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A-A-59641B

11 March 2011

SUPERSEDING

A-A-59641A

18 January 2007

COMMERCIAL ITEM DESCRIPTION

BEARING, BALL, ANNULAR, DOUBLE ROW, ANGULAR CONTACT,
FILLING SLOT, VERTEX OF CONTACT ANGLES OUTSIDE BEARING,
DIMENSION SERIES 33

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

1. **SCOPE.** This commercial item description (CID) covers metric, double row, angular contact, annular ball bearings for general-purpose use. These bearings are not intended for use in critical aeronautical or critical special precision applications.

2. **CLASSIFICATION.** The ball bearings shall be classified by the class, sizes, cage materials, shield and snap ring configurations, precision tolerances, and lubricant and preservative requirements listed below:

Class 9 - dimension series 33

Size - bearing dimensions (see [table I](#))

Cage materials (see [table II](#))

Shield and snap ring configurations (see [table III](#))

Precision tolerances (see [table IV](#))

Lubricant and preservative requirements (see [table V](#))

3. SALIENT CHARACTERISTICS

3.1 **Dimensions.** Bearing boundary dimensions shall conform to the requirements specified in [table I](#) for each of the coded bearing sizes. The listed dimensions conform to the requirements specified for the listed bearing sizes from dimension series 33 in ABMA Standard 20, "Radial Bearings of Ball, Cylindrical Roller, and Spherical Roller Types, Metric Design". The bearing

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| Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data that may improve this document should be sent to: STDZNMGT@dla.mil or Defense Logistics Agency Aviation VEB, 8000 Jefferson Davis Highway, Richmond, VA 23297-5616. Since contact information can change, you may want to verify the currency of this address information using the ASSIST database at https://assist.daps.dla.mil/ . |
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size shall be as specified in the acquisition order (see 7.3(b)). For unlisted bearing sizes, the dimensional and dynamic load rating requirements should also be specified in the acquisition order.

TABLE I. Dimensional requirements (ABMA series 33).

| Bearing size code | Bore diameter (mm) | Outside diameter (mm) | Width (mm) | Chamfer r/min. (mm) | Minimum shaft shoulder diameter ¹ (mm) | Dynamic load rating (minimum) (lb.) |
|-------------------|--------------------|-----------------------|------------|---------------------|---|-------------------------------------|
| 00 | 10 | 35 | 19.0 | 0.6 | 15 | 2110 |
| 01 | 12 | 37 | 19.0 | 1.0 | 18 | 2320 |
| 02 | 15 | 42 | 19.0 | 1.0 | 21 | 2660 |
| 03 | 17 | 47 | 22.2 | 1.0 | 23 | 3740 |
| 04 | 20 | 52 | 22.2 | 1.1 | 27 | 4740 |
| 05 | 25 | 62 | 25.4 | 1.1 | 32 | 6415 |
| 06 | 30 | 72 | 30.2 | 1.1 | 37 | 8310 |
| 07 | 35 | 80 | 34.9 | 1.5 | 44 | 10405 |
| 08 | 40 | 90 | 36.5 | 1.5 | 49 | 12725 |
| 09 | 45 | 100 | 39.7 | 1.5 | 54 | 14260 |
| 10 | 50 | 110 | 44.4 | 2.0 | 60 | 19035 |
| 11 | 55 | 120 | 49.2 | 2.0 | 65 | 22115 |
| 12 | 60 | 130 | 54.0 | 2.1 | 72 | 27080 |
| 13 | 65 | 140 | 58.7 | 2.1 | 77 | 28900 |
| 14 | 70 | 150 | 63.5 | 2.1 | 82 | 34465 |
| 15 | 75 | 160 | 68.3 | 2.1 | 87 | 37525 |
| 16 | 80 | 170 | 68.3 | 2.1 | 92 | 42890 |
| 17 | 85 | 180 | 73.0 | 3.0 | 99 | 46275 |
| 18 | 90 | 190 | 73.0 | 3.0 | 104 | 49725 |
| 19 | 95 | 200 | 77.8 | 3.0 | 109 | 53250 |
| 20 | 100 | 215 | 82.6 | 3.0 | 114 | 56870 |
| 21 | 105 | 225 | 87.3 | 3.0 | 119 | 60525 |
| 22 | 110 | 240 | 92.1 | 3.0 | 124 | 64265 |
| 24 | 120 | 260 | 106.0 | 3.0 | 134 | 71135 |
| 28 | 140 | 300 | 118.0 | 4.0 | 148 | 83275 |

¹ Listed for reference purposes only. Shoulder height shall be determined to provide sufficient clearance for the direct application of bearing removal force against the bearing inner ring. If the required minimum clearance is not available, an alternative non-destructive bearing removal capability shall be provided.

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3.2 Materials.

3.2.1 Rings. The bearing ring material shall be chromium-alloy steel 52100 (UNS G52986) as specified in ASTM A295/A295M, "Standard Specification for High-Carbon Anti-Friction Bearing Steel". The finished rings shall not exceed the associated billet material inclusion rating that is also specified in ASTM A295/A295M. Ring hardness shall be at least 58 HRC as defined in ASTM E18, "Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials". The grain size of the ring material shall be determined in accordance with ASTM E112, "Standard Methods for Determining Average Grain Size".

3.2.2 Balls. The bearing ball material shall be chromium-alloy steel 52100 (UNS G52986) as specified in ASTM A295/A295M. The finished balls shall not exceed the associated billet material inclusion rating, which is also specified in ASTM A295/A295M. Balls shall be through-hardened no less than 60 HRC and no more than 67 HRC as defined in ASTM E18. The grain size of the ball material shall be determined in accordance with ASTM E112.

3.2.3 Cage. The bearing cage material shall be impervious to deterioration from any lubricant, preservative, solvent, or other chemical substance expected to contact the bearing during normal use or storage. Similarly, the material shall not cause any chemical deterioration of any other bearing component. Metallic cage materials shall operate from -40 to 250 °F (-40 to 121 °C). Non-metallic cage materials shall operate from -20 to 250 °F (-30 to 121 °C). Unless otherwise specified in the acquisition order, the cage material shall be one of the optional coded types listed in [table II](#) (see [7.3\(c\)](#)).

TABLE II. Cage materials.

| Code ¹ | Material type |
|-------------------|--------------------------------------|
| J | Pressed steel |
| M | Machined bronze or brass |
| P | Molded plastic (nylon 6/6 or equal) |
| T | Machined non-metallic (phenolic) |
| Y | Pressed brass |
| X | Other (specify in acquisition order) |

¹ No significant change from FF-B-171/37.

3.2.4 Shields. When used, the shield material shall be as recommended by the manufacturer, unless otherwise specified in the acquisition order (see [7.3\(d\)](#)). The material shall be impervious to deterioration from any lubricant, preservative, solvent, or other chemical substance expected to contact the bearing during normal use or storage. Similarly, the material shall not cause any chemical deterioration of any other bearing component. The shield shall remain functionally effective at a minimum temperature range of -20 to 250 °F (-30 to 121 °C) for non-metallic and -40 to 250 °F (-40 to 121 °C) for metallic materials. Unless otherwise specified in the acquisition order, the shield and snap ring configuration for the bearing shall be one of the coded options listed in [table III](#) (see [7.3\(e\)](#)).

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TABLE III. Shield and snap ring configurations.

| Code ¹ | Configuration options |
|-------------------|---|
| A | Open |
| B | Single shield (opposite filling slot side) |
| C | Single shield (on filling slot side) |
| D | Double shield |
| E | Open with snap ring (on filling slot side) |
| F | Open with snap ring (opposite filling slot side) |
| G | Single shield opposite filling slot side (snap ring on filling slot side) |
| H | Single shield and snap ring opposite filling slot side |
| J | Single shield and snap ring on filling slot side |
| K | Single shield on filling slot side (snap ring opposite filling slot side) |
| L | Double shield (snap ring on filling slot side) |
| M | Double shield (snap ring opposite filling slot side) |
| X | Other (specify in acquisition order) |

¹ No significant change from FF-B-171/37.

3.2.5 Snap ring. When used, the bearing snap ring and associated snap ring groove shall conform to the requirements specified in ABMA Standard 20.

3.3 Precision tolerance. The bearing precision tolerance level shall conform to Annular Bearing Engineers Committee (ABEC) class ABEC-1, ABEC-3, ABEC-5, or ABEC-7 as defined in ABMA Standard 20. The tolerance class and associated radial internal clearance shall be one of the coded options listed in [table IV](#) (see [7.3\(f\)](#)).

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TABLE IV. Precision tolerance requirements.

| Code | Tolerance class | Radial internal clearance |
|------|-----------------|--------------------------------|
| A | ABEC-1 | Group 2 (less than normal) |
| B | | Group N (normal) |
| C | | Group 3 (greater than normal) |
| D | | Group 4 (greater than group 3) |
| T | | Group 5 (greater than group 4) |
| E | ABEC-3 | Group 2 (less than normal) |
| F | | Group N (normal) |
| G | | Group 3 (greater than normal) |
| H | | Group 4 (greater than group 3) |
| U | | Group 5 (greater than group 4) |
| J | ABEC-5 | Group 2 (less than normal) |
| K | | Group N (normal) |
| L | | Group 3 (greater than normal) |
| M | | Group 4 (greater than group 3) |
| V | | Group 5 (greater than group 4) |
| N | ABEC-7 | Group 2 (less than normal) |
| P | | Group N (normal) |
| R | | Group 3 (greater than normal) |
| S | | Group 4 (greater than group 3) |
| W | | Group 5 (greater than group 4) |

3.3.1 Bearing precision tolerance levels and internal clearances may be affected by the addition of shields. Manufacturers/suppliers should be consulted for availability of desired precision tolerances when shields are required.

3.4 Lubrication and preservation requirements. Unless otherwise specified in the acquisition order, the bearing lubricant or preservative requirement shall be as selected from the approved coded options listed in [table V](#) (see [7.3\(g\)](#)). When grease fill is required, the bearing void (the airspace between the inner and outer rings of the assembled bearing) shall be 25 to 50 percent filled. Bearing preservative shall be in accordance with MIL-DTL-197, "Packaging of Bearings, Associated Parts and Subassemblies".

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TABLE V. Lubricant and preservative requirements.

| Code | Lubricant or preservative compound |
|------|--|
| B | Grease in accordance with MIL-PRF-81322 |
| E | Grease in accordance with DOD-G-24508 |
| H | Grease in accordance with MIL-PRF-23827 |
| L | Grease with SRI-2 or qualified equivalent |
| S | No fill |
| T | Preservation compound in accordance with MIL-DTL-197 |
| X | Other (specify in the acquisition order) |

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 Foreign acquisition restrictions. Unless otherwise indicated in the solicitation and resulting contract, the foreign acquisition restrictions in Section 252.225, Clause 252.225.7016 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 CID, 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.

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

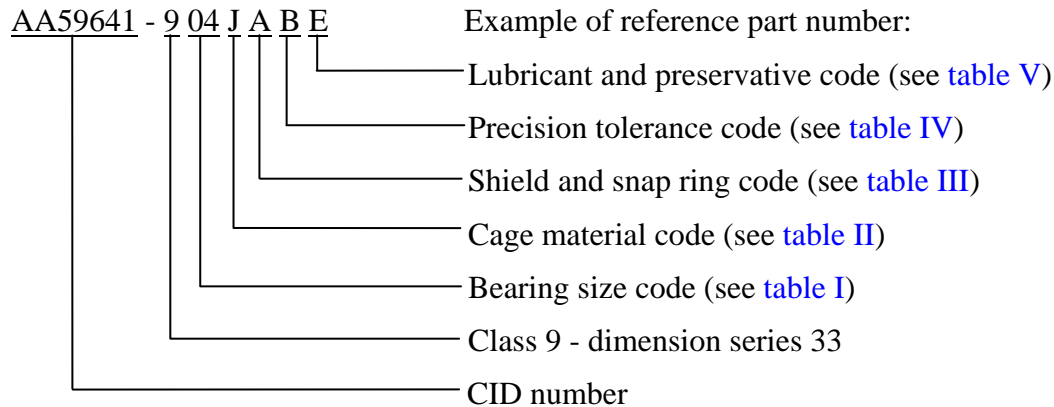
6. PACKAGING

6.1 Preservation, packing, and marking. Unless otherwise specified in the acquisition order, the bearings supplied shall be preserved, packed, and marked in accordance with MIL-DTL-197 (see 7.3(h)).

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7. NOTES

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



AA59641 - 9 04 J A B E indicates: boundary dimension series 33; bore diameter 20 mm, outside diameter 52 mm, width 22.2 mm; pressed steel cage; open (no shields); ABEC-1 tolerance class, normal radial internal clearance; filled with grease in accordance with DOD-G-24508.

7.2 Sources of documents.

7.2.1 DFARS and FAR. Copies of DFARS and FAR may be obtained from the Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. Electronic copies of DFARS may be obtained from <http://www.acq.osd.mil/dpaf/dars/dfarspgi/current/index.html>. Electronic copies of FAR may be obtained from <https://www.acquisition.gov/far/>.

7.2.2 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 may be obtained from <https://assist.daps.dla.mil/>.

7.2.3 ABMA standards. Copies of ABMA standards may be obtained from the American Bearing Manufacturers Association, 2025 M Street NW, Suite 800, Washington, DC 20036. Electronic copies may be obtained from <http://www.abma-dc.org/>.

7.2.4 ASTM standards. Copies of ASTM standards may be obtained from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959. Electronic copies may be obtained from <http://www.astm.org/>.

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7.3 Ordering data. The acquisition order should specify the following information:

- a. CID document number, revision, and CID PIN.
- b. Bearing size (with dimension/load requirements if size is unlisted) (see [3.1](#)).
- c. Cage material type (see [3.2.3](#)).
- d. Shield material (see [3.2.4](#)).
- e. Shield and snap ring configuration (see [3.2.4](#)).
- f. Precision tolerance requirements (see [3.3](#)).
- g. Lubricant and preservative requirement (see [3.4](#)).
- h. Preservation, packing, and marking requirements (see [6.1](#)).

7.4 Codes cross-reference. [Tables VI](#), [VII](#), and [VIII](#) contain cross-reference data for the PIN information as listed in FF-B-171/37 and this CID.

7.4.1 Bearing class designations. The CIDs replacing 33 of the 37 associated specification sheets of FF-B-171 have been assigned class codes corresponding to ABMA dimension series. [Table VI](#) lists the FF-B-171 specification sheets, the corresponding dimension series, the CID class codes, and the replacement CIDs.

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TABLE VI. Federal specification to CID cross-reference.

| FF-B-171 specification sheets | ABMA dimension series | CID class codes | Replacement CID numbers |
|----------------------------------|--------------------------|--------------------|----------------------------|
| 1 | 02, 03, 10 | 1, 2, 4 | A-A-59581 |
| 2 | 19 | 5 | A-A-59582 |
| 3 | 10 | 4 | A-A-59583 |
| 4 | 02 | 1 | A-A-59584 |
| 5 | 03 | 2 | A-A-59585 |
| 6 | 04 | 3 | A-A-59586 |
| 7 | 02 | 1 | A-A-59587 |
| 8 | 03 | 2 | A-A-59589 |
| 9 | 32 | 8 | A-A-59595 |
| 10 | 33 | 9 | A-A-59596 |
| 11 | 02 | 1 | A-A-59597 |
| 12 | 03 | 2 | A-A-59598 |
| 13 | 22 | 6 | A-A-59599 |
| 14 | 23 | 7 | A-A-59600 |
| 15 | 19 | - | Canceled |
| 16 | 10 | - | Canceled |
| 17 | 02 | - | Canceled |
| 18 | 03 | - | Canceled |
| 19 | 19 | 5 | A-A-59623 |
| 20 | 10 | 4 | A-A-59624 |
| 21 | 02 | 1 | A-A-59625 |
| 22 | 03 | 2 | A-A-59626 |
| 23 | 04 | 3 | A-A-59627 |
| 24 | 10 | 4 | A-A-59628 |
| 25 | 02 | 1 | A-A-59629 |
| 26 | 03 | 2 | A-A-59630 |
| 27 | 04 | 3 | A-A-59631 |
| 28 | 10 | 4 | A-A-59632 |
| 29 | 02 | 1 | A-A-59633 |
| 30 | 03 | 2 | A-A-59634 |
| 31 | 04 | 3 | A-A-59635 |
| 32 | 32 | 8 | A-A-59636 |
| 33 | 33 | 9 | A-A-59637 |
| 34 | 32 | 8 | A-A-59638 |
| 35 | 33 | 9 | A-A-59639 |
| 36 | 32 | 8 | A-A-59640 |
| 37 | 33 | 9 | A-A-59641 |

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TABLE VII. Radial internal clearance and ABEC tolerance codes.

| FF-B-171/37 codes | | | A-A-59641B codes | | |
|-------------------|---------------------------|-----------------|------------------|-----------------|---------------------------|
| Code | Radial internal clearance | Tolerance class | Code | Tolerance class | Radial internal clearance |
| 1 | Symbol 2 | ABEC-1 | A | ABEC-1 | Group 2 |
| 2 | Symbol 0 | | B | | Group N |
| 3 | Symbol 3 | | C | | Group 3 |
| 4 | Symbol 4 | | D | | Group 4 |
| | | | T | | Group 5 |
| | | | E | ABEC-3 | Group 2 |
| | | | F | | Group N |
| | | | G | | Group 3 |
| | | | H | | Group 4 |
| | | | U | | Group 5 |
| 5 | Symbol 2 | ABEC-5 | J | ABEC-5 | Group 2 |
| 6 | Symbol 0 | | K | | Group N |
| 7 | Symbol 3 | | L | | Group 3 |
| 8 | Symbol 4 | | M | | Group 4 |
| | | | V | | Group 5 |
| | | | N | ABEC-7 | Group 2 |
| | | | P | | Group N |
| | | | R | | Group 3 |
| | | | S | | Group 4 |
| | | | W | | Group 5 |

TABLE VIII. Lubricant and preservative requirements codes.

| FF-B-171/37 codes | | A-A-59641B codes | |
|-------------------|---------------------------------------|------------------|---|
| Code | Lubricant or preservative | Code | Lubricant or preservative |
| A | Grease IAW MIL-PRF-81322 | B | Grease IAW MIL-PRF-81322 |
| B | Grease IAW DOD-G-24508 | E | Grease IAW DOD-G-24508 |
| C | Grease IAW MIL-PRF-23827 | H | Grease IAW MIL-PRF-23827 |
| D | Grease with SRI-2 or equivalent | L | Grease with SRI-2 or qualified equivalent |
| E | Preservation compound IAW MIL-DTL-197 | T | Preservation compound IAW MIL-DTL-197 |
| | | S | No fill |
| | | X | Other (specify in the acquisition order) |

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7.5 Subject term (key word) listing.

ABEC
cage
dynamic load rating
lubricant
precision tolerance
rings

MILITARY INTERESTS:

Custodians:

Army - AT
Navy - OS
Air Force - 99
DLA - GS

Review Activities:

Army - GL
Navy - SH
Air Force - 11, 84

CIVIL AGENCY
COORDINATING ACTIVITY:

GSA - FAS

Preparing Activity:

DLA - GS4

(Project 3110-2011-017)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST database at <https://assist.daps.dla.mil/>.