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**AMERICAN NATIONAL STANDARD**  
**ABMA STANDARD**

**RADIAL BEARINGS OF BALL,  
CYLINDRICAL ROLLER AND  
SPHERICAL ROLLER TYPES**

**METRIC DESIGN**

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## FOREWORD

(This foreword is not part of ANSI/ABMA Standard 20, Radial Bearings of Ball, Cylindrical Roller and Spherical Roller Types, Metric Design.)

This American National Standard specifies boundary dimensions, tolerances and radial internal clearances for metric radial ball, cylindrical roller and spherical roller bearings in common useage in the United States.

This standard has been revised to be in close conformity with International Standards developed by the members of the International Organization for Standardization (ISO). In particular, the language and intent of ISO 15 (Rolling bearings - Radial bearings - Boundary dimensions - General plan), ISO 464 (Rolling bearings with locating snap rings - Dimensions), ISO 492 (Radial bearings - tolerances), ISO 582 (Rolling bearings - Metric series - Chamfer dimension limits), ISO 5753 (Rolling bearings - Radial internal clearance), ISO 8443 (Radial ball bearings with flanged outer ring - Flange dimensions), ISO 12043 (Rolling bearings - Single-row cylindrical roller bearings - Chamfer dimensions for loose rib and non-rib sides) and ISO 12044 (Rolling bearings - Single-row angular contact ball bearings - Chamfer dimensions for outer ring non-thrust side) has been followed.

Copies of ISO standards concerning rolling bearings are available from the American National Standards Institute.

Suggestions for the improvement of this standard gained through experience with its use will be welcomed. These should be sent to the American National Standards Institute, Inc., 11 West 42nd Street, 13th Floor, New York, NY 10036.

The officers of Accredited Standards Committee B3 operating under the American National Standards Institute procedures and the organizations represented at the time this standard was submitted are as follows:

W.G. Looft, Chairman      G.T. Satterfield, Secretary

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Hydraulic Institute  
Association for Manufacturing Technology  
Society of Tribologists and Lubrication Engineers  
U.S. Department of Defense, DISC  
U.S. Department of the Navy

**ABMA Standards  
(formerly AFBMA Standards)  
for  
Ball and Roller Bearings**

- 1 - Terminology for Anti-Friction Ball and Roller Bearings and Parts
- 4 - Tolerance Definitions and Gaging Practices for Ball and Roller Bearings
- 7 - Shaft and Housing Fits for Metric Radial Ball and Roller Bearings (Except Tapered Roller Bearings) Conforming to Basic Boundary Plan
- 8.1 - Mounting Accessories, Metric Design
- 8.2 - Mounting Accessories, Inch Design
- 9 - Load Ratings and Fatigue Life for Ball Bearings
- 10 - Metal Balls
- 11 - Load Ratings and Fatigue Life for Roller Bearings
- 12.1 - Instrument Ball Bearings, Metric Design
- 12.2 - Instrument Ball Bearings, Inch Design
- 13 - Rolling Bearing Vibration and Noise (Methods of Measuring)
- 14 - Housings for Bearings with Spherical Outside Surfaces
- 15 - Ball Bearings with Spherical Outside Surfaces and Extended Inner Ring Width (Includes Eccentric Locking Collars)
- 16.1 - Airframe Ball, Roller, and Needle Roller Bearings, Metric Design
- 16.2 - Airframe Ball, Roller, and Needle Roller Bearings, Inch Design
- 17 - Needle Rollers, Metric Design
- 18.1 - Needle Roller Bearings, Radial, Metric Design
- 18.2 - Needle Roller Bearings, Radial, Inch Design
- 19.1 - Tapered Roller Bearings, Radial, Metric Design
- 19.2 - Tapered Roller Bearings, Radial, Inch Design
- 20 - Radial Bearings of Ball, Cylindrical Roller and Spherical Roller Types, Metric Design
- 21.1 - Thrust Needle Roller and Cage Assemblies and Thrust Washers, Metric Design
- 21.2 - Thrust Needle Roller and Cage Assemblies and Thrust Washers, Inch Design
- 22.1 - Spherical Plain Radial Bearings, Joint Type - Metric Design
- 22.2 - Spherical Plain Radial Bearings, Joint Type - Inch Design
- 23.2 - Thrust Bearings of Tapered Roller Type - Inch Design
- 24.1 - Thrust Bearings of Ball, Cylindrical Roller and Spherical Roller Types - Metric Design
- 24.2 - Thrust Bearings of Ball and Cylindrical Roller Types - Inch Design
- 25.2 - Rolling Bearings, Linear Motion, Recirculating Ball, Sleeve Type - Inch Series
- 26.2 - Thin Section Ball Bearings, Radial, Inch Design

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

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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.