact width	Basic static load rating $C_o$	
				inner ring $r$				
				min.	max.	min.	lb	kg
0.1900	0.7500	0.312	0.218	0.022	0.037	0.12	790	360
0.2500	0.8750	0.375	0.281	0.022	0.037	0.22	1 255	570
0.3750	1.0625	0.500	0.375	0.022	0.037	0.31	2 285	1 035
0.5000	1.3125	0.625	0.500	0.032	0.047	0.44	3 780	1 710
0.6250	1.5000	0.750	0.625	0.032	0.047	0.56	5 490	2 490
0.7500	1.7500	1.000	0.875	0.032	0.047	0.75	9 050	4 105
0.8750	2.0000	1.125	1.000	0.032	0.047	0.88	11 530	5 230

NOTE. – The sides of the above bearings are cadmium-plated. The outside cylindrical surface is chromium-plated to minimize wear. The thickness of the plating on the outside surface is 0.0005 in minimum to 0.0010 in maximum.

TABLE 19 – Rigid needle roller bearings, track roller, double row (see Fig. 3)  
(shielded)

Inch series

Dimensions in inches

Bore diameter $d$	Outside diameter $D$	Inner ring width $B_1$	Outer ring width $B$	Chamfer dimension inner ring $r$		Track contact width min.	Basic static load rating $C_o$	
				min.	max.		lb	kg
0.375 0	1.125 0	1.000	0.875	0.022	0.037	0.75	4 575	2 075
0.500 0	1.375 0	1.250	1.125	0.032	0.047	1.00	8 095	3 670
0.625 0	1.625 0	1.500	1.375	0.032	0.047	1.12	12 690	5 755
0.750 0	1.875 0	1.750	1.625	0.032	0.047	1.38	17 895	8 115
0.875 0	2.125 0	2.000	1.875	0.032	0.047	1.62	23 975	10 875

NOTE. – The sides of the above bearings are cadmium-plated. The outside cylindrical surface is chromium-plated to minimize wear. The thickness of the plating on the outside surface is 0.0005 in minimum to 0.0010 in maximum.

## 3. TOLERANCES

## 3.1 External tolerances and running accuracy

The tolerances for metric series bearings are given in Table 20 and for inch series bearings in Table 21.

Symbols : see clause 2.2.

TABLE 20 – Tolerances for metric series bearings

Tolerances in microns

Inner ring									
Bore diameter $d$ nominal millimetres		Bore diameter				Width $B_1$ or $B$			Radial run-out
		$d_m$		$d$		Deviations		Variation of individual ring	
		Deviations						max.	
Over	Incl.	High	Low	High	Low	High	Low	max.	max.
(2.5)	10	0	- 8	+2	-10	0	-120	15	10
(10)	18	0	- 8	+3	-11	0	-120	20	10
(18)	30	0	-10	+3	-13	0	-120	20	13
(30)	50	0	-12	+3	-15	0	-120	20	15
Outer ring									
Outside diameter $D$ nominal millimetres		Outside diameter				Width $B$			Radial run-out
		$D_m$		$D$		Deviations			
		Deviations						max.	
Over	Incl.	High	Low	High	Low	Identical to those of inner ring of same bearing			
(6)	18	0	- 8	+2	-10				15
(18)	30	0	- 9	+2	-11				15
(30)	50	0	-11	+3	-14				20
(50)	80	0	-13	+4	-17				25
(80)	120	0	-15	+5	-20				35

NOTE. – For plated bearings, wider diameter tolerances are required, but these should be selected to give the same average diameters as unplated bearings.

TABLE 21 — Tolerances for inch series bearings

Bearings of Table No.	Bore diameter range inches	Bore diameter $d_m$ Deviations		Outside diameter $D_m$ Deviations		Width $B$ and $B_1$ Deviations		Radial run-out		Groove run-out with reference side*
		High	Low	High	Low	High	Low	Inner ring max.	Outer ring max.	
3, 4, 8, 11, 15, 16,	all	0	-0.0005	+0.0001	-0.0006	0	-0.005	0.001	0.0016	0.0016
6	0.625 to 1.5625	+0.0007	-0.0007	0	-0.0010	0	-0.005	0.001	0.0016	0.0016
6	1.8125 to 2.3125	+0.0010	-0.0010	0	-0.0015	0	-0.005	0.001	0.0016	0.0016
7	all	0	-0.0010	0	-0.0010	0	-0.005	0.001	0.0016	0.0016
17	all	0	-0.0007	+0.0001	-0.0006	0	-0.005	0.001	0.0016	—
18, 19	all	0	-0.0007	0	-0.0010	0	-0.005	0.001	0.0016	—

\* Applies to rigid ball bearings only.

NOTE. — If the bore of bearings in Table 6 is plated, the bore diameter tolerances should be +0.0002 in to -0.0012 in.