

METRIC

A-A-59631B
28 January 2011
SUPERSEDING
A-A-59631A
6 August 2004

COMMERCIAL ITEM DESCRIPTION

BEARING, BALL, ANNULAR, SINGLE ROW, ANGULAR CONTACT,
CONTACT ANGLE 23° THROUGH 32°, DIMENSION SERIES 04

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, single 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 seal configurations, precision tolerances, lubricant and preservative requirements, and duplex mounting configurations listed below:

Class 3 - dimension series 04

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

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

Shield and seal configurations (see [table III](#))

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

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

Duplex mounting configurations (see [table VI](#))

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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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 04 in the American Bearing Manufacturers Association (ABMA) Standard 20, "Radial Bearings of Ball, Cylindrical Roller, and Spherical Roller Types, Metric Design". The bearing 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 04).

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) (lbs.)
00	25	80	21	1.5	34	6,430
06	30	90	23	1.5	39	8,305
07	35	100	25	1.5	44	10,535
08	40	110	27	2.0	50	11,385
09	45	120	29	2.0	55	14,835
10	50	130	31	2.1	62	16,780
11	55	140	33	2.1	67	19,305
12	60	150	35	2.1	72	20,960
13	65	160	37	2.1	77	22,650
14	70	180	42	3.0	84	26,070
15	75	190	45	3.0	89	27,860
16	80	200	48	3.0	94	31,355
17	85	210	52	4.0	1.3	33,245
18	90	225	54	4.0	108	37,535

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.

3.2 Materials.

3.2.1 Rings. The bearing ring material shall be chromium-alloy steel 52100 (UNS G52986) as specified in ASTM International (ASTM) A295/A295M, "Standard Specification for High-Carbon Anti-Friction Bearing Steel". The finished rings shall not exceed the associated billet material inclusion rating 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".

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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 °F to 250 °F (-40 °C to 121 °C). Non-metallic cage materials shall operate from -20 °F to 250 °F (-30 °C 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 changes from FF-B-171/27.

3.2.4 **Shields and seals.** Unless otherwise specified in the acquisition order, the shield and seal configuration for the bearing shall be one of the coded options listed in [table III](#) (see [7.3\(d\)](#)). The acquisition order shall state which side of the outer ring (heavy shoulder or counterbore side) the shield or seal is to be located (see [7.3\(e\)](#)).

TABLE III. Shield and seal configurations.

Code ¹	Configuration option
A	Open
X	Other (specify in acquisition order)

¹ No significant changes from FF-B-171/27.

3.2.4.1 If a single shield or seal is required, the shield or seal material shall be as recommended by the manufacturer, unless otherwise specified in the acquisition order (see [7.3\(f\)](#)). 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 or seal material shall remain functionally effective at a minimum temperature range of -20 °F to

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250 °F (-30 °C to 121 °C) for non-metallic and -40 °F to 250 °F (-40 °C to 121 °C) for metallic materials.

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 shall be one of the coded options listed in [table IV](#) (see [7.3\(g\)](#)).

TABLE IV. Precision tolerance requirements.

Code	Tolerance class
B	ABEC-1
F	ABEC-3
K	ABEC-5
P	ABEC-7

3.3.1 Bearing precision tolerance levels and internal clearances may be affected by the addition of shields and/or seals. Manufacturers/suppliers should be consulted for availability of desired precision tolerances when shields and/or seals 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\(h\)](#)). 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".

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)

3.5 Duplex mounting. When required, the adjoining faces of bearings used in duplex applications shall be match ground and marked for proper mounting. The duplex mounting configuration shall be one of the coded options listed in [table VI](#). If required, the duplex mounting configuration shall be specified in the acquisition order (see [7.3\(i\)](#)).

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TABLE VI. Duplex mounting.

Code	Configuration option
F	Face to face
B	Back to back
T	Tandem
U	Universal (F, B, or T)

3.6 Preload. Preload requirements shall be listed in the acquisition order (see [7.3\(j\)](#)).

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

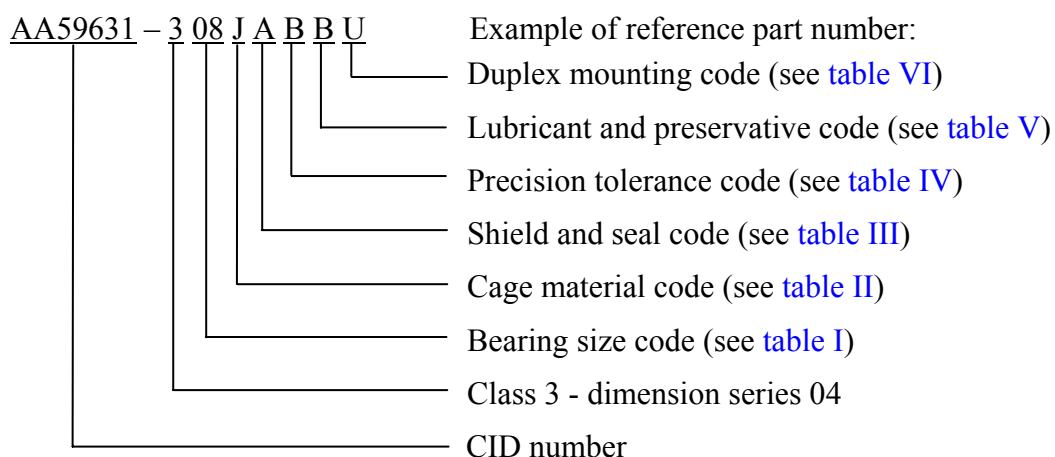
6. PACKAGING

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\(k\)](#)).

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.

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AA59631 - 3 08 J A B B U indicates: boundary dimension series 04; bore diameter 40 mm, outside diameter 110 mm, width 27 mm; pressed steel cage; open, no shield or seal; ABEC-1 tolerance class; filled with grease in accordance with MIL-PRF-81322; universal duplex mounting.

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/dpap/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/>.

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

- CID document number, revision, and CID PIN.
- Bearing size (with dimension/load requirements if size is unlisted), if different (see [3.1](#)).
- Cage material type (see [3.2.3](#)).
- Shield and seal configuration (see [3.2.4](#)).
- Location of shield or seal (see [3.2.4](#)).
- Shield or seal material (see [3.2.4.1](#)).
- Precision tolerance requirement (see [3.3](#)).

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- h. Lubricant and preservative requirements (see 3.4).
- i. Duplex mounting configuration, if required (see 3.5).
- j. Preload requirement, if required (see 3.6).
- k. Preservation, packing, and marking requirements (see 6.1).

7.4 Codes cross-reference. Tables VII, VIII, and IX contain cross-reference data for the PIN information as listed in FF-B-171/27 and this CID.

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

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TABLE VII. 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 VIII. Radial internal clearance and ABEC tolerance codes.

FF-B-171/27 codes			A-A-59631B codes	
Code	Radial internal clearance	Tolerance class	Code	Tolerance class
1	Symbol 2	ABEC-1	B	ABEC-1
2	Symbol 0			
3	Symbol 3			
4	Symbol 4			
			F	ABEC-3
5	Symbol 2	ABEC-5	K	ABEC-5
6	Symbol 0			
7	Symbol 3			
8	Symbol 4			
			P	ABEC-7

TABLE IX. Lubricant and preservative requirements codes.

FF-B-171/27 codes		A-A-59631B 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)

7.5 Subject term (key word) listing.

ABEC
 cage
 precision tolerance
 rings

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MILITARY INTERESTS:

Custodians:

Army - AT

Navy - OS

Air Force - 99

DLA - GS

Review Activities:

Army - GL, MI

Air Force - 84

CIVIL AGENCY
COORDINATING ACTIVITY:

GSA - FAS

Preparing Activity:

DLA - GS4

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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/>.