

INCH-POUND

A-A-59646A
28 September 2006
SUPERSEDING
A-A-59646
30 October 2001

COMMERCIAL ITEM DESCRIPTION

BEARINGS, BALL, ANNULAR, SINGLE ROW, RADIAL, NON-FILLING SLOT, EXTRA LIGHT SERIES (XLS - 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, extra light series (XLS - series), annular ball bearings for general purpose use.

2. **CLASSIFICATION.** The bearings shall be classified and identified by the following sizes, cage materials, shield and seal configurations, lubricants and preservatives, and tolerance classes and radial internal clearances:

Sizes (see [table I](#))

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

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

Lubricants and preservatives (see [table IV](#))

Tolerance classes and radial internal clearances (see [table V](#))

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 ABMA Standard 20, "Radial Bearings of Ball, Cylindrical Roller and Spherical Roller Types Metric Design".

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data that may improve this document should be sent to: STDZNMGT@dla.mil or Defense Supply Center Richmond (DSCR), ATTN: DSCR-VEB, 8000 Jefferson Davis Highway, Richmond, VA 23297-5616.

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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	1.3750	34.9250	2.5625	0.5625	0.060	0	2,786
02	1.5000	38.1000	2.6875	0.5625	0.060	0	2,926
03	1.6250	41.2750	2.8750	0.5625	0.060	0	3,050
04	1.7500	44.4500	3.0000	0.5625	0.060	0	3,919
05	1.8750	47.6250	3.1875	0.6250	0.060	0	3,878
06	2.0000	50.8000	3.3125	0.6250	0.060	0	4,608
07	2.1250	53.9750	3.4375	0.6250	0.060	0	3,995
08	2.2500	57.1500	3.5625	0.6250	0.060	0	4,140
09	2.3750	60.3250	3.7500	0.6875	0.060	0	4,950
10	2.5000	63.5000	3.8750	0.6875	0.060	0	4,914
11	2.6250	66.6750	4.1250	0.6875	0.060	0	5,045
12	2.7500	69.8500	4.1250	0.6875	0.060	0	5,045
13	2.8750	73.0250	4.5000	0.7500	0.090	0	6,122
14	3.0000	76.2000	4.5000	0.7500	0.090	0	6,122
15	3.1250	79.3750	4.7500	0.7500	0.090	0	6,042
16	3.2500	82.5500	4.7500	0.7500	0.090	0	6,042
17	3.3750	85.7250	5.0000	0.7500	0.090	0	7,008
18	3.5000	88.9000	5.0000	0.7500	0.090	9	7,008
19	3.6250	92.0750	5.2500	0.7500	0.090	0	7,420
20	3.7500	95.2500	5.2500	0.7500	0.090	9	7,420
21	3.8750	98.4250	5.6250	0.8750	0.090	9	9,087
22	4.0000	101.600	5.6250	0.8750	0.090	9	8,540
23	4.1250	104.7750	6.0000	0.8750	0.090	9	8,363
24	4.2500	107.9500	6.0000	0.8750	0.090	9	8,363
25	4.3750	111.1250	6.2500	0.8750	0.090	9	8,270
26	4.5000	114.3000	6.2500	0.8750	0.090	9	8,270
27	4.6250	117.4750	6.5000	0.8750	0.090	9	8,730
28	4.7500	120.6500	6.5000	0.8750	0.090	9	8,730
29	4.8750	123.8250	7.0000	1.0000	0.090	9	10,575
30	5.0000	127.0000	7.0000	1.0000	0.090	9	10,575
31	5.1250	130.1750	7.2500	1.0000	0.090	9	10,487
32	5.2500	133.3500	7.2500	1.0000	0.090	9	10,487
33	5.3750	136.5250	7.5000	1.0000	0.090	9	11,068
34	5.5000	139.7000	7.5000	1.0000	0.090	9	11,068
35	5.6250	142.8750	7.7500	1.0000	0.090	9	11,613
36	5.7500	146.0500	7.5000	1.0000	0.090	9	10,887

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TABLE I. Boundary dimensions¹ - Continued.

Size code	Bore diameter (inch)	Bore diameter (mm)	Outside diameter	Width	Chamfer min. ²	Dia. series ³	Dynamic load rating (lbs.)
37	5.8750	149.2250	8.0000	1.0000	0.090	9	11,461
38	6.0000	152.4000	8.0000	1.0000	0.090	9	11,106
39	6.2500	158.7500	8.5000	1.1250	0.120	9	13,243
40	6.5000	165.1000	8.7500	1.1250	0.120	9	13,452
41	6.7500	171.4500	9.0000	1.1250	0.120	9	14,307
42	7.0000	177.8000	9.5000	1.2500	0.120	9	16,017
43	7.2500	184.1500	9.7500	1.2500	0.120	9	16,340
44	7.5000	190.5000	10.0000	1.2500	0.120	9	16,340
45	7.7500	196.8500	10.5000	1.3750	0.120	9	18,791
46	8.0000	203.2000	10.7500	1.3750	0.120	9	19,542
47	8.2500	209.5500	11.0000	1.3750	0.120	9	19,219
48	8.5000	215.9000	11.5000	1.5000	0.120	9	22,211
49	8.7500	222.2500	11.7500	1.5000	0.120	9	23,342
50	9.0000	228.6000	11.9990	1.5000	0.120	9	22,638
51	9.5000	241.3000	12.4790	1.6250	0.160	9	26,059
52	10.0000	254.0000	13.2500	1.6250	0.160	8	27,464

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 ABMA Standard 20.

3.2 Materials.

3.2.1 Ring and ball materials. The ring and ball material shall be chromium alloy steel 52100 (G52986) as specified in the ASTM A 295/A 295M, "Standard Specification for High-Carbon Anti-Friction Bearing Steel".

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 inspections 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](#).

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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	Chromium alloy steel ¹
F	Other (specify in acquisition order)

¹ One piece crown or two piece ribbon.

3.2.3 Closures. Shields and seals shall be fabricated from the manufacturer's recommended materials or as specified in the acquisition order (see 7.3(b)). 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 in contact with the bearing, and shall cause no deterioration of the same. Closures shall not affect the specified dimensional tolerance, nor shall they inhibit the free rotation of the bearing rings, and may be either removable or non-removable. Seals shall be impervious contact type. Closure materials shall operate from -65 to 230 °F (-54 to 110 °C). The closure configuration for the bearing shall be one of the coded options listed in [table III](#).

TABLE III. Shield and seal configurations.

Code	Configuration option
A	Open
B	Single shield
C	Double shield
D	Single seal
E	Double seal
F	Single shield and seal
X	Other (specify in acquisition order)

3.3 Lubrication and preservation. When grease fill is required, the bearing void shall be 25 to 50 percent filled. The bearing part number shall include the appropriate code from [table IV](#). 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 shall be in accordance with MIL-DTL-197, "Packaging of Bearings, Associated Parts and Subassemblies", or as specified in the acquisition order (see 7.3(c)).

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TABLE IV. 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 acquisition order)

3.4 Precision tolerance. The bearing precision tolerance level shall conform to Annular Bearing Engineers Committee (ABEC) class ABEC-1, ABEC-3, or ABEC-5 as defined in ABMA Standard 20. The tolerance class and associated radial internal clearance shall be specified in the acquisition order using the codes listed in [table V](#).

TABLE V. 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-3	Tight	1 - 3
F		Normal	2 - 5
G		Loose	5 - 8
H		Extra-loose	8 - 11
J	ABEC-5	Tight	1 - 3
K		Normal	2 - 5
L		Loose	5 - 8
M		Extra-loose	8 - 11

3.5 Dynamic load rating. The listed ratings in [table I](#) conform to the requirements specified in ABMA Standard 9, "Load Ratings and Fatigue Life for Ball Bearings" (see [3.1](#)).

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", 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".

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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).

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.

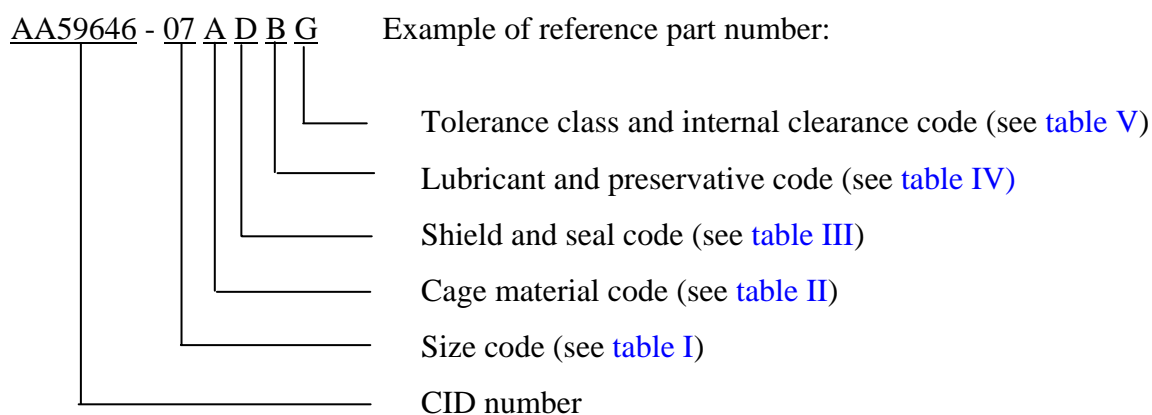
6. PACKAGING

6.1 Preservation and packaging. The product shall be preserved and packaged as specified in the acquisition order (see 7.3(d)).

6.2 Marking. For military procurements, bearings with an outside diameter greater than 30mm shall be marked in accordance with MIL-STD-130, "Identification Marking of U.S. Military Property". Bearings with an outside diameter less than or equal to 30mm shall be marked in accordance with MIL-STD-1647, "Identification Markings for Domestically Manufactured Bearings, Ball, Annular for Instruments and Precision Components", (see 7.3(e)).

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.



AA59646-07 A D B G indicates: 2.1250 bore diameter; 3.4375 outside diameter; 0.6250 width; corrosion resistant steel cage; a single seal bearing lubricated in accordance with MIL-PRF-81322; ABEC-3 tolerance class, loose internal clearance.

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7.2 Sources of documents.

7.2.1 FAR. Copies of the FAR 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/>.

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 of military specifications may be obtained from <http://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 of the ABMA standards may be obtained from <http://www.abma-dc.org/>.

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

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

- a. CID document number, revision, and CID PIN.
- b. Shield and seal material (see 3.2.3).
- c. Preservative compound and specification, if required (see 3.3).
- d. Preservation and packaging (see 6.1).
- e. Marking (see 6.2).

7.4 Supersession data. **Table VI** contains cross-reference data between FF-B-2844 slant sheets and the superseding CID numbers.

TABLE VI. Document supersession data.

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

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7.5 Codes cross-reference. Table VII cross-references the bore codes listed in FF-B-2844/06 to the size codes of this CID.

TABLE VII. Cross-references.

FF-B-2844/06 bore codes	A-A-59646 size codes	Bore diameter	Outside diameter	Width
BA	01	1.3750	2.5625	0.5625
BB	02	1.5000	2.6875	0.5625
BC	03	1.6250	2.8750	0.5625
BD	04	1.7500	3.0000	0.5625
BE	05	1.8750	3.1875	0.6250
CA	06	2.0000	3.3125	0.6250
CB	07	2.1250	3.4375	0.6250
CD	08	2.2500	3.5625	0.6250
CE	09	2.3750	3.7500	0.6875
CF	10	2.5000	3.8750	0.6875
CG	11	2.6250	4.1250	0.6875
CH	12	2.7500	4.1250	0.6875
CJ	13	2.8750	4.5000	0.7500
DA	14	3.0000	4.5000	0.7500
DB	15	3.1250	4.7500	0.7500
DC	16	3.2500	4.7500	0.7500
DE	17	3.3750	5.0000	0.7500
DF	18	3.5000	5.0000	0.7500
DG	19	3.6250	5.2500	0.7500
DG	20	3.7500	5.2500	0.7500
DJ	21	3.8750	5.6250	0.8750
EA	22	4.0000	5.6250	0.8750
EB	23	4.1250	6.0000	0.8750
EC	24	4.2500	6.0000	0.8750
ED	25	4.3750	6.2500	0.8750
EE	26	4.5000	6.2500	0.8750
EF	27	4.6250	6.5000	0.8750
EG	28	4.7500	6.5000	0.8750
EH	29	4.8750	7.0000	1.0000
FA	30	5.0000	7.0000	1.0000
FB	31	5.1250	7.2500	1.0000
FC	32	5.2500	7.2500	1.0000
FD	33	5.3750	7.5000	1.0000
FE	34	5.5000	7.5000	1.0000
FF	35	5.6250	7.7500	1.0000
FG	36	5.7500	7.5000	1.0000

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TABLE VII. Cross-references - Continued.

FF-B-2844/06 bore codes	A-A-59646 size codes	Bore diameter	Outside diameter	Width
FH	37	5.8750	8.0000	1.0000
GA	38	6.0000	8.0000	1.0000
GB	39	6.2500	8.5000	1.1250
GC	40	6.5000	8.7500	1.1250
GD	41	6.7500	9.0000	1.1250
HA	42	7.0000	9.5000	1.2500
HB	43	7.2500	9.7500	1.2500
HC	44	7.5000	10.0000	1.2500
HD	45	7.7500	10.5000	1.3750
JA	46	8.0000	10.7500	1.3750
JB	47	8.2500	11.0000	1.3750
JC	48	8.5000	11.5000	1.5000
JD	49	8.7500	11.7500	1.5000
KA	50	9.0000	11.9990	1.5000
KB	51	9.5000	12.4790	1.6250
LA	52	10.0000	13.2500	1.6250

7.6 Subject term (key word) listing.

bore
cage
closures
hardness
load
lubrication
size code

MILITARY INTERESTS:

Custodians:

Navy - OS
Air Force - 99

Review Activities:

Air Force - 11, 84

CIVIL AGENCY
COORDINATING ACTIVITY:

GSA - FSS

Preparing Activity:

DLA - GS4

(Project 3110-2006-016)

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 <http://assist.daps.dla.mil/>.