AMERICAN NATIONAL STANDARD

ANSI/AFBMA
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AMERICAN NATIONAL STANDARD

AFBMA STANDARD

ROLLING BEARINGS, LINEAR MOTION RECIRCULATING BALL, SLEEVE TYPE INCH SERIES

REAFFIRMED

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Sponsored by

The Anti-Friction Bearing Manufacturers Association, Inc.

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American National Standards Institute, Inc.

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FOREWORD

(This foreword is not part of ANSI/AFBMA Standard 25.2, Rolling Bearings, Linear Motion, Recirculating Ball, Sleeve Type-Inch Series.)

This American National Standard specifies boundary dimensions and tolerances for inch design, sleeve type linear motion ball bearings with recirculating balls.

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., 1430 Broadway, New York, NY 10018.

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

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Anti-Friction Bearing Manufacturers Association
Hydraulic Institute
National Machine Tool Builders Association
U.S. Department of Defense, DISC
U.S. Department of the Navy

AFBMA Standards for Ball and Roller Bearings

1 —Terminology for Anti-Friction Ball and Roller Bearings and Parts
4 —Tolerance Definitions and Gauging 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 Plans
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
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19 —Tapered Roller Bearings, Radial, Inch Design
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20 —Radial Bearings of Ball, Cylinder 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
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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

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ROLLING BEARINGS, LINEAR MOTION RECIRCULATING BALL, SLEEVE TYPE INCH SERIES

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1. INTRODUCTION

Linear motion bearings provide for rectilinear motion as opposed to rotational motion. The type of bearing described in this standard uses balls which circulate in a number of closed loops in the cylindrical bearing body which surrounds the shaft. See Figure 1.

Linear bearings are typically applied to meet one or more of the following criteria:

a. Smooth anti-friction motion, free from stick-slip or chatter.
b. Low force required to produce relative linear motion between the bearing and shaft.

These requirements, as well as others, can be met by appropriate use of the various linear bearing types (closed type, adjustable type, open type). The appropriate selection of bearing type and specification should be established between the manufacturer and the user.

2. SCOPE

This Standard gives the general plan for boundary dimensions, tolerances and terminology for recirculating ball, sleeve type, linear motion bearings.

This standard applies only to the size range covered by Table 1, Boundary Dimensions.

3. REFERENCES

ANSI/AFBMA Standard 1—Terminology for Anti-Friction Ball and Roller Bearings

ANSI/AFBMA Standard 4—Tolerance Definitions and Gauging Practices for Ball and Roller Bearings

4. TERMINOLOGY

4.1 Definitions

For the purposes of this National Standard, the following definitions apply:

4.1.1 Linear bearing—A basically cylindrical sleeve with a number of closed loops of circulating balls which is designed to achieve linear rolling motion along a shaft.

4.1.2 Shaft—The hardened cylindrical rod along which a linear bearing traverses.

4.1.3 Nominal outside diameter—The diameter of the cylinder containing the theoretical surface of a basically cylindrical outside surface.

4.1.4 Nominal ball complement bore diameter—The diameter of the cylinder inscribed inside the inner balls.

4.1.5 Nominal bearing width—Distance between two theoretical end faces designated to bound the width of the linear motion rolling bearing.

4.1.6 Radial runout—The difference between the largest and the smallest radial distance between the outside surface of the cylindrical sleeve and the centerline of the ball complement bore diameter.

4.1.7 Closed type—That type in which the outer sleeve is continuous, or virtually continuous, whereby adjustment of clearance between the ball complement bore and the shaft can be achieved only by selection of the housing fit, shaft precision class, and the bearing.

4.1.8 Adjustable type—That type which has elastic features which permit mechanical adjustment of the clearance between the ball complement bore and the shaft.

4.1.9 Open type—That type in which a longitudinal section is removed to provide clearance over shaft support rails.

4.2 Symbols

See Figure 1.

F_w —Nominal ball complement bore diameter.

$F_{w\,min}$ —Smallest single diameter of the ball complement bore.