

**NOT MEASUREMENT
SENSITIVE**

**MIL-STD-1647E
21 April 2003
SUPERSEDING
MIL-STD-1647D
04 October 1993**

**DEPARTMENT OF DEFENSE
STANDARD PRACTICE**

**IDENTIFICATION MARKINGS FOR
DOMESTICALLY MANUFACTURED
BEARINGS, BALL, ANNULAR FOR
INSTRUMENTS AND
PRECISION COMPONENTS**



AMSC N/A

FSC 3110

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

MIL-STD-1647E

FOREWORD

1. This standard is approved for use by all Departments and Agencies of the Department of Defense.
2. This document establishes the symbolic markings to be used for the identification of bearings manufactured in the United States and Canada for use in defense contracts. The markings chosen comply with those established and accepted as standard by the bearing industry.
3. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Air Warfare Center Aircraft Division, Code 414100B120-3, Hwy 547, Lakehurst, NJ 08733-5100, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

MIL-STD-1647E

PARAGRAPH	CONTENTS	PAGE
	<u>FOREWORD</u>	ii
1.	<u>SCOPE</u>	1
1.1	Scope	1
2.	<u>APPLICABLE DOCUMENTS</u>	1
2.1	General	1
2.2	Government documents	1
2.2.1	Specifications and standards	1
2.3	Non-Government publications	2
2.4	Order of precedence.	3
3.	<u>DEFINITIONS</u>	3
3.1	Miniature and instrument type annular ball bearings.	3
3.2	Domestic manufacture.. . . .	3
3.3	Made in U.S.A...	3
3.4	Basic bearing part number.	3
3.5	Chrome steel 52100.	3
3.6	Stainless (corrosion-resistant) steel 440C.	3
4	<u>GENERAL REQUIREMENTS</u>	3
4.1	Identification	3
5	<u>DETAILED REQUIREMENTS</u>	3
5.1	Literal (non-symbolic) identification	4
5.2	Symbolic marking.	4
5.3	Indirect marking	4
5.4	Barrier coated bearing marking	4
5.5	Duplex bearing marking	4
5.6	Source and specification control bearing marking	4
5.7	Exemptions from marking requirements	4
5.8	Certification of symbolic markings.	4
5.9	Marking methods	6
6.	<u>NOTES</u>	6
6.1	Intended use	6
6.2	Issue of DoDISS	6
6.3	Subject term (keyword) listing	6
6.4	Changes from previous issue.	6
FIGURE 1	Symbolic markings.	5
	<u>CONCLUDING MATERIAL.</u>	6

MIL-STD-1647E

1. SCOPE

1.1 Scope. This standard establishes the marking requirements for identification and certification of miniature and instrument type annular ball bearings of domestic manufacture.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, and 5 of this standard. This section does not include documents cited in other sections of this standard or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3, 4, and 5 of this standard, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

FF-B-171	Bearings, Ball, Annular (General Purpose), Metric
FF-B-2844	Bearings, Ball, Annular (General Purpose)

DEPARTMENT OF DEFENSE

MIL-B-913	Bearings, Ball, Annular, for Instruments and Precision Rotating Components (Metric), General Specification For
MIL-B-81793	Bearings, Ball, Annular, for Instruments and Precision Rotating Components

MIL-STD-1647E

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-129	Military Marking for Shipment and Storage
MIL-STD-130	Identification Marking of U.S. Military Property

(Unless otherwise indicated, copies of the above specifications and standards are available from the Standardization Document Order Desk, 700 Robbins Avenue, Bldg. 4D, Philadelphia, PA 19111-5094 or www.dodssp.daps.mil.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of the documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM-A295 Steel, Bearing, High-Carbon Anti-friction. (DoD adopted)

(Application for copies should be addressed to ASTM International, P.O. Box C700, West Conshocken, PA 19428-2959 or www.astm.org.)

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE-AS13341	Process for Barrier Coating of Anti-Friction Bearings. (DoD adopted)
SAE-AMS5618	Steel, Corrosion-Resistant, Bars, Wire, and Forgings, 17CR-0.52MO (0.95 – 1.20C) (SAE 51440C), Consumable Electrode Vacuum Melted. (DoD adopted)
SAE-AMS5630	Steel, Corrosion Resistant, Bars, Wire, and Forgings, 17CR-0.52 MO (0.95 – 1.20C) (SAE 51440C). (DoD adopted)
SAE-AMS5880	Steel, Corrosion Resistant, Bars, Forgings, and Wire 17CR-0.52 MO (0.95 – 1.20C) (SAE 51440C) for Bearing Applications. (DoD adopted)
SAE-AMS6440	Steel, Bars, Forgings, and Tubing 1.45CR (0.98 – 1.10C) (SAE 52100) for Bearing Applications. (DoD adopted)
SAE-AMS6444	Steel Bars, Forgings and Tubing 1.45CR (0.98 – 1.10C) (SAE 52100) Premium Aircraft-Quality, Consumable Electrode Vacuum Melted. (DoD adopted)

MIL-STD-1647E

SAE-AMS6447 Steel Bars, Forgings, and Tubing 1.4CR (0.98 – 1.10C) (SAE 52100)
Electroslag Remelted. (DoD adopted)

(Application for copies should be addressed to the Society of Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, PA 15096-0001 or <http://www.sae.org>)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. DEFINITIONS

3.1 Miniature and instrument type annular ball bearings. For purposes of this document, any reference to “bearings” or “ball bearings” will mean miniature and instrument type annular ball bearings, ABEC 1 tolerance or better and 30mm outer diameter (OD) (1.1811 inch) and smaller.

3.2 Domestic manufacture. Domestically manufactured ball bearings are those which are assembled in the United States or Canada. When a ball bearing is involved, all components of the assembly must also have been manufactured in the United States or Canada.

3.3 Made in USA Made in USA refers to ball bearings and components of ball bearings completely manufactured, assembled and tested within the United States of America.

3.4 Basic bearing part number. The basic bearing part number refers to the group of numbers or letters in a manufacturer’s part number which specifies the bore, outside diameter, width, material and the number of shields or seals used.

3.5 Chrome steel 52100. Chrome steel is defined under the following specifications: ASTM-A295, SAE-AMS6440, 6444, 6447.

3.6 Stainless steel 440C. Stainless steel is defined under the following specifications: SAE-AMS5618, 5630, 5880.

4. GENERAL REQUIREMENTS

4.1 Identification. All bearings used in any DoD contract, or bearings supplied for the repair of a DoD contract item shall be marked in accordance with one of the methods in Detailed Requirements.

MIL-STD-1647E

5. DETAILED REQUIREMENTS

5.1 Literal (non-symbolic) identification. Bearings (miniature, instrument and instrument precision) having an adequate width on either the inner or the outer ring face shall be marked in accordance with MIL-STD-130. In addition, the bearing shall be marked "Made in USA" or "USA", or "Made in Canada" or "Canada". The use of symbolic marking may be used in addition to MIL-STD-130 marking.

5.2 Symbolic marking. Symbolic marking shall be used when the bearing is too small to place the literal markings required by MIL-STD-130 on the ring faces. The applicable symbolic marking illustrated on figure 1 shall be marked on the inner or outer ring face of bearings, ABEC 1 or better 30mm/1.1811 inch OD or less. Symbolic markings shall fully identify the manufacturer of the bearing and the material used in its manufacture (440C stainless steel or 52100 chrome steel).

5.3 Indirect marking. Bearings having an inadequate face width for the symbolic markings (see figure 1) shall be exempt from the marking requirements of 5.2. The unit packages of such bearings shall be marked in accordance with MIL-STD-129.

5.4 Barrier coated bearing marking. In addition to the requirements of 5.1 and 5.2, barrier coated bearings shall be marked in accordance with SAE-AS13341. Such markings shall be accomplished prior to barrier coating of the bearing.

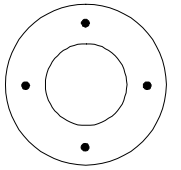
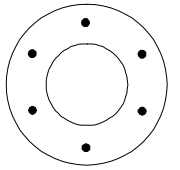
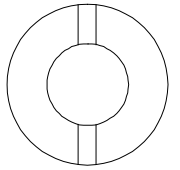
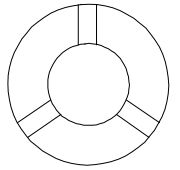
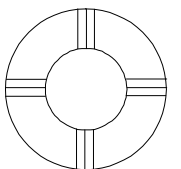
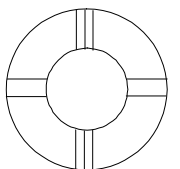
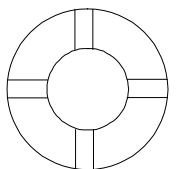
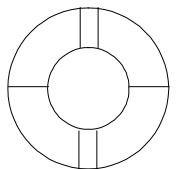
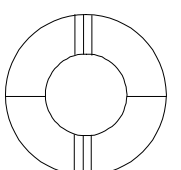
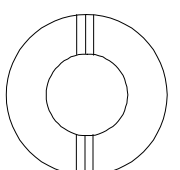
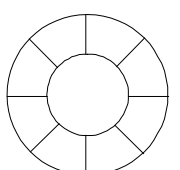
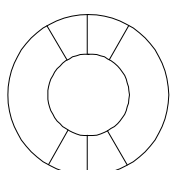
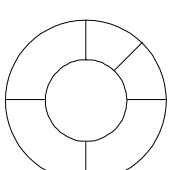
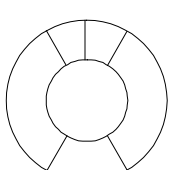
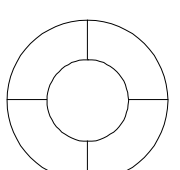
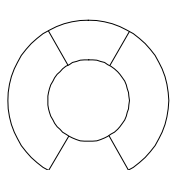
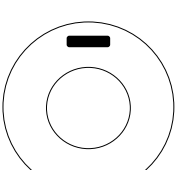
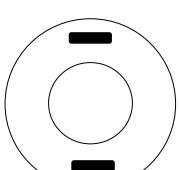
5.5 Duplex bearing marking. Duplex bearings shall be marked in accordance with the requirements of 5.1 to 5.3 and MIL-B-913, MIL-B-81793, FF-B-171 and FF-B-2844. In addition, bearings furnished as duplex pairs shall be marked to identify their relative position to each other in the assembly. Instructions shall be included with duplex bearings to identify such markings.

5.6 Source and specification control bearing marking. These bearings shall be marked in accordance with the requirements specified in 5.1 through 5.5. The packaging of these bearings shall be in accordance with MIL-STD-129.

5.7 Exemptions from marking requirements. Bearings made of materials other than 440C and 52100 steels, bearings of configuration other than conventional radial or angular contact type, and bearings where marking is specifically prohibited by the Government shall be exempt from all marking requirements of this standard. Such bearings shall be marked as specified in the applicable contract.

5.8 Certification of symbolic markings. All bearing manufacturers using symbolic markings shall furnish a notarized certification that the symbolic markings shall have the same meaning as the words "Made in USA", "USA", or "Made in Canada", "Canada". The certification shall indicate the bearing was manufactured of stainless (corrosion resistant) steel (440C) or chrome steel (52100) to tolerances which are equal to or exceed the requirements for

MIL-STD-1647E

COMPANY NAME	ABEC 1 to ABEC 3		ABEC 5 or better	
	Chrome Steel 52100	Stainless Steel 440C	Chrome Steel 52100	Stainless Steel 440C
NEW HAMPSHIRE BALL BEARING INC. (PETERBOROUGH, NH)				
NEW HAMPSHIRE BALL BEARING INC. (CHATSWORTH, CA)				
PACAMOR/KUBAR BEARING INC.				
SUPER PRECISION BEARING DIV, TIMKEN CORP.				
BARDEN CORP.	*	*		

* BARDEN HAS NO SYMBOLS FOR ABEC 1 AND ABEC 3

FIGURE 1. Symbolic markings.

MIL-STD-1647E

ABEC 1. The certificate shall be sent to: Commander, Naval Air Systems Command, Code 4.3.5.4, 48110 Shaw Road, Bldg. 2187, Patuxent River, MD 20670-5304.

5.9 Marking methods. Markings shall not result in raised metal or in any way affect the function of the bearing. The marking shall be applied by stamping, laser, electroetch, or any other permanent method. Selection of the permanent marking method is left to the manufacturer.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. This document shows the markings to be used by domestic (U.S. and Canada) manufacturers to identify their bearings used in military contracts. This document also tells how to apply the markings to the bearing surfaces.

6.2 Issue of DoDISS. When this standard is used in acquisition, the applicable issue of the DoDISS must be cited in the solicitation (see 2.2.1 and 2.3).

6.3 Subject term (keyword) listing.

Barrier coated
Duplex
Literal
Miniature
Symbolic

6.4 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

CONCLUDING MATERIAL

Custodians:
Army – AT
Navy – AS
Air Force – 99

Preparing activity:
Navy – AS
(Project No. 3110-1303)

Review Activities:
Air Force – 84
DLA – GS, LS

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7, and send to preparing activity.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-STD-1647E	2. DOCUMENT DATE (YYYYMMDD) 20030421
3. DOCUMENT TITLE IDENTIFICATION MARKINGS FOR DOMESTICALLY MANUFACTURED BEARINGS, BALL, ANNULAR FOR INSTRUMENTS AND PRECISION COMPONENTS		
4. NATURE OF CHANGE (<i>Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.</i>) 		
5. REASON FOR RECOMMENDATION 		
6. SUBMITTER		
a. NAME (<i>Last, First, Middle Initial</i>)	b. ORGANIZATION	
c. ADDRESS (<i>Include ZIP Code</i>)	d. TELEPHONE (<i>Include Area Code</i>) (1) Commercial (2) DSN (<i>If applicable</i>)	7. DATE SUBMITTED (YYYYMMDD)
8. PREPARING ACTIVITY		
a. NAME COMMANDER NAVAL AIR WARFARE CENTER AIRCRAFT DIVISION	b. TELEPHONE (<i>Include Area Code</i>) (1) Commercial (732) 323-2947	(2) DSN 624-2947
c. ADDRESS (<i>Include ZIP Code</i>) CODE 414100B120-3 HIGHWAY 547 LAKEHURST, NJ 08733-5100	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman Road, Suite 2533 Fort Belvoir, Virginia 22060-6221 Telephone (703) 767-6888 DSN 427-6888	