

ANSI/ABMA 19.2

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ANSI/ABMA  
Std. 19.2 - 1994

**AMERICAN NATIONAL STANDARD  
ABMA STANDARD**

**TAPERED ROLLER BEARINGS - RADIAL  
INCH DESIGN**

Sponsored by

**The American Bearing Manufacturers Association, Inc.**

Approved May 12, 1994

**American National Standards Institute, Inc.**

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## FOREWORD

(This foreword is not part of ANSI/ABMA Standard 19.2, Tapered Roller Bearings -Radial, Inch Design.)

This American National Standard describes the types of inch design radial tapered roller bearings and the dimensions affecting interchangeability, specifies tolerances for these bearings, and provides recommended cup and cone fitting practices for industrial and automotive applications. The five-part numbering system for radial tapered roller bearings is described.

Boundary dimensions are not contained in this standard. For boundary dimensions, refer to manufacturers' catalogs. ABMA maintains a clearinghouse of those dimensions affecting tapered roller bearing interchangeability.

Tapered roller bearing duty class is based on the 1948 radial capacity formula. Procedural information regarding the determination of duty class can be obtained from ABMA.

Copies of ISO standards concerning rolling element (anti-friction) 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:

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**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 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
- 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
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- 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
- 26.2 - Thin Section Ball Bearings, Radial, Inch Design

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# TAPERED ROLLER BEARINGS - RADIAL INCH DESIGN

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# TAPERED ROLLER BEARINGS - RADIAL INCH DESIGN

## 1 Scope

This standard covers inch design radial tapered roller bearings of various types, part numbering systems, tolerances, and fitting practices. For boundary dimensions, refer to manufacturers' catalogs. Tapered roller thrust bearings are covered in ANSI/ABMA Standard 23.2.

General ABMA standards which apply to various types of bearings should be consulted for tolerance definitions, gauging practices, mounting accessories, and method of evaluating load ratings.

## 2 Part Numbering Systems

**2.1 Identification Code.** Inch design tapered roller bearings are numbered in an identical manner or reference is made to the universal number by all producers. Therefore, an identification code for the use of bearing users to provide a universal language for describing and identifying these products is not required.

### 2.1.1 Individual Component Part Numbers.

Unlike other bearing types, tapered roller bearing cones and cups are individually numbered. The cone is assembled with rollers and a cage, and when used with a cup, makes a complete bearing assembly. Both cone and cup numbers are required to identify a complete bearing assembly. The cone number followed by the cup number is the preferred practice.

**2.2 ABMA Standard 19.2 Designation System.** The current part numbering system

for tapered roller bearings attempts to describe each bearing on the basis of dimensional and functional interchangeability. The system has been in use since 1950. Another system for bearings designated prior to 1950 is described in Appendix A.

**2.2.1 General Arrangement.** The cone and cup part numbers, consisting of prefix letters, numerical designators, and suffix letters, are divided into five sections as shown below and described in the following paragraphs.

| COMPONENT NUMBER |            |              |                  |                     |
|------------------|------------|--------------|------------------|---------------------|
| SERIES NUMBER    |            |              |                  |                     |
| SECTION 1        | SECTION 2  | SECTION 3    | SECTION 4        | SECTION 5           |
| Series Prefix    | Angle Code | Basic Series | Component Number | Modification Suffix |
| HM               | 9          | 032          | 49               | A                   |
| HM               | 9          | 032          | 10               |                     |

**2.2.2 Section 1 - Series Designation.** The series designation uses a prefix consisting of one or two letters which designate the duty class of the series based on the 1948 radial capacity formula. A complete list of prefixes and their designation follows:

| Prefix | Series Designation                                                                                                                    |
|--------|---------------------------------------------------------------------------------------------------------------------------------------|
| EH     | Extra Heavy Series                                                                                                                    |
| EL     | Extra Light Series                                                                                                                    |
| H      | Heavy Series                                                                                                                          |
| HH     | Heavier than Heavy Series                                                                                                             |
| HM     | Heavy-Medium Series                                                                                                                   |
| L      | Light Series                                                                                                                          |
| LL     | Lighter than Light Series                                                                                                             |
| LM     | Light-Medium Series                                                                                                                   |
| M      | Medium Series                                                                                                                         |
| J      | Indicates Metric. See ABMA Standard 19.1. Prefixes other than above or absence of prefixes indicates original system. See Appendix A. |

### 2.2.3 Section 2 - Angularity Designation.

The 1st digit following the prefix is an indicator of the angularity of the bearing series according to the following code:

| Included Cup Angle          | Code |
|-----------------------------|------|
| 0° to 23°59'59.99"          | 1    |
| 24° to 25°29'59.99"         | 2    |
| 25°30' to 26°59'59.99"      | 3    |
| 27° to 28°29'59.99"         | 4    |
| 28°30' to 30°29'59.99"      | 5    |
| 30°30' to 32°29'59.99"      | 6    |
| 32°30' to 35°59'59.99"      | 7    |
| 36° to 44°59'59.99"         | 8    |
| 45° up, but not thrust only | 9    |

**2.2.4 Section 3 - Basic Series.** The 2nd, 3rd, and 4th digits following the prefix letters are reserved for the basic series indication, which can be indicated by one digit, or by two digits, or by three digits. It can be indicated by a single digit 0 to 9 inclusive, or by a double digit 00 to 99 inclusive, or by a triple digit 000 to 999 inclusive.

The bearing series indication will be related to the maximum theoretical bore of the bearing or the diameter of the cone at the small end of the roller, in order that smaller numbers will indicate smaller sizes of bearings and larger numbers will indicate larger sizes of bearings.

For the present, the series numbers indicated by the absence of any digit or by the single digit 0 to 9 inclusive, have been reserved for future development of extremely small sized tapered roller bearings, if required.

Likewise, the numbers 900 to 999, inclusive, have been reserved for future development of extremely large bore tapered roller bearings, if required.

The selection of the basic series indication in relation to the maximum theoretical bore of the bearing will then be in accordance with the tabulation below.

| Maximum Bore Range<br>(in millimetres) |        | Series Indication |
|----------------------------------------|--------|-------------------|
| Over                                   | Incl.  |                   |
| 0                                      | 25.4   | 00- 19 incl.      |
| 25.4                                   | 50.8   | 20- 99 incl.      |
|                                        |        | 000-029 incl.     |
| 50.8                                   | 76.2   | 039-129 incl.     |
| 76.2                                   | 101.6  | 130-189 incl.     |
| 101.6                                  | 127.0  | 190-239 incl.     |
| 127.0                                  | 152.4  | 240-289 incl.     |
| 152.4                                  | 177.8  | 290-339 incl.     |
| 177.8                                  | 203.2  | 340-389 incl.     |
| 203.2                                  | 228.6  | 390-429 incl.     |
| 228.6                                  | 254.0  | 430-469 incl.     |
| 254.0                                  | 279.4  | 470-509 incl.     |
| 279.4                                  | 304.8  | 510-549 incl.     |
| 304.8                                  | 330.2  | 550-579 incl.     |
| 330.2                                  | 355.6  | 580-609 incl.     |
| 355.6                                  | 381.0  | 610-639 incl.     |
| 381.0                                  | 406.4  | 640-659 incl.     |
| 406.4                                  | 431.8  | 660-679 incl.     |
| 431.8                                  | 457.2  | 680-694 incl.     |
| 457.2                                  | 482.6  | 695-709 incl.     |
| 482.6                                  | 508.0  | 710-724 incl.     |
| 508.0                                  | 534.4  | 725-739 incl.     |
| 534.4                                  | 558.8  | 740-754 incl.     |
| 558.8                                  | 584.2  | 755-769 incl.     |
| 584.2                                  | 609.6  | 770-784 incl.     |
| 609.6                                  | 635.0  | 785-799 incl.     |
| 635.0                                  | 762.0  | 800-829 incl.     |
| 762.0                                  | 889.0  | 830-859 incl.     |
| 889.0                                  | 1016.0 | 860-879 incl.     |
| 1016.0                                 | 1270.0 | 880-889 incl.     |
| 1270.0                                 | 1841.5 | 890-899 incl.     |

| Maximum Bore Range<br>(in inches) |       | Series Indication |
|-----------------------------------|-------|-------------------|
| Over                              | Incl. |                   |
| 0                                 | 1     | 00- 19 incl.      |
| 1                                 | 2     | 20- 99 incl.      |
|                                   |       | 000-029 incl.     |
| 2                                 | 3     | 039-129 incl.     |
| 3                                 | 4     | 130-189 incl.     |
| 4                                 | 5     | 190-239 incl.     |
| 5                                 | 6     | 240-289 incl.     |
| 6                                 | 7     | 290-339 incl.     |
| 7                                 | 8     | 340-389 incl.     |
| 8                                 | 9     | 390-429 incl.     |
| 9                                 | 10    | 430-469 incl.     |
| 10                                | 11    | 470-509 incl.     |
| 11                                | 12    | 510-549 incl.     |
| 12                                | 13    | 550-579 incl.     |
| 13                                | 14    | 580-609 incl.     |
| 14                                | 15    | 610-639 incl.     |
| 15                                | 16    | 640-659 incl.     |
| 16                                | 17    | 660-679 incl.     |
| 17                                | 18    | 680-694 incl.     |
| 18                                | 19    | 695-709 incl.     |
| 19                                | 20    | 710-724 incl.     |
| 20                                | 21    | 725-739 incl.     |
| 21                                | 22    | 740-754 incl.     |
| 22                                | 23    | 755-769 incl.     |
| 23                                | 24    | 770-784 incl.     |
| 24                                | 25    | 785-799 incl.     |
| 25                                | 30    | 800-829 incl.     |
| 30                                | 35    | 830-859 incl.     |
| 35                                | 40    | 860-879 incl.     |
| 40                                | 50    | 880-889 incl.     |
| 50                                | 72.5  | 890-899 incl.     |

Basic Series Indication

**2.2.5 Section 4 - Component Number.** The last two numeric digits will indicate the part number of the bearing component.

Roller numbers will be indicated by the digits 01 to 04, inclusive, but these numbers will not appear on the bearings. They are used for manufacturing identification.

Cage numbers will be indicated by the digits 05 to 09, inclusive. These numbers will not appear on the bearings. They are used for manufacturing identification.

Cup numbers will be indicated by the digits 10 to 19, inclusive, the first cup made to minimum section in any series starting with the number 10. If more numbers are required in any series, numbers 20 and up will be utilized where available.

Cone numbers will be indicated by the digits 30 to 49, inclusive, the first cone made to minimum section in any series being numbered 49. If more numbers are required for the cones in any one series, number 29 and below will be utilized where available.

The numbers 20 to 29 are, therefore, reserved for cone and cup number overflow.  
The numbers 50 to 99 are reserved for additional overflow in the case of an extremely crowded series. Any major change in a series involving new part numbers which are not interchangeable with the old will be accommodated through the use of this upper range of numbers.

#### **2.2.6 Section 5 - Modification Suffix.**

Following the numbers identifying the bearing component, there may be a suffix. The suffix consists of one, two, or three letters which designate type or external modification from the basic number according to the following tabulation: