ROYAL CANADIAN AIR FORCE

ANTIFRICTION BEARINGS

TOLERANCES
BALL & ROLLER TYPES

21 FEB 57

LIST OF RCAF REVISIONS

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AIRCRAFT HARDWARE, RUBBER MATERIALS AND BEARINGS

ANTIFRICTION BEARINGS—ANTIFRICTION BEARING TOLERANCES—BALL AND ROLLER TYPES

This Technical Order replaces T.O.No. 04-20B-6, dated 25 October 1945, revised where indicated by black vertical revision lines.

NOTE The information contained herein will be used as a guide and standard for inspecting antifriction bearings at the time of their overhaul by depots in the continental United States and then __only__ when such specifications and tolerances are required by either Technical Order compliance or for identification purposes.

1. PURPOSE.

The purpose of this Technical Order is to furnish dimensional tolerances on antifriction bearings and to establish methods and procedures for obtaining proper measurements of such tolerances. This Technical Order establishes a precise definition of what is meant by the tolerances for bore and outside diameters and outlines instructions for computing measurements of such tolerances.

2. TABLES OF AFBMA STANDARD SPECIFICATIONS.

a. Table I - ABEC 1 - RBEC1 - Tolerances of Metric Annular Ball and Roller Bearings Except Magneto Bearings.

b. Table II ABEC 3 - Tolerances of Metric Annular Ball Bearings Except Magneto Bearings.

c. Table III - ABEC 5 - Tolerances of Metric Annular Ball Bearings Except Magneto Bearings.

d. Table IV - ABEC 1 - Tolerances of Magneto Type Ball Bearings.

e. Table V - ABEC 1 - Tolerances of Inch Type Ball Bearings.

f. Table VI - ABEC 3 - Tolerances of Inch Type Ball Bearings.

g. Table VII - ABEC 5 - Tolerances of Inch Type Ball Bearings.

h. Table VIII - ABEC 7 - Tolerances of Metric Annular Ball Bearings Except Magneto Bearings.

3. METHOD OF PERFORMING MEASUREMENT OPERATION.

a. The bores or outside diameters of the relatively thin hardened rings are not true cylinders in shape. When measuring with a 2-point gage, different readings may be obtained in different locations. Such variations may not be discovered when using a round plug gage. For instance, if the plug gage for the upper bore limit does not enter, the bore may still be oversize an objectionable amount at some other point of the bore not reached by the gage. In this way an objectionable bearing may be passed. In another case the Go Gage may not enter, not because the bearing bore is too small on an average, but, because the ring has gone slightly out-of-round after the bore was ground. As long as the average diameter is within limits, that is, the bore circumference is correct, the minimum diameter due to this slight out-of-roundness should not be cause for rejection because when mounted on the shaft with a light press fit the ring resumes its round shape.

b. Similarly, a slight oversize or undersize of outside diameter in one location, due to slight out-of-roundness, is not objectionable as the ring will take the shape of the housing under load.

c. The specifications herein include methods for measuring boundary dimensions and eccentricities for ball bearings, cylindrical and self-aligning roller bearings; also, parallelism of side, side run-out and groove parallelism with side for ball bearings made up to and including Specification ABEC 7. The tolerances applying to these measurements are shown in tables I to VIII inclusive, with indication on each table of the specific bearing type to which the table is applicable.
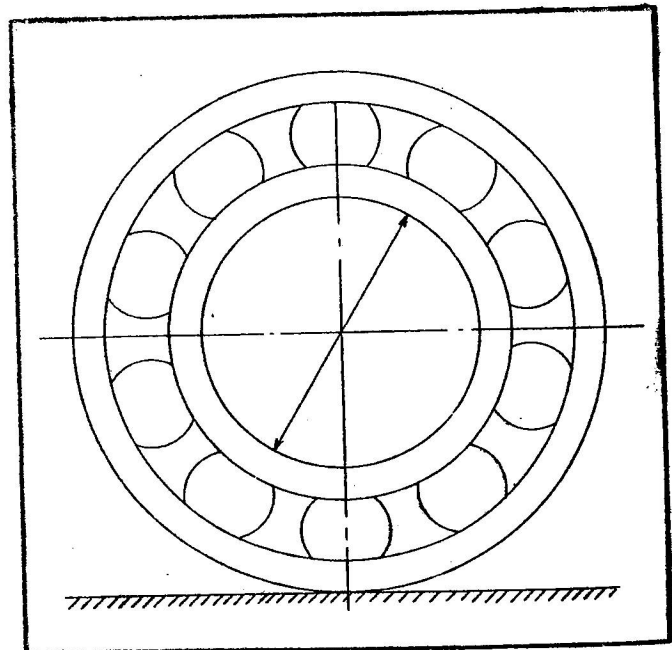

Figure 1

TABLE I

AFBMA STANDARD SPECIFICATION
ABEC I - RBEC I
TOLERANCES OF METRIC ANNULAR BALL AND ROLLER BEARINGS
EXCEPT MAGNETO BEARINGS
TOLERANCES IN .0001"

INNER RING

BORE IN MM		TOL. FOR BORE				ECC.
		DM				
OVER	INCL.	LOW	HIGH	D MIN.	D MAX.	
0	9	-3	+0	-4	+1	3
9	18	-3	+0	-4	+1	4
18	30	-4	+0	-5	+1	5
30	50	-5	+0	-7	+2	6
50	80	-6	+0	-8	+2	8
80	120	-8	+0	-11	+3	10
120	180	-10	+0	-13	+3	12
180	250	-12	+0	-16	+4	16
250	315	-14	+0	-18	+4	20
315	400	-16	+0	-20	+4	24
400	500	-18	+0	-23	+5	26

OUTER RING

O. D. IN MM		TOL. FOR OUTER DIAMETER				ECC.
		DM		DIA SERIES 2		
OVER	INCL.	HIGH	LOW	D MAX.	D MIN.	
0	18	+0	-4	+1	-5	6
18	30	+0	-4	+1	-5	6
30	50	+0	-5	+2	-7	8
50	80	+0	-5	+2	-7	10
80	120	+0	-6	+3	-9	14
120	150	+0	-8	+3	-11	16
150	180	+0	-10	+3	-13	18
180	250	+0	-12	+4	-16	20
250	315	+0	-14	+4	-18	24
315	400	+0	-16	+4	-20	28
400	500	+0	-18	+5	-23	32
500	630	+0	-20	+6	-26	40

BEARINGS OTHER THAN DUPLEX
WIDTH OF INDIVIDUAL
INNER OR OUTER RING

NOMINAL BORE IN MM		WIDTH TOLERANCE	
OVER	INCL.	+	–
0	180	0	50
180	315	0	100
315	400	0	160
400	500	0	180
500	630	0	220

DUPLEX BEARINGS *
TOTAL WIDTH OF
INNER OR OUTER RINGS

NOMINAL BORE IN MM		WIDTH TOLERANCE	
OVER	INCL.	+	–
0	80	0	200
80	180	0	300
180	315	0	400
315	400	0	500

* IF OTHER THAN A PAIR OF BEARINGS IS INVOLVED, THE TOLERANCE IS IN PROPORTION TO THE NUMBER OF BEARINGS

TABLE II

AFBMA STANDARD SPECIFICATION
ABEC 3
TOLERANCE OF METRIC ANNULAR BALL BEARINGS
EXCEPT MAGNETO BEARINGS
TOLERANCES IN .0001*

INNER RING

| BORE IN MM | | TOL. FOR BORE | | | | ECC. |
| | | DM | | | | |
OVER	INCL.	LOW	HIGH	D MIN.	D MAX.	
0	9	-2	+0	-3	+1	2
9	18	-2	+0	-3	+1	3
18	30	-2	+0	-3	+1	3
30	50	-3	+0	-5	+2	4
50	80	-4	+0	-6	+2	4
80	120	-5	+0	-8	+3	5
120	180	-6	+0	-9	+3	6
180	250	-7	+0	-11	+4	8
250	315	-8	+0	-12	+4	10

OUTER RING

| O.D. IN MM | | TOL. FOR OUTER DIAMETER | | | | ECC. |
| | | DM | | DIA SERIES 2 | | |
OVER	INCL.	HIGH	LOW	D MAX.	D MIN.	
0	18	+0	-3	+1	-4	4
18	30	+0	-3	+1	-4	4
30	50	+0	-3	+2	-5	4
50	80	+0	-4	+2	-6	5
80	120	+0	-4	+3	-7	7
120	150	+0	-5	+3	-8	8
150	180	+0	-6	+3	-9	9
180	250	+0	-7	+4	-11	10
250	315	+0	-8	+4	-12	12
315	400	+0	-9	+4	-13	14
400	500	+0	-10	+5	-15	16

BEARINGS OTHER THAN DUPLEX
WIDTH OF INDIVIDUAL
INNER OR OUTER RING

| NOMINAL BORE IN MM | | WIDTH TOLERANCE | |
OVER	INCL.	+	-
0	180	0	50
180	315	0	100
315	400	0	160
400	500	0	180
500	630	0	220

DUPLEX BEARINGS *
TOTAL WIDTH OF
INNER OR OUTER RINGS

| NOMINAL BORE IN MM | | WIDTH TOLERANCE | |
OVER	INCL.	+	-
0	80	0	200
80	180	0	300
180	315	0	400
315	400	0	500

*IF OTHER THAN A PAIR OF BEARINGS IS INVOLVED, THE TOLERANCE IS IN PROPORTION TO THE NUMBER OF BEARINGS

TABLE III

AFBMA STANDARD SPECIFICATION
ABEC 5
TOLERANCES OF METRIC ANNULAR BALL BEARINGS
EXCEPT MAGNETO BEARINGS
TOLERANCES IN .0001"

INNER RING

BORE IN MM		BORE TOL.		ECC.	PARALLELISM OF SIDES	SIDE RUN-OUT WITH BORE	GROOVE PARALLELISM WITH SIDE
OVER	INCL.	D MIN.	D MAX.				
0	9	-2	+0	2	2	3	3
9	18	-2	+0	2	2	3	3
18	30	-2	+0	2	2	3	3
30	50	-2	+0	2	2	?	3
50	80	-3	+0	2	3	3	4
80	120	-3	+0	3	3	4	4
120	180	-4	+0	3	3	4	4
180	250	-5	+0	4	4	4	5
250	315	-5	+0	5	5	5	6

OUTER RING

O.D. IN MM		O.D. TOL.		ECC.	PARALLELISM OF SIDES	O.D. SQUARE WITH SIDE RUN-OUT	GROOVE PARALLELISM WITH SIDE
OVER	INCL.	D MAX.	D MIN.				
0	18	+0	-2	2	2	3	3
18	30	+0	-2	2	2	3	3
30	50	+0	-2	2	2	3	4
50	80	+0	-3	3	2	3	5
80	120	+0	-3	4	3	3	5
120	150	+0	-4	4	3	4	5
150	180	+0	-5	5	3	4	6
180	250	+0	-5	5	4	4	6
250	315	+0	-5	6	5	5	7
315	400	+0	-6	7	5	5	8
400	500	+0	-7	8	6	6	9

BEARINGS OTHER THAN DUPLEX
WIDTH OF INDIVIDUAL
INNER OR OUTER RING

NOMINAL BORE IN MM		WIDTH TOLERANCE	
OVER	INCL.	+	-
0	180	0	50
180	315	0	100
315	400	0	160
400	500	0	180
500	630	0	220

DUPLEX BEARINGS *
TOTAL WIDTH OF
INNER OR OUTER RINGS

NOMINAL BORE IN MM		WIDTH TOLERANCE	
OVER	INCL.	+	-
0	80	0	200
80	180	0	300
180	315	0	400
315	400	0	500

* IF OTHER THAN A PAIR OF BEARINGS IS INVOLVED, THE TOLERANCE IS IN PROPORTION TO THE NUMBER OF BEARINGS

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TABLE IV

AFBMA STANDARD SPECIFICATION
ABEC I
TOLERANCES OF MAGNETO TYPE BALL BEARINGS
TOLERANCES IN .0001"

INNER RINGS

BORE IN MM		BORE TOLERANCES				ECCENTRICITY
		DM				
OVER	INCL.	LOW	HIGH	D MIN.	D MAX.	
0	9	-3	+0	-4	+1	3
9	18	-3	+0	-4	+1	4
18	30	-4	+0	-5	+1	5

OUTER RINGS

O.D. IN MM		O.D. TOLERANCES				ECCENTRICITY
		DM				
OVER	INCL.	HIGH	LOW	D MAX.	D MIN.	
0	18	+4	-0	+5	-1	6
18	30	+4	-0	+5	-1	6
30	50	+5	-0	+7	-2	8
50	80	+5	-0	+7	-2	10

INNER AND OUTER RINGS

BORE IN MM		WIDTH
ALL SIZES	INDIVIDUAL RINGS	+.000 TO -.005
	ASSEMBLED BEARINGS	+.005 TO -.005
	PAIR OF INNER OR OUTER RINGS DUPLEXED	+.000 TO -.020

NOTE: IF OTHER THAN A PAIR OF BEARINGS IS INVOLVED
IN DUPLEXING, THE TOLERANCE IS IN PROPORTION
TO THE NUMBER OF BEARINGS.

TABLE V

AFBMA STANDARD SPECIFICATION
ABEC I
TOLERANCES OF INCH TYPE BALL BEARINGS - SERIES S
TOLERANCES IN .0001"

INNER RINGS

BORES IN INCHES INCLUSIVE	CORRESPONDING METRIC GROUPING		BORE TOLERANCES				ECCEN-TRICITY
			DM				
	OVER	INCL.	LOW	HIGH	D MIN.	D MAX.	
0- 1/4	0	9	-3	+0	-4	+1	3
3/8- 5/8	9	18	-3	+0	-4	+1	4
3/4-1-1/8	18	30	-4	+0	-5	+1	5
1-1/4-1-1/2	30	50	-5	+0	-7	+2	6

OUTER RINGS

O.D. IN INCHES INCLUSIVE	CORRESPONDING METRIC GROUPING		O.D. TOLERANCES				ECCEN-TRICITY
			DM				
	OVER	INCL.	LOW	HIGH	D MIN.	D MAX.	
0- 5/8	0	18	+0	-4	-5	+1	6
3/4-1-1/8	18	30	+0	-4	-5	+1	6
1-3/8-1-7/8	30	50	+0	-5	-7	+2	8
2 -2-5/8	50	80	+0	-5	-7	+2	10

INNER AND OUTER RINGS

WIDTH OF INDIVIDUAL RINGS, ALL SIZES +0 TO -50
WIDTH OF PAIR OF INNER OR OUTER RINGS, DUPLEXED, ALL SIZES +0 TO -200

NOTE IF OTHER THAN A PAIR OF BEARINGS IS INVOLVED IN DUPLEXING,
THE TOLERANCE IS IN PROPORTION TO THE NUMBER OF BEARINGS.

TABLE VI

AFBMA STANDARD SPECIFICATION
ABEC 3
TOLERANCES OF INCH TYPE BALL BEARINGS - SERIES S
TOLERANCES .0001"

INNER RINGS

BORES IN INCHES INCLUSIVE	CORRESPONDING METRIC GROUPING		BORE TOLERANCES				ECCEN-TRICITY
	OVER	INCL.	DM LOW	DM HIGH	D MIN.	D MAX.	
0- 1/4	0	9	-2	+0	-3	+1	2
3/8- 5/8	9	18	-2	+0	-3	+1	3
3/4-1-1/8	18	30	-2	+0	-3	+1	3
1-1/4-1-1/2	30	50	-3	+0	-5	+2	4

OUTER RINGS

O.D. IN INCHES INCLUSIVE	CORRESPONDING METRIC GROUPING		O.D. TOLERANCES				ECCEN-TRICITY
	OVER	INCL.	DM HIGH	DM LOW	D MAX.	D MIN.	
0- 5/8	0	18	+0	-3	+1	-4	4
3/4-1-1/8	18	30	+0	-3	+1	-4	4
1-3/8-1-7/8	30	50	+0	-3	+2	-5	4
2 -2-5/8	50	80	+0	-4	+2	-6	5

INNER AND OUTER RINGS

WIDTH OF INDIVIDUAL RINGS, ALL SIZES   +0 TO -50
WIDTH OF PAIR OF INNER OR OUTER RINGS, DUPLEXED, ALL SIZES   +0 TO -200

NOTE: IF OTHER THAN A PAIR OF BEARINGS IS INVOLVED IN DUPLEXING, THE TOLERANCE IS IN PROPORTION TO THE NUMBER OF BEARINGS.

TABLE VII

AFBMA STANDARD SPECIFICATION
ABEC 5
TOLERANCES OF INCH TYPE BALL BEARINGS - SERIES S
TOLERANCES IN .0001"

INNER RINGS

BORES IN INCHES INCLUSIVE	CORRESPONDING METRIC GROUPING		BORE TOLERANCES		ECCEN-TRICITY	PARALLELISM OF SIDES	SIDE RUN OUT	GROOVE PARALLELISM WITH SIDES
	OVER	INCL.	D MIN.	D MAX.				
0- 1/4	0	9	-2	+0	2	2	3	3
3/8- 5/8	9	18	-2	+0	2	2	3	3
3/4-1-1/8	18	30	-2	+0	2	2	3	3
1-1/4-1-1/2	30	50	-2	+0	2	2	3	3

OUTER RINGS

O.D. IN INCHES INCLUSIVE	CORRESPONDING METRIC GROUPING		O.D. TOL.		ECCEN-TRICITY	PARALLELISM OF SIDES	SIDE RUN OUT	GROOVE PARALLELISM WITH SIDES
	OVER	INCL.	D MAX.	D MIN.				
4- 5/8	0	18	+0	-2	2	2	3	3
3/4-1-1/8	18	30	+0	-2	2	2	3	3
1-3/8-1-7/8	30	50	+0	-2	2	2	3	3
2 -2-5/8	50	80	+0	-3	3	3	3	4

INNER AND OUTER RINGS

WIDTH OF INDIVIDUAL RINGS, ALL SIZES   +0 TO -50
WIDTH OF PAIR OF INNER OR OUTER RINGS, DUPLEXED, ALL SIZES   +0 TO -200

NOTE: IF OTHER THAN A PAIR OF BEARINGS IS INVOLVED IN DUPLEXING, THE TOLERANCE IS IN PROPORTION TO THE NUMBER OF BEARINGS.

TABLE VIII

AFBMA STANDARD SPECIFICATION
ABEC 7
TOLERANCES OF METRIC ANNULAR BALL BEARINGS
EXCEPT MAGNETO BEARINGS
TOLERANCES IN .0001"

INNER RING

BORE		BORE TOL.			PARALLEL-ISM OF SIDES	SIDE RUN-OUT WITH BORE	GROOVE PARALLEL-ISM WITH SIDE
OVER	INCL	D MIN.	D MAX.	ECC.			
0	9	1-1/2	+0	1	1	1	1
9	18	1-1/2	+0	1	1	1	1
18	30	1-1/2	+0	1-1/2	1	1-1/2	1-1/2
30	50	2	+0	1-1/2	1	1-1/2	1-1/2
50	80	2	+0	1-1/2	1-1/2	2	1-1/2
80	120	2-1/2	+0	2	1-1/2	2	2
120	180	3	+0	3	2	3	3
180	250	4	+0	3	2	3	3

OUTER RING

O.D.		O.D. TOL.			PARALLEL-ISM OF SIDES	O.D. SQUARE WITH SIDE RUN-OUT	GROOVE PARALLEL-ISM WITH SIDE
OVER	INCL.	D MIN.	D MAX.	ECC.			
0	18	+0	2	2	1	1-1/2	2
18	30	+0	2	2	1	1-1/2	2
30	50	+0	2	2	1	1-1/2	2
50	80	+0	2	2	1	1-1/2	2
80	120	+0	3	2	2	2	2
120	150	+0	4	3	2	2	3
150	180	+0	4	3	2	2	3
180	250	+0	4	4	3	3	4
250	315	+0	5	4	3	3	4
315	400	+0	5	5	3	4	5

BEARINGS OTHER THAN DUPLEX
WIDTH OF INDIVIDUAL
INNER OR OUTER RING

NOMINAL BORE IN MM		WIDTH TOLERANCE	
OVER	INCL.	+	-
0	180	0	50
180	250	0	100

DUPLEX BEARINGS *
TOTAL WIDTH OF
INNER OR OUTER RINGS

NOMINAL BORE IN MM		WIDTH TOLERANCE	
OVER	INCL.	+	-
0	80	0	200
80	180	0	300
180	250	0	400

* IF OTHER THAN A PAIR OF BEARINGS IS
INVOLVED, THE TOLERANCE IS IN PRO-
PORTION TO THE NUMBER OF BEARINGS.

d. The following are definitions for bearing measurements, inner and outer ring:

(1) BORE. - For determining bore diameter use apparatus arranged for 2-point measuring. If out-of-roundness and taper exist in a particular bearing a minimum diameter reading d_{min} and a maximum diameter reading d_{max} may be obtained. The bore diameter, d_m, of the bearing in question is defined as the arithmetical average of these two readings d_{min} and d_{max}. Large diameter rings with thin cross sections should be placed in a horizontal position when measuring. (See figure 1.)

(2) WIDTH OF INNER RING. - The tolerances for width of the bearings apply to individual rings and not to the total width of the bearing. Outer ring is free and the inner ring that is to be measured is supported on one side by three buttons. Apply indicator against other side directly over one button and take reading while rotating the ring. (See figure 2.)
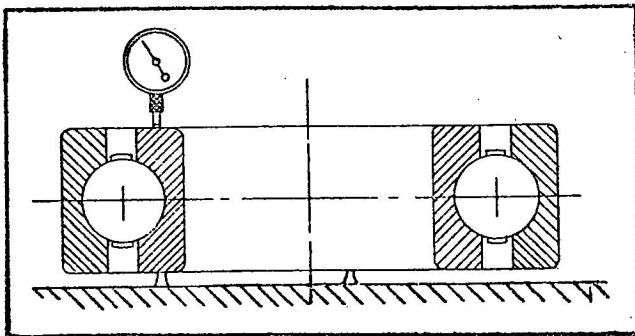
Figure 2

(3) PARALLELISM OF SIDES. - Parallelism of sides is the difference between the largest and smallest width. Outer ring is free and the inner ring that is to be measured is supported on one side by three buttons. Apply indicator against other side directly over one button and take reading while rotating the ring. (See figure 2.)
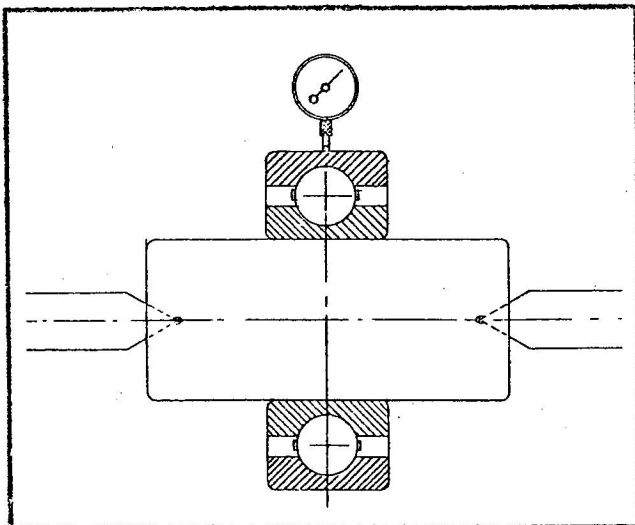
Figure 3

(4) ECCENTRICITY. - Mount bearing on arbor having a very slight taper (.0001 to .0002 inch on diameter per inch of length). Apply indicator on center of stationary outer ring. The eccentricity is the difference between the minimum and maximum reading when rotating the arbor one revolution. Corrections must be made for the inaccuracy of the arbor. (See figure 3.)

(5) SIDE RUN-OUT. - Mount bearing on arbor having a very slight taper (.0001 to .0002 inch on diameter per inch of length). Apply indicator against side of inner ring. The side run-out is the difference between the maximum and minimum reading when rotating the arbor one revolution. (See figure 4.)
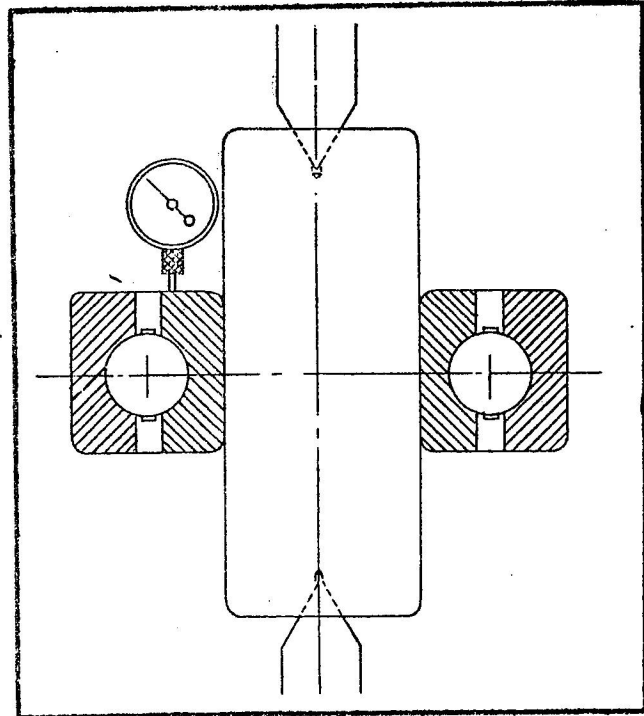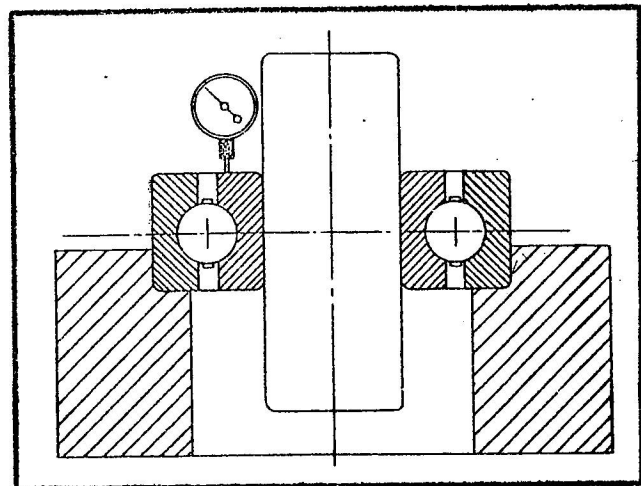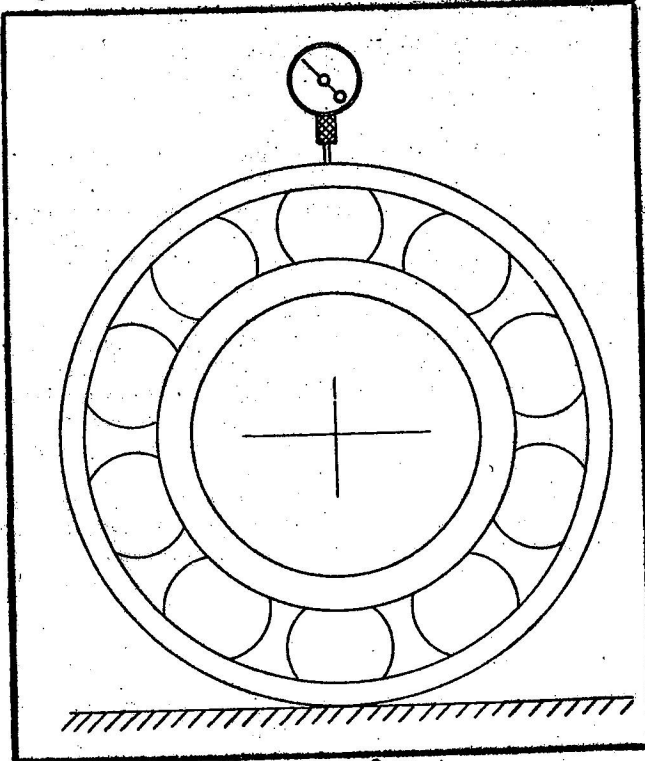

Figure 4

Figure 5

(6) GROOVE PARALLELISM WITH SIDE. - Mount bearing on arbor having very slight taper (preferably .0001 to .0002 inch on the diameter per inch of length). Support outer ring in horizontal position and apply indicator to side of inner ring. The groove parallelism with side is the difference between the maximum and minimum readings when rotating arbor one revolution. (See figure 5.)

(7) OUTSIDE DIAMETER. - For determining the outside diameter use apparatus arranged for measuring between a flat surface and a rounded indicator point. If out-of-roundness and taper exist in a particular bearing, a minimum diameter reading d_{min} and a maximum diameter reading d_{max} may be obtained. The outside diameter, d_m, of the bearing in question is defined as the arithmetical average of these two readings d_{min} and d_{max}. When measuring thin section rings the measuring pressure should be small so as to avoid distortion of the rings. Large diameter rings with thin sections should be placed in a horizontal position when measuring. (See figure 6.)

Figure 7

Figure 6

(8) WIDTH OF OUTER RING. - The tolerances for width of the bearings apply to the individual rings and not to the total width of the bearing. Inner ring is free and the outer ring that is to be measured is supported on one side by three buttons. Apply indicator against other side directly over one button and take reading while rotating the ring. (See figure 7.)
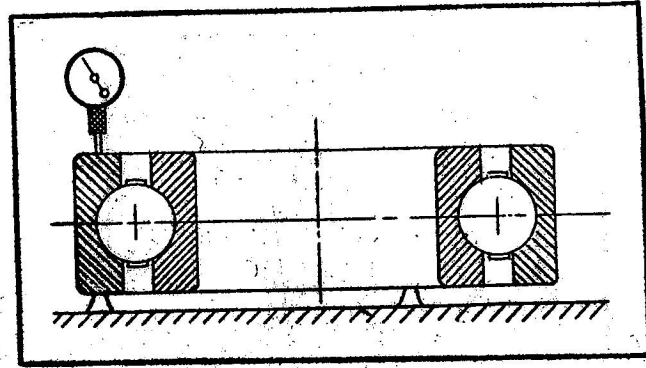
(9) PARALLELISM OF SIDES. - Parallelism of sides is the difference between the largest and smallest width. Inner ring is free and the outer ring that is to be measured is supported on one side by three buttons. Apply indicator against other side directly over one button and take reading while rotating the ring. (See figure 7.)

(10) ECCENTRICITY. - Mount bearing on arbor having a very slight taper (.0001 to .0002 inch on diameter per inch of length). Apply indicator on center of outer ring. The eccentricity is the difference between the minimum and maximum reading when rotating outer ring one revolution with arbor stationary. (See figure 3.)

(11) GROOVE PARALLELISM WITH SIDE. - Mount bearing on arbor having a very slight taper (preferably .0001 to .0002 inch on the diameter per inch of length). Apply a true running weight to the outer ring. Support arbor in a vertical position and apply indicator to side of outer ring. The groove parallelism with side is the difference between the maximum and minimum reading when rotating outer ring one revolution. (See figure 8.)
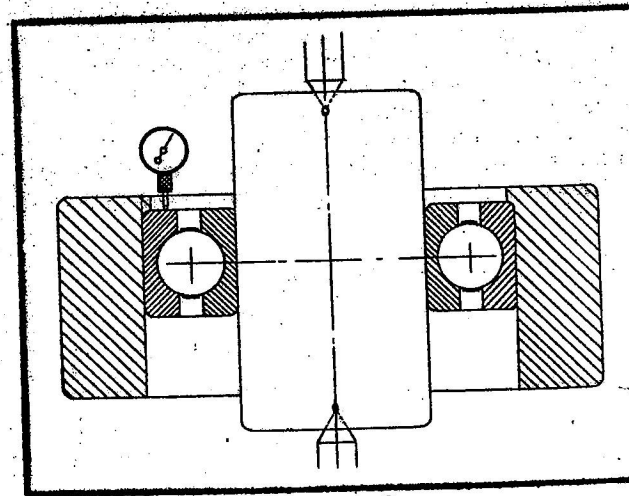

Figure 8

(12) O.D. SQUARE WITH SIDE. - One side of the outer ring to be supported on a flat plate of suitable dimensions (with inner ring free) and held against stop located close to the lower corner of the outside diameter. The indicator is applied directly above the stop close to the upper corner of the outside diameter. O.D. square with side is the difference between the minimum and the maximum reading of the indicator when rotating the outer ring one revolution. (See figure 9.)
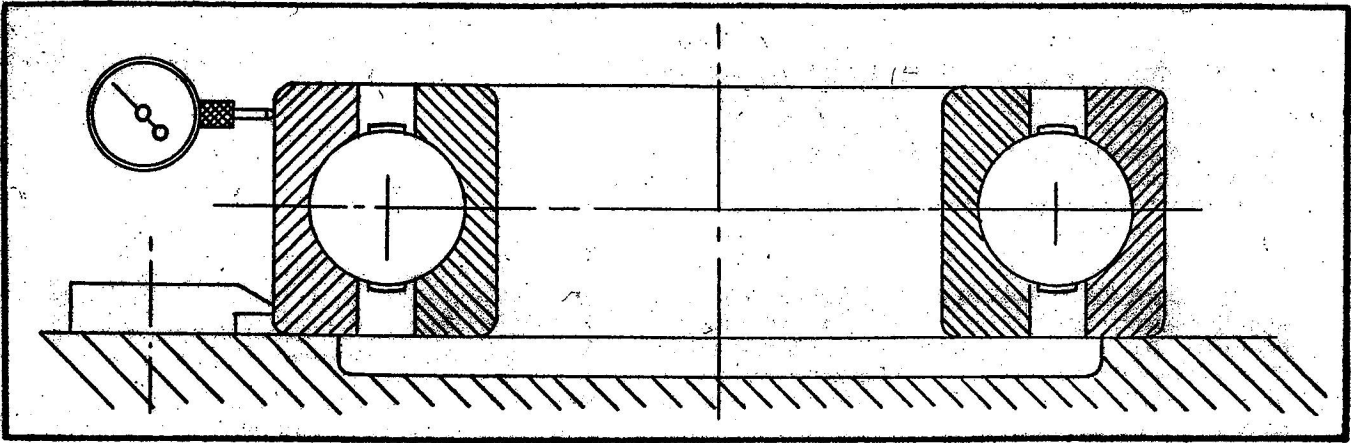
Figure 9

4. INTERNAL FIT-UP WITHIN THE BEARING.

Except for special bearings, the internal fit-up or radial and lateral looseness in antifriction bearings does not have a uniform standard dimension for bearings manufactured by different contractors; however, all bearings are generally classified into one of the following groups:

a. STANDARD FIT-UP. - In this class, internal unmounted clearances to be of such magnitude that, as a result of the bearings' internal design, when mounted with standard ABEC fits for revolving shafts the average radial clearances will be those best suited for single row annular bearing service.

b. LOOSE FIT-UP. - In this class, internal unmounted clearances to be of such magnitude that, as the result of the bearings' internal design, the bearings can accommodate heavier press fits, or, when normal press fits are used, will have a small amount of radial clearance.

c. TIGHT FIT-UP. - In this class, internal unmounted clearances to be of such magnitude, that, as

the result of the bearings' internal design, when mounted with standard ABEC fits for revolving shafts, the bearings' operating fit-up will be an actual pre-loaded condition.

5. IDENTIFYING AND CLASSIFYING ANTIFRICTION BEARINGS BEING OVERHAULED BY BEARING BRANCH.

a. When antifriction bearings are identified and classified by the Bearing Branch, extreme care must be taken to classify such bearings correctly. The following example and information is submitted as a guide on the correct procedures in this matter.

b. By referring to table IX the specifications of New Departure bearings, Nos. C88504X1C and C88504X3C, will be noted. Such specifications have been abstracted from the tables as covered by paragraph 2. of this Technical Order. It will further be noted that these bearings are identically the same with the exception of the bearing tolerances. In classifying the two example bearings so that the correct part numbers and stock numbers are applied, one of the following procedures will be followed:

TABLE IX

	C88504X1C					C88504X3C				
	DM		D	D		DM		D	D	
	LOW	HIGH	MIN	MAX	ECC	LOW	HIGH	MIN	MAX	ECC
BORE .7874"	-4	+0	-5	+1	5	-2	+0	-3	+1	3
O. D. 1.8504"	-4	+0	-5	+1	6	-3	+0	-4	+1	4
WIDTH INNER RING .6988"	-50	+0				-50	+0			
WIDTH OUTER RING .550"	-50	+0				-50	+0			

NOTE: ALL TOLERANCE IN .0001"

(1) When an ABEC 3, ABEC 5, or ABEC 7, bearing is removed from an application and it is known that such an application requires a special tolerance bearing, such bearings should be tagged with the correct part number and AF stock number and forwarded to the Bearing Branch for processing. During this procedure, the bearing will retain its identity and will be classified as an ABEC 3, ABEC 5, or ABEC 7, depending upon its original identity when it has met the inspection standards and has been declared serviceable.

(2) When a C88504 bearing is received in the Bearing Branch without proper identification with regard to its classification of tolerance, it will be classified as an ABEC 1 bearing. If it is desired, however, to check the high and low limits of bearing tolerances in accordance with instructions contained herein to ascertain the ABEC classification of the bearing, such checking may be accomplished and the bearing will then be identified as either meeting the ABEC 1, ABEC 3, ABEC 5, or ABEC 7, classification so that the correct part numbers and AF stock numbers can be assigned.

c. From the foregoing it will be noted that the C88504X1C and C88504X3C are not interchangeable and should be correctly identified so as to indicate the respective tolerances. Where emergency requirements exist, an ABEC 3, ABEC 5, or ABEC 7, bearing may be substituted for an ABEC 1 bearing, but substitution of an ABEC 1 bearing for any other classification is not authorized.