Designation: F2444 – 04 (Reapproved 2018)

Standard Practice for Damage Prevention of Bearings, and Bearing Components Through Proper Handling Techniques[1]

This standard is issued under the fixed designation F2444; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers requirements for the handling of all bearings and bearing components.

1.2 This is a general practice. The individual bearing handling requirements shall be as specified herein or as specified in the contract or purchase order. In the event of any conflict between requirements of this practice and the individual bearing requirements of an OEM drawing, procurement specification, or other specification, the latter shall govern. Many companies, organizations, and bearing users have excellent facilities, equipment, and knowledgeable personnel for handling bearings. The thrust of this practice is for users that do not have this knowledge of bearings.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ABMA Standard:*[2]

ABMA 1 Terminology

2.2 *ISO Standards:*[3]

ISO 14644-1 Cleanrooms and Associated Controlled Environments—Part 1: Classification of Air Cleanliness (DOD Adopted)

ISO 14644-2 Cleanrooms and Associated Controlled Environments—Part 2: Specifications for Testing and Monitoring to Prove Continued Compliance with ISO 14644-1

ISO 9001 Quality Management Systems—Requirements

3. Terminology

3.1 *Definitions*—For definitions of terms used in this practice, refer to ABMA 1.

4. Significance and Use

4.1 This practice covers bearings and bearing components of all material compositions and grades. It may be used to develop a process for adequately handling bearings.

4.2 Unless the proper conditions of an adequate facility, equipment, and trained personnel are available, it may be better not to inspect the bearings in-house. The danger of contaminating and damaging the bearings may be much greater than the possibility of receiving bearings that will not function.

4.3 Bearings are easily damaged at the customers' receiving and test areas. In most cases, bearings should be accepted based on the bearing manufacturer's certification. Certificates of quality (conformance) supplied by the bearing manufacturer may be furnished in lieu of actual performance of such testing by the receiving activity of the bearings. The certificate shall include the name of the purchaser, contract number/PO number, name of the manufacturer or supplier, item identification, name of the material, lot number, lot size, sample size, date of testing, test method, individual test results, and the specification requirements.

4.4 This practice does not cover clean room requirements of miniature and instrument precision bearings. These bearings require clean room environments in accordance with ISO 14644-1 and ISO 14644-2.

5. Reasons for Not Handling Bearings

5.1 When bearings are received, the following questions must be asked:

5.1.1 What amount of inspection checks will be performed on the bearings? Do we need to do any checks?

5.1.2 What will it cost to establish and maintain equipment and facilities to inspect and test bearings?

[1] This practice is under the jurisdiction of ASTM Committee F34 on Rolling Element Bearings and is the direct responsibility of Subcommittee F34.03 on Preservation, Cleaning and Packaging.

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[2] Available from American Bearing Manufacturers Association, 330 N. Wabash Ave, Ste 2000 Chicago, IL 60611, http://www.americanbearings.org.

[3] Available from International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, http://www.iso.org.

5.1.3 What is the established history of the bearing? If there has never been a rejection, is inspection warranted?

5.1.4 What type of test is required and how detailed is it?

5.1.4.1 Rough spin,

5.1.4.2 Destructive,

5.1.4.3 Nondestructive (NDT),

5.1.4.4 Disassembly,

5.1.4.5 Test requires recleaning, relubrication, and repackaging of the bearings,

5.1.4.6 Test requires a clean room environment,

5.1.4.7 Dimensional, or

5.1.4.8 Performance.

5.1.5 What type of documentation is required?

5.1.6 Are trained personnel available?

5.1.7 Are adequate equipment and facilities available?

5.1.8 Do we have knowledge of the bearing manufacturer's quality system?

6. Equipment and Facilities

6.1 The list below provides some conditions that must be considered by the bearing user. The bearing user must determine if they have the necessary in-house capability to perform inspections and tests of bearings.

6.2 It is recommended that the bearing areas have a controlled environment.

6.3 The construction of the bearing handling areas should be made of materials that do not lend themselves to accumulating dust. It is recommended that plastic materials or other non-shedding materials be used for walls and ceilings. The floors should be of a material that will not require waxing, has very few seams if any, and a non-abrasive surface.

6.4 Bearing handling areas should be away from doors and windows to prevent dust from entering the area when the doors or windows are opened.

6.5 The room must be well-lit.

6.6 Containers with covers are recommended for use during inspection and tests of bearings. Racks, trays, and handling containers should be made of glass, solvent resistant plastic, or non-magnetic materials.

6.7 Tweezers and tongs should have blunt points and rounded edges, and be made of non-magnetic stainless steel. Other suitable materials may be used.

6.8 Compressed air, if any is used in the room for gauging, cleaning, or drying bearings, should be filtered and dehydrated.

6.9 Inspection equipment required would depend on what and how much inspection is to be performed. It could consist of microscopes for visual inspection, air gages for checking bores and outside diameters, electronic or mechanical gages for checking width, and special gages for checking radial play, torque, axial play, and preload. Not all of these gages are used on all bearings. Many of these tests can only be performed at the manufacturer's facility. Many dimensions can only be checked as component parts. These are made before the bearings are assembled.

7. Training of Bearing Personnel

7.1 All personnel handling bearings shall be trained and must demonstrate the ability to perform visual inspections of bearings. This training shall be documented on the employee training record.

7.2 The training may be divided into two parts. Classroom training may be Part I and performance training may be Part II.

7.3 Personnel must complete all of the training requirements.

7.4 The bearing supplier is responsible for performance of all of the testing and inspection requirements. The receiving activity may use assigned certified personnel and equipment or any other suitable facility with trained personnel in the performance of the acceptance tests or inspections.

8. General Handling Rules (Recommended Precautions)

8.1 Never touch bearings with the bare hands. Acid moisture deposited by fingers will corrode bearings, and particles of skin on the surface of the bearings are very hard to remove. Use tweezers, tongs, powder free rubber gloves, and finger cots.

8.2 A bearing should never be placed directly on a contaminated surface.

8.3 The use of headgear or hairnets is recommended to protect the bearings from hair contamination.

8.4 Personnel handling bearings should change their personal clothing when it becomes soiled or contaminated by solid or liquid materials.

8.5 Personnel should wear shoes or boots that are free of dirt or other contamination. Shoe brushes may be provided in these areas so that footgear can be cleaned.

8.6 Personal items such as jackets, sweaters, papers, food, or drinks should not be in areas of close proximity to the bearings.

8.7 Lint-free rags and cloths should be used when cleaning bearings

8.8 No smoking is allowed in any inspection, test, or assembly area where bearings are handled.

8.9 No paper should be allowed to touch bearings because of possible contamination from paper lint. Some paper is also acidic and could cause corrosion. The use of non-shedding paper is desirable for making notes and recording data. Plastic document protectors may be used to enclose paper documentation such as routing tickets, labels, etc.

8.10 No erasers or rubber bands should be permitted around bearings. These items are a source of particulate contamination.

8.11 Personnel should use ballpoint pens.

8.12 Personnel handling bearings should wash and dry hands frequently, especially after eating or smoking.

8.13 Do not carry tweezers or other working equipment in pockets. Pockets are a large source of contamination. Garments without pockets are desirable.