

NOTICE OF CANCELLATION

METRIC

FF-B-171B
NOTICE 1
18 August 2003

FEDERAL SPECIFICATION

BEARINGS, BALL, ANNULAR (GENERAL PURPOSE), METRIC

FF-B-171B, dated 30 November 1993, is hereby canceled without replacement. Users may consult one of the commercial item descriptions (CIDs) provided in the cross-reference below for future procurements.

FF-B-171B associated specification sheet to CID cross-reference.

Specification sheet	CID	Specification sheet	CID	Specification sheet	CID
FF-B-171/1	A-A-59581	FF-B-171/14	A-A-59600	FF-B-171/27	A-A-59631
FF-B-171/2	A-A-59582	FF-B-171/15	None	FF-B-171/28	A-A-59632
FF-B-171/3	A-A-59583	FF-B-171/16	None	FF-B-171/29	A-A-59633
FF-B-171/4	A-A-59584	FF-B-171/17	None	FF-B-171/30	A-A-59634
FF-B-171/5	A-A-59585	FF-B-171/18	None	FF-B-171/31	A-A-59635
FF-B-171/6	A-A-59586	FF-B-171/19	A-A-59623	FF-B-171/32	A-A-59636
FF-B-171/7	A-A-59587	FF-B-171/20	A-A-59624	FF-B-171/33	A-A-59637
FF-B-171/8	A-A-59589	FF-B-171/21	A-A-59625	FF-B-171/34	A-A-59638
FF-B-171/9	A-A-59595	FF-B-171/22	A-A-59626	FF-B-171/35	A-A-59639
FF-B-171/10	A-A-59596	FF-B-171/23	A-A-59627	FF-B-171/36	A-A-59640
FF-B-171/11	A-A-59597	FF-B-171/24	A-A-59628	FF-B-171/37	A-A-59641
FF-B-171/12	A-A-59598	FF-B-171/25	A-A-59629		
FF-B-171/13	A-A-59599	FF-B-171/26	A-A-59630		

MILITARY INTERESTS:

Custodians:

Army - AT
Navy - OS
Air Force - 99

Review Activities:

Army - AR, CR4, EA, GL, MI
Navy - SH
Air Force - 11, 84

CIVIL AGENCY
COORDINATING ACTIVITY

GSA - 7FLE

Preparing Activity:

DLA - GS4

(Project 3110-1183)

AMSC N/A

FSC 3110

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

FF-B-171B
AMENDMENT 1
9 MARCH 1995

FEDERAL SPECIFICATION

BEARINGS, BALL, ANNULAR (GENERAL PURPOSE), METRIC

The General Services Administration has authorized the use of this Amendment, which forms a part of FF-B-171B, dated 30 November 1993, by all federal agencies.

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Delete paragraph 3.3.2 & subparagraphs a., b., and c. and substitute:

3.3.2 Marking. Each bearing shall be permanently marked with the bearing manufacturers name or symbol and part number in accordance with MIL-STD-130.

Custodians:
Army - AT
Air Force - 11

Civil Agency Coordinating Activity:
GSA - FSS

Reviewers:
Army - AR, EA, MI, GL, ME
Navy - OS

Preparing Activity:
DLA - IS

(Project 3110-0922)

AMSC N/A

FSC 3110

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

METRIC

FF-B-171B
SUPPLEMENT 1
30 NOVEMBER 1993

FEDERAL SPECIFICATION

BEARINGS, BALL ANNULAR (GENERAL PURPOSE)

This supplement forms a part of FF-B-171B, dated 30 NOVEMBER 1993

SPECIFICATION SHEETS

- FF-B-171/1 - Bearing, Ball, Annular, Single Row, Radial, Non-Filling Slot, ANSI/AFBMA Dimension Series 10, 02, 03, Under 10 mm Bore (Metric)
- FF-B-171/2 - Bearing, Ball, Annular, Single Row, Radial, Non-Filling Slot, ANSI/AFBMA Dimension Series 19 (Metric)
- FF-B-171/3 - Bearing, Ball, Annular, Single Row, Radial, Non-Filling Slot, ANSI/AFBMA Dimension Series 10 (Metric)
- FF-B-171/4 - Bearing, Ball, Annular, Single Row, Radial, Non-Filling Slot, ANSI/AFBMA Dimension Series 02 (Metric)
- FF-B-171/5 - Bearing, Ball, Annular, Single Row, Radial, Non-Filling Slot, ANSI/AFBMA Dimension Series 03 (Metric)
- FF-B-171/6 - Bearing, Ball, Annular, Single Row, Radial, Filling Slot, ANSI/AFBMA Dimension Series 04 (Metric)
- FF-B-171/7 - Bearing, Ball, Annular, Single Row, Radial, Filling Slot, ANSI/AFBMA Dimension Series 02 (Metric)
- FF-B-171/8 - Bearing, Ball, Annular, Single Row, Radial, Filling Slot, ANSI/AFBMA Dimension Series 03 (Metric)
- FF-B-171/9 - Bearing, Ball, Annular, Single Row, Radial, Non-Filling Slot, Cartridge Type Without Grease Plug, ANSI/AFBMA Dimension Series 32 (Metric)

AMSC N/A

FSC 3110

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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- FF-B-171/10 - Bearing, Ball, Annular, Single Row, Radial, Non-Filling Slot, Cartridge Type Without Grease Plug, ANSI/AFBMA Dimension Series 33 (Metric)
- FF-B-171/11 - Bearing, Ball, Annular, Double Row, Radial, Internal Self-Aligning, ANSI/AFBMA Dimension Series 02 (Metric)
- FF-B-171/12 - Bearing, Ball, Annular, Double Row, Radial, Internal Self-Aligning, ANSI/AFBMA Dimension Series 03 (Metric)
- FF-B-171/13 - Bearing, Ball, Annular, Double Row, Radial, Internal Self-Aligning, ANSI/AFBMA Dimension Series 22 (Metric)
- FF-B-171/14 - Bearing, Ball, Annular, Double Row, Radial, Internal Self-Aligning, ANSI/AFBMA Dimension Series 23 (Metric)
- FF-B-171/15 - Bearing, Ball, Annular, Single Row, Primarily Radial, Counterbored Outer Ring, Contact Angle Up To And Including 10 deg, Non-Separable, ANSI/AFBMA Dimension Series 19 (Metric)
- FF-B-171/16 - Bearing, Ball, Annular, Single Row, Primarily Radial, Counterbored Outer Ring, Contact Angle Up To And Including 10 deg, Non-Separable, ANSI/AFBMA Dimension Series 10, (Metric)
- FF-B-171/17 - Bearing, Ball, Annular, Single Row, Primarily Radial, Counterbored Outer Ring, Contact Angle Up To And Including 10 deg, Non-Separable, ANSI/AFBMA Dimension Series 02 (Metric)
- FF-B-171/18 - Bearing, Ball, Annular, Single Row, Primarily Radial, Counterbored Outer Ring, Contact Angle Up To And Including 10 deg, Non-Separable, ANSI/AFBMA Dimension Series 03 (Metric)
- FF-B-171/19 - Bearing, Ball, Annular, Single Row, Angular Contact, Counterbored Outer Ring, Contact Angle Above 10 deg Up To And Including 22 deg, Non-Separable, ANSI/AFBMA Dimension Series 19 (Metric)
- FF-B-171/20 - Bearing, Ball, Annular, Single Row, Angular Contact, Counterbored Outer Ring, Contact Angle Above 10 deg Up To And Including 22 deg, Non-Separable, ANSI/AFBMA Dimension Series 10 (Metric)
- FF-B-171/21 - Bearing, Ball, Annular, Single Row, Angular Contact, Counterbored Outer Ring, Contact Angle Above 10 deg, Up To And Including 22 deg, Non-Separable, ANSI/AFBMA Dimension Series 02 (Metric)

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- FF-B-171/22 - Bearing, Ball, Annular, Single Row, Angular Contact, Counterbored Outer Ring, Contact Angle Above 10 deg, Up To And Including 22 deg, Non-Separable, ANSI/AFBMA Dimension Series 03 (Metric)
- FF-B-171/23 - Bearing, Ball, Annular, Single Row, Angular Contact, Counterbored Outer Ring, Contact Angle Above 10 deg, Up To And Including 22 deg, Non-Separable, ANSI/AFBMA Dimension Series 04 (Metric)
- FF-B-171/24 - Bearing, Ball, Annular, Single Row, Angular Contact, Counterbored Outer Ring, Contact Angle Above 22 deg, Up To And Including 32 deg, Non-separable, ANSI/AFBMA Dimension Series 10 (Metric)
- FF-B-171/25 - Bearing, Ball, Annular, Single Row, Angular Contact, Counterbored Outer Ring, Contact Angle Above 22 deg, Up To And Including 32 deg, Non-Separable, ANSI/AFBMA Dimension Series 02 (Metric)
- FF-B-171/26 - Bearing, Ball, Annular, Single Row, Angular Contact, Counterbored Outer Ring, Contact Angle Above 22 deg, Up To And Including 32 deg, Non-Separable, ANSI/AFBMA Dimension Series 03 (Metric)
- FF-B-171/27 - Bearing, Ball, Annular, Single Row, Angular Contact, Counterbored Outer Ring, Contact Angle Above 22 deg, Up To And Including 32 deg, Non-Separable, ANSI/AFBMA Dimension Series 04 (Metric)
- FF-B-171/28 - Bearing, Ball, Annular, Single Row, Angular Contact, Counterbored Outer Ring, Contact Angle Above 32 deg, Up To And Including 45 deg, Non-Separable, ANSI/AFBMA Dimension Series 10 (Metric)
- FF-B-171/29 - Bearing, Ball, Annular, Single Row, Angular Contact, Counterbored Outer Ring, Contact Angle Above 32 deg, Up To And Including 45 deg, Non-separable, ANSI/AFBMA Dimension Series 02 (Metric)
- FF-B-171/30 - Bearing, Ball, Annular, Single Row, Angular Contact, Counterbored Outer Ring, Contact Angle Above 32 deg, Up To And Including 45 deg, Non-Separable, ANSI/AFBMA Dimension Series 03 (Metric)
- FF-B-171/31 - Bearing, Ball, Annular, Single Row, Angular Contact, Counterbored Outer Ring, Contact Angle Above 32 deg, Up To And Including 45 deg, Non-Separable, ANSI/AFBMA Dimension Series 04 (Metric)

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- FF-B-171/32 - Bearing, Ball, Annular, Double Row, Angular Contact, Non-Filling Slot, Vertex Of Contact Angles Outside Bearing, ANSI/AFBMA Dimension Series 32 (Metric)
- FF-B-171/33 - Bearing, Ball, Annular, Double Row, Angular Contact, Non-Filling Slot, Vertex Of Contact Angles Outside Bearing, ANSI/AFBMA Dimension Series 33 (Metric)
- FF-B-171/34 - Bearing, Ball, Annular, Double Row, Angular Contact, Filling Slot, Vertex Of Contact Angles Inside Bearing, ANSI/AFBMA Dimension Series 32 (Metric)
- FF-B-171/35 - Bearing, Ball, Annular, Double Row, Angular Contact, Filling Slot, Vertex Of Contact Angles Inside Bearing, ANSI/AFBMA Dimension Series 33 (Metric)
- FF-B-171/36 - Bearing, Ball, Annular, Double Row, Angular Contact, Filling Slot, Vertex Of Contact Angles Outside Bearing, ANSI/AFBMA Dimension Series 32 (Metric)
- FF-B-171/37 - Bearing, Ball, Annular, Double Row, Angular Contact, Filling Slot, Vertex Of Contact Angles Outside Bearing, ANSI/AFBMA Dimension Series 33 (Metric)

MILITARY INTERESTS:

Military Coordinating Activity:
DLA-IS

Custodians:
Army - AT
Air Force - 11

Review Activities:
Army - AR, EA, MI
Navy - OS
DLA - IS

User Activity:
Army - GL, ME

CIVIL AGENCY COORDINATING
ACTIVITIES:

GSA - FSS

PREPARING ACTIVITY:
DLA-IS

METRIC

FF-B-171B/GEN
30 NOVEMBER 1993
TO SUPERSEDE
FF-B-171A (In Part)
September 24, 1956
(See Section 6.6)

FEDERAL SPECIFICATION

BEARINGS, BALL, ANNULAR (GENERAL PURPOSE), METRIC

This specification is approved by the Administrator, Federal Supply Service, General Services Administration, for the use of all Federal Agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers annular ball bearings for general purpose use that conform to boundary dimensions and Annular Bearing Engineering Committee (ABEC) ABEC-1 and ABEC-5 tolerances as defined in American National Standards Institute (ANSI) Anti-Friction Bearing Manufacturers Association (AFBMA) STD 20.

1.2 Classification. Bearings, ball, annular (general purpose) shall be of the following metric types:

Bearing, Ball, Annular, Single Row, Radial, Non-Filling Slot, ANSI/AFBMA Dimension Series 10, 02, 03, Under 10 mm Bore.

Bearing, Ball, Annular, Single Row, Radial, Filling Or Non-Filling Slot, ANSI/AFBMA Dimension series 02, 03, 04, 10, And 19.

Bearing, Ball, Annular, Single Row, Radial, Non-Filling Slot, Cartridge Type Without Grease Plug, ANSI/AFBMA Dimension Series 32 And 33.

Bearing, Ball, Annular, Double Row, Radial, Internal Self-Aligning, ANSI/AFBMA Dimension Series 02, 03, 22, And 23.

Bearing, Ball, Annular, Single Row, Primarily Radial, Counterbored Outer Ring, Contact Angle Up To And Including 10 deg, Non-Separable, ANSI/AFBMA Dimension Series 02, 03, 10, And 19.

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Bearing, Ball, Annular, Single Row, Angular Contact, counterbored Outer Ring, Contact Angle Above 10 deg, Up To And Including 22 deg, Non-Separable, ANSI/AFBMA Dimension series 02, 03, 04, 10 And 19.

Bearing, Ball, Annular, Single Row, Angular Contact, Counterbored Outer Ring, Contact Angle Above 22 deg, Up To And Including 32 deg, Non-Separable, ANSI/AFBMA Dimension Series 02, 03, 04, And 10.

Bearing, Ball, Annular, Single Row, Angular Contact, Counterbored Outer Ring, Contact Angle Above 32 deg, Up To And Including 45 deg, Non-Separable, ANSI/AFBMA Dimension Series 02, 03, 04 And 10.

Bearing, Ball, Annular, Double Row, Angular Contact, Filling Or Non-Filling Slot, Vertex Of Contact Angles Inside Or Outside Bearing, ANSI/AFBMA Dimension Series 32, And 33.

2. APPLICABLE DOCUMENTS

2.1 Government publications. The following documents, of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

FEDERAL SPECIFICATIONS:

(See Supplement 1 for list of associated specifications.)

MILITARY SPECIFICATIONS.

- MIL-P-197 - Packaging Of Anti-Friction Bearings, Associated Parts And Subassemblies.
- MIL-B-1083 - Balls, Bearing, Ferrous And Non-Ferrous (For Use In Bearings And Valves).
- DoD-G-24508 - Grease, High Performance Multipurpose (Metric)
- MIL-G-81322 - Grease, Aircraft, General Purpose, Wide Temperature Range.

MILITARY STANDARDS:

- MIL-STD-105 - Sampling Procedures And Tables For Inspection By Attributes.
- MIL-STD-129 - Marking For Shipment And Storage.
- MIL-STD-130 - Identification Marking Of U.S. Military Property.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Department of Defense Single Stock Point DODSSP - Customer Service, Standardization Document Order Desk, 700 Robbins Avenue, Bldg. 4D, Philadelphia, PA 19111-5094).

2.2 Other Publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)/ANTI-FRICTION BEARING MANUFACTURERS ASSOCIATION (AFBMA)

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- ANSI/AFBMA STD-4 - Tolerance Definitions and Gaging Practices for Ball and Roller Bearings.
- ANSI/AFBMA STD-9 - Load Ratings and Fatigue Life for Ball Bearings.
- ANSI/AFBMA STD-10 - Metal Balls.
- ANSI/AFBMA STD-20 - Metric Ball and Roller Bearings (Except Tapered Roller Bearings) Conforming to Basic Boundary Plans.

(Application for copies should be addressed to the American Bearing Manufacturers Association, Inc., 1101 Connecticut Avenue, N.W., Suite 700, Washington, DC 20036). Formerly, the Anti-Friction Bearing Manufacturers Association.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- ASTM A 295 - Standard Specification for High-Carbon and Roller Bearing Steel.
- ASTM B 18 - Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials.
- ASTM B 112 - Standard Methods for Determining Average Grain Size.

(Application for copies should be addressed to the American Society of Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187).

3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheets.

3.2 Materials: Materials for the bearing component parts all meet the requirements of 3.2.1 through 3.2.7.

3.2.1 Inner and outer ring material. Bearing rings shall be made at chromium-alloy steel 52100 (UNS G52986) produced by the electric furnace process and vacuum-carbon-deoxidized or any other steel making process that produces steel in accordance with ASTM A 295. The finished ring material shall not exceed the inclusion rating specified for the billet material in accordance with ASTM A 295. Grain size shall be determined in accordance with ASTM E 112.

3.2.2 Ball material. Balls shall be made of chromium-alloy-steel 52100 (UNS G52986) produced by the electric furnace process and vacuum-carbon-deoxidized or any other steel making process that produces steel in accordance with ASTM A 295. The finished ball material shall not exceed the inclusion rating specified for the billet material in accordance with ASTM A 295. Grain size shall be determined in accordance with ASTM E 112.

3.2.3 Cage material. Materials shall be compatible with and shall be resistant to deterioration due to lubricant, preservative solvents or other substances and chemicals that can be expected to come into contact with the bearing and shall cause no deterioration of the same. Bearings with nonmetallic cages shall meet the same inspections and performance requirements as conducted on bearings with metallic cages. Materials shall operate from -65 deg F (-54 deg C) to 230 deg F (110 deg C). The cage type shall be specified in the part number as indicated on the individual specification sheet (see 6.2.1).

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3.2.4 Shield and seal material. Shields and seals shall be fabricated from any material unless otherwise specified (see 6.2.1). Materials shall be compatible with and shall be resistant to deterioration due to lubricant, preservative, solvents or other substances and chemicals that can be expected to come into contact with the bearing and shall cause no deterioration of the same. Materials shall operate from -65 deg F (-54 deg C) to 230 deg F (110 deg C). This specification covers removable and non-removable type shields and removable and non-removable impervious contact and non contact type seals. The number of shields and seals shall be specified in the part number as indicated on the individual specification sheet.

3.2.5 Snap rings. Snap rings shall be manufactured from ferrous materials unless specified (see 6.2.1). Materials shall be compatible with and shall be resistant to deterioration due to lubricant, preservative, solvents or other substances and chemicals that can be expected to come into contact with the bearing. Rings shall have sufficient spring temper to set firmly in the ring grooves and shall be removable without the material taking a permanent set. The relative location of snap rings shall be specified in the part number as indicated on individual specification sheet.

3.2.6 Lubricants or preservative. Unless otherwise specified (see 6.2.1) bearings shall be supplied with grease in accordance with MIL-G-81322 or DoD-G-24508 or preservative in accordance with MIL-P-197. When grease is specified the bearing void (the air space between the inner and outer ring of the assembled bearing) shall be one-quarter to one-half filled. The lubricant or preservative shall be specified in the part number.

3.2.7 Recovered materials. The offerer/contractor is encouraged to use recovered materials in accordance with Public Law 94-580 to the maximum extent practicable.

3.3 Visual requirements. Bearings furnished under this specification shall conform to the visual requirements relative to surface quality, marking, and workmanship (see 4.4.3).

3.3.1 Surface quality. The surface quality of the bearings shall be such that the manufactured bearing shall be free of defects visible to the unaided eye.

3.3.2 Marking. Each bearing shall be permanently marked with the following:

- a. The bearing manufacturer's name or symbol and part number or the complete National Stock Number (NSM) in accordance with MIL-STD-130.
- b. The complete specification sheet part number.
- c. Each bearing with an outer ring diameter greater than or equal to 62 millimeters shall be permanently marked on the outer ring. Bearings less than 62 millimeters outer ring diameter shall be marked on the package.

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3.4 Metrology.

3.4.1 Metrology of assembled bearing. The dimensions of bearings shall conform to tolerance classes, radial internal clearances, runout and chamber dimensions in accordance with ANSI/AFBMA STD 20.

3.4.1.1 Tolerance class. The tolerance limits for bearings shall be either tolerance class ABEC-1 or ABEC-5 and shall be specified in the part number as indicated on the individual specification sheet (see 4.5.1).

3.4.1.2 Radial internal clearance. The tolerance limits for radial internal clearance for bearings shall be in accordance with ANSI/AFBMA STD 20 for the following internal fit symbols: 2 (tight), 0 (normal), 3 (loose), and 4 (extra loose) and shall be specified in the part number as specified on the individual specification sheet (see 4.5.1).

3.4.2 Metrology of disassembled bearings. Bearings shall be assembled with balls that conform to a ball grade and to geometric quality requirements as tabulated in ANSI/AFBMA STD 10 (see 4.5.2).

3.4.2.1 Ball grade or geometric quality. Unless otherwise specified herein, bearings shall be assembled with balls that conform to a ball grade and geometric quality requirement as tabulated in ANSI/AFBMA STD 10. Manufacturers shall specify the ball grade and tolerance limits. Balls shall be subject to the quality assurance provisions specified in 4.5.2.

3.5 Heat treatment. The heat treatment processes shall be such that the finished rings and balls meet the requirements specified in 3.5.1 through 3.5.2.

3.5.1 Hardness of rings. Measured hardness of rings shall be not less than 58 HRC as measured in accordance with ASTM E 18. Measured hardness of rings shall not vary more than three points on the Rockwell C scale on any one ring (see 4.5.2).

3.5.2 Hardness of balls. Measured hardness of balls shall be within 60-67 HRC, or equivalent. Case hardened or work hardened balls are not acceptable (see 4.5.2).

3.6 General assembly requirements. Unless otherwise specified herein, the details of the component parts shall be optional with the contractor. Bearings shall be manufactured using new, unused component parts only.

3.6.1 Balls. Balls for bearings shall be in accordance with MIL-B-1083 or ANSI/AFBMA STD 10 and as specified herein (see 4.5.2).

3.6.2. Cage. Bearings shall have cages for spacing the balls in their proper relationship within the bearings. Cages shall be assembled so as not to degrade the primary function of the bearing. The cage shall admit the lubricant freely to the raceway and ball surfaces of the bearing (see 4.4).

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3.6.3 Shields and seals. Shields and seals, when utilized, shall not affect the dimensional tolerances specified herein. Contact seals shall not inhibit the free rotation of the bearing rings (see 4.4).

3.6.4 Snap rings. Snap rings and snap ring grooves shall be in accordance with ANSI/AFBMA STD 20 (see 4.4).

3.6.5. Assembly. Bearings shall be assembled correctly utilizing the components and requirements specified herein (see 4.4).

3.7 Dynamic load rating. Dynamic load rating for all bearings covered by this specification shall be in accordance with ANSI/AFBMA STD 9. Bearing performance shall meet or exceed the dynamic load rating tabulated in each individual specification sheet (see 4.3).

3.8 Workmanship. Bearing surfaces shall be free of contamination from foreign particle debris, rust, and dirt. Additionally, all functional surfaces shall be free from mechanical and physical damage which would be detrimental to satisfactory performance of the bearing. Such damage would include but not be limited to, tool marks, grinding scratches, pits, indentations, and cracks visible to the unaided eye (see 4.4.3).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection not forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Inspection terms and definitions. Inspection terms and definitions shall be as defined in MIL-STD-109.

4.1.3 Measurement standards calibration. Measurement standards used by the contractor for calibrating measuring and test equipment (M&TE) shall have the accuracy, stability, range and resolution required for their intended use, and shall be traceable to the National Institute of Standards Technology.

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4.1.4 Environmental controls. M&TE and measurement standards shall be calibrated and used in an environment controlled to the extent necessary to assure continued measurements of required accuracy, giving due consideration to temperature, cleanliness and other controllable factors.

4.1.5 Gaging practices. A standard gaging method must be developed and used by the manufacturer to verify the product conformance to the requirements of this specification. The gaging methods shall be acceptable to the authorized government representative. In areas of dispute ANSI/AFBMA Standard 4 shall take precedence.

4.1.6 Test records. The manufacturer shall maintain a record showing quantitative results of all tests performed to requirements of this specification. The records shall be available to the purchaser and shall be signed by an authorized representative of the manufacturer or the testing laboratory an applicable.

4.2 Classification of examinations and tests. The examination and test requirements specified herein are classified as follows:

- a. Certification of performance (see 4.3).
- b. Quality conformance inspection (see 4.4).

4.3 Certification of performance. Manufacturer shall certify in writing that bearing performance shall meet or exceed the dynamic load rating listed in specification sheet as calculated in accordance with ANSI/AFBMA STD 9.

4.4 Quality conformance inspection. Quality conformance inspection shall be conducted at the contractors facility under the surveillance of the Government quality assurance representative. Quality conformance inspection shall be in accordance with 4.4.1 through 4.6.

4.4.1 Lot. A lot shall consist of assembled bearing of a particular part number assembled at the same time on the same assembly set-up and processed through all final assembly operations as a single group submitted for delivery at the same tire.

4.4.2 Sampling for quality conformance inspection. Samples shall be drawn from each lot of bearings which are to be inspected to evaluate the characteristics specified in table I. Sampling shall be conducted in accordance with the single sample plan of MIL-STD-105.

4.4.3 Visual examination. All samples of bearings submitted shall be subjected to visual examination to verify conformance with this specification regarding surface quality, workmanship and marking. Irregularities may be observed under magnification to establish identification. Defects shall be classified in table I.

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TABLE I. CLASSIFICATION OF DEFECTS
All grades

Category	AQL	Defects	Inspection method
Critical	.01		
01		Shields or seals, interfere with rotating parts of bearing (see 3.6.3)	Visual
02		Lubricant or preservative is missing or is required (see 3.2.6)	Visual
03		Radial runout, inner ring is not within required limit for grade specified - measured (see 4.5.1)	[1]
04		Radial runout, outer ring is not within required maximum limit for grade specified measured (see 4.5.1)	[1]
Major:	1.0		
101		Bearing are not of the part number specified	Visual
102		Bearings are not of the material specified	[1]
103		Bearing shows evidence of corrosion (see 3.8)	Visual
104		Bearing shows evidence of contamination (see 3.8)	Visual
105		Bore diameter, inner ring is not within required limits for grade specified - measured (see 4.5.1)	[1]
106		Outside diameter, outer ring is not within required limits for grade specified - measured (see 4.5.1)	[1]
107		Chamber dimensions is not within required limits- measured (see 3.4.1)	[1]
108		Hardness of balls not within required limits - measured (see 4.5.2)	[1]
109		Hardness of inner ring is not within required limits - measured (see 4.5.2)	[1]
110		Hardness of outer ring is not within required limits - measured (see 4.5.2)	[1]
111		Radial internal clearance is not within required limits for category specified - measured (see 4.5.1)	[1]
112		Cage in not of adequate construction, interferes lubricant (see 3.6.2) with rotation of bearing or impedes entrance	Visual
113		Snap ring, if required, is on wrong side of bearing (see 3.6.4)	Visual
114		Snap ring, if required, does not seat properly in outer ring groove (see 3.2.5)	Visual
115		Seals or shields are on wrong side of bearing from snap ring (see 3.2.4)	Visual
116		Shield(s) or seal(s), if required, interfere with rotating parts of bearing (see 3.6.3)	Visual
117		Contact seals inhibit free rotation of rings (see 3.6.3)	Visual
118		Bearing is not marked as required (see 3.3.2)	Visual

[1] Commercial Inspection Equipment

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TABLE I. CLASSIFICATION OF DEFECTS - continued
All grades

Category	AQL	Defects	Inspection method
Major:	1.0		
119		Packaging, packing, and marking are not as specified (see 4.4.4)	Visual
120		Each ball scheduled for assembly in not within specified - measured (see 3.4.2.1)	[1]
121		Each ball scheduled for assembly is not within diameter tolerance required - measured (see 3.4.2.1)	[1]
122		Width, (individual) inner ring is not within required limits for grade specified - measured (see 3.4.1)	[1]
123		Width, (individual) outer ring is not within required limits for grade specified - measured (see 3.4.1)	[1]
Minor:	4.0		
201		Surface quality, inner ring is not in accordance with requirements (see 3.3.1)	Visual
202		Surface quality, outer ring in not in accordance with requirements (see 3.3.1)	Visual
203		Surface quality, each ball in not in accordance with requirements (see 3.3.1)	Visual
204		Corners, inner ring, at intersections of bore and side surfaces, are not within required limits - measured (see 3.4.1)	[1]
205		Corners, outer ring, at intersections of outside diameter and side surfaces, are not within required limits - measured (see 3.4.1)	Visual
206		Snap ring, if required, is not within required limits - measured (see 3.6.4)	Visual [1]
207		Snap ring groove, if required, is not within required limits - measured (see 3.6.4)	Visual [1]
208		Reference side runout with bore, inner ring, is not within the required maximum limit - measured (see 4.5.1)	[1]
209		Raceway runout with reference side, inner ring is not within the required maximum limit measured (see 4.5.1)	[1]
210		Outside cylindrical surface runout with referenced side, outer ring in not within required maximum limit - measured (see 4.5.1)	[1]
211		Raceway runout with reference side, outer ring is not within required maximum limit - measured (see 4.5.1)	[1]

[1] Commercial inspection equipment

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4.4.4 Inspection of packaging. The packaging, packing and marking shall be inspected for compliance with section 5 of this document.

4.5 Test procedures. Descriptions of the tests and procedures of analysis for quality conformance shall be as specified in 4.5.1 through 4.5.2.

4.5.1 Metrology of assembled bearings. Assembled bearings shall be measured to verify conformance with this specification regarding bore diameter, outside diameter, chamber dimensions width, ring runout as appropriate for the tolerance class of the bearing and radial internal clearance. Runout measurements shall be made in accordance with ANSI/AFBMA STD 4 (see 3.4.1).

4.5.2 Hardness test. Rings and balls shall be subjected to a hardness test in accordance with ASTM E 18 for rings and MIL-B-1083 for "composition 1" balls. Defects shall be classified as specified in table I (see 3.5).

4.6 Acceptance and rejection for quality conformance inspection. Acceptance or rejection of the lot and parts or assembled bearings subjected to the sampling in 4.4.2 shall be in accordance with the procedures of MIL-STD-105 using Inspection Level II and the applicable Acceptance Quality Level (AQL) as specified in table I. Defects shall be classified as specified in table I. Defects observed in each classification shall apply to that classification only for purposes of acceptance or rejection and defects shall be non-cumulative, i.e., critical defects shall not be included in the major or minor defect counts.

5. PACKAGING

5.1 Preservation. Preservation shall be in accordance with MIL-P-197, Level A, C or commercial as specified.

5.2 Packing. Packing shall be in accordance with MIL-P-197, Level A, B, C or commercial as specified.

5.3 Marking. Marking shall be in accordance with MIL-P-197 and MIL-STD-129 or MIL-STD-123 as specified in the contract or order.

5.4 Navy fire-retardant requirements. Requirements shall be as specified in MIL-P-197.

6. NOTES

6.1 Intended use. This specification covers ball bearings of bore sizes from 4 to 200 millimeters. This specification does not cover stainless steel general purpose bearings. This specification does not include all types of general purpose annular ball bearings, but is intended to cover only those types generally used by the Federal Government.

6.2 Ordering data.

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6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. Complete specification sheet part number.
- c. Cage material (see 3.2.3).
- d. Shield or seal material (see 3.2.4).
- e. Snap ring material (see 3.2.5).
- f. Lubricant/preservative (see 3.2.6).
- g. Levels of preservation (see 5.1).
- h. Level of packing (see 5.2).
- i. Special marking required (see 5.3).
- j. Navy fire-retardant requirements (see 5.4).

6.3 Definitions.

6.3.1 General purpose bearings. General purpose bearings are ball bearings with ANSI/AFBMA precision classification of ABEC-1 and ABEC-5.

6.4 Cross reference to FF-B-171A. Table II tabulates the relationship of bearing type and class of FF-B-171A and the corresponding designation and applicable specification sheet of FF-B-171B.

6.5 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

6.6 Metric specification. This document supersedes only the metric bearings specified by FF-B-171A. See FF-B-2844 for coverage of the inch-pound bearings specified by FF-B-171A.

TABLE II. CROSS REFERENCE - BEARING DESIGNATIONS

FF-B-171A Type and Class	FF-B-171B Designation and Applicable Specification Sheets
Type III - Radial, Single Row Class 1 - open	Non-filling Slot Assembly Specification Sheets 1, 2, 3, 4, 5, 6, (Code A)
Class 2 - Single Shield	Specification Sheets 1, 2, 3, 4, 5, 6, (Code B)
Class 3 - Double Shield	Specification Sheets 1, 2, 3, 4, 5, 6, (Code C)
Class 4 - Snap Ring	Specification Sheets 3, 4, 5, 6, (Code G)
Class 5 - Single Shield, Snap Ring	Specification Sheets 3, 4, 5, 6
Class 6 - Double Shield, Snap Ring	Specification Sheets 3, 4, 5, (Code K)
Class 7 - Single Seal	Specification Sheets 1, 2, 3, 4, 5, (Code D)
Class 8 - Double Seal	Specification Sheets 1, 2, 3, 4, 5, (Code E)
Class 9 - Single Seal, Snap Ring	Specification Sheets 3, 4, 5, (Codes L, M)

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TABLE II. CROSS REFERENCE - BEARING DESIGNATIONS - continued

FF-B-171A Type and Class	FF-B-171B Designation and Applicable Specification Sheets
NOTE: Location of Seal Not Specified	NOTE: Two Locations of Seal Specified Relative to Snap Ring
Class 10 - Double Seal, Snap Ring	Specification Sheets 3, 4, 5 (Code N)
Type 120 - Radial, Single Row, Both Races Extended, Sealed Cartridge Type.	Non-filling Slot Assembly Specification sheets 9, 10 (Codes A, B, C, D)
NOTE: Seal Type Not Specified	NOTE: Contact and Labyrinth Seals Specified With/Without Snap Rings
Type 123 - Radial, Double Row, Internal Self-Aligning	Raceway of Outer Ring Spherical, Specification Sheets 9, 10 (Codes A, B, C, D) Specification Sheets 11,12,13,14 (Codes C, T)
Type III - Radial, Single Row, NOTE: Only Cylindrical Bores Specified	Non-filling Slot Assy NOTE: Cylindrical and Tapered Bore Specified
Not Specified	Filling Slot Assy, Specification Sheets 7, 8
Not Specified	Single Shield and Seal, Specification Sheets 1,2,3,4,5 (Code F)
Not Specified	Single Shield and Seal with Snap Ring, Specification Sheets 3, 4, 5 (Codes P, R)
Not Specified	NOTE: Two Locations of Shield/Seal Specified Relative to Snap Ring
Not Specified	Specification Sheets 19, 20, 21, 22 and 23 (Code A)
Type 124, Radial Thrust, Single Row, Contact Angle Greater Than 25 Degrees	Specification Sheets 24, 25, 26, 27, 28, 29, 30, 31 (Code A)
Type 142, Radial Thrust Double Row, Non-Separable, Vertex of Angle Falls Inside Bearing	No Coverage Because of Unavailability and Low Usage
Type 143, Radial Thrust Double Row, Non-Separable, Vertex of Angle Falls Outside Bearing	Specification Sheets 32, 33 (Code A)
Type 145, Radial Thrust Double Row, Filling Slot, Vertex of Contact Angle Falls Inside Bearing	Specification Sheets 34, 35 (Code A)
Type 146, Radial Thrust Double Row, Filling Slot, Vertex of Contact Angle Falls Outside Bearing	Specification Sheets 36, 37 (Code A)

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MILITARY INTERESTS:

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA - FSS

Military Coordinating Activity:

DLA - IS

PREPARING ACTIVITY:

DLA - IS

Custodians:

Army - AT

Air Force - 11

(Project 3110-0840)

Review Activities:

Army - AR, EA, MI

Navy - OS

User Activities:

Army - GL, ME