INCH-POUND
A-A-59643
6 February 2001
SUPERSEDING
FF-B-2844/01
15 February 1994
FF-B-2844/04
15 February 1994

COMMERCIAL ITEM DESCRIPTION

BEARING, 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 types, sizes, cage materials, lubricants/preservatives and shield and seal configurations, and the tolerance classes and radial internal clearances listed below. The selected type (see 7.4(b)) and sizes (see 7.4(c)) shall be specified in the acquisition order.

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

Size (see table I)

Cage materials (see table II)

Lubricants/preservatives and shield and seal configurations (see table III)

Tolerance class and radial internal clearance (see table IV)

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 table 4.1 - Part 2 in the

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

American National Standards Institute/American Bearing Manufacturers Association (ANSI/ABMA) Standard 12.2, "Instrument Ball Bearings Inch Design" (DoD adopted).

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	.003	9	18
02	0.0469	1.1906	0.1562	0.0937	.003	9	18
03	0.0550	1.3970	0.1875	0.0781	.003	9	28
04	0.0550	1.3970	0.1875	0.1094	.003	9	28
05	0.0781	1.9844	0.2500	0.0937	.003	9	36
06	0.0781	1.9844	0.2500	0.1406	.003	9	36
07	0.0937	2.3812	0.1875	0.0625	.003	7	24
08	0.0937	2.3812	0.1875	0.0937	.003	7	24
09	0.0937	2.3812	0.2500	0.0937	.003	9	36
10	0.0937	2.3812	0.2500	0.1094	.003	9	36
11	0.0937	2.3812	0.3125	0.1094	.003	0	54
12	0.0937	2.3812	0.3125	0.1406	.003	0	54
13	0.1250	3.1750	0.2500	0.0937	.003	7	36
14	0.1250	3.1750	0.2500	0.1094	.003	7	36
15	0.1250	3.1750	0.3125	0.1094	.003	9	54
16	0.1250	3.1750	0.3125	0.1406	.003	9	54
17	0.1250	3.1750	0.3750	0.1094	.005	2	76
18	0.1250	3.1750	0.3750	0.1406	.005	2	76
19	0.1562	3.9687	0.3125	0.1094	.003	7	37
20	0.1562	3.9687	0.3125	0.1250	.003	7	37
21	0.1875	4.7625	0.3125	0.1094	.003	7	43
22	0.1875	4.7625	0.3125	0.1250	.003	7	43
23	0.2500	6.3500	0.3750	0.1250	.003	7	36
24	0.3125	7.9375	0.5000	0.1562	.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 ANSI/ABMA Standard 20.

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 American Society for Testing and Materials (ASTM) A 295, "Standard Specification for High-Carbon Anti-Friction Bearing Steel" (DoD adopted). Material for Type II bearings shall be corrosion resistant steel 440C (UNS 44004) as

specified in Society of Automotive Engineers-Aerospace Materials Specifications (SAE-AMS) QQ-S-763, "Steel Bars, Wire, Shapes, and Forgings; Corrosion Resistant" (DoD adopted).

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 (see 7.4(d)).

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	Other (specify in acquisition order)

[1] One piece crown or two piece ribbon.

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

3.2.2.1.1 One piece crown cages. The one piece crown cage shall be American Iron and Steel Institute (AISI) class 410 steel made in accordance with ASTM A 240, "Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels" (DoD adopted).

3.2.2.1.2 Two piece ribbon retainers. Two piece ribbon retainers shall be either AISI class 305 or 430 in accordance with ASTM A 240, or AISI class 302 in accordance with ASTM A 666, "Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar" (DoD adopted).

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. Shields shall not affect the specified dimensional tolerance and may be either a removable or non-removable type (see 7.4(e)). Materials shall operate from -65 to 230 ºF (-54 to 110 ºC). Unless specified otherwise in the acquisition order, the shield configuration for the bearing shall be one of the coded options listed in table III (see 7.4 (f)).

3.2.3.1 Type I bearings. Shields for Type I bearings shall be fabricated from the manufacturers recommended materials or as specified in the acquisition order (see 7.4(g)).

3.2.3.2 Type II bearings. Shields for Type II bearings shall be fabricated from corrosion resistant steel conforming to ASTM A 580, "Standard Specification for Stainless Steel Wire" (DoD adopted)condition A, ASTM A 313, "Standard Specification for Stainless Steel Spring Wire" (DoD adopted) condition C, or SAE-AMS QQ-S-763.

3.2.4 Seals. Seals shall be fabricated from manufacturers recommended material or as specified in the acquisition order (see 7.4(h)) and shall be impervious contact type, removable or non-removable as specified in the acquisition order (see 7.4(i)). 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 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 (see 7.4(f)).

3.3 Lubrication and preservation. When grease is required, the bearing void shall be 25 to 40 percent filled in accordance with one of the following documents: DOD-G-24508, "Grease, High Performance, Multi-purpose (Metric)" or MIL-PRF-81322, "Grease, Aircraft, General Purpose, Wide Temperature Range". The bearing part number shall include the appropriate code from table III. 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 name and any applicable specification shall be specified in the acquisition order (see 7.4(j)).

TABLE III. Lubricants, preservatives, and shield and seal configurations.

Code	Lubricant	Shield and seal
A B C	DOD-G-24508 MIL-PRF-81322 Preservative [1]	Open
D E F	DOD-G-24508 MIL-PRF-81322 Preservative [1]	Single shield
G H	DOD-G-24508 MIL-PRF-81322	Double shield
J K L	DOD-G-24508 MIL-PRF-81322 Preservative [1]	Single seal
M N	DOD-G-24508 MIL-PRF-81322	Double seal
P R	DOD-G-24508 MIL-PRF-81322	Single shield and seal

[1] Preservative shall be in accordance with MIL-DTL-197, "Packaging of Bearings, Antifriction Associated Parts and Subassemblies".

3.4 Precision tolerance. The bearing precision tolerance level shall conform to Annular Bearing Engineers Committee (ABEC) class ABEC-1 as defined in ANSI/ABMA Standard 20, "Radial Bearings of Ball, Cylindrical Roller and Spherical Roller Types, Metric Design" (DoD adopted) or ABEC-3P as defined in ANSI/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 IV (see 7.4(k)).

TABLE IV. 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

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

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" (DoD adopted), 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" (DoD adopted).

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" (DoD adopted).

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 specified 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.

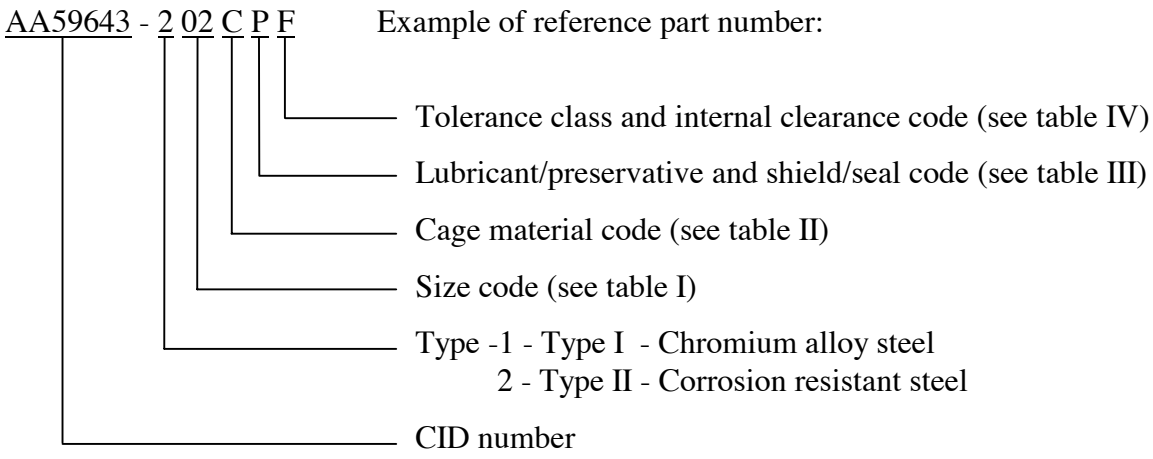
5.2 Market acceptability. The product offered must have been previously sold either to the government or on the commercial market.

6. PACKAGING.

6.1 Preservation, packing, and marking. For acquisition purposes, the product shall be preserved, packed, and marked as specified in the acquisition order (see 7.4(l)).

7. NOTES.

7.1 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.



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

7.2 Sources of documents.

7.2.1 Government documents. Copies of the FAR, DFARS, military details, and performance and federal specifications may be obtained from the U.S. Government Printing Office, Superintendent of Documents, Mail Stop: SSOP, Washington, DC 20402-9328. Electronic copies of military detail and performance specifications may be obtained from http://astimage.daps.dla.mil/quicksearch/.

7.2.2 AISI standards. Copies of AISI standards may be obtained from the American Iron and Steel Institute, 1101 17th Street NW, Washington, DC 20036.

7.2.3 ANSI standards. Copies of ANSI standards may be obtained from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

7.2.4 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.

7.2.5 SAE standards. Copies of SAE standards may be obtained from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

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

New Hampshire Ball Bearings Inc. Chatsworth, CA 91311	Jamaica Bearings Co. Inc. New Hyde Park, NY 11040

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

a. CID document number, revision, and CID PIN
b. Bearing type (see 2)
c. Bearing size (see 2)
d. Cage material (see 3.2.2)
e. Shield type (see 3.2.3)
f. Closure configuration, shield (see 3.2.3), seal (see 3.2.4)
g. Shield material, Type I bearing (see 3.2.3.1)
h. Seal material (see 3.2.4)
i. Seal type (see 3.2.4)
j. Preservative compound and specification, if required (see 3.3)
k Precision tolerance (see 3.4)
l. Preservation, packing, and marking requirements (see 6.1)

7.5 Codes cross reference. Table V cross references the bore codes listed in FF-B-2844/01 and FF-B-2844/04 to the size codes of this CID.

TABLE V. Cross references.

FF-B-2844 /01 and /04 bore codes	A-A-59643 size codes	Bore diameter OB	Outside diameter OD	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 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

7.7 Key words.

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

MILITARY INTERESTS:

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

Reviewers:
Army - AR, CR4, EA, GL, MI
Air Force -11, 84

CIVIL AGENCY
COORDINATING ACTIVITY:

GSA - 7FXE

Preparing activity:
DLA - GS4

(Project 3110-1231)