

MIL-STD-1334B
NOTICE 1
9 September 1985

MILITARY STANDARD
PROCESS FOR BARRIER COATING
OF ANTI-FRICTION BEARINGS

TO ALL HOLDERS OF MIL-STD-1334B:

1. The following pages of MIL-STD-1334B have been revised and supersede the pages listed:

| <u>NEW PAGE</u> | <u>DATE</u> | <u>SUPERSEDED PAGE</u> | <u>DATE</u> |
|-----------------|------------------|------------------------|----------------------|
| 1 | 9 September 1985 | 1 | 4 January 1977 |
| 2 | 9 September 1985 | 2 | 4 January 1977 |
| 2a | 9 September 1985 | | |
| 3 | 9 September 1985 | 3 | 4 January 1977 |
| 4 | 4 January 1977 | 4 | Print without change |

2. Retain this notice and insert before Table of Contents.

3. Holders of MIL-STD-1334B will verify that page changes and additions indicated above have been entered. This notice will be retained as a check sheet. Each notice is to be retained by stocking points until the Military Standard is completely revised or cancelled.

Custodians:

Army - AR
Navy - AS
Air Force - 99

Preparing activity:

Navy - AS
(Project 3110-0728)

Review interest:

Army - AV, ER, MI
Navy - SH, OS, EC
Air Force - 11, 17, 84, 85

Agent:

DLA -IS

FSC 3110

DISTRIBUTION STATEMENT A. Approved for Public Release: Distribution is unlimited.

MIL-STD-1334B

1. SCOPE

1.1 Scope. This standard specifies the basic requirements for the application of barrier coatings to anti-friction bearings for the purpose of preventing lubricant loss by surface migration and spreading during storage and in service.

2. REFERENCED DOCUMENTS

2.1 Government documents

2.1.1 Specifications, standards and handbooks. Unless otherwise specified, the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this standard to the extent specified herein.

STANDARDS

FEDERAL

| | | |
|-------------|---|--|
| FED-STD-209 | - | Clean Room and Work Station Requirements, Controlled Environment |
|-------------|---|--|

SPECIFICATIONS

FEDERAL

| | | |
|----------|---|--|
| QQ-S-763 | - | Steel Bars, Wire, Shapes and Forgings, Corrosion-Resisting |
|----------|---|--|

MILITARY

| | | |
|-------------|---|---|
| MIL-B-81705 | - | Barrier Materials, Flexible, Electro-Static Free, Heat Sealable |
|-------------|---|---|

| | | |
|-------------|---|--|
| MIL-B-81744 | - | Barrier Coating Solution, Lubricant Migration Detering |
|-------------|---|--|

| | | |
|-------------|---|--|
| MIL-B-81793 | - | Bearing, Ball Precision, For Instruments and Rotating Components |
|-------------|---|--|

2.2 Order of precedence. In the event of a conflict between the text of this standard and the references cited herein, the text of this standard shall take precedence.

3. DEFINITIONS (Not applicable)

4. GENERAL REQUIREMENTS

Supersedes page 1 of 4 January 1977.

MIL-STD-1334B

4.1 Barrier coating requirement. Prior to imposing the Barrier Coating requirement of bearings within an instrument, it must be demonstrated that lubricant migration from the bearings will cause the premature failure of that instrument and the lubricant migration can be deterred by using Barrier Coating. For each instrument application this determination must be based on an engineering assessment of the factors influencing lubricant migration and a functional knowledge of the various modes of instrument and bearing failure. Barrier Coating will not prevent lubrication sling, atomization, or evaporation. Barrier Coating is not necessary with grease lubricants or porous retainers (except silicone greases).

4.2 Contamination by barrier-coating. Since barrier coated surfaces cannot be lubricated, all precautions necessary to prevent the spread of barrier coating material to unwanted areas shall be exercised. Particular attention shall be given to maintaining cleaning solutions free of barrier coating material and to avoiding its accidental application to the working surfaces of bearings.

4.3 Toxicity of barrier coating solution and solvent. The toxic properties of the barrier coating and solvent have not been fully established. Adequate ventilation to avoid inhalation of vapor shall be provided.

5. DETAIL REQUIREMENTS

5.1 Facilities. Work areas for the cleaning of barrier coated bearings and for the removal or application of barrier coatings shall be isolated from all other types of bearing processing and handling operations. To avoid cross contamination of other bearing work areas, the tools and solvent systems shall be segregated from general use and never be returned to stock or moved out of the isolated barrier coating work area. All processes described in this Standard shall be performed in a clean environment meeting the requirements for Class 100 of FED-STD-209. A laminar flow clean work space has been proven to be a suitable site for the successive steps required for barrier coating.

5.2 Materials.

5.2.1 Barrier coating materials. The barrier coating solution shall conform to MIL-B-81744. The solution is supplied as a 0.18 ± 0.005 percent by weight solution of a fluoromethacrylate polymer (1H, 1H pentadecafluorooctylmethacrylate) in a fluorochemical solvent. It air dries to a thin film with a critical surface tension of wetting of 10.6 dynes per centimeter; it will not be wet by liquids with higher surface tensions. Coatings of this polymer are chemically inert and have a useful temperature range of -148°F (-100°C) to 347°F (175°C). Pre-application dilution and dilution to control increases of polymer concentration are not permitted. Use fresh solution to insure obtaining acceptable films.

5.2.2 Cleaning solvents. Unless otherwise specified in the contract, order or other document invoking this Standard, cleaning solvents shall be in accordance with best commercial practice.

Supersedes page 2 of 4 January 1977.

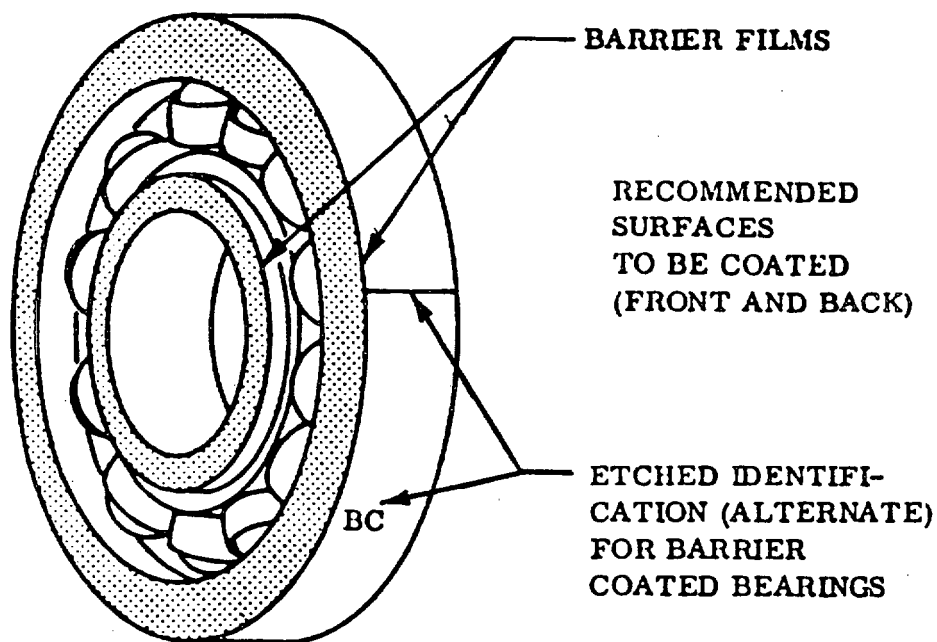
MIL-STD-1334B

5.3 Pre-coating processing.

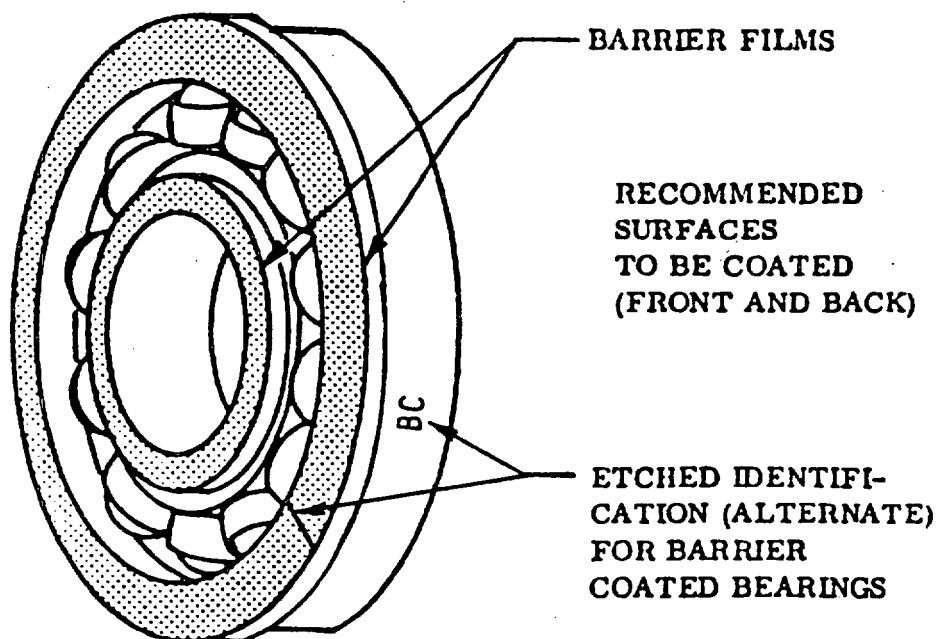
5.3.1 Marking. Barrier coated bearings shall be permanently identified with the letters "BC" etched on the outer ring periphery of unflanged and flanged bearings except for the bearings whose small size makes marking impractical. The small size bearings which are the exception are the following: Unflanged bearings with less than 0.1250 inch (3.18mm) outside diameter or less than 0.046 inch (1.17mm) width; or flanged bearings with less than 0.0905 inch (2.3mm) width overall. These exceptions should be marked with a single etched line 0.020 inch (0.51mm) wide maximum. The etched line should be marked on the unflanged bearings's outer ring periphery in a direction parallel to the bore axis as shown in figure (1) detail (A) and marked on the outer flanged face of the flanged bearing in a radial direction from the bore axis, as shown in figure (1) detail (B). If steel code marks, used to designate the type of steel, are on the same flanged face as the etched line used to designate barrier coating, the etched line used to designate barrier coating should be placed in an angular position which will not interfere with the steel code marks. Marking shall be accomplished prior to cleaning in preparation for barrier coating.

5.3.2 Cleaning. Surfaces to be barrier coated shall be absolutely clean. Cleaning of items (bearing and bearing parts) to be barrier coated shall be in accordance with best commercial practice unless otherwise specified in the contract, order or other document invoking this Standard, except that the requirements of this Standard shall be complied with and in case of conflict, shall prevail.

MIL-STD-1334B



DETAIL A - UNFLANGED BEARING



DETAIL B - FLANGED BEARING

THE SEALS AND SHIELDS SHOULD BE DIPPED IN THE BARRIER FILM MATERIAL AND OVEN CURED BEFORE ASSEMBLY

FIGURE 1. Typical barrier film application areas and identification of barrier coated bearings (See 5.3.1 and 5.4.5)

MIL-STD-1334B

5.3.2.1 Bearing disassembly. All snap rings and shields shall be removed prior to cleaning.

5.3.2.2 Contamination and corrosion control. Surfaces to be barrier coated shall not be touched or otherwise contaminated during or after the final cleaning; cleaned items shall be protected against all forms of contamination and corrosion until the barrier coating and lubricant are applied.

5.3.2.2.1 Contaminating material. All cleaning systems and solvent shall be maintained free of silicones and barrier coating material. Items to be barrier coated shall not be cleaned in systems or with solvents which have been exposed either to silicones or barrier coating material or to items which have at any time been barrier coated or lubricated with silicones.

5.3.2.3 Cleaning of uncoated items. Items which are free of barrier coating material may be cleaned in either fluorinated or nonfluorinated solvents.

5.3.2.4 Removal of barrier coating. Removal of unacceptable, old or damaged barrier coatings from bearings is difficult. There is also the possibility that dissolved barrier coating may spread to unwanted areas. Therefore, defective, old or damaged barrier coatings on bearings shall not be removed. A new bearing shall be used.

5.4 Barrier coating application. There are several methods and devices which have been developed for the application of barrier coatings. The actual method to be employed is optional, provided it is consistent with the requirements of this Standard.

5.4.1 Silicone lubricated bearings. Bearings which have been previously lubricated with silicone oils or greases shall not be barrier coated. Such lubricants cannot be completely removed by solvents or any other practical procedure. Silicone residues will interfere with the adhesion of barrier coatings and with the wetting of the working surfaces of bearings by other types of lubricants.

5.4.2 Items previously barrier coated. Items, other than bearings, previously barrier coated and cleaned may be re-used if the coating is continuous, undamaged and has not spread to unwanted areas (see 5.4.5).

5.4.3 Disassembled bearings and bearing parts. Seals and shields which have been removed from bearings and cleaned separately, shall be barrier coated prior to reassembly.

5.4.4 Barrier coating thickness. The thickness of the barrier coating shall be no greater than 0.25 micron (9.84×10^{-6} inch). Films of greater thickness are increasingly subject to peeling and abrasion. An acceptable film is blue-brown to oblique light.