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INCH-POUND

A-A-59643A
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SUPERSEDING
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COMMERCIAL ITEM DESCRIPTION

BEARINGS, BALL, ANNULAR, SINGLE ROW, RADIAL, NON-FILLING SLOT, MINIATURE SIZE, INSTRUMENT TYPE

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, miniature size, instrument type, annular ball bearings for general purpose use.

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

Type I - Chromium alloy steel
Type II - Corrosion resistant steel

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)

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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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 4.1 - Part 2 in ABMA Standard 12.2, "Instrument Ball Bearings Inch Design".

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	0.0469	1.1906	0.1562	0.0625	0.003	9	18
02	0.0469	1.1906	0.1562	0.0937	0.003	9	18
03	0.0550	1.3970	0.1875	0.0781	0.003	9	28
04	0.0550	1.3970	0.1875	0.1094	0.003	9	28
05	0.0781	1.9844	0.2500	0.0937	0.003	9	36
06	0.0781	1.9844	0.2500	0.1406	0.003	9	36
07	0.0937	2.3812	0.1875	0.0625	0.003	7	24
08	0.0937	2.3812	0.1875	0.0937	0.003	7	24
09	0.0937	2.3812	0.2500	0.0937	0.003	9	36
10	0.0937	2.3812	0.2500	0.1094	0.003	9	36
11	0.0937	2.3812	0.3125	0.1094	0.003	0	54
12	0.0937	2.3812	0.3125	0.1406	0.003	0	54
13	0.1250	3.1750	0.2500	0.0937	0.003	7	36
14	0.1250	3.1750	0.2500	0.1094	0.003	7	36
15	0.1250	3.1750	0.3125	0.1094	0.003	9	54
16	0.1250	3.1750	0.3125	0.1406	0.003	9	54
17	0.1250	3.1750	0.3750	0.1094	0.005	2	76
18	0.1250	3.1750	0.3750	0.1406	0.005	2	76
19	0.1562	3.9687	0.3125	0.1094	0.003	7	37
20	0.1562	3.9687	0.3125	0.1250	0.003	7	37
21	0.1875	4.7625	0.3125	0.1094	0.003	7	43
22	0.1875	4.7625	0.3125	0.1250	0.003	7	43
23	0.2500	6.3500	0.3750	0.1250	0.003	7	36
24	0.3125	7.9375	0.5000	0.1562	0.003	7	99

[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.

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3.2 Materials.

3.2.1 Ring and ball materials. The ring and ball material for type I bearings 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". Material for type II bearings shall be corrosion resistant steel 440C (UNS 44004) as specified in SAE AMS-QQ-S-763, "Steel, Corrosion Resistant, Bars, Wire, Shapes, and Forgings".

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 ºF (-54 to 110 ºC). The cage material shall be one of the coded options listed in table II.

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.

3.2.2.1 Steel cages. Corrosion resistant and chromium alloy steel cages shall be either a one piece crown or a two piece ribbon type.

3.2.3 Shields. 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 into contact with the bearing, and shall cause no deterioration of the same. All shields shall be fabricated from the manufacturer's recommended materials or as specified in the acquisition order (see 7.3(b)). Shields shall not affect the specified dimensional tolerance and may be either a removable or non-removable type (see 7.3(c)). Materials shall operate from -65 to 230 ºF (-54 to 110 ºC). The shield configuration for the bearing shall be one of the coded options listed in table III.

3.2.4 Seals. Seals shall be fabricated from manufacturer's recommended material or as specified in the acquisition order (see 7.3(d)) and shall be impervious contact type, removable or non-removable as specified in the acquisition order (see 7.3(e)). Materials 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. When used, seals shall not affect the specified tolerance

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nor shall they inhibit the free rotation of the bearing rings. Materials shall operate from -65 to 230 ºF (-54 to 110 ºC). The seal 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(f)).

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 as defined in ABMA Standard 20, "Radial Bearings of Ball, Cylindrical Roller and Spherical Roller Types Metric Design", or ABEC-3P or ABEC-5P as defined in ABMA Standard 12.2. The tolerance class and associated radial internal clearance shall be specified in the part number by using the codes listed in table V.

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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-3P	Tight	1 - 3
F		Normal	2 - 5
G		Loose	5 - 8
H		Extra-loose	8 - 11
J	ABEC-5P	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".

3.8 Passivation. All components fabricated from corrosion resistant steel shall be passivated in accordance with ASTM A 380, "Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems".

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).

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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(g)).

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(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.

AA59643 - 2 02 C F E F Example of reference part number:

- F — Tolerance class and internal clearance code (see table V)
- F — Lubricant and preservative code (see table IV)
- E — Shield and seal code (see table III)
- F — Cage material code (see table II)
- C — Size code (see table I)
- 02 — Type 1 - Type I - Chromium alloy steel; 2 - Type II - Corrosion resistant steel
- 2 — CID number

AA59643 - 2 02 C F E F indicates: corrosion resistant steel; 0.0469 bore diameter; 0.1562 outer diameter; 0.0937 width; machined brass or bronze cage; single shield and seal, lubricant in accordance with DOD-G-24508; ABEC-3P tolerance, normal 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/.

7.2.5 SAE standards. Copies of SAE standards may be obtained from the SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001. Electronic copies of the SAE standards may be obtained from http://www.sae.org/.

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

a. CID document number, revision, and CID PIN.
b. Shield material (see 3.2.3).
c. Shield type (see 3.2.3).
d. Seal material (see 3.2.4).
e. Seal type (see 3.2.4).
f. Preservative compound and specification, if required (see 3.3).
g. Preservation and packaging (see 6.1).
h. 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. Supersession cross-reference.

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-2844/01 and FF-B-2844/04 to the size codes of this CID.

TABLE VII. Cross-references.

FF-B-2844 /01 and /04 bore codes	A-A-59643 size codes	Bore diameter	Outside diameter	Width
AA	01	0.0469	0.1562	0.0625
AB	02	0.0469	0.1562	0.0937
AC	03	0.0550	0.1875	0.0781
AD	04	0.0550	0.1875	0.1094
AE	05	0.0781	0.2500	0.0937
AF	06	0.0781	0.2500	0.1406
AG	07	0.0937	0.1875	0.0625
AH	08	0.0937	0.1875	0.0937
AJ	09	0.0937	0.2500	0.0937
AK	10	0.0937	0.2500	0.1094
AL	11	0.0937	0.3125	0.1094
AM	12	0.0937	0.3125	0.1406
AN	13	0.1250	0.2500	0.0937
AP	14	0.1250	0.2500	0.1094
AR	15	0.1250	0.3125	0.1094
AT	16	0.1250	0.3125	0.1406
AU	17	0.1250	0.3750	0.1094
AW	18	0.1250	0.3750	0.1406
AY	19	0.1562	0.3125	0.1094
BA	20	0.1562	0.3125	0.1250
BB	21	0.1875	0.3125	0.1094
BC	22	0.1875	0.3125	0.1250
BD	23	0.2500	0.3750	0.1250
BE	24	0.3125	0.5000	0.1562

7.6 Key words.

bore
cage
closures
diameter
dimension
hardness
load
lubrication
part number
size code
width

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MILITARY INTERESTS:

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

Review Activities:
Army - AR, CR4, GL, MI
Air Force -11, 84

CIVIL AGENCY
COORDINATING ACTIVITY:

GSA - FSS

Preparing Activity:
DLA - GS4

(Project 3110-2006-014)

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