

MIL-B-22446(Wep)  
1 September 1964

MILITARY SPECIFICATION  
BEARINGS, ANNULAR BALL, HIGH GRADE

This specification has been approved by the  
Bureau of Naval Weapons, Department of the Navy.

1. SCOPE

1.1 Scope.- This specification describes the requirements for the procurement of precision annular ball bearings that are presently not Included in Specification FF-B-171. Bearings covered in this specification are designed primarily for radial loads, but are suitable for thrust loads in either direction up to approximately 60 percent of the radial load. Unless otherwise specified in the contract or order, the ball bearings shall be of the Conrad or non-loading groove type.

1.2 Classification.- The bearings, see figure 1, shall be of the following types:

Type I	Radial, retainer, open
Type II	Radial, retainer, single shield, extra thin
<b>Type</b> III	Radial, retainer, single shield
Type IV	Radial, retainer, double shield
<b>Type</b> V	Radial, retainer, extended inner race, open
Type VI	Radial, retainer, extended inner race, single shield
Type VII	Radial, retainer, extended inner race, double shield
Type VIII	Radial, full, filling notch (no retainer), open
Type IX	Angular contact, retainer, non-separable, outer race relieved, open

FSC 3110

MIL-B-22446 (Wep)

Type X	Angular contact, retainer, separable, outer race relieved, open
Type XI	Angular contact, retainer, separable, inner race relieved, open
Type XII	Radial, retainer, flanged, open
Type XIII	Radial, retainer, flanged, single shield*
Type XIV	Radial, retainer, flanged, double shield
Type XV	Radial, retainer, flanged, extended inner race, open
Type XVI	Radial, retainer, flanged, extended inner race, single shield*
Type XVII	Radial, retainer, flanged, extended inner race, double shield
Type XVIII	Radial, full, flanged, filling notch (no retainer), open
Type XIX	Angular contact, non-separable, retainer, outer race relieved, flanged, open
Type XX	Angular contact, separable, retainer, outer race relieved, flanged, open
Type XXI	Angular contact, separable, retainer, inner race relieved, flanged, open

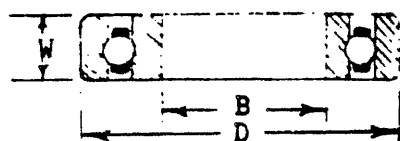
\* Shield may be on either side

1.2.1 The bearings shall be of the classes specified in Table I.

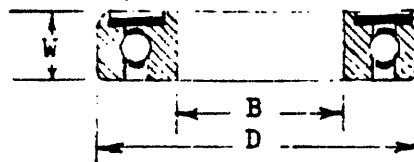
1.2.2 The specific bearings, listed by types and classes, are tabulated in Table II.

## 2. APPLICABLE DOCUMENTS

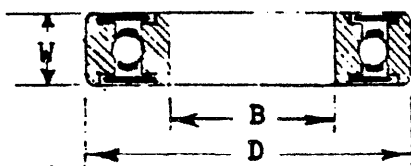
2.1 The following specifications, standards, drawings, publications, or such portion thereof as may be designated herein, of the issue in effect on the date of invitation for bids, form a part of this specification:



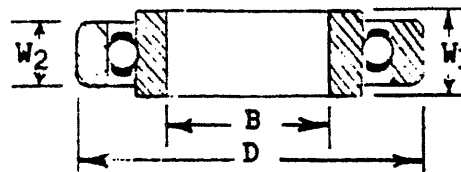
Type I



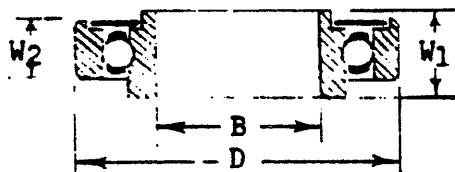
Types II and III



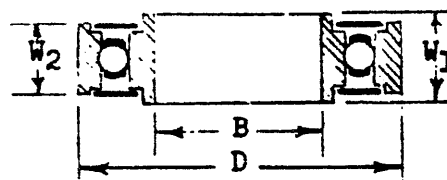
Type IV



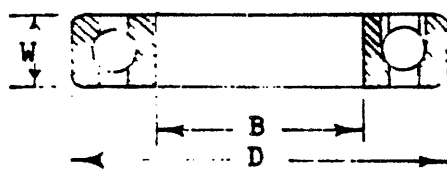
Type V



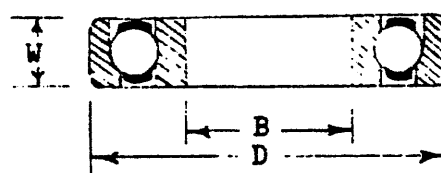
Type VI



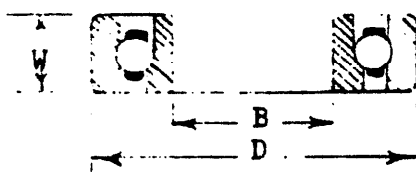
Type VII



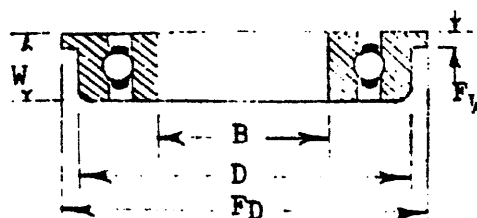
Type VIII



Types IX and X



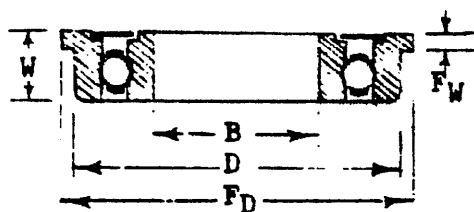
Type XI



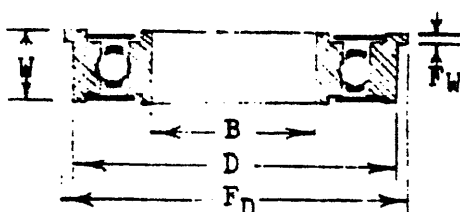
Type XII

Figure 1. Bearing Illustrations (Sheet 1 of 2)

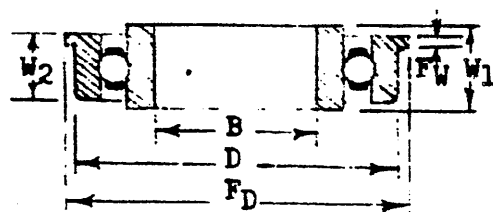
MIL-B-22446(Wep)



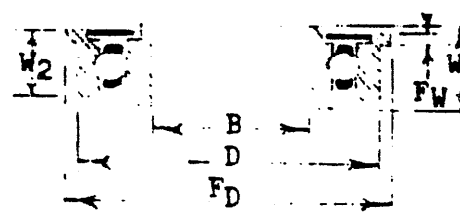
Type XIII



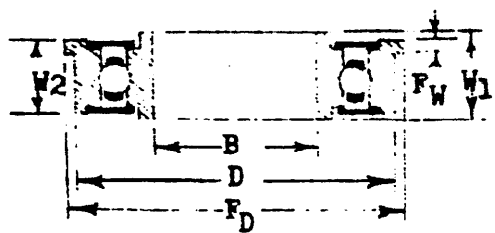
Type XIV



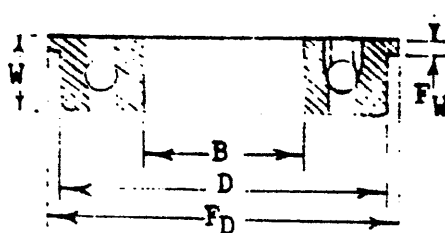
Type XV



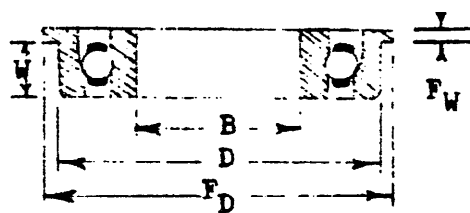
Type XVI



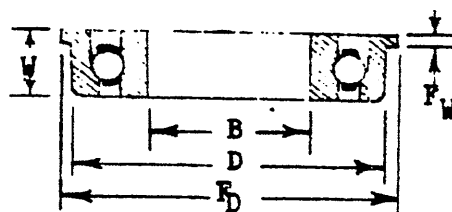
Type XVII



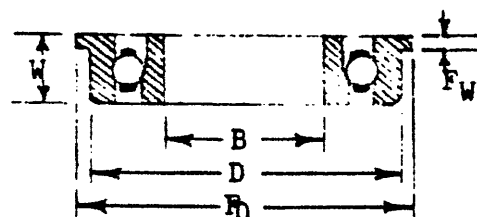
Type XVIII



Type XIX



Type XX



Type XXI

Figure 1. Bearing Illustrations (Sheet 2 of 2)

MIL-B-22446(Wep)

## SPECIFICATIONS

## FEDERAL

FF-B-171	Bearings, Ball, Annular (General Purpose )
QQ-S-624	Steel Bars, Alloy, Cold Finished and Hot Rolled (General Purpose)
QQ-S-763	Steel Bars, Shapes, and Forgings, Corrosion Resisting

## MILITARY

MIL-P-197	Preservation, Packaging and Packing of Anti-Friction Bearings* Associated Parts, and Sub-Assemblies
MIL-B-1083	Balls, Bearing, Ferrous

## STANDARDS

## MILITARY

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage

(Copies of specifications, standards, drawings, and publications requested by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications.- The following documents form a part of this specification. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply.

## ANTI-FRICTION BEARING MANUFACTURERS ASSOCIATION PUBLICATION

Section 4 of AFBMA Standards	Ball and Roller Bearing Standard Gaging Practices
------------------------------	---

MIL-B-22446 (Wep)

(Application for copies should be addressed to the Anti-Friction Bearing Manufacturers Association, 60 East 42nd Street, New York 17, New York.)

#### CONSOLIDATED CLASSIFICATION COMMITTEE PUBLICATION

##### Consolidated Freight Classification Rules

(Application for copies should be addressed to the Consolidated Classification Committee, 202 Chicago Union Station, Chicago 6, Ill.)

#### AMERICAN TRUCKING ASSOCIATION, INC. PUBLICATION

##### Motor Freight Classification Rules

(Application for copies should be addressed to the Issuing Officer, American Trucking Association, Inc., 1424 16th Street N.W., Washington 6, D.C.)

### 3. REQUIREMENTS

#### 3.1 General requirements.

3.1.1 Pre-production samples.- Unless otherwise specified in the contract or order, pre-production samples of the ball bearings shall be manufactured by the methods and procedures proposed for the production lot. These samples shall be tested as specified in Section 4 herein and are for the purpose of determining that the production items meet the requirement of this specification and the design. See 4.1.2.

#### 3.1.2 Materials.

3.1.2.1 Wills and rings.- Balls and rings shall be made of alloy steel (Composition Number E52100, Specification QQ-S-624) unless corrosion-resisting steel (Class 440C, Specification QQ-S-763) is specified (see 6.2). The steel used for the manufacture of the balls and rings shall be of the same composition as that approved on pre-production tests.

3.1.2.1.1 Case-hardened or work-hardened balls or rings are not acceptable for alloy steel.

3.1.2.1.2 Freedom of metal from defects.- The metal employed for balls and rings shall be homogeneous in structure, free from pipes, seams, laminations, excessive inclusion of nonmetallic impurities, and such other internal defects as would render the material unsuitable for the purpose intended. On microscopic examination, it shall be free from signs of overheating.

MTL-B-22446(Wep)

3.1.2.1.3 Uniformity of metal.- The manufacturer shall have used due care in subjecting his metal to suitable check analyses and physical tests to satisfy the purchaser as to the uniformity of the material used.

3.1.2.2 Retainers.- The ball bearing shall, unless otherwise specified in the contract or order (see 6.2), have a retainer for restraining the balls within the bearing and for spacing them circumferentially between the races. The retainer shall be so constructed as not to limit the proper functioning of the ball bearing to which it is fitted. Retainers shall be made of stamped, pressed, forged, cast, or machined steel, suitable nonferrous alloy, or molded phenolic composition unless one of these is specifically required (see 6.2). The retainer of corrosion-resisting bearings shall be of the same composition approved on the qualification tests. The retainer shall be formed either with pockets substantially fitting the surface of the balls or with cylindrical ball pockets, unless a specific construction is specified (see 6.2), but shall be of such a design as to admit the lubricant freely. The retainers shall be of material, workmanship, and finish suitable for the purpose intended.

3.1.2.3 Reconditioned component parts .- The ball bearing shall contain reconditioned component parts.

3.1.3 Construction and dimensions.- Construction and dimensions for the ball bearing shall be in accordance with the applicable BUORD drawing.

3.1.4 Moisture and corrosion.- The ball bearing shall be rendered moisture and corrosion resistant in accordance with detail requirements specified on the drawings and specifications in the applicable BUORD drawing.

3.1.5 Marking.- Where size permits, the assembled bearing shall be marked with the bearing manufacturer's name or symbol and the BUORD drawing number and, when applicable, an indication of the direction of thrust.

3.1.6 Gages.- The contractor shall provide himself with whatever gages are necessary and adequate to ensure that the material to which this application applies will meet the dimensional requirements shown on the applicable drawings. If so stipulated in the contract, order or requisition, the Government will furnish drawings of pertinent Navy Final Inspection Gages for guidance in design of the contractor's inspection gages. However, such procedure shall not relieve the contractor of his responsibility in the design and manufacture of such gages as may be required for the satisfactory fulfillment of the contract requirements,



MIL-B-22446 (Wep)

but is intended to facilitate acceptance of all component and assemblies by Naval Final Inspection Gages.

3.1.7 Requests for deviation.- Each request that a deviation be authorized shall have been submitted to the procuring activity, and the deviation shall have been authorized by the Bureau of Naval Weapons or by a Naval Activity delegated such authority, prior to the production of the affected item, or prior to the performance of a particular operation on the item. The deviation shall apply only to this specific item or operation. The request shall define the suggested deviation in sufficient detail to permit the procuring activity to evaluate its effect on performance and reliability, and the reasons for the suggested deviation shall be stated. Each request that a deviation be authorized, and the authorization, shall state specifically the extent of the departure, the identifying number of the item, the contractor (or bidder) and the contract number. A deviation is essentially temporary in character, and usually represents a departure limited to a specific period, to a specific number of items, or to the contract to which it applies. It may require an equitable reduction in contract price if a decrease in the cost of performance results therefrom.

3.1.8 Conflicting requirements.- Conflicting requirements arising between this specification or any specification, publication, or drawing listed herein shall be referred in writing to the procuring agency or appointed agent for interpretation, clarification, and resolution (or correction).

3.2 Definitions.- Definitions applicable to this specification are set forth in Section 4 of AFBMA standards.

3.3 Product characteristics.- The ball bearing shall meet the following product characteristics.

3.3.1 Markings and finish.- When checked in accordance with 4.4.4.1, the markings and finish of the ball bearing shall meet the following requirements. See 4.4, 4.1.

3.3.1.1 Markings.- Markings (when markings are specified on the applicable BUORD drawing) shall be correct and legible.

3.3.1.2 Finish.- The bore and edges of the inside ring, and the outside diameter and edges of the outer ring, shall have a finish which is characteristic of a polishing or lapping process, and shall be free from tool marks, chatter, waves, grinding, scratches, pits, rust, and other surface imperfections, irregularities, and defects visible to the normal unaided eye.



MIL-B-22446(Wep)

3.3.2 Dimensions- When measured in accordance with 4.4.4.2, the dimensions of the ball bearing shall meet the following requirements. See 4.4.4.2.

3.3.2.1 Bore diameter and outside diameter.- The bore and outer cylindrical surface of the ball bearing shall be round, and free from taper, to the extent that both the largest and smallest diameters shall be within the limits of size for the diameters, applying the specified tolerances as shown in table III. Out of roundness due to failure to clean up all of the way around on the last finish grind, or because of local grinding to remove defects, or other examples of poor workmanship, shall not be acceptable.

3.3.2.2 Width.- The ring width shall not differ from the width shown in table I by more than the tolerance shown in table III.

3.3.2.3 Flange.- The dimensions of the flange, when a flange is present, shall not differ from the dimensions given in table I by more than the tolerances given in table III.

3.3.2.4 Corners.- The corner on the bore and outside diameter need not be an arc of a circle, but shall lie within the area bounded by 90-degree arcs of circles having radii as given in table I.

3.3.3 Eccentricity, parallelism, run out, and squareness.- When checked in accordance with 4.4.4.3, the ball bearing shall meet the following requirements. See 4.4.4.3.

3.3.3.1 Inner ring.- The eccentricity, parallelism of sides, side run out with bore, and groove parallelism with side of the inner ring shall be in accordance with table III.

3.3.3.2 Outer ring.- The eccentricity, 'parallelism of sides, squareness of outside diameter with side, and groove parallelism with side shall be in accordance with table III.

3.3.4 Finish, ball bearing disassembled.- When inspected in accordance with 4.5.1, the surfaces listed in 3.3.1.2, the races, and each ball shall meet the finish requirements of 3.3.1.2. See 4.5.1.

3.3.5 Ball dimensions.- When measured in accordance with 4.5.2, the individual balls of the ball bearing shall meet the ball dimensional requirements given in Specification MIL-B-1083 for balls of grade 10. See 4.5.2.

MIL-B-22446 (Wep)

3.3.6 Hardness of balls and races, - When measured in accordance with 4.5.3, the hardness of the balls and races on the Rockwell C scale shall be as follows. See 4.5.3.

3.3.6.1 Alloy steel ball bearings.- 60 minimum.

3.3.6.2 Corrosion resistant steel ball bearings.- 56 minimum.

3.4 Clean-up.- Prior to and after final assembly, all parts, components, and the assembly shall be thoroughly cleaned of metal chips and other foreign matter. Burrs and sharp edges shall be removed.

3.5 Workmanship.- The ball bearings, including all parts, shall be constructed and finished in a manner to assure compliance with all requirements of this specification. Particular attention shall be paid to marking of assemblies and freedom of parts from burrs and sharp edges.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection.- Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Sampling.- Unless otherwise specified by the contract or purchase order, and when applicable, the sampling plans and procedures used in the determination of the acceptability of products submitted by a supplier shall be in accordance with 4.1.2 and 4.1.4.

4.1.2 We-production sample,- Unless otherwise specified for each contract or order, a representative sample of five ball bearings shall be manufactured by the methods and procedures proposed for the production lot. These shall be submitted to the Government inspector for pre-production tests at an activity designated by the Bureau of Naval Weapons, for purposes of determining compliance with the requirements of the contract, specifications, and drawings. Further production of the item by the contractor prior to approval of the contracting activity or the completion of tests on the pre-production samples shall be at the contractor's risk. Pre-production samples accepted will be applied as part of the quantity specified by the contract or order, but shall not be used in any equipment manufactured for the Government.

MIL-B-22446 (Wep)

\* L'

4.1.3 Lot size.- As applied to Government inspection of units of product, the term "lot" shall mean "inspection lot"; i.e., a collection of units of product submitted by a supplier for Government inspection. Unless otherwise determined by the Government inspector, each shipment of units of product shall be a separate "inspection lot" and may differ from the quantity specified in the total order or contract. Where a shipment consists of less than 60 units, the Government inspector may select and combine several shipments into one "inspection lot." In any event, all units of a single "inspection lot" shall be made to the same design, with the same material and manufacturing technique, and shall be part of one continuous production run.

4.1.4 Periodic production samples.- A random sample shall be selected from each lot in accordance with Standard MIL-STD-105, inspection level L-4, acceptance number zero. Unless otherwise specified in the contract or purchase order, these units shall be submitted to a Bureau of Naval weapons assigned activity to determine compliance of the samples with the requirements of the contract, specifications, and drawings. The ball bearings shall be considered satisfactory if they meet all specifications and pertinent drawing requirements and withstand the tests specified in 4.4 and 4.5. Periodic production samples accepted will be applied as part of the quantity specified by the contract or order, but shall not be used in any equipment manufactured for the Government.

4.2 Classification of test.- The inspection and testing of the ball bearing shall be classified as follows:

4.2.1 Acceptance tests.- These tests shall be accomplished on each ball bearing submitted for acceptance under contract. Acceptance tests shall either be performed by the manufacturer and witnessed by the Government inspector, or they may be conducted by the Government inspector. These tests are detailed in 4.4.

4.2.2 Pre-production and periodic production tests.- Pre-production and periodic production tests shall be accomplished on samples selected as specified in 4.1.2 and 4.1.4 which are representative of the production of the ball bearing after the award of the contract, to determine that the production meets the requirements of this specification. These tests are detailed in 4.5. Acceptance shall be based on no defects in the sample. Failure of the sample to comply with these requirements will result in the rejection of the lot or the cessation of production, as determined by the procuring activity. 1

MIL-B-22446(Wep)

4.2.3 Tests after delivery.- Unless otherwise specified in the contract, the Government reserves the right to conduct any or all the tests specified herein, as deemed necessary, after installation of the ball bearing. Any defects discovered during or after these tests due to the contractor's failure to comply with drawings or specifications for this equipment shall be corrected by the contractor at no expense to the Government, provided the contractor is notified of such defects within the guarantee period of the contract.

4.3 Test equipment.- The following items of test equipment are required to perform the acceptance tests set forth in this specification.

4.3.1 Gages.- Gage blocks, plug gages, ring gages, or other special gages calibrated by a qualified Government gage Laboratory at a temperature of 68 degrees Fahrenheit, or at a temperature directed by the procuring agency.

4.4 Acceptance tests.

4.4.1 The contractor shall conduct acceptance tests as specified in 4.2.1 to assure that the ball bearing is in compliance with the requirements of 3.1, 3.3.1, 3.3.2, 3.3.3, 3.4, and 3.5. Manufacturer's certification of materials specified in the applicable drawings shall be used in lieu of material tests.

4.4.2 Test conditions.- Unless otherwise specified, the ball bearing shall be subjected to acceptance tests under the following conditions:

4.4.2.1 Temperature: Room ambient 65 to 95 degrees Fahrenheit (18 to 35 degrees centigrade).

4.4.2.2 Altitude: Normal ground atmospheric pressure.

4.4.2.3 Vibration: None.

4.4.2.4 Humidity: Room ambient to 95 percent relative maximum.

4.4.3 Test and inspection equipment and facilities, - The manufacturer shall furnish and maintain all necessary test equipment, facilities, and personnel for performing all acceptance tests. The test equipment shall be adequate in quantity and, unless definite requirements are specified, shall be of sufficient accuracy and quality to permit performance of the required acceptance tests.

4.4.4 Test procedure.- The detailed test procedure listed in the following paragraphs shall be followed.

4.4.4.1 Markings and finish.- The ball bearings shall be inspected visually to determine compliance with the requirements of 3.3.1.

4.4.4.2 Dimensions.- The ball bearing dimensions listed in 3.3.2 shall be measured in accordance with section 4 of AFBMA standards to determine compliance with the requirements of 3.3.2.

4.4.4.2.1 Measurements may be made at a room temperature other than the calibration temperature of the gages, provided that the measurements are corrected to the calibration temperature of the gages.

4.4.4.2.2 All measurements shall be made with suitable apparatus which will permit duplication of measurements to within one-half the last decimal unit specified in this specification.

4.4.4.2.3 Measurements shall be rounded off to the accuracy indicated in the applicable tables of dimensions and tolerances before judgment is made on the conformance of any item with the requirements. Ambiguous cases shall be considered conforming.

4.4.4.3 Eccentricity, parallelism, and squareness.- The parameters listed in 3.3.3 shall be measured in accordance with section 4 of AFBMA standards to determine compliance with the requirements of 3.3.3. Paragraphs 4.4.4.2.1, 4.4.4.2.2, and 4.4.4.2.3 shall also apply for these measurements.

4.4.4.4 Preparation for delivery of bearings shall be inspected for conformance with the requirements of section 5 of this specification.

4.5 Pm-production and periodic production sample tests.

4.5.1 Finish, ball bearing disassembled.- The ball bearing shall be disassembled and inspected visually, using a 3-power magnifier, to determine compliance with the requirements of 3.3.4. Although a magnifier is used, the requirements regarding surface imperfections, irregularities, and defects are the same as for inspection by the normal unaided eye.

4.5.2 Ball dimensions.- The dimensional tolerances of all the balls of the ball bearing shall be measured in accordance with the document listed in 3.3.5 to determine compliance with the requirements of 3.3.5.

4.5.3 Hardness of balls and races.- The hardness of all the balls of the ball bearing, and of each race at several points along its circumference, shall be measured using a Rockwell testing machine with a 120-degree cone and a 150-kilogram load. The lowest hardness reading shall be noted to determine compliance with the requirements of 3.3.6.



MIL-B-22446 (Wep)

4.6 Failure of the ball bearing to meet any of the requirements and tests of this specification shall be considered cause for rejection.

## 5. PREPARATION FOR DELIVERY

### 5.1 Preservation and packaging.

#### 5.1.1 Level A.

5.1.1.1 Cleaning, drying, and preservation.- Cleaning, drying, and preservation of the ball bearings shall be in accordance with specification MIL-P-197. The cleaning method, drying method, and preservative shall be designated by the procuring activity.

5.1.1.2 Unit packaging.- The ball bearings shall be packaged in accordance with specification MIL-P-197. The packaging method shall be designated by the procuring activity.

#### 5.1.2 Level B. - Not applicable.

#### 5.1.3 Level C.

5.1.3.1 Cleaning, drying, and preservation.- Cleaning, drying, and preservation of the ball bearings shall be in accordance with the manufacturer's commercial practice, when adequate.

5.1.3.2 Unit packaging.- The ball bearings shall be packaged in accordance with specification MIL-P-197. The packaging method shall be designated by the procuring activity.

### 5.2 Packing.

5.2.1 Number of packages per pack.- The number of unit packages per pack shall be as specified in the contract or purchase order.

5.2.2 Levels A and B.- The box shall conform to the requirements of specification MIL-P-197. The type, grade, style, and size of the box shall be designated by the procuring activity. The unit packages shall be supported by rigid or resilient dunnage or blocked or braced as necessary to prevent free movement in the box.

5.2.3 Level C.- The ball bearings shall be packed to afford protection against damage during direct shipment from the supply source to the first receiving activity for immediate use. The box shall conform to Consolidated Freight Classification Rules or Motor Freight Classification Rules, whichever is applicable to the mode of transportation. The unit packages shall be supported by rigid or resilient dunnage or blocked or braced as necessary to prevent free movement in the box.



### 5.3 Marking.

5.3.1 Normal markings.- In addition to the normal markings required in the contract or orders unit packages and shipping containers shall be marked in accordance with the requirements of Standard MIL-STD-129.

5.3.2 Serial numbers.- Unit packages and shipping containers shall be marked with the serial numbers of the units contained within.

## 6. NOTES

6.1 Intended use.- The ball bearings covered in this specification are intended for use in shipboard fire control systems and associated equipment in which the algebraic sum of the radial and thrust loads is less than 1 pound, and the speed is less than 1000 revolutions per minute. Under these conditions, bearing life is indefinite (theoretically, as great as 100 years or more). When used in applications in which the load and speed are greater than these figures, the method for computing bearing life given in Specification FF-B-171 is applicable.

6.2 Ordering data.- Procurement documents should specify the specific title, number, and date of this specification and exceptions to this specification; applicable drawings and other documents; selection of applicable levels of packing; and guarantee clause (see 6.5).

6.2.1 The attention of the contracting officer is called to 5.2.1.

6.3 Criteria for use of the proper level of packaging shall be as follows:

6.3.1 Level A.- This level shall be used for all items except those receiving Level C packaging in accordance with 6.3.2.

6.3.2 Level C.- This level shall be used for those items which are to be shipped to domestic installations for immediate use at the first receiving activity.

6.4 Criteria for use of the proper level of packing shall be as follows:

6.4.1 Level A.- This level shall be used for those items which are to be shipped to indeterminate destinations or stored under indeterminate conditions for redistribution anywhere.

6.4.2 Level B.- This level shall be used for those items which will be subjected to multiple domestic shipments, handling, or covered storage.

MIL-B-22446(Wep)

6.4.3 Level C.- This level shall be used for those items which are to be shipped to domestic Installations for immediate use or repacking at the first receiving activity.

6.5 Guarantee.- The contract or order shall include a requirement for a guarantee stating that any ball bearing which fails to meet the requirements of this specification within one year after delivery because of a defect in material or workmanship or because of the vendor's failure to comply with the requirements of the applicable drawings and specifications shall be replaced by the vendor at no cost to the Government.

6.6 The contract or order shall include a sufficient number of extra item to cover production and pre-production testing samples.

MIL-B-22446 (Wep)

TABLE I  
CLASSES AND APPLICABLE DIMENSIONS

Class	Bore B Inch	Outside Diameter D Inch	Width W Inch	Flange Diameter FD Inch	Flange Width FW Inch	Limit Radii for Corners Inch	
1	.0250	.1000	.0312			.003,	.005
2	.0400	.1250	.0469			.003,	.005
3	.0400	.1250	.0469			.005,	.009
4	.0469	.1562	.0625			.005,	.009
5	.0469	.1562	.0625	.203	.013	.005,	.009
6	.0469	.1562	.0937			.005,	.009
7	.0469	.1562	.0937	.203	.031	.005,	.009
8	.0550	.1875	.0781			.005,	.009
9	.0550	.1875	.0781	.234	.023	.005,	.009
10	.0550	.1875	.0937			.005,	.009
11	.0550	.1875	.1094			.005,	.009
12	.0550	.1875	.1094	.234	.031	.005,	.009
13	.0781	.2500	.0937			.005,	.009
14	.0781	.2500	.0937	.296	.023	.005,	.009
15	.0781	.2500	.1094			.008,	.014
16	.0781	.2500	.1406			.005,	.009
17	.0781	.2500	.1406	.296	.031	.005,	.009
18	.0937	.1875	.0625			.005,	.009
19	.0937	.1875	.0625	.234	.018	.005,	.009
20	.0937	.2500	.0937			.005,	.009

MIL-B-22446(Wep)

TABLE I (cont)

## CLASSES AND APPLICABLE DIMENSIONS

Class	Bore B Inch	Outside Diameter D Inch	Width W Inch	Flange Diameter F <sub>D</sub> Inch	Flange Width F <sub>W</sub> Inch	Limit Radii for Corners Inch	
21	.0937	.3125	.1094			.005,	.009
22	.0937	.3125	.1094	.359	.023	.005,	.009
23	.0937	.3125	.1094			.006,	.011
24	.0937	.3125	.1094			.008,	.014
25	.0937	.3125	.1406			.005,	.009
26	.0937	.3125	.1406	.359	.031	.005,	.009
27	.1250	.2500	.0937			.005,	.009
28	.1250	.2500	.0937	.296	.023	.005,	.009
29	.1250	.2500	.1094			.005,	.009
30	.1250	.2500	.1094	.296	.031	.005,	.009
31	.1250	.3125	.1094			.005,	.009
32	.1250	.3125	.1094	.359	.023	.005,	.009
33	.1250	.3125	.1094			.008,	.014
34	.1250	.3125	.1406			.005,	.009
35	.1250	.3125	.1406	.359	.031	.005,	.009
36	.1250	.3750	.1094			.005,	.009
37	.1250	.3750	.1094	.422	.023	.005,	.009
38	.1250	.3750	.1406			.005,	.009
39	.1250	.3750	.1406	.422	.031	.005,	.009
40	.1250	.3750	.1562			.012,	.021

MIL-B-22446(Wep)

TABLE I (cont)  
CLASSES AND APPLICABLE DIMENSIONS

Class	Bore B Inch	Outside Diameter D Inch	Width W Inch	Flange Diameter FD Inch	Flange Width FW Inch	Limit Radii for Corners Inch	
41	.1250	.3750	.1562	.440	.030	.012,	.021
42	.1562	.3125	.1094			.005,	.009
43	.1562	.3125	.1094	.359	.023	.005,	.009
44	.1562	.3125	.1094			.008,	.014
45	.1562	.3125	.1250			.005,	.009
46	.1562	.3125	.1250	.359	.036	.005,	.009
47	.1875	.3125	.1094			.005,	.009
48	.1875	.3125	.1094	.359	.023	.005,	.009
49	.1875	.3125	.1094			.008,	.014
50	.1875	.3125	.1250			.005,	.009
51	.1875	.3125	.1250	.359	.036	.005,	.009
52	.1875	.3750	.1250			.005,	.009
53	.1875	.3750	.1250	.422	.023	.005,	.009
54	.1875	.3750	.1250	.422	.023	.008,	.014
55	.1875	.3750	.1250	.422	.031	.005,	.009
56	.1875	.5000	.1562			.012,	.021
57	.1875	.5000	.1562	.565	.042	.012,	.021
58	.1875	.5000	.1960			.012,	.021
59	.1875	.5000	.1960	.565	.042	.012,	.021
60	.2187	.3125	.1094			.005,	.009

MIL-B-22446(WeP)

TABLE I (cont)

## CLASSES AND APPLICABLE DIMENSIONS

Class	Bore B Inch	Outside Diameter D Inch	Width W Inch	Flange Diameter FD Inch	Flange Width FW Inch	Limit Radii for Corners Inch
61	.2362	.5118	.1378			.017, .030
62	.2500	.3750	.1250			.005, .009
63	.2500	.3750	.1250	.422	.023	.005, .009
64	.2500	.3750	.1250	.422	.023	.008, .014
65	.2500	.3750	.1250	.422	.036	.005, .009
66	.2500	.5000	.1250			.010, .018
67	.2500	.5000	.1250	.547	.023	.010, .018
68	.2500	.5000	.1875			.010, .018
69	.2500	.5000	.1875	.547	.045	.010, .018
70	.2500	.6250	.1960			.012, .021
71	.2500	.6250	.1960	.690	.042	.012, .021
72	.3125	.5000	.1562			.009, .016
73	.3125	.5000	.1562	.547	.031	.009, .016
74	.3750	.8750	.2812	.969	.062	.016, .028
75	.1250	.5000	.1719			.012, .021
76	.2500	.7500	.2188			.016, .028
77	.3125	.5000	.1562	.547	.031	.005, .009
78	.3750	.8750	.2188			.016, .028
79	.5000	1.1250	.2500			.016, .028
80	.6250	1.3750	.2812			.031, .055



MIL-B-22446(Wep)

TABLE I (cont)

## CLASSES AND APPLICABLE DIMENSIONS

Class	Bore B	outside Diameter D	Width Inner W <sub>1</sub>	Width Outer W <sub>2</sub>	Flange Diameter F <sub>D</sub>	Flange Width F	Limit Radii for Corners
	Inch	Inch	Inch	Inch	Inch	Inch	
101	.0469	.1562	.0937	.0625			.005, .009
102	.0469	.1562	.0937	.0625	.203	.013	.005, .009
103	.0469	.1562	.1250	.0937			.005, .009
104	.0469	.1562	.1250	.0937	.203	.031	.005, .009
105	.0550	.1875	.1093	.0781			.005, .009
106	.0550	.1875	.1093	.0781	.234	.023	.005, .009
107	.0550	.1875	.1406	.1094			.005, .009
108	.0050	.1875	.1406	.1094	.234	.031	.005, .009
109	.0781	.2500	.1249	.0937	.296	.023	.005, .009
110	.0781	.2500	.1250	.0937			.005, .009
111	.0781	.2500	.1718	.1406			.005, .009
112	.0781	.2500	.1718	.1406	.296	.031	.005, .009
113	.0937	.1875	.0937	.0625			.005, .009
114	.0937	.1875	.0937	.0625	.234	.018	.005, .009
115	.0937	.3125	.1406	.1094			.005, .009
116	.0937	.3125	.1406	.1094	.359	.023	.005, .009
117	.0937	.3125	.1718	.1406			.005, .009
118	.0937	.3125	.1718	.1406	.359	.031	.005, .009
119	.1250	.2500	.1250	.0937			.005, .009
120	.1250	.2500	.1250	.0937	.296	.023	.005, .009

MIL-B-22446(Wep)

TABLE I (cont)

## CLASSES AND APPLICABLE DIMENSIONS

Class	Bore B Inch	Outside Diameter D Inch	Width Inner W <sub>1</sub> Inch	Width Outer W <sub>2</sub> Inch	Flange Diameter FD Inch	Flange Width FW Inch	Limit Radii for Corners Inch
121	.1250	.2500	.1406	.1094			.005, .009
122	.1250	.2500	.1406	.1094	.296	.031	.005, .009
123	.1250	.3125	.1406	.1094			.005, .009
124	.1250	.3125	.1406	.1094	.359	.023	.005, .009
125	.1250	.3125	.1718	.1406			.005, .009
126	.1250	.3125	.1718	.1406	.359	.031	.005, .009
127	.1250	.3750	.1406	.1094			.005, .009
128	.1250	.3750	.1406	.1094	.422	.023	.005, .009
129	.1250	.3750	.1718	.1406			.005, .009
130	.1250	.3750	.1718	.1406	.422	.031	.005, .009
131	.1562	.3125	.1406	.1094			.005, .009
132	.1562	.3125	.1406	.1094	.359	.023	.005, .009
133	.1562	.3125	.1562	.1250			.005, .009
134	.1562	.3125	.1562	.1250	.359	.036	.005, .009
135	.1875	.3125	.1406	.1094			.005, .009
136	.1875	.3125	.1406	.1094	.359	.023	.005, .009
137	.1875	.3125	.1562	.1250			.005, .009
138	.1875	.3125	.1562	.1250	.359	.036	.005, .009
139	.1875	.3750	.1562	.1250			.005, .009
140	.1875	.3750	.1562	.1250	.422	.023	.005, .009

MIL-B-22446(Wep)

TABLE I (cont)

## CLASSES AND APPLICABLE DIMENSIONS

Class	Bore B Inch	Outside Diameter D Inch	Width Inner W <sub>1</sub> Inch	Width Outer W <sub>2</sub> Inch	Flange Diameter F <sub>D</sub> Inch	Flange Width F <sub>W</sub> Inch	Limit Radii for Corners Inch
141	.1875	.3750	.1562	.1250	.422	.031	.005, .009
142	.2500	.3750	.1562	.1250			.005, .009
143	.2500	.3750	.1562	.1250	.422	.023	.008, .014
144	.2500	.3750	.1562	.1250	.422	.036	.005, .009
145	.2500	.5000	.1562	.1250			.010, .018
146	.2500	.5000	.1562	.1250	.547	.023	.010, .018
147	.2500	.5000	.2187	.1870			.010, .018
148	.2500	.5000	.2187	.1875			.010, .018
149	.2500	.5000	.2187	.1875	.547	.045	.010, .018
150	.3125	.5000	.1875	.1562			.009, .016
151	.3125	.5000	.1875	.1562	.547	.031	.009, .016

TABLE II  
SPECIFIC BEARINGS COVERED BY THIS SPECIFICATION

Type I - Applicable Classes

2,4,8,13,20,21,27,31,36,40,42,47,52,56,61,62,66,72,75,76,78,  
79,80,81,82,83

Type II - Applicable Classes

6,11,16,25,29,34,38,40,45,50,52,58,62,68,70,72

Type III - Applicable Classes

6,11,16,25,29,34,38,40,45,50,52,58,62,68,70,72

Type IV - Applicable Classes

10,15,24,27,33,44,49

Type V - Applicable Classes

101,105,110,113,115,119,123,127,131,135,139,142,145,150

Type VI - Applicable Classes

103,107,111,117,121,125,129,133,137,139,142,148,150

Type VII - Applicable Classes

103,107,111,117,121,125,129,133,137,139,142,147,150

Type VIII - Applicable Classes

1,3,4,8,13,18,23,27,37,40,42,47,52,60,62,72

Type IX - Applicable Classes

8,13,21,31,36,40

Type X - Applicable Classes

8,13,21,31,36,40

MIL-B-22446(Wep)

## TABLE II (cont)

## SPECIFIC BEARINGS COVERED BY THIS SPECIFICATION

## Type XI - Applicable Classes

8,13,21,31,36,40

## Type XII - Applicable Classes

5,9,14,19,21,28,32,37,41,43,48,54,57,59,64,67,71,73,74

## Type XIII - Applicable Classes

7,12,17,26,30,35,39,41,46,51,55,59,65,69,71,73,74

## Type XIV - Applicable Classes

7,12,17,26,30,35,39,41,46,51,55,59,65,69,71,73,74

## Type XV - Applicable Classes

102,106,109,114,116,120,124,128,132,136,140,143,146,151

## Type XVI - Applicable Classes

104,108,112,118,122,126,130,134,138,141,144,149,151

## Type XVII - Applicable Classes

104,108,112,118,122,126,130,134,138,141,144,149,151

## Type XVIII - Applicable Classes

5,9,14,19,22,28,32,37,43,48,53,63

## Type XIX - Applicable Classes

9,14,22,32,37,41

## Type XX - Applicable Classes

9,14,22,32,37,41

## Type XXI - Applicable Classes

9,14,22,32,37,41

TABLE III. TOLERANCES  
BEARING TYPES I, II, III, IV, VIII, IX, X, XI

BEARING TYPES I, II, III, IV,									
INNER RING									
Bore		ECC.	Parallelism of Sides	Side Run Out With Bore	Groove Parallelism With Side	Width			
						Plus	Minus	Inch	Plus
Plus	Minus	Inch	Inch	Inch	Inch	.0003	.000	.000	.001
Inch	Inch	Inch	Inch	Inch	Inch	.0003	.000	.000	.001
.0000	.0002	.0002	.0002	.0003	.0003	.0003	.000	.000	.001
OUTER RING									
Outside Diameter		ECC.	Parallelism of Sides	O. D. Square With Side	Groove Parallelism With Side	Width			
						Plus	Minus	Inch	Plus
Plus	Minus	Inch	Inch	Inch	Inch	.0003	.000	.000	.001
Inch	Inch	Inch	Inch	Inch	Inch	.0003	.000	.000	.001
.0000	.0002	.0002	.0002	.0003	.0003	.0003	.000	.000	.001
BEARING TYPES V, VI, AND VII									
INNER RING									
Bore		ECC.	Parallelism of Sides	Side Run Out With Bore	Groove Parallelism With Side	Width			
						Plus	Minus	Inch	Plus
Plus	Minus	Inch	Inch	Inch	Inch	.0003	.000	.000	.002
Inch	Inch	Inch	Inch	Inch	Inch	.0003	.000	.000	.002
.0000	.0002	.0002	.0002	.0003	.0003	.0003	.000	.000	.002
OUTER RING									
Outside Diameter		ECC.	Parallelism of Sides	O.D. Square With Side	Groove Parallelism With Side	Width			
						Plus	Minus	Inch	Plus
Plus	Minus	Inch	Inch	Inch	Inch	.0003	.000	.000	.001
Inch	Inch	Inch	Inch	Inch	Inch	.0003	.000	.000	.001
.0000	.0002	.0002	.0002	.0003	.0003	.0003	.000	.000	.001



MIL-B-22446 (Wep)

TABLE III. TOLERANCES (cont.)  
BEARING TYPES XII, XIII, XIV, XVIII, XIX, XX, AND XXI

INNER RING									
Bore	ECC.		Parallelism of Sides	Side Run Out With Bore		Groove Parallelism With Sides	Width		
	Plus	Minus		With Bore	With Sides		Plus	Minus	Width
Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch
.0000	.0002	.0002	.0003	.0003	.0003	.0003	.000	.000	.001

OUTER RING									
Outside Diameter	ECC.		Parallelism of Sides	O. D. Square With Side		Groove Parallelism With Side	Width		
	Plus	Minus		With Side	With Sides		Plus	Minus	Flange Diameter
Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Plus Minus Inch Inch
.0000	.0002	.0002	.0002	.0003	.0003	.0003	.000	.001	.000 .005 .000 .002

BEARING TYPES XV, XVI, AND XVII

INNER RING									
Bore	ECC.		Parallelism of Sides	Side Run Out With Bore		Groove Parallelism With Sides	Width		
	Plus	Minus		With Bore	With Sides		Plus	Minus	Extension
Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Plus Minus Inch Inch
.0000	.0002	.0002	.0002	.0003	.0003	.0003	.000	.001	.002 .002

OUTER RING									
Outside Diameter	ECC.		Parallelism of Sides	O. D. Square With Side		Groove Parallelism With Side	Width		
	Plus	Minus		With Side	With Sides		Plus	Minus	Flange Diameter
Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Plus Minus Inch Inch
.0000	.0002	.0002	.0002	.0003	.0003	.0003	.000	.001	.000 .005 .000 .002

**INSTRUCTIONS:** In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (*DO NOT STAPLE*), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

**NOTE:** This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

(Fold along this line)

(Fold along this line)

DEPARTMENT OF THE NAVY

OFFICIAL BUSINESS  
PENALTY FOR PRIVATE USE \$300

**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 12503 WASHINGTON D. C.

POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE NAVY

Bureau of Naval Weapons (RREN-5)  
Department of the Navy  
Washington, DC 20360

NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL***(See Instructions - Reverse Side)***1. DOCUMENT NUMBER****2. DOCUMENT TITLE****3a. NAME OF SUBMITTING ORGANIZATION****4. TYPE OF ORGANIZATION (Mark one)**☐**VENDOR**☐**USER**☐**MANUFACTURER**☐**OTHER (Specify):** \_\_\_\_\_**b. ADDRESS (Street, City, State, ZIP Code)****5. PROBLEM AREAS****a. Paragraph Number and Wording:****b. Recommended Wording:****c. Reason/Rationale for Recommendation:****6. REMARKS****7a. NAME OF SUBMITTER (Last, First, MI) - Optional****b. WORK TELEPHONE NUMBER (Include Area Code) - Optional****c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional****8. DATE OF SUBMISSION (YYMMDD)**

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)