METRIC

A-A-59589B
15 December 2003
SUPERSEDING
A-A-59589A
23 January 2001

COMMERCIAL ITEM DESCRIPTION

BEARING, BALL, ANNULAR, SINGLE ROW, RADIAL, FILLING SLOT, DIMENSION SERIES 03

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, radial, filling slot, 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, and lubricant and preservative requirements listed below:

Class 2 - dimension series 03

Sizes - 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 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 03 in the American Bearing Manufacturers Association (ABMA) Standard 20, "Radial Bearings of Ball, Cylindrical Roller, and Spherical Roller Types, Metric Design" (DoD adopted). The bearing size shall be as specified in the

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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 03).

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.)
03	17	47	14	1.0	23	3,020
04	20	52	15	1.1	27	3,500
05	25	62	17	1.1	32	4,655
06	30	72	19	1.1	37	6,025
07	35	80	21	1.5	43.5	7,575
08	40	90	23	1.5	48.5	9,270
09	45	100	25	1.5	53.5	11,325
10	50	110	27	2.0	60	13,270
11	55	120	29	2.0	65	16,265
12	60	130	31	2.1	72	18,610
13	65	140	33	2.1	77	21,090
14	70	150	35	2.1	82	23,705
15	75	160	37	2.1	87	25,825
16	80	170	39	2.1	92	27,990
17	85	180	41	3.0	99	30,210
18	90	190	43	3.0	104	32,470
19	95	200	45	3.0	109	34,250
20	100	215	47	3.0	114	38,500
21	105	225	49	3.0	119	41,500
22	110	240	50	3.0	124	46,500
24	120	260	55	3.0	134	48,700

[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) A 295, "Standard Specification for High-Carbon and Roller Bearing Steel" (DoD adopted). The finished rings shall not exceed the associated billet material inclusion rating, which is also specified in ASTM A 295. 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). The grain size of the ring material shall be determined in accordance with ASTM E 112, "Standard Methods for Determining Average Grain Size" (DoD adopted).

3.2.2 Balls. The bearing ball material shall be chromium-alloy steel 52100 (UNS G52986) as specified in ASTM A 295. The finished balls shall not exceed the associated billet material inclusion rating, which is also specified in ASTM A 295. Balls shall be through-hardened no less than 60 HRC and no more than 67 HRC as defined in ASTM E 18. The grain size of the ball material shall be determined in accordance with ASTM E 112.

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-171/8.

3.2.4 Shields and seals. When used, the shield or seal 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 or seal shall remain functionally effective at a minimum temperature range of -20 °F to 250 °F (-30 °C to 121 °C) for non-metallic and -40 °F to 250 °F (-40 °C to 121 °C) for metallic materials. 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 7.3(e)).

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)).

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.

TABLE III. Shield and snap ring configurations.

Code[1]	Configuration option
A	Open
B	Single shield (opposite filling slot)
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 opposite filling slot side (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 on opposite 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 changes from FF-B-171/8.

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)

3.4 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".

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 Unless otherwise indicated 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.

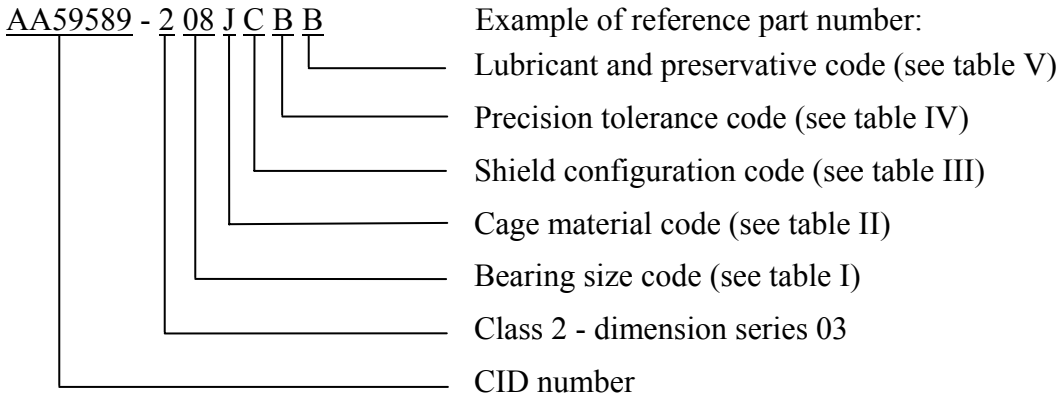
5.2 Market acceptability. The product offered must have been previously sold either to the government or on the commercial market.

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(h)).

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.



AA59589 - 2 08 J C B B indicates: boundary dimension series 03; bore diameter 40 mm, outside diameter 90 mm, width 23 mm; pressed steel cage; single shield on filling slot side; ABEC-1 tolerance class, normal radial internal clearance; filled with grease in accordance with MIL-PRF-81322.

7.2 Sources of documents.

7.2.1 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 of ABMA standards may be obtained from http://www.abma-dc.org/.

7.2.2 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 of ASTM standards may be obtained from http://www.astm.org/.

7.2.3 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.

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

7.3 Ordering data. Acquisition documents shall 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 and seal material (see 3.2.4).
e. Shield and snap ring configuration (see 3.2.4 and 3.2.5).
f. Precision tolerance requirement (see 3.3).
g. Lubricant and preservative requirements (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-171/8 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.

TABLE VI. Federal specification to CID cross-reference.

FF-B-171 specificationt 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

TABLE VII. Radial internal clearance and ABEC tolerance codes.

FF-B-171/8 codes			A-A-59589B 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-171/8 codes		A-A-59589B 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

MILITARY INTERESTS:

Custodians:
Army - AT
Navy - OS
Air Force - 99

Review Activities:
Army - GL, MI
Air Force - 11, 84

CIVIL AGENCY
COORDINATING ACTIVITY:

GSA - 7FLE

Preparing Activity:
DLA - GS4

(Project 3110-1284)