

**METRIC**

A-A-59585

7 August 2000

SUPERSEDING

FF-B-171/5

30 November 1993

## COMMERCIAL ITEM DESCRIPTION

### BEARING, BALL, ANNULAR, SINGLE ROW, RADIAL, NON-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, non-filling slot, annular ball bearings for general-purpose use.
2. **CLASSIFICATION.** The ball bearings shall be classified by the class, sizes, cage materials, shield and seal configurations, precision tolerances, and lubricant and preservative compounds listed below:

Class 2 - dimension series 03

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 compounds (see table V)

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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A-A-59585

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* (mm)	Dynamic load rating (minimum) (lb)
00	10	35	11	0.6	15	1,810
01	12	37	12	1.0	18	2,120
02	15	42	13	1.0	21	2,550
03	17	47	14	1.0	23	3,040
04	20	52	15	1.1	27	3,570
05	25	62	17	1.1	32	4,631
06	30	72	19	1.1	37	6,000
07	35	80	21	1.5	43.5	7,460
08	40	90	23	1.5	48.5	9,105
09	45	100	25	1.5	53.5	10,993
10	50	110	27	2.0	60	13,900
11	55	120	29	2.0	65	16,074
12	60	130	31	2.1	72	18,300
13	65	140	33	2.1	77	20,795
14	70	150	35	2.1	82	23,380
15	75	160	37	2.1	87	25,403
16	80	170	39	2.1	92	27,500
17	85	180	41	3.0	99	28,500
18	90	190	43	3.0	104	30,000
19	95	200	45	3.0	109	32,500
20	100	215	47	3.0	114	36,500
21	105	225	49	3.0	119	39,000
22	110	240	50	3.0	124	42,500
24	120	260	55	3.0	134	46,500
26	130	280	58	4.0	148	51,050
28	140	300	62	4.0	158	56,400
30	150	320	65	4.0	168	61,500
32	160	340	68	4.0	178	62,100
34	170	360	72	4.0	188	70,100
36	180	380	75	4.0	198	78,900
38	190	400	78	5.0	212	79,500

\* 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. SALIENT CHARACTERISTICS

3.1 Dimensions. Bearing boundary dimensions (and dynamic load ratings, see 3.4) 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 American National Standards Institute/American Bearing Manufacturers Association (ANSI/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 acquisition order (see 7.4(b)). For unlisted bearing sizes, the associated dimensional and dynamic load rating requirements shall also be specified in the acquisition order.

#### 3.2 Materials.

3.2.1 Rings. The bearing ring material shall be chromium-alloy steel 52100 (UNS G52986) as specified in the American Society for Testing and Materials (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 no less than 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 and non-metallic cages shall meet the same bearing performance requirements. Unless otherwise specified in the acquisition order, the cage material shall be one of the optional coded types listed in table II (see 7.4(c)).

TABLE II. Cage materials.

Code	Material type
J	Pressed steel
M	Machined bronze or brass
P	Molded plastic (nylon 66 or equal)
T	Machined non-metallic (phenolic)
Y	Pressed brass

A-A-59585

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 7.4(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 material shall remain functionally effective at temperatures ranging from  $-65$  to  $230$  °F ( $-54$  to  $110$  °C). Unless otherwise specified in the acquisition order, the shield, seal, and snap ring configuration for the bearing shall be one of the coded options listed in table III (see 7.4(e)).

TABLE III. Shield and seal configurations.

Code	Configuration option
A	Open
B	Single shield
C	Double shield
D	Single seal
E	Double seal
G	Open with snap ring
H	Single shield on snap ring side
J	Single shield opposite snap ring
K	Double shield with snap ring
X	Other (specify in acquisition order)

3.2.5 Snap ring. When used, the bearing snap ring and associated snap-ring groove shall conform to the requirements specified in ANSI/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 ANSI/ABMA Standard 20. The tolerance class and associated radial internal clearance shall be one of the coded options listed in table IV (see 7.4(f)).

TABLE IV. Precision tolerance requirements.

Code	Tolerance class	Radial internal clearance
A	ABEC-1	Symbol 2 (less than normal)
B		Symbol 0 (normal)
C		Symbol 3 (greater than normal)
D		Symbol 4 (greater than symbol 3)
E	ABEC-3	Symbol 2 (less than normal)
F		Symbol 0 (normal)
G		Symbol 3 (greater than normal)
H		Symbol 4 (greater symbol 3)

TABLE IV. Precision tolerance requirements (continued).

Code	Tolerance class	Radial internal clearance
J	ABEC-5	Symbol 2 (less than normal)
K		Symbol 0 (normal)
L		Symbol 3 (greater than normal)
M		Symbol 4 (greater than symbol 3)
N	ABEC-7	Symbol 2 (less than normal)
P		Symbol 0 (normal)
R		Symbol 3 (greater than normal)
S		Symbol 4 (greater than symbol 3)

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

3.5 Lubrication and preservation. Unless otherwise specified in the acquisition order (see 7.4(g)), the bearing lubricant shall be selected from the approved coded options listed in table V.

TABLE V. Lubricant and preservative compounds.

Code	Lubricant or preservative compound
A	Grease in accordance with MIL-PRF-81322
B	Grease in accordance with DOD-G-24508
C	Grease in accordance with MIL-PRF-23827
D	Grease in accordance with SRI-2 or qualified equivalent
E	Preservation compound in accordance with MIL-P-197
F	Grease Mobilith SHC 100
X	Other

3.6 Grease fill requirements. The bearing shall be filled with lubricant in accordance with one of the coded options listed in table VI. The amount of grease fill shall be specified in the acquisition order (see 7.4 (h)). The percentage of fill is based on the internal empty space of an assembled bearing.

TABLE VI. Grease fill requirements.

Code	Percentage (%) of fill
A	0 - 15.00
B	15.01 - 25.00
C	25.01 - 35.00
D	35.01 - 45.00
E	45.01 - 65.00
F	65.01 - 80.00
X	Other (specify in acquisition order)

A-A-59585

#### 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 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. For acquisition purposes, the bearings supplied shall be preserved, packed, and marked as specified in the acquisition order (see 7.4(i)).

#### 7. NOTES

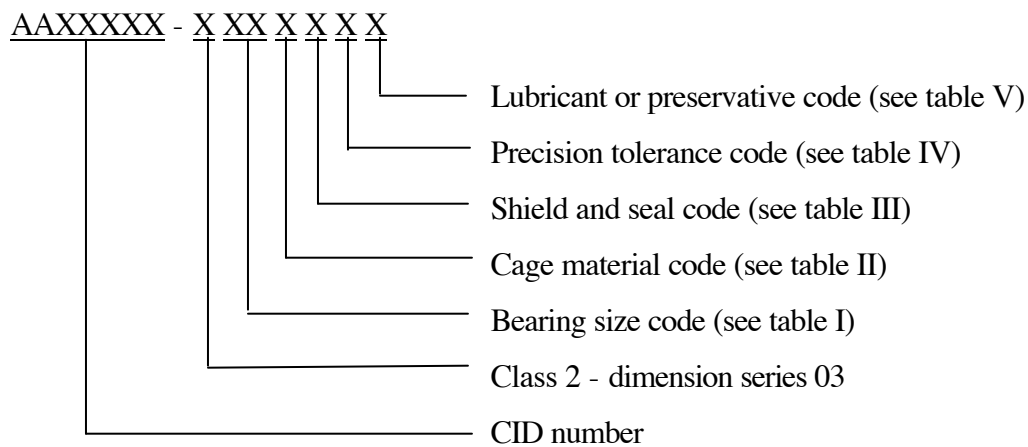
7.1 Sources of documents.

7.1.1 ANSI/ABMA standards. Copies of ANSI/ABMA standards may be obtained from the American Bearing Manufacturers Association, 1200 19th Street NW, Suite 300, Washington, DC 20036-2401.

7.1.2 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.

7.1.3 FAR and DFARS. The FAR and DFARS may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-0001.

7.2 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.



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

FAG Bearings Corporation  
Danbury, CT 06813

NTN Bearing Corporation of America  
Mt. Prospect, IL 60056

KOYO Corporation of U.S.A  
Westlake, OH 44145

SKF USA, Inc.  
Kulpsville, PA 19443

NSK Corporation  
Ann Arbor, MI 48106

The Torrington Company  
Torrington, CT 06790

MRC Specialty Bearings  
Jamestown, NY 14702

6.4 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, seal, and snap ring configuration (see 3.2.4)
- f. Precision tolerance requirement (see 3.3)
- g. Lubricant (see 3.5)
- h. Grease fill requirement (see 3.6)
- i. Packaging and marking requirements (see 6.1)

A-A-59585

6.5 Codes cross-reference. Tables VII, VIII, IX, and X contain cross-reference data for the part identification number information as listed in FF-B-171/5 and this CID.

TABLE VII. Cage codes.

FF-B-171/5 codes		A-A-59585 codes	
Code	Cage	Code	Cage
J	Pressed steel	J	Pressed steel
M	Machined bronze or brass	M	Machined bronze or brass
P	Molded plastic (nylon 66 or equal)	P	Molded plastic (nylon 66 or equal)
T	Machined non-metallic (phenolic)	T	Machined non-metallic (phenolic)
Y	Pressed brass	Y	Pressed brass
	Not listed	X	Other

TABLE VIII. Shield and seal codes.

FF-B-171/5 codes		A-A-59585 codes	
Code	Number of shield and seals	Code	Configuration option
A	Open (no shields or seals)	A	Open
B	Single shield	B	Single shield
C	Double shield	C	Double shield
D	Single seal	D	Single seal
E	Double seal	E	Double seal
F	Single shield and seal	F	Not listed
G	Open with snap ring	G	Open with snap ring
H	Single shield (attached on snap ring side)	H	Single shield on snap ring side
J	Single shield (attached on side opposite snap ring)	J	Single shield opposite snap ring
K	Double shield with snap ring	K	Double shield with snap ring
L	Single seal (attached on snap ring side)	L	Not listed
M	Single seal (attached on side opposite snap ring)	M	Not listed
N	Double seal with snap ring	N	Not listed
P	Single shield and seal (shield on snap ring side)	P	Not listed
R	Single shield and seal (seal on snap ring side)	R	Not listed
	Not listed	X	Other



TABLE IX. Radial internal clearance and ABEC tolerance codes.

FF-B-171/5 codes			A-A-59585 codes		
Code	Radial internal clearance	Tolerance class	Code	Tolerance class	Radial internal clearance
1	Symbol 2	ABEC-1	A	ABEC-1	Symbol 2
2	Symbol 0		B		Symbol 0
3	Symbol 3		C		Symbol 3
4	Symbol 4		D		Symbol 4
	Not listed		E	ABEC-3	Symbol 2
	Not listed		F		Symbol 0
	Not listed		G		Symbol 3
	Not listed		H		Symbol 4
5	Symbol 2	ABEC-5	J	ABEC-5	Symbol 2
6	Symbol 0		K		Symbol 0
7	Symbol 3		L		Symbol 3
8	Symbol 4		M		Symbol 4
	Not listed		N	ABEC-7	Symbol 2
	Not listed		P		Symbol 0
	Not listed		R		Symbol 3
	Not listed		S		Symbol 4

TABLE X. Lubrication codes.

FF-B-171/5 codes		A-A-59585 codes	
Code	Lubricant or preservative compound	Code	Lubricant or preservative compound
A	Grease IAW MIL-PRF-81322	A	Grease IAW MIL-PRF-81322
B	Grease IAW DOD-G-24508	B	Grease IAW DOD-G-24508
C	Grease IAW MIL-PRF-23827	C	Grease IAW MIL-PRF-23827
D	Grease IAW SRI-2 or qualified equivalent	D	Grease IAW SRI-2 or qualified equivalent
E	Preservation compound IAW MIL-P-197	E	Preservation compound IAW MIL-P-197
F	Grease Mobilith SHC 100 <sup>1</sup>	F	Grease Mobilith SHC 100

A-A-59585

MILITARY INTERESTS:

Custodians:

Air Force – 99

Army – AT

Navy – OS

Reviewers:

Army - AR, EA, GL, MI

Navy - SH

Air Force - 11, 84

CIVIL AGENCY  
COORDINATING ACTIVITY:

GSA - 7FXE

Preparing activity:

DLA - GS

(Project 3110-1189)