

INCH-POUND

A-A-59644

30 October 2001

SUPERSEDING

FF-B-2844/02

15 February 1994

FF-B-2844/05

15 February 1994

COMMERCIAL ITEM DESCRIPTION**BEARING, BALL, ANNULAR, SINGLE ROW, RADIAL,
NON-FILLING SLOT, EXTRA LIGHT SERIES (R - SERIES)**

The General Services Administration has authorized the use of this commercial item description for all federal agencies.

1. **SCOPE.** This commercial item description (CID) establishes the government acquisition requirements for single row, radial, non-filling slot, miniature size, instrument type, annular ball bearings for general purpose use.

2. **CLASSIFICATION.** The bearings shall be classified and identified by the types, sizes, cage materials, lubricants/preservatives and shield and seal configurations, and the tolerance classes and radial internal clearances listed below. The selected type (see 7.4(b)) and size (see 7.4(c)) shall be specified in the acquisition order.

Type I - chromium alloy steel

Type II - corrosion resistant steel

Sizes (see table I)

Cage materials (see table II)

Lubricants/preservatives and shield and seal configurations (see table III)

Tolerance classes and radial internal clearances (see table IV)

3. SALIENT CHARACTERISTICS

3.1 Dimensions. Bearing boundary dimensions and dynamic load ratings (see 3.5) shall conform to the requirements specified in table I for each of the coded bearing sizes. These dimensions conform to the requirements specified for the listed bearing sizes in table 4.1 - Part 2 in the American National Standards Institute/American Bearing Manufacturers Association (ANSI/ABMA) Standard 12.2, "Instrument Ball Bearings Inch Design" (DoD adopted).

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data that may improve this document should be sent to: Defense Supply Center Richmond (DSCR), ATTN: DSCR-VBD, 8000 Jefferson Davis Highway, Richmond, VA 23297-5610.

AMSC N/A

FSC 3110

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TABLE I. Boundary dimensions.¹

| Size code | Bore diameter (inch) | Bore diameter (mm) | Outside diameter | Width | Chamfer min. ² | Dia. series ³ | Dynamic load rating (lbs.) |
|-----------|----------------------|--------------------|------------------|--------|---------------------------|--------------------------|----------------------------|
| 01 | 0.1250 | 3.1750 | 0.3750 | 0.1562 | 0.012 | 2 | 130 |
| 02 | 0.1250 | 3.1750 | 0.5000 | 0.1719 | 0.012 | 3 | 245 |
| 03 | 0.1875 | 4.7625 | 0.5000 | 0.1562 | 0.012 | 9 | 278 |
| 04 | 0.1875 | 4.7625 | 0.5000 | 0.1960 | 0.012 | 9 | 278 |
| 05 | 0.2500 | 6.3500 | 0.5000 | 0.1250 | 0.005 | 8 | 177 |
| 06 | 0.2500 | 6.3500 | 0.5000 | 0.1875 | 0.005 | 8 | 177 |
| 07 | 0.2500 | 6.3500 | 0.6250 | 0.1969 | 0.012 | 9 | 316 |
| 08 | 0.2500 | 6.3500 | 0.7500 | 0.2188 | 0.016 | 2 | 499 |
| 09 | 0.2500 | 6.3500 | 0.7500 | 0.2812 | 0.016 | 2 | 499 |
| 10 | 0.3750 | 9.5250 | 0.8750 | 0.2188 | 0.016 | 9 | 703 |
| 11 | 0.3750 | 9.5250 | 0.8750 | 0.2812 | 0.016 | 9 | 703 |
| 12 | 0.5000 | 12.7000 | 1.1250 | 0.2500 | 0.016 | 2 | 865 |
| 13 | 0.5000 | 12.7000 | 1.1250 | 0.3125 | 0.016 | 2 | 865 |
| 14 | 0.6250 | 15.8750 | 1.3750 | 0.2812 | 0.031 | 2 | 1197 |
| 15 | 0.6250 | 15.8750 | 1.3750 | 0.3438 | 0.031 | 2 | 1197 |
| 16 | 0.7500 | 19.0500 | 1.6250 | 0.3125 | 0.031 | 0 | 1691 |
| 17 | 0.7500 | 19.0500 | 1.6250 | 0.4375 | 0.031 | 0 | 1691 |

¹ All dimensions are in inches unless otherwise specified.² The chamfer on bearings will clear a maximum fillet radius equal to a minimum chamfer.³ Diameter series is a soft metric conversion of the inch outside diameter and width in comparison with the boundary dimension in ANSI/ABMA Standard 20.

3.2 Materials.

3.2.1 Ring and ball materials. The ring and ball material for type I bearings shall be chromium alloy steel 52100 (G52986) as specified in the American Society for Testing and Materials (ASTM) A 295, "Standard Specification for High-Carbon Anti-Friction Bearing Steel" (DoD adopted). Material for type II bearings shall be corrosion resistant steel 440C (UNS 44004) as specified in Society of Automotive Engineers-Aerospace Materials Specifications (SAE-AMS) QQ-S-763, "Steel Bars, Wire, Shapes, and Forgings; Corrosion Resistant" (DoD adopted).

3.2.2 Cages. The cage material shall be compatible with and shall be resistant to deterioration due to lubricant, preservative, hydraulic fluid, 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. Non-metallic cages shall meet the same inspection and performance requirements as those conducted on bearings with metallic cages. Materials shall operate from -65 to 230 °F (-54 to 110 °C). The cage material shall be one of the coded options listed in table II (see 7.4(d)).

TABLE II. Cage materials.

| Code | Cage material |
|------|----------------------------------------|
| A | Corrosion resistant steel ¹ |
| B | Molded plastic |
| C | Machined brass or bronze |
| D | Machined non metallic (phenolic) |
| E | Other (specify in acquisition order) |

¹ One piece crown or two piece ribbon.

3.2.2.1 Corrosion resistant steel cages. Corrosion resistant steel cages shall be either a one-piece crown or a two-piece ribbon type.

3.2.2.1.1 One-piece crown cages. The one piece crown cage shall be American Iron and Steel Institute (AISI) class 410 steel made in accordance with ASTM A 240, "Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels" (DoD adopted).

3.2.2.1.2 Two piece ribbon retainers. Two piece ribbon retainers shall be either AISI class 305 or 430 in accordance with ASTM A 240, or AISI class 302 in accordance with ASTM A 666, "Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar" (DoD adopted).

3.2.3 Shields. Materials shall be compatible with and resistant to deterioration due to lubricants, preservatives, hydraulic fluid, solvents, and other substances or chemicals that can be expected to come into contact with the bearing, and shall cause no deterioration of the same. Shields shall not affect the specified dimensional tolerance and may be either a removable or non-removable type (see 7.4(e)). Materials shall operate from -65 to 230 °F (-54 to 110 °C). Unless otherwise specified in the acquisition order, the shield configuration for the bearing shall be one of the coded options listed in table III (see 7.4 (f)).

3.2.3.1 Type I bearings. Shields for type I bearings shall be fabricated from the manufacturers recommended materials or as specified in the acquisition order (see 7.4(g)).

3.2.3.2 Type II bearings. Shields for type II bearings shall be fabricated from corrosion resistant steel conforming to ASTM A 580, "Standard Specification for Stainless Steel Wire" (DoD adopted) condition A, ASTM A 313, "Standard Specification for Stainless Steel Spring Wire" (DoD adopted) condition C, or SAE-AMS QQ-S-763.

3.2.4 Seals. Seals shall be fabricated from the manufacturer's recommended material or as specified in the acquisition order (see 7.4(h)) and shall be impervious contact type, removable or non-removable as specified in the acquisition order (see 7.4(i)). Materials shall be compatible with and shall be resistant to deterioration due to lubricant, preservative, hydraulic fluid, 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. When used, seals shall not affect the specified tolerance nor shall they inhibit the free rotation of the bearing rings. Materials shall

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operate from -65 to 230 °F (-45 to 110 °C). The seal configuration for the bearing shall be one of the coded options listed in table III (see 7.4(f)).

3.3 Lubrication and preservation. When grease is required, the bearing void shall be 25 to 50 percent filled in accordance with DOD-G-24508, "Grease, High Performance, Multi-purpose (Metric)" or MIL-PRF-81322, "Grease, Aircraft, General Purpose, Wide Temperature Range". The bearing part number shall include the appropriate code from table III. Preservative compound shall be applied to all open and single closure bearings that have no lubricant requirement. If a preservative compound is required for packing or storage, the compound name and any applicable specification shall be specified in the acquisition order (see 7.4(j)).

TABLE III. Lubricants, preservatives, and shield and seal configurations.

| Code | Lubricant | Shield and seal |
|------|---------------------------|------------------------|
| A | DOD-G-24508 | Open |
| B | MIL-PRF-81322 | |
| C | Preservative ¹ | |
| D | DOD-G-24508 | Single shield |
| E | MIL-PRF-81322 | |
| F | Preservative ¹ | |
| G | DOD-G-24508 | Double shield |
| H | MIL-PRF-81322 | |
| J | DOD-G-24508 | Single seal |
| K | MIL-PRF-81322 | |
| L | Preservative ¹ | |
| M | DOD-G-24508 | Double seal |
| N | MIL-PRF-81322 | |
| P | DOD-G-24508 | Single shield and seal |
| R | MIL-PRF-81322 | |

¹ Preservative shall be in accordance with MIL-DTL-197, "Packaging of Bearings, Antifriction, Associated Parts and Subassemblies".

3.4 Precision tolerance. The bearing precision tolerance level shall conform to Annular Bearing Engineers Committee (ABEC) class ABEC-1 as defined in ANSI/ABMA Standard 20, "Radial Bearings of Ball, Cylindrical Roller and Spherical Roller Types Metric Design" (DoD adopted) or ABEC-3P as defined in ANSI/ABMA Standard 12.2. The tolerance class and associated radial internal clearance shall be specified in the part number by using the codes listed in table IV (see 7.4(k)).

TABLE IV. Tolerance class and radial internal clearance.

| Code | Tolerance class | Radial internal clearance | Clearance in 0.0001 inches |
|------|-----------------|---------------------------|----------------------------|
| A | ABEC-1 | Tight | 1 - 3 |
| B | | Normal | 2 - 5 |
| C | | Loose | 5 - 8 |
| D | | Extra-loose | 8 - 11 |
| E | ABEC-3P | Tight | 1 - 3 |
| F | | Normal | 2 - 5 |
| G | | Loose | 5 - 8 |
| H | | Extra-loose | 8 - 11 |

3.5 Dynamic load rating. The listed ratings in table I conform to the requirements specified in ANSI/ABMA Standard 9, "Load Ratings and Fatigue Life for Ball Bearings" (DoD adopted).

3.6 Hardness. The finished ring hardness shall be at least 58 HRC as defined in ASTM E 18, "Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials" (DoD adopted), and shall not vary more than three points on the Rockwell C scale on any one ring. The ball hardness shall be within 60-70 HRC in accordance with ASTM E 18. Case or work hardened balls shall not be acceptable.

3.7 Grain size. The grain size for the ring and ball material shall be in accordance with ASTM E 112, "Standard Test Methods for Determining Average Grain Size" (DoD adopted).

3.8 Passivation. All components fabricated from corrosion resistant steel shall be passivated in accordance with ASTM A 380, "Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems" (DoD adopted).

4. REGULATORY REQUIREMENTS

4.1 Recovered materials. The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR).

4.2 Unless otherwise specified in the solicitation and resulting contract, the foreign acquisition restrictions in Section 225.7019 of the Defense Federal Acquisition Regulation Supplement (DFARS) apply to products described by this CID.

5. PRODUCT CONFORMANCE PROVISIONS

5.1 Product conformance. The products provided shall meet the salient characteristics of this commercial item description, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial marketplace. The government reserves the right to require proof of such conformance.

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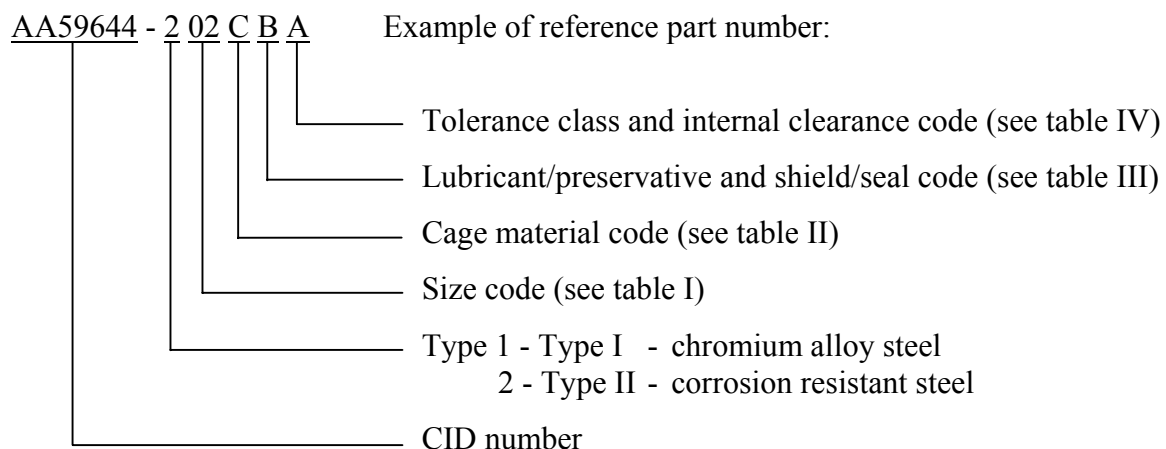
5.2 Market acceptability. The product offered must have been previously sold either to the government or on the commercial market.

6. PACKAGING

6.1 Preservation, packing, and marking. For acquisition purposes, the product shall be preserved, packed, and marked as specified in the acquisition order (see 7.4(l)).

7. NOTES

7.1 Part or identification number (PIN). The following part or identification numbering procedure is for government purposes and does not constitute a requirement for the contractor.



AA59644-2 02 C B A indicates: corrosion resistant steel; 0.1250 bore diameter; 0.5000 outer diameter; 0.1719 width; machined brass or bronze cage; open bearing; lubricant in accordance with MIL-PRF-81322; tolerance class ABEC-1, tight internal clearance.

7.2 Sources of documents.

7.2.1 Military specifications. Copies of military specifications may be obtained from Standardization Documents Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094. Electronic copies of military specifications may be obtained from <http://astimage.daps.dla.mil/quicksearch/>.

7.2.2 FAR and DFARS. Copies of the FAR and DFARS may be obtained from the Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. Electronic copies of the FAR may be obtained from <http://www.arnet.gov/far/>. Electronic copies of the DFARS may be obtained from <http://www.acq.osd.mil/dp/dars/dfars.html>.

7.2.3 ANSI standards. Copies of ANSI standards may be obtained from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

7.2.4 ASTM standards. Copies of ASTM standards may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

7.2.5 SAE standards. Copies of SAE standards may be obtained from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

7.3 Sources of supply. The manufacturers and/or suppliers listed below are known to supply products that meet the salient characteristics requirements of this document. Competition is not limited to the listed firms.

New Hampshire Ball Bearings Inc.
Chatsworth, CA 91311

Jamaica Bearings Co. Inc.
New Hyde Park, NY 11040

7.4 Ordering data. Acquisition documents should specify the following information:

- a. CID document number, revision, and CID PIN
- b. Bearing type (see 2)
- c. Bearing size (see 2)
- d. Cage material (see 3.2.2)
- e. Shield type (see 3.2.3)
- f. Closure configuration; shield (see 3.2.3), seal (see 3.2.4)
- g. Shield material, Type I bearing (see 3.2.3.1)
- h. Seal material (see 3.2.4)
- i. Seal type (see 3.2.4)
- j. Preservative compound and specification, if required (see 3.3)
- k. Precision tolerance (see 3.4)
- l. Preservation, packing, and marking requirements (see 6.1)

7.5 Supersession data. Table V contains cross reference data between FF-B-2844 slant sheets and the superseding CID numbers.

TABLE V. Supersession cross reference.

| FF-B-2844 slant number | Replacement CID |
|------------------------|-----------------|
| FF-B-2844/01 | A-A-59643 |
| FF-B-2844/02 | A-A-59644 |
| FF-B-2844/03 | A-A-59645 |
| FF-B-2844/04 | A-A-59643 |
| FF-B-2844/05 | A-A-59644 |
| FF-B-2844/06 | A-A-59646 |
| FF-B-2844/07 | A-A-59647 |
| FF-B-2844/08 | A-A-59648 |

7.6 Codes cross reference. Table VI cross-references the bore codes listed in FF-B-2844/02 and FF-B-2844/05 to the size codes of this CID.

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TABLE VI. Cross references.

| FF-B-2844 bore codes | A-A-59644 size codes | Bore diameter | Outside diameter | Width |
|-------------------------|-------------------------|------------------|---------------------|--------|
| AA | 01 | 0.1250 | 0.3750 | 0.1562 |
| AB | 02 | 0.1250 | 0.5000 | 0.1719 |
| AC | 03 | 0.1875 | 0.5000 | 0.1562 |
| AD | 04 | 0.1875 | 0.5000 | 0.1960 |
| AE | 05 | 0.2500 | 0.5000 | 0.1250 |
| AF | 06 | 0.2500 | 0.5000 | 0.1875 |
| AG | 07 | 0.2500 | 0.6250 | 0.1969 |
| AH | 08 | 0.2500 | 0.7500 | 0.2188 |
| AJ | 09 | 0.2500 | 0.7500 | 0.2812 |
| AK | 10 | 0.3750 | 0.8750 | 0.2188 |
| AL | 11 | 0.3750 | 0.8750 | 0.2812 |
| AM | 12 | 0.5000 | 1.1250 | 0.2500 |
| AN | 13 | 0.5000 | 1.1250 | 0.3125 |
| AP | 14 | 0.6250 | 1.3750 | 0.2812 |
| AR | 15 | 0.6250 | 1.3750 | 0.3438 |
| AT | 16 | 0.7500 | 1.6250 | 0.3125 |
| AU | 17 | 0.7500 | 1.6250 | 0.4375 |

7.7 Subject term (key word) listing.

bore
cage
closures
hardness
load
lubrication
size code
width

MILITARY INTERESTS:

Custodians:

Navy - OS

Air Force - 99

Reviewers:

Air Force -11, 84

CIVIL AGENCY
COORDINATING ACTIVITY:

GSA - 7FXE

Preparing activity:

DLA - GS4

(Project 3110-1232)