NOT MEASUREMENT SENSITIVE

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SUPERSEDING
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DETAIL SPECIFICATION

PACKAGING OF BEARINGS, ASSOCIATED PARTS AND SUBASSEMBLIES

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the cleaning, drying, preservation, packaging, and packaging marking requirements for all types and sizes of stock and production bearings, associated parts, and subassemblies (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 or 4 of this specification. This section does not include documents cited in other sections of this specification 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 of documents cited in sections 3 or 4 of this specification, 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 cited in the solicitation or contract.

Comments, suggestions, or questions on this document should be addressed to Defense Supply Center Richmond, ATTN: DSCR-VEB, 8000 Jefferson Davis Highway, Richmond, VA 23297-5616 or emailed to STDZMGT@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST database at http://assist.daps.dla.mil/.

FEDERAL SPECIFICATIONS

PPP-B-566	-	Boxes, Folding, Paperboard.
PPP-B-585	-	Boxes, Wood, Wirebound.
PPP-B-621	-	Boxes, Wood, Nailed and Lock-Corner.
PPP-B-676	-	Boxes, Setup.
PPP-B-1055	-	Barrier Material, Waterproof, Flexible.
PPP-C-96	-	Cans, Metal, 28 Gage and Lighter.
PPP-C-795	-	Cushioning Material, Packaging (Flexible Closed Cell Plastic Film, for Long Distribution Cycles).
PPP-C-1120	-	Cushioning Material, Uncompressed Bound Fiber For Packaging.
PPP-D-723	-	Drum, Fiber.
QQ-A-1876	-	Aluminum Foil.

FEDERAL STANDARD

FED-STD-791	-	Lubricants, Liquid Fuels, and Related Products; Methods of Testing.

COMMERCIAL ITEM DESCRIPTION

A-A-3174	-	Plastic Sheet, Polyolefin.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-C-104	-	Crates, Wood: Lumber and Plywood Sheathed, Nailed, and Bolted.
MIL-DTL-117	-	Bags, Heat-Sealable.
MIL-PRF-121	-	Barrier Materials, Greaseproof, Waterproof, Flexible, Heat-Sealable.
MIL-P-130	-	Paper, Wrapping, Laminated and Creped.
MIL-PRF-131	-	Barrier Materials, Watervaporproof, Greaseproof, Flexible, Heat-Sealable.
MIL-P-149	-	Plastic Coating Compound, Strippable (Hot Dipping).
MIL-D-3464	-	Desiccants, Activated, Bagged, Packaging Use and Static Dehumidification.
MIL-PRF-6085	-	Lubricating Oil: Instrument, Aircraft, Low Volatility.
MIL-C-11796	-	Corrosion Preventive Compound, Petrolatum, Hot Application.
MIL-P-17667	-	Paper, Wrapping, Chemically Neutral (Non Corrosive).
MIL-B-17931	-	Bearings, Ball, Annular, for Quiet Operation.
MIL-PRF-20092	-	Rubber or Plastic Sheets and Assembled and Molded Shapes, Synthetic, Foam or Sponge, Open Cell.

DEPARTMENT OF DEFENSE SPECIFICATIONS - Continued

MIL-PRF-22191	-	Barrier Materials, Transparent, Flexible, Heat-Sealable.
MIL-B-26195	-	Boxes, Wood-Cleated, Skidded, Load-Bearing Base.
MIL-PRF-26514	-	Polyurethane Foam, Rigid or Flexible, for Packaging.
MIL-PRF-27617	-	Grease, Aircraft and Instrument, Fuel and Oxidizer Resistant.
MIL-PRF-32033	-	Lubricating Oil, General Purpose, Preservative (Water-Displacing, Low Temperature).
MIL-L-45973	-	Liner Material, Greaseproof.
MIL-I-52211	-	Industrial Gas Production, Accessories, and Support Items; Packaging of.
MIL-DTL-53131	-	Lubricating Oil, Precision Rolling Element Bearing, Polyalphaolefin Based.
MIL-G-81937	-	Grease, Instrument, Ultra-Clean, Metric.
DOD-L-81846	-	Lubricating Oil, Instrument, Ball Bearing, High Flash Point.
MIL-PRF-83671	-	Foam-in-Place Packaging Materials, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-129	-	Military Marking for Shipment and Storage.
MIL-STD-2073-1	-	DOD Standard Practice for Military Packaging.
MIL-STD-3010	-	Test Procedures for Packaging Materials.
MIL-STD-3004	-	Quality Surveillance for Fuels, Lubricants, and Related Products.

(Copies of these documents are available online at http://assist.daps.dla.mil/ or from the Standardization Documents Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents and publications. The following other Government documents and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

CODE OF FEDERAL REGULATIONS (CFR)

21 CFR	-	Food and Drugs.
29 CFR	-	Labor.
40 CFR	-	Protection of Environment.
49 CFR	-	Transportation.

(Copies of these documents are available online at http://www.gpoaccess.gov/cfr/ or from Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250.)

NATIONAL AERONAUTICS & SPACE ADMINISTRATION (NASA)

NASA JPG 5322.1	-	Contamination Control Requirements Manual.
NASA-STD-6001	-	Flammability, Odor, Offgassing, and Compatibility Requirements and Test Procedures for Materials in Environments that Support Combustion.

(Copies of these documents are available online at http://standards.nasa.gov/ or from the NASA Technical Standards, EL01 MSFC, AL 35801.)

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 these documents are those cited in the solicitation or contract.

ASTM INTERNATIONAL

ASTM D 1974	-	Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes.
ASTM D 4727/D 4727M	-	Standard Specification for Corrugated and Solid Fiberboard Sheet Stock (Container Grade) and Cut Shapes.
ASTM D 5118/D 5118M	-	Standard Practice for Fabrication of Fiberboard Shipping Boxes.
ASTM D 5168	-	Standard Practice for Fabrication and Closure of Triple-Wall Corrugated Fiberboard Containers.
ASTM D 5486/D 5486M	-	Standard Specification for Pressure-Sensitive Tape for Packaging, Box Closure, and Sealing.
ASTM D 6251/D 6251M	-	Standard Specification for Wood-Cleated Panelboard Shipping Boxes.
ASTM D 6576	-	Standard Specification for Flexible Cellular Rubber Chemically Blown.
ASTM F 25	-	Standard Test Method for Sizing and Counting Airborne Particulate Contamination in Clean Rooms and Other Dust-Controlled Areas Designed for Electronic and Similar Applications.
ASTM F 50	-	Standard Practice for Continuous Sizing and Counting of Airborne Particles in Dust-Controlled Areas and Clean Rooms Using Instruments Capable of Detecting Single Sub-Micrometre and Larger Particles.
ASTM F 311	-	Standard Practice for Processing Aerospace Liquid Samples for Particulate Contamination Analysis Using Membrane Filters.
ASTM F 312	-	Standard Test Methods for Microscopical Sizing and Counting Particles from Aerospace Fluids on Membrane Filters.

(Copies of these documents are available from http://www.astm.org/ or from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

INTERNATIONAL STANDARDIZATION ORGANIZATION (ISO)

ISO 14644-1	-	Cleanrooms and Associated Controlled Environments - Part 1: Classification of Air Cleanliness.
ISO 14644-2	-	Cleanrooms and Associated Controlled Environments - Part 2: Specifications for Testing and Monitoring to Prove Continued Compliance with ISO 14644-1.

(Copies of these documents are available from http://www.iso.org/ or from ISO, 1, rue de Varembé, CH-1211 Geneva 20, Switzerland.)

SAE INTERNATIONAL

SAE AS13341	-	Process for Barrier Coating of Anti-Friction Bearings.

(Copies of this document are available from http://www.sae.org/ or from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001.)

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. REQUIREMENTS

3.1 General. This procedural document provides the detailed preservation and packaging requirements for bearings, associated parts, and subassemblies. Many of the methods of preservation described herein have been derived from MIL-STD-2073-1. However, the methods specified in this document have been tailored to meet the necessary requirements for the proper protection of bearings. Consequently, the methods specified herein are not identical to those detailed in MIL-STD-2073-1. The general requirements of 3.1.1 through 3.1.4.3 apply in effecting all methods of preservation in accordance with this document.

3.1.1 Hazardous material. Packaging of hazardous material shall comply with the applicable requirements contained in Code of Federal Regulations (CFR) Titles 29, 40, and 49. Hazardous material shipment documentation shall be provided with the shipment as required.

3.1.2 Loose fill materials. Loose fill materials are prohibited in all military packages.

3.1.3 Facilities. Bearings shall be packaged and preserved in facilities that meet the requirements of this document.

3.1.4 Transfer to a subcontract packaging facility. The following procedure, as specified in 3.1.4.1 through 3.1.4.3, shall be used when transferring the bearings from the manufacturing facility to a subcontract packaging facility:

3.1.4.1 Required information. The packaging facility shall be provided all the necessary information that includes and clearly defines the type bearings and degree of preservation/ packaging required in accordance with this specification. This is to include complete identification of embedded lubricants as may have been applied by the manufacturer during production to meet government contract requirements. When bearings are provided to the packager with required lubrication or an acceptable contact preservative compound applied, and also protected in manufacturer's intimate packs meeting requirements of this specification, this protection shall be maintained and this information shall be fully communicated to the packager. Subsequent required final packaging shall be accomplished as specified herein.

3.1.4.2 Prior to cleaning. Bearings shall be protected against damage and shipped to the packager with a minimum of transport and storage time. The packager shall perform military preservation operations and packaging as specified herein.

3.1.4.3 Prior to packaging. Lubricated bearings (3.3.4) and preserved bearings (3.3.4.7) scheduled for transfer to a packaging facility shall be placed individually or in bulk in a clean dust-excluding container. Containers and lining shall protect the bearings against damage, corrosion and deterioration when shipped in the protective container. Storage and transport time shall be held to a minimum and intimate wrapping shall be applied in the required packaging environment.

3.2 Packing (intermediate and exterior containers).

3.2.1 Packing level. All bearings shall be Level A or B packing as defined in section 3 of MIL-STD-2073-1.

3.2.2 Level A packing. Packaged bearings shall be packed in containers conforming to the following:

Specification	Class/Type
PPP-B-585	Class 3, military overseas type
ASTM D 6251/D 6251M	Class 2, overseas type
PPP-B-621	Class 2, overseas type
ASTM D 5118/D 5118M	Class weather resistant (with vials)
ASTM D 5168	Class weather resistant (with vials)

Exterior shipping containers shall be multi-application type containers designed to protect bearings and bearing components within a given fragility and size range. Intermediate containers shall provide weather resistant case liners, closed and sealed in accordance with military practices. Alternately, wrapping of unit or intermediate packages with PPP-B-1055 barrier material with all seams sealed with a minimum 2-inch wide tape conforming to ASTM D 5486/D 5486M is acceptable in lieu of case liners. Boxes shall be closed, strapped, or banded in accordance with the applicable box specification, except that ASTM D 5118/D 5118M

boxes shall be closed, sealed, and reinforced using any method in ASTM D 1974. Unless otherwise specified, the gross weight of wood or wood-cleated boxes shall not exceed 1000 pounds; fiberboard boxes shall not exceed the weight limitation of the applicable box specification.

3.2.2.1 Exterior shipping container. Unless otherwise specified, containers conforming to ASTM D 5118/D 5118M, ASTM D 5168, and PPP-B-566, shall be prohibited as exterior shipping containers under Level A.

3.2.2.1.1 Exception. Exceptions shall be as follows:

a) For bearing unit protection Method 44B (where shipments do not exceed 20 pounds gross weight), the shipping container shall be in accordance with ASTM D 5118/D 5118M, class weather resistant. Fiberboard separators, or other devices, of material in accordance with ASTM D 4727/D 4727M shall be provided to separate unit packages both horizontally and vertically.

b) For bearing unit protection Method 20B, shipping containers not exceeding 1000 pounds gross weight shall be in accordance with ASTM D 6251/D 6251M or PPP-B-621. Container shall have skids applied in accordance with applicable container specification. Shipping containers exceeding 1000 pounds gross weight shall be in accordance with MIL-B-26195 or MIL-C-104. Dunnage shall be used to prevent movement of the bearing relative to the crate. Nylon sling straps shall be used in lifting bearings from the crate.

3.2.3 Level B packing. Bearings shall be packed in containers conforming to the following:

Specification	Class/Type
ASTM D 6251/D 6251M	Class 2, overseas type
PPP-B-585	Class 2, normal overseas type or Class 3, military overseas type
ASTM D 6251/D 6251M	Class 1, domestic type
PPP-B-621	Class 1, domestic type
ASTM D 5118/D 5118M	Class weather resistant
ASTM D 5168	Class weather resistant

Box closures and sealing shall be as specified in the applicable box specification or as specified in ASTM D 1974.

3.3 Preservation.

3.3.1 Selection of methods of preservation. The methods of preservation listed in table I and as described in 3.3.2 through 3.9.3 applies depending upon bearing type, size, and any specific contract requirements included in the procurement item description. The details of these methods are described in this specification (see 3.10.3 through 3.10.14). These requirements are the minimum acceptable.

3.3.2 General preservation process. All bearings are subject to a general preservation procedure. The details of that procedure are determined by bearing type and closure and contract or purchase order requirements. The general procedure consists of the following steps: demagnetization, cleaning, drying, preservation, lubrication, intimate bagging or wrapping, and unit packaging. These steps are not listed in sequence and additional steps may be required.

TABLE I. Methods of unit preservation by size or type.

Size or type	Open/closed bearings 1/ Method
Up to and including 1.1811 inches or 30 mm (metric) OD 2/	41B 44B 46B 52B, 55B
Over 1.1811 inches or 30 mm (metric) but not exceeding 16 inches OD 2/ 3/	20B 40B 41B 4/
Greater than 16 inches OD or 406 mm (metric) or greater than 10 lbs.	49B 32B
Plain bearings self-aligning/rod ends/sleeves/airframe and needle roller bearings.	33B
Optional methods (3.3.1)	45B 54B

1/ Cleaning and drying applies only to open, non-lubricated bearings.
2/ Method 40B is required for bearings to MIL-B-17931.
3/ Method 20B may be used for bearings with OD over 4.86 inches or over 123 mm.
4/ No weight limit when used with supporting container (MIL-DTL-117, Type I, heavy duty).

3.3.3 Demagnetization, cleaning and drying. Prior to cleaning, the magnetization of instrument precision ball bearings shall not exceed a pole strength of 2 gauss and a magnetization of all other bearings shall not exceed a pole strength of 5 gauss. Bearings in excess of the applicable value shall be demagnetized and retested. Bearings shall be cleaned and dried according to type and closure and contract or purchase order requirements. Pre-lubricated bearings shall not be subjected to the cleaning process. Processed bearings shall be free of any chemical or particulate residue that will have detrimental effect on the life of the bearing.

3.3.4 Lubricants and preservative compound. Lubrication of bearings and actual lubricants used shall conform to government prime contract item description requirements. Any resultant flow down of item description requirements to a packaging facility shall include the same item description information (see 3.1.4.1). When lubrication is not applicable, then a contact preservative compound shall be applied in accordance with contract or purchase order requirements. When the bearing item description does not specify a contact preservative compound, then the preservative material shall be as specified in table II. Self-lubricating bearings, as described within this document, shall not have lubricants or preservative compounds applied.

TABLE II. Lubricants and preservative compounds.

Bearing type	Bearing closure	Lubricant or preservative compound
General purpose and precision	Open	MIL-C-11796, Class 3, MIL-PRF-32033 1/, MIL-PRF-6085 or 2/
	Closed	Preservative same as operational lubricant or 2/
Instrument and instrument precision	Open	MIL-PRF-6085, DOD-L-81846, MIL-DTL-53131, MIL-PRF-32033 1/ or 2/
	Closed	Preservative same as operational lubricant or 2/
Oxygen equipment (free of hydrocarbons)	Open	Fluorocarbon Grease or 2/
	Closed	MIL-PRF-27617 or 2/
Large (Over 16 inches OD or over 10 pounds)	Open	MIL-PRF-6085, MIL-PRF-32033, or 2/
	Closed	Preservative same as operational lubricant or 2/
Airframe bearings	Closed	Preservative same as operational lubricant or 2/
Rod end bearings	Closed	Preservative same as operational lubricant or 2/
Needle roller bearings	Closed	Preservative same as operational lubricant or 2/
Plain bearings	Self-aligning	Preservative same as operational lubricant or 2/
Plain/sleeve/rod end bearing	Self-lubricating	Dry

1/ MIL-PRF-32033 is recommended in accomplishing Method 20B and Method 41B preservation for open bearings. Bearings shall cool to ambient temperature before packaging.
2/ As specified in contract or purchase order.

3.3.4.1 Contamination levels for oils. When measured in accordance with FED-STD-791, method 3009.3 (optical) or method 3011.1 (particle counter), the number of solid contaminant particles in the lubricating oil shall not exceed the following limits:

a. Oil for general purpose, precision and large bearings:

Particle size range (micrometers)	Count per 100 ml
5 to 15	1785
> 15 to 25	265
> 25 to 50	78
> 50 to 100	11
>100	0

b. Oil for instrument and instrument precision bearings:

Particle size range (micrometers)	Count per 100 ml
5 to 15	150
> 15 to 25	45
> 25 to 50	23
> 50 to 100	10
>100	0

3.3.4.2 Contamination levels for grease. Grease for general purpose, precision, and large bearings shall be tested in accordance with FED-STD-791, method 3005.4; no more than 1000 particles per cubic centimeter (cm^3) of 25 micrometers or larger in size and no particles larger than 75 micrometers shall be allowed. For instrument and instrument precision bearing greases, the contamination requirements of MIL-G-81937 shall apply.

a. Grease for general purpose, precision, and large bearings:

Particle size range (micrometers)	Count per cm^3
25 to 75	1000 max.
>75	0

b. Grease for instrument and instrument precision bearings:

Particle size range (micrometers)	Count per cm^3
10 to 35	1000 max.
>35	0

c. The greases shall not contain dirt, crystals, lumps, or particles of gelling agent exceeding the limits. The particle size shall be measured along with the largest dimension of the particle.

3.3.4.3 Receiving inspection test. No receiving inspection tests are necessary on packaged lubricants provided the containers are intact and markings adequately identify the lubricant(s).

3.3.4.4 Shelf life. Lubricants used by the packaging facility shall have a manufacture date and an inspect/test or expiration date, as appropriate, on the container, marked in accordance with MIL-STD-129. For lubricants in storage that go beyond the shelf life, see 6.4.1.

3.3.4.5 Visual check. A visual check of all lubricants shall be made every 12 months on all containers that have been opened. Closed containers shall be checked for damage or leak out and shall not be opened unless there is evidence of damage. The visual inspection shall be conducted prior to being used. The containers that have been opened shall be checked for: proper color, all forms of visual contamination, evidence of water, and evidence of separation. Any lubricants that show evidence of deterioration because of age or contamination shall not be used (see 6.3.2).

3.3.4.6 Lubricant testing. The lubricant shall pass the Type B-2 tests for lubricating oils and for greases, semi-fluids, lubricants, and other grease like materials of MIL-STD-3004. Additional testing of the principal characteristics likely to effect deterioration is optional.

3.3.4.7 Preservative application. Unless otherwise specified (see 3.1.4.1 and 6.2), bearing and bearing parts shall be coated with the lubricant or preservative compound specified in 3.3.4. Bearings shall be completely preserved so as to obtain a continuous coating on all surfaces. During or after preservation with the compound, all internal surfaces shall receive complete coverage. When an operational lubricant (grease or oil) is required, the quantity applied shall conform to the item description or technical data applicable to the assigned National Stock Number (NSN) (or other identification number when an NSN has not been assigned) (see 6.2). When no quantity is specified, it shall be in accordance with the manufacturer's standard practice. Non-stainless steel closed bearings shall have a thin coating of

compatible lubricant on outer surfaces and shall be internally greased. Plain self-lubricating bearings shall be packaged free of oil and grease.

3.3.4.7.1 Self-lubricating bearings. Bearings shall be preserved dry. The use of cleaning solvents, grease, or oil shall not be used.

3.4 Oxygen equipment bearings.

3.4.1 Separate clean work area for oxygen equipment bearings. A minute deposit of hydrocarbon oil film on an oxygen equipment bearing presents an explosion hazard when installed in the system; for this reason a separate clean work area shall be designated for the processing of oxygen equipment bearings. This area shall be isolated from all manufacturing processes and shall contain only equipment necessary to process the oxygen equipment bearings. Workbenches, tools, and processing equipment shall be maintained free of grease, oil, or other combustible materials and shall only be used on or for oxygen equipment. Personnel present in this area shall maintain themselves and their clothing in a condition that will prevent transferring contaminants to bearing surfaces.

3.4.2 Cleaning, drying, and unit preservation of oxygen equipment bearings. The method of cleaning and drying as well as the cleanliness classification that determines the type of inspection shall be as specified in MIL-I-52211. Cleaning and drying of oxygen equipment bearings shall be as specified in MIL-I-52211 and 3.5. Preservation shall be Method 41B and shall include the special marking requirements of MIL-I-52211. The environment and processing cleanliness for oxygen equipment bearings shall be the same as that described in 3.5.1 and 3.5.3.

3.4.3 Lubricants and preservative compounds for oxygen equipment bearings. The preservative for oxygen equipment bearings shall be the operating grease. Oils and greases shall be fluorocarbon. Hydrocarbon oils or greases are prohibited.

3.4.4 Intimate bags for oxygen equipment bearings. Intimate bag material shall be fluorocarbon or chlorofluorocarbon film (at least 2 mils nominal thickness) that meets the liquid oxygen (LOX) impact compatibility requirements of NASA per tests specified in NASA-STD-6001. Closure shall be by heat sealing. Bags shall allow for re-closure and shall be leak-proof when resealed.

3.4.5 Unit pack bags for oxygen equipment bearings. Unit pack bags shall be as specified in 3.10.7.3.

3.5 Instrument and instrument precision ball bearings.

3.5.1 Environment and process cleanliness of cleaning and drying areas. Cleaning and drying areas are defined as those areas in which bearings are subjected to the cleaning and drying processes. Requirements of Class 7 (previously FED-STD-209 Class 10,000) of ISO 14644-1 and ISO 14644-2 for particle count shall be met (see 4.4). The temperature shall be maintained at $73^{o} \pm 5$ ºF with a maximum relative humidity (R.H.) of 45 percent.

3.5.2 Cleaning and drying of open non-lubricated instrument and instrument precision ball bearings. The bearings shall be cleaned and dried by any process or processes that are not injurious to the item (see 3.3.3). The use of chlorinated and fluorinated solvents, and acetone and aqueous washes and other suitable non-ozone-depleting solvents (ODSs) are permitted. Solutions used to clean barrier film coated bearings shall be stored separate from solutions used to clean non-barrier film coated bearings. A barrier film coated bearing shall not be processed through the regular bearing cleaning area. Procedures for packaging barrier coated bearings are specified in SAE AS13341 and these procedures shall be followed. Bearings shall be thoroughly dried prior to lubrication and intimate wrapping.

3.5.3 Preservation and unit packaging area environment and process. The working area shall be well illuminated and air conditioned. Requirements of Class 7 of ISO 14644-1 and ISO 14644-2 shall be met (see 4.4). When bearings are dry, they shall be preserved, lubricated, and intimate packaged in a continuous process under a Class 5 (previously FED-STD-209 Class 100) environment. Any transfer out of the Class 5 environment after the preservation process has begun shall require that the bearings be placed in clean dust excluding containers. The unit packaging area (e.g. secondary bagging) shall be well illuminated, clean, dry, and in an air-conditioned environment. The presence of dust and dirt providing sources shall be kept to a minimum. When bearings have been intimate wrapped in Nylon 6 material, they shall remain in the controlled environment described in 3.5.1 until the bearings are enclosed within the unit pack bag.

3.5.4 Method 40B preservation area environment, cleaning and drying areas, and process controls. Working area environment and process control for Method 40B bearings shall conform to 3.5.1, 3.5.2, and 3.5.3.

3.6 General purpose and precision bearings.

3.6.1 Environment and process cleanliness of cleaning and drying areas. The presence of dust and dirt producing sources, such as cartons, trash barrels, shall be kept at a minimum. Smoking, eating, and drinking shall not be permitted in the cleaning and drying areas. Cleaning and drying areas are defined as those areas within a 10-foot radius of the cleaning and drying equipment, including aisles.

3.6.2 Preservation and unit packaging area environment and process control. The working area shall be well illuminated. Requirements of Class 8 (previously FED-STD-209 Class 100,000) of ISO 14644-1 and ISO 14644-2 shall be met for the preserving, intimate bagging, or intimate wrapping processes (see 4.4). The temperature shall be maintained at $73^{o} \pm 5$ ºF with a maximum R.H. of 45 percent. Area control shall be in accordance with 3.6.1. Bearings shall be preserved and transferred to the unit packaging area in a continuous process. Delays shall be minimized. Bearings waiting to be preserved or lubricated shall be kept in covered containers, or suitable rust preservatives or humidity chambers to avoid corrosion. Bearings shall be reprocessed if they become contaminated. Preserved bearings shall immediately be transferred (after insertion of seals or shields) to the unit packaging area in a clean dust excluding compatible containers. The unit packaging area (e.g. secondary bagging) shall be well illuminated, clean, dry, and in an air conditioned environment. The presence of dust and dirt providing sources shall be kept to a minimum.

3.6.3 Cleaning. Open non-lubricated bearings shall be cleaned by any process or combination of processes that will accomplish thorough cleaning without damage to the item. Agitation tanks and commercial filtration systems shall be used. Spray washes and ultrasonic cleaning are permitted. Prior to lubrication and wrapping, bearings shall be thoroughly cleaned and shall be free of any chemical or particulate residue that will have a detrimental effect on the life of the bearing. The cleaning system shall be capable of cleaning bearings to the requirements of 4.4.4. Written procedures shall be established for planned maintenance and checks of the cleaning and drying systems. At a minimum, the procedures shall include machinery cleanliness, filter maintenance, cleaning fluid quality and cleanliness, replacement or replenishment of fluids, and the frequency of such maintenance and checks.

3.6.4 Method 40B preservation area environment, cleaning and drying areas, and process controls. Working area environment and process control for Method 40B bearings shall conform to 3.6.1, 3.6.2, and 3.6.3.

3.7 Bearings, plain, rod end, self-aligning, self-lubricating, SAE AS81935, bearings, sleeve, plain and flanged, self-lubricating, SAE AS81934, bearings, plain, self-aligning, self-lubricating, low speed oscillation, SAE AS81820, and similar airframe products.

3.7.1 Environment and process cleanliness of cleaning and drying areas. The presence of dust and dirt producing sources, such as cartons, trash barrels, shall be kept at a minimum. Smoking, eating, and drinking shall not be permitted in the cleaning and drying areas. Cleaning and drying areas are defined as those areas within a 10-foot radius of the cleaning and drying equipment, including aisles. The area for the self-lubricating plain bearings shall be maintained at a temperature of 75° ± 10 ºF with a maximum R.H. of 75 percent. The enclosed atmosphere shall be well ventilated and maintained so that the particle count is 2500 maximum of 5 microns or less when measured per ASTM F 25 or ASTM F 50.

3.7.2 Preservation and unit packaging area environment and process control. The working area shall be well illuminated. The temperature shall be maintained at 75° ± 10 ºF with a maximum R.H. of 75 percent. Bearings shall be preserved and transferred to the unit packaging area in a continuous process (see 3.10.1). Delays shall be minimized. Bearings shall be reprocessed if they become contaminated. The unit packaging area shall be well illuminated, clean, and dry. The presence of dust and dirt producing sources shall be kept to a minimum.

3.7.3 Cleaning. The bearings shall be cleaned by any process or combination of processes that will accomplish thorough cleaning without damage to the item. The self-lubricating bearings shall be cleaned using established cleaning procedures. The use of filtered dry compressed air or wiping with soft clean cloth are examples of suitable processes. Cleaning solvent, grease, or oil shall not be used. Prior to wrapping, bearings shall be thoroughly dry and free of any chemical particulate residue that could have a detrimental affect on the bearing. Written procedures shall be established for planned maintenance and checks of the cleaning and drying systems and the frequency of such maintenance and checks.

3.8 Bearings, plain, self-aligning, all metal, SAE AS8976, bearings, plain, self-aligning, (BeCu Ball, CRES Race), SAE AS81936, and similar airframe products.

3.8.1 Environment and process cleanliness of cleaning and drying areas. The presence of dust and dirt producing sources, such as cartons, trash barrels, shall be kept at a minimum. Smoking, eating, and drinking shall not be permitted in the cleaning and drying areas. Cleaning and drying areas are defined as those areas within a 10-foot radius of the cleaning and drying equipment, including aisles.

3.8.2 Preservation and unit packaging area environment and process control. The working area shall be well illuminated. The temperature shall be maintained at 75° ± 10 ºF with a maximum R.H. of 75 percent. Area control shall be in accordance with 3.8.1. Bearings shall be preserved and transferred to the unit packaging area in a continuous process (see 3.10.1). Delays shall be minimized. Bearings waiting to be preserved or greased shall be kept covered as necessary to avoid contamination. Bearings shall be reprocessed if they become contaminated. Preserved bearings shall be transferred to the unit packaging area. The unit packaging area shall be well illuminated, clean, and dry. The presence of dust and dirt producing sources shall be kept to a minimum.

3.8.3 Cleaning. The bearings shall be cleaned by any process or combination of processes that will accomplish thorough cleaning without damage to the item. Agitation tanks and commercial filtration systems may be used. Spray washes and ultrasonic cleaning are permitted. Prior to wrapping, bearings shall be thoroughly cleaned and shall be free of any chemical or particulate residue that could have a detrimental effect on the life of the bearing. Written procedures shall be established for planned maintenance and checks of the cleaning and drying systems. At a minimum, the procedures shall include machinery cleanliness, filter maintenance, cleaning fluid quality and the frequency of such maintenance and checks.

3.9 Bearings, ball, airframe, antifriction, SAE AS7949, bearings, ball, rod end, self-aligning, SAE AS6039, and bearings, roller, needle, airframe, antifriction, SAE AS39901.

3.9.1 Environment and process cleanliness of cleaning and drying areas. The presence of dust and dirt producing sources, such as cartons, trash barrels, shall be kept at a minimum. Smoking, eating, and drinking shall not be permitted in the cleaning and drying areas. Cleaning and drying areas are defined as those areas within a 10-foot radius of the cleaning and drying equipment, including aisles.

3.9.2 Preservation and unit packaging area environment and process control. The working area shall be well illuminated. The temperature shall be maintained at 75° ± 10 ºF with a maximum R.H. of 75 percent. Area control shall be in accordance with 3.9.1. Bearings shall be preserved and transferred to the unit packaging area in a continuous process (see 3.10.1). Delays shall be minimized. Bearings waiting to be preserved or lubricated shall be kept in covered containers as necessary, to avoid contamination. Bearings shall be reprocessed if they become contaminated. Preserved bearings shall be transferred to the unit packaging area. The unit packaging area shall be well illuminated, clean, and dry. The presence of dust and dirt producing sources shall be kept to a minimum.

3.9.3 Cleaning. The bearings shall be cleaned by any process or combination of processes that will accomplish thorough cleaning without damage to the item. Agitation tanks

and commercial filtration systems may be used. Spray washes and ultrasonic cleaning are permitted. Bearings shall be thoroughly cleaned and shall be free of any chemical or particulate residue that will have a detrimental effect on the life of the bearing prior to lubrication and wrapping. Written procedures shall be established for planned maintenance and checks of the cleaning and drying systems. At a minimum, the procedures shall include machinery cleanliness, filter maintenance, cleaning fluid quality and cleanliness, and the frequency of such maintenance and checks.

3.10 Methods of preservation.

3.10.1 Military preservation. The military preservation procedure shall be accomplished without interruption. When interruptions are unavoidable, temporary covers or enclosures shall be provided to insure against contamination or deterioration of items.

3.10.1.1 Cleaning and drying. Open non-lubricated bearings shall be cleaned and dried by any process or combination of processes that will accomplish thorough cleaning and drying without damage to the item. Closed bearings shall not be subjected to any process injurious to internal lubrication.

3.10.1.2 Preservative applicability. When contact preservatives are required to protect the bearing, the preservatives shall be as specified in 3.3.4. The required preservative shall be uniformly applied by any applicable procedure that permits the preservative to coat all the necessary surfaces (see 3.3.4.7).

3.10.1.3 Self-lubricating bearings. Bearings shall be cleaned using the manufacturers established cleaning procedure. The use of cleaning solvents, grease, or oil is not allowed.

3.10.2 Selection of unit preservation. Unit preservation methods shall be in accordance with 3.10.3 through 3.10.14. Method 40B unit preservation is required for MIL-B-17931 bearings. Unit preservation for instrument precision ball bearings shall be Method 41B. The appropriate military methods as specified in table I shall be used for the type and size of bearings being preserved. Bearings shall be packaged individually, in pairs, or as sets. Bearing and bearing components that are bulk preserved shall be as specified in 3.10.14 and the quantity for each bulk pack shall be as specified in the contract or purchase order. Unit preservation for balls and rollers shall be Method 41B or Method 46B.

3.10.3 Method 20B - Aluminum foil wrap. After cleaning and drying, the bearings shall be coated as specified in 3.3.4.7 with the materials listed in 3.3.4. Bearings shall be securely wrapped in aluminum foil. The aluminum foil shall be in accordance with QQ-A-1876 and be 0.0015 inches thick for bearings weighing up to and including 5 pounds, and 0.0020 inches thick for bearings weighing more than 5 pounds. Bearings having a bore diameter of 3-1/2 inches or greater, or weighing over 20 pounds, shall be doughnut wrapped. Separable bearing assemblies or cup (inner) and cone (outer) combinations that measure over 2-1/2 inches outside diameter (OD) shall have aluminum foil in accordance with QQ-A-1876 placed between each part to prevent brinelling. Bearings thus treated shall be cooled to room temperature and coated with strippable compound conforming to Type II of MIL-P-149 to a minimum thickness of 0.05 inch, and over wrapped in a grease-proof barrier material conforming to MIL-PRF-121, type optional.

3.10.4 Method 32B - Container, waterproof bag, sealed. The bearings or bearing components shall be preserved as required in 3.3.4 and 3.3.4.7, and enclosed in a close fitting container (box), which in turn shall be enclosed in a sealed waterproof bag conforming to MIL-DTL-117, Type III, Class B, Style 1. The net weight limitation shall be 10 lbs without a supporting container. When A-A-3174 material is used, the net weight is restricted to 5 lbs without a supporting container. Any MIL-DTL-117 type, class, and style bag that meets or exceeds the bag specified may be used. A protective wrap of heavy-duty kraft paper or equivalent material (tape sealed) may be provided to protect the barrier material during handling and storage.

3.10.5 Method 33B - Greaseproof-waterproof bag, sealed. The bearings or bearing components shall be preserved as required in 3.3.4 and 3.3.4.7, and processed as specified in 3.1. The bearings shall be enclosed in a close fitting sealed bag conforming to MIL-DTL-117, Type II, Class C, Style 1, 2, or 3. A-A-3174 material may also be used. The net weight limitation shall be 10 lbs without a supporting container. Any MIL-DTL-117 type, class, and style bag that meets or exceeds the requirements may be used. Projections, sharp edges or other physical characteristics of the item which may damage the greaseproof-waterproof barrier or container, shall be cushioned as necessary to mitigate shock, thereby preventing physical and functional damage to the items. A carton or box may be used to effect the unit container and the primary cushioning shall be placed between the outside of the bag and the inside of the carton or box (see 3.11).

3.10.6 Method 40B - Vacuum formed plastic skin package. After required cleaning and drying (see 3.3.3), the open non-lubricated bearings shall be thoroughly coated as specified in 3.3.4.7 and enclosed in a vacuum-formed package. The plastic sheet shall be cleaned prior to draping over the bearing. The packaged bearing shall show no evidence of corrosion (see 4.3.4 or 4.3.5). Material used in forming the package shall be either cellulose acetate, cellulose acetate butyrate, or cellulose propionate (use of polyvinyl chloride (PVC) is prohibited). Material shall be sufficiently transparent to permit ease of reading and identification of bearing marking and visual examination of the exterior bearing surfaces. In packaging bearings up to 6 inches outside diameter, the plastic sheet shall have a minimum thickness of 15 mils prior to forming. The minimum thickness after forming shall be 8 mils single thickness at the outside diameter and 4 mils in the bearing bore. In packaging bearings with outside diameter over 6 inches, the sheet shall have a minimum thickness of 30 mils prior to forming. Doughnut packages shall be limited to bearings with bore diameter 1 inch or larger. Dimpling at bore shall be acceptable for all bearings and may be used as an alternate to the doughnut type pack, except that dimpling hole shall not be permitted between the inner and outer rings of any bearing.

3.10.6.1 Vacuum forming. A transparent plastic sheet shall be vacuum formed over the bearing. Single seal and single shield bearings shall be oriented with the bearing seal or shield up under the first drape. Bearings with snap rings on the outside diameter shall be oriented so that the snap ring is on the side opposite to the final seal.

3.10.6.2 Sealing. Plastic shall be sealed at the base edge with a cellulose acetate base of acetone. Flange type seals are not permitted. Seal shall be positive and shall not impair the

transparency of the package. Small air bubbles formed in the closing shall not be cause for rejection.

3.10.7 Method 41B - Water-vaporproof bag, sealed. After required cleaning and drying (see 3.3.3 and 3.5), the bearings or bearing components shall be coated as specified in 3.3.4.7. Bearings shall then be wrapped or bagged with the material specified in 3.10.7.1 or 3.10.7.2 as appropriate, and closure completed by means of heat sealing. The bearings shall then be placed individually into a water-vapor proof bag in accordance with MIL-DTL-117, Type I or II, Class E, Style 1, 2, or 3. Entrapped air shall be exhausted from the bag by any suitable means but not to the point where undo stress is placed upon the barrier and then the bag shall be heat-sealed. Strength of the heat seals shall be as specified in 4.3.3, based upon samples made on production packaging equipment. A carton or box shall be used to complete the unit container (see 3.11).

3.10.7.1 Intimate bags for instrument and instrument precision ball bearings for Method 41B. All intimate bags for instrument and instrument precision ball bearings shall be nylon 6 at least 2 mils nominal thickness, certified as meeting Food and Drug Administration (FDA) requirements for direct contact with food, in accordance with 21 CFR 177.1500, transparent, and cleaned to NASA JPG 5322.1, Level 100. Alternate bags in accordance with MIL-DTL-117, Type I or II, Class E, any style, cleaned to NASA JPG 5322.1, Level 100, may be used. Intimate bags shall be heat sealed so as to prevent free movement of the bearing inside the bag. Sealing shall take place in an environment meeting the requirements of ISO 14644-1 and ISO 14644-2, Class 5. Bags shall allow for re-closure and shall be leak-proof when resealed. Nylon 6 bags are moisture sensitive and all unused bags shall be stored in the clean room with temperature and humidity controls (see 3.5.1). Once bearings are sealed within nylon 6 bags they shall remain in the temperature and humidity controlled Class 7 area until closure is made within the unit pack bag (see 3.10.7.3).

3.10.7.2 Intimate bags for general purpose and precision bearings for Method 41B. The intimate bag material shall be 2 mils nominal thickness nylon 6 or at least 4 mils nominal thickness polyethylene in accordance with A-A-3174, Type I or II. When A-A-3174 material is used, the net weight is restricted to 5 lbs. Transparent materials are desirable but not mandatory. Intimate bags for general purpose and precision bearings shall be cleaned to the requirements of NASA JPG 5322.1, Level 100. Alternate bags in accordance with MIL-DTL-117, Type I or II, Class E, any style, cleaned to NASA JPG 5322.1, Level 100, may be used. Bags shall allow for re-closure and shall be leak-proof when resealed. Nylon 6 bags are moisture sensitive and all unused bags shall be stored in the clean room with temperature and humidity controls (see 3.6.2). Once bearings are sealed within nylon 6 bags they shall remain in the temperature and humidity controlled area until closure is made within the unit pack bag (see 3.10.7.3).

3.10.7.3 Unit pack bag for Method 41B. Unit pack bags for instrument, instrument precision and general bearings shall be MIL-PRF-22191, Type I, material heat-sealed. Alternate bags meeting the requirements of MIL-DTL-117, Type I or II, Class E, any style, may be used. Bags shall allow for re-closure and shall be leak-proof when resealed. A carton or box shall be used to complete the unit container (see 3.11).

3.10.8 Method 44B - Vials (plastic), sealed. Bearings or bearing components shall be fully immersed in preservative compound as required in 3.3.4 and 3.3.4.7, and enclosed within a

sealed rigid container of extruded plastic (use of PVC is prohibited) resistant to the particular lubricant or preservative being utilized. The container wall thickness shall be 0.030 inches minimum and length shall not exceed 10 inches. The size of the vial shall be such as to provide minimum weight and cube, permitting not less than 0.010 inch play between bearings or bearing parts and inside diameter of the vial. In filling the container, a five-percent minimum void shall be provided to permit thermal expansion. Vials shall be initially closed by a secure leak proof closure. Vials shall allow for re-closure and need to be leak proof when re-closed.

3.10.9 Method 45B - Rigid metal container, sealed. The bearings, preserved, wrapped, and cushioned as specified in 3.10.6, shall be snugly enclosed in a sealed rigid metal container. Any selected type of rigid metal container listed in PPP-C-96 may be used if the container meets one of the test requirements of Method 5009 in MIL-STD-3010. When specified in the contract or purchase order, the metal container may be vacuumed sealed.

3.10.10 Method 46B - Vials (plastic), sealed. After cleaning and drying, the bearings, balls, or rollers shall be coated as specified in 3.3.4.7. Bearings or balls shall be seperated by nylon 6 spacers or tightly wrapped with nylon 6 material. Wraps shall be made secure either by heat sealing or folding, followed by insertion into vials specified in 3.10.8. Each vial shall have been cleaned with a blast of dry nitrogen, by vacuum, or solvent washed before inserting the contents. Additional dunnage of nylon 6 shall be used when necessary to prevent movement of the bearings, balls, or rollers within the vial. The vial closure seal shall provide a water vapor transmission rate (WVTR) equal to the vial material. Vials shall allow for re-closure and shall be leak proof when re-closed.

3.10.11 Method 49B - Greaseproof spiral wrap, hot wax coating. After cleaning and drying, bearings shall be dip preserved or lubricated with the bearing operating fluid. The bearings shall be wrapped in a greaseproof spiral inner wrap and over wrapped with self-adhering greaseproof spiral wrap. The external surface of the over wrap shall be coated with hot wax. The unit shall be cushioned and unit packaged in a container of fiberboard or wood (see 3.11).

3.10.11.1 Intimate wrapping of large bearings either 16 inches outside diameter or greater than 10 pounds for Method 49B. Bearing shall be wrapped with an intimate wrap of material in accordance with MIL-PRF-121, Type I or II (greaseproof), and shall be wound in a spiral fashion from inside diameter to outside diameter to inside diameter. An over-wrap of material in accordance with MIL-PRF-121, Type I or II, shall be applied in a spiral fashion and in the opposite direction of the intimate wrap. Hot wax shall be applied to the entire surface of the wrapped bearing. The hot wax shall be applied with a brush in order to form a seal as water-vaporproof and waterproof as possible. Method 41B is an acceptable alternative to Method 49B, however, the intimate wrap bag shall be at least 4 mils nominal thickness (type, Spun Bonded Polyolefin); and the unit pack bag shall be MIL-DTL-117, Type I, heavy duty.

3.10.12 Method 52B - Container, water-vaporproof bag, sealed container. The bearings or bearing components shall be preserved as specified in 3.3.4 and 3.3.4.7 and comply with the requirements of Method 50 of MIL-STD-2073-1. The bearings shall also be wrapped and enclosed in a close fitting box conforming to PPP-B-566 or PPP-B-676. The box shall be desiccated with activated desiccant conforming to MIL-D-3464, Type I. The quantity of

desiccant shall be determined in accordance with section 5 of MIL-STD-2073-1. The desiccant shall not be permitted to come in direct contact with critical surfaces of the bearings. The desiccant shall be located as to not be load-carrying. The box shall be enclosed in a heat sealed bag conforming to MIL-DTL-117, Type I or II, Class E, Style 1, 2, or 3. A-A-3174 material may also be used. The sealed bags shall be enclosed in an outer container conforming to ASTM D 5118/D 5118M or ASTM D 5168 as applicable. Closure of the container shall be in accordance with ASTM D 1974.

3.10.13 Method 54B - Rigid container (other than metal), sealed. Bearings or bearing components shall be preserved as specified in 3.3.4 and 3.3.4.7, processed in accordance with 3.1 and comply with the requirements of Method 50 of MIL-STD-2073-1. Bearings not exceeding 20 pounds, preserved, wrapped, cushioned, and desiccated as required in 3.10.14, shall be enclosed in a sealed close fitting, rigid container other than all metal. When a greaseproof liner is required, liner material shall conform to MIL-L-45973. For heavier items, fiber containers conforming to PPP-D-723, Type III, Grade A, Class 2, may be used. Sealed rigid containers other than all metal may be used if the container meets one of the test requirements of Method 5009 in MIL-STD-3010. The container may be vacuumed sealed.

3.10.14 Method 55B - Bulk quantities only. In addition to the requirements of Method 50 of MIL-STD-2073-1, bearings or bearing components shall be packaged utilizing the container specified in 3.11. Bearings shall be coated as specified (see 3.3.4.7) prior to intimately wrapping each bearing with nylon 6 or other suitable clean material in accordance with MIL-PRF-131, MIL-PRF-121, or MIL-PRF-22191. Prior to wrapping, the bearings shall be drained of all excess preservative. Bearings shall be secured in place in a manner devised by the contractor. Activated desiccant shall be used as required and shall be evenly distributed among the bearings. Desiccant shall not come in direct contact with the bearing surfaces (see 3.10.14.1). The size of the container shall be minimized, consistent with the quantity and weight of the bearings packed therein. The quantity of bearings shall be such that the gross weight shall not exceed 70 pounds. Additional over packing is not required. All unit packs shall include a humidity indicator.

3.10.14.1 Desiccant (activated). The bagged activated desiccant shall conform to MIL-D-3464. Type I shall be used unless Type II or Type III is specified or required because of special characteristics of the item (see 6.2). The desiccant shall be located in the pack in a place most accessible to voids in the item or pack interior. Desiccant bags shall be secured within the unit pack by tying, taping, etc., or in specially designated desiccant baskets affixed to the container interior. Desiccant shall be adequately secured so as to prevent its shifting or movement and under no circumstances be permitted to come in direct contact with critical surfaces of the enclosed item. When direct contact is absolutely unavoidable, the desiccant shall be isolated from the item with MIL-PRF-121, Type I or II, barrier material. The desiccant shall not be unnecessarily exposed to the ambient environment when removed from the vaporproof desiccant storage container. Removal of the desiccant and its insertion into the unit pack shall be the last action prior to effecting the final seal of the bag or container.

3.10.14.2 Quantity of desiccant. The minimum quantity of desiccant to be used per a unit pack shall be computed in accordance with either Formula I or II as specified in section 5 of MIL-STD-2073-1.

3.10.14.3 Humidity indicators. Humidity indicators shall be as specified in section 5 of MIL-STD-2073-1.

3.11 Containers for bearings. Container selection shall be determined by the size and weight of the bearings, for example, fiberboard box, cleated plywood, nailed box, metal drum, or wood crate. Containers for large bearings shall have sufficient strength to withstand the forces exerted on the container during handling. Dunnage shall be used to prevent movement of the bearing within the container.

3.11.1 Unit containers. Bearings and components larger than 1.625 inches or 40 millimeter outside diameter, unit protected in accordance with Methods 20B, 40B, and 41B, shall be individually packaged in a unit container. The quantity unit pack (QUP) for large bearings shall be one each due to their fragile nature (brinelling). Items packed in vials in accordance with preservation Methods 44B or 46B may have more than one item in a vial. Items in kits shall indicate one each, regardless of the quantity of items contained in the kit. Bearings 1.625 inches outside diameter and smaller shall not be packaged with more than 25 per unit container. The specified QUP of the contract or purchase order shall govern. Unit containers shall conform to PPP-B-566 or PPP-B-676 for contents not exceeding 5 pounds and ASTM D 5118/D 5118M for contents in excess of 5 pounds.

3.11.2 Closure/sealing of unit container. Unit packs shall be closed as specified in the appendices or notes of the applicable container specifications by use of tape, stitching, staples, or fasteners. When Level A packaging is specified and ASTM D 5118/D 5118M class weather resistant or class domestic boxes are intermediate packed, weather resistant boxes shall be closed by any method in accordance with ASTM D 1974. Boxes shall be sealed with tape applied over all external seams, corners, staples, and joints of the box. The tape shall be centered over the seams and extend over the corners and edges of the box. Vial closures shall be in accordance with 3.10.8 and 3.10.10.

3.11.3 Intermediate container. Unless excepted by 3.11.4 or unless otherwise specified (see 6.2), unit packs shall be intermediate packed. Intermediate containers shall provide a snug fit for contents and shall contain identical items only. The applicable container specification or a limit of 20 pounds shall govern gross weight of intermediate packs, whichever is smaller. Unit packs shall be placed in the intermediate containers in an upright position, or a position that will preclude possible brinelling of the packed bearings. For Methods 44B and 46B, fiberboard separators of material conforming to ASTM D 4727/D 4727M shall be provided to separate unit packs both horizontally and vertically. Intermediate packs shall be marked to indicate the top of the container.

3.11.4 Exceptions. Intermediate containers shall not be required when any of the following apply:

a) Commercial packing is required.

b) Shipments do not exceed 20 pounds gross weight.

c) Packs include a carton conforming to ASTM D 5118/D 5118M as the unit package.

3.11.5 Intermediate container when Level A packing is specified. Intermediate containers shall be as specified in 3.11.3. Containers shall conform to ASTM D 5118/D 5118M (class weather resistant). Containers shall be closed and sealed using any method specified in ASTM D 1974 and 3.11.2.

3.11.6 Intermediate container when Level B packing is specified. Intermediate containers shall be as specified in 3.11.3. Containers shall conform to PPP-B-566, ASTM D 5118/D 5118M (class domestic), or PPP-B-676. Container closure shall be in accordance with the applicable specification and ASTM D 1974.

3.11.7 Cushioning and dunnage materials. The use of excelsior, newspaper, shredded paper (all types), and similar hygroscopic or non-neutral materials and all types of loose fill materials for applications such as cushioning, fill, stuffing, and dunnage is prohibited. The following materials are acceptable for use for cushioning and dunnage for bearing containers: PPP-C-795, PPP-C-1120, MIL-P-130, MIL-P-17667, MIL-PRF-20092, MIL-PRF-26514, MIL-PRF-83671, and ASTM D 6576. The acceptable material thickness shall be found in MIL-STD-2073-1. Additional materials listed in MIL-STD-2073-1 may be selected for cushioning and dunnage as acceptable alternate materials.

3.12 Marking for shipment and storage.

3.12.1 Levels A and B. Interior (unit and intermediate) packages, exterior shipping containers, and palletized unit loads shall be marked in accordance with MIL-STD-129.

3.12.2 Method 41B marking. Bearings unit protected in accordance with Method 41B shall have the barrier bag and unit container marked in accordance with MIL-STD-129.

3.12.3 Bar coding. Unless otherwise specified (see 6.2), bar code markings shall be applied on interior (unit and intermediate) packs, exterior shipping containers, and palletized unit loads, in accordance with MIL-STD-129.

3.12.4 Precautionary marking. One of the following markings shall appear on one side of each unit, intermediate, and exterior packing as applicable:

a) For lubricated bearings:

"PACKAGED MIL-DTL-197
LUBRICATED WITH (SPECIFICATION NUMBER)"

b) For preserved bearings:

"PACKAGED MIL-DTL-197
PRESERVED WITH (SPECIFICATION NUMBER)
CLEAN AND LUBRICATE PRIOR TO USE AS REQUIRED"

c) For barrier film coated bearings:

"PACKAGED MIL-DTL-197
LUBRICATED WITH (SPECIFICATION NUMBER) BARRIER FILM COATED"

d) For oxygen equipment bearings:

"PACKAGED.....MIL-DTL-197
LIQUID OXYGEN/GASEOUS OXYGEN SYSTEM"
(Special marking and labeling in accordance with MIL-I-52211 also required)

3.12.5 Special marking requirement bearings. Special circumstances may require special marking. For example, bearings may be acquired for a special project code or a shelf life may be required for the lubrication in the bearing. Such bearings or bearing components as identified in the contract or purchase order, would require marking in accordance with contract requirements.

3.12.6 Method 20B. In addition to the required markings on containers, bearings unit protected to Method 20B shall be labeled as follows:

a) A label shall be affixed to the outermost circumference (tapered rollers may be packed separately) of the bearing after the bearing has been foil wrapped.

b) Printing on the label shall be readable through the strippable compound applied at the hot dip operation.

3.12.7 Method 40B labeling. In addition to required markings on containers, bearings unit protected to Method 40B shall be permanently marked with the NSN and date packaged. The marking may be printed directly onto the plastic or may be applied as a label. The label, if used, shall be compatible with the plastic and shall not be affected by the lubricant or preservative compound. Labels shall be sealed between layers of the transparent material around the outer circumference of the bearing. If the label obscures more than 50 percent of the outer circumference of the bearing, it shall be of a transparent material.

3.12.8 Workmanship. Workmanship shall be such that when the proper process and procedure are followed, materials and items shall be protected against corrosion, deterioration, and damage during handling, shipment, storage, and require minimum processing for service.

3.12.9 Lot numbers. Bearing manufacturers lot number(s) shall be shown on the unit and exterior container labels for every lot of packaged bearings. Lot numbers are not required when bearings are serialized (see 3.12.10).

3.12.10 Serial numbers. Bearing serial numbers shall be shown on the unit marking label as well as on the bearings.

3.12.11 Matched sets. Individually packaged bearings constituting a set shall be taped together with transparent pressure-sensitive tape before the insertion into the unit package or heat sealed together as a set, or individual unit package of a set shall be taped together so markings

are not obscured. In all cases, the unit package shall have the following warning: "Matched Set, Do Not Separate".

3.12.12 Bearing nomenclature marking. The bearing nomenclature, as specified on the contract or purchase order, shall be included on the packaging and packing container.

3.12.13 Preservation method marking. The preservation method code shall be marked on the unit pack label in accordance with MIL-STD-129.

4. VERIFICATIONS

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

a) Conformance inspections (see 4.1.1).

b) Quality system (see 4.2).

c) Tests (see 4.3).

4.1.1 Conformance inspections. The conformance inspection shall consist of the inspections and examinations as applicable for the methods used for the characteristics shown in paragraph 4.1.1.1 through 4.1.1.8 and table III. Quality conformance inspection shall be performed on every lot of packaged bearings acquired under this specification. A lot may also consist of one day's production or processing of bearings, regardless of bearing dimensions, subject to the same packaging method and cleanliness level. As a minimum, the contractor shall randomly select a sample quantity from each lot of completed packages in accordance with table IV's code letter A. If one or more defects are found in any sample, the entire lot or entire days production shall be rejected. The contractor has the option of screening 100 percent of the lot for the defective characteristics or providing a new lot, which shall be inspected in accordance with the sampling plan, contained herein.

4.1.1.1 Materials. All materials to be used in the packaging and lubricants shall be inspected in accordance with the applicable material specification and the cleanliness levels of this specification, or certified inspection and laboratory test reports shall be provided which show that materials as furnished conforms to the detailed specification.

TABLE III. Examination.

Examination	Requirement
Visual examination	4.1.1.2 4.1.1.3
Marking examination	4.1.1.4
Method of preservation	4.1.1.5
Level of packing	4.1.1.6
Magnetism	4.1.1.7
Requirements for method	4.1.1.8

TABLE IV. Sample size for conformance inspection and tests.

Lot Size	Sample size		
	Sampling plan		
	Code letter A	Code letter B	Code letter C
2 to 8	2	1/	2/
9 to 15	2	1/	2/
14 to 25	3	1/	2/
26 to 50	5	1/	2/
51 to 90	5	1/	2/
91 to 150	6	1/	2/
151 to 280	7	1/	2/
281 to 500	9	1/	2/
501 to 1200	11	1/	2/
1201 to 3200	13	1/	2/
3201 to 10,000	15	1/	2/

NOTES:

1/ Sampling for fingerprint corrosion and cleanliness test. A daily sample shall be tested for fingerprint corrosion and cleanliness in accordance with 4.3.1 (not applicable to ceramic materials). Samples shall be one of the following:

a) Five panels fabricated of the same material as the bearing outer ring and having the same surface finish as the bearing outer ring.

b) Five bearings or bearing outer rings selected at random which are classified as "scrap" or "reject", but whose surfaces are adequate for the purpose of this test.

2/ Sampling for corrosion test (Method 40B). Two packages prepared by the same production procedures as the packages being offered for acceptance shall be selected at random as often as necessary for the test of 4.3.5. Material contained in the packages may be as specified in 1/. This shall be a continuous test and packages shall be examined daily. A new set of test packages shall be placed under test every week (168 hours) unless a failure is noted prior to the end of the 168-hour period. If a failure (any corrosion) is noted prior to the end of the 168-hour period, a new package, or packages, as applicable, shall be placed under test immediately and packaging by the method represented by the failure shall be stopped. All items packaged by the method represented, which have not already been shipped, shall be rejected. After the correction of procedural deficiencies, the rejected material shall be reprocessed, repackaged, re-sampled, and re-tested. This test is for process control only and shall not effect material already shipped.

4.1.1.2 Visual examination. Each of the sample packages selected in accordance with 4.1.1 shall be visually examined to verify compliance with the requirements of this specification.

4.1.1.3 Visual examination under magnification. Instrument and instrument precision ball bearings packaged in transparent materials shall be visually examined under a 10X scope through the package for contamination within the bearing or the package prior to shipment. Other bearings as applicable shall be examined visually through the transparent package for contamination. The use of a 2X scope may be used in the event the transparent material is cloudy.

4.1.1.4 Marking examination. Unit, intermediate, and exterior packages shall be examined to determine compliance with the marking requirements specified in 3.12.1 through 3.12.13.

4.1.1.5 Method of preservation. Military method used is in accordance with contract or purchase order requirements and the requirements of this specification.

4.1.1.6 Level of packing. Level of packing shall be A or B, as specified in the contract or purchase order (see 6.2).

4.1.1.7 Magnetism. Magnetism of bearing does not exceed the specified level for the preservation method used (see 3.3.3).

4.1.1.8 Requirements for method. Verify the requirements of section 3 have been accomplished for the preservation method utilized.

4.2 Quality system. The contractor shall implement and maintain a quality system that satisfies program objectives and meets the test, examination, and inspection requirements.

4.3 Test methods. Table V shows the tests required for each applicable method. The sampling requirements are also identified.

TABLE V. Tests applicable to each method of unit preservation.

Inspection/test	Method no.											
	20B	32B	33B	40B	41B	44B	45B	46B	49B	52B & 55B	54B	Sample Plan
Leakage (4.3.3)	--	X 1/	X 1/	--	X	X	--	--	--	X 1/	X	A
Heat sealed seam test (4.3.3)	--	X	X	--	X	--	--	--	--	X	X	A
Fingerprint corrosion & cleanliness test (4.3.4)	X 2/	X 2/	X 2/	X 2/	X 2/	X 2/	X 2/	X 2/	X 2/	X 2/	X 2/	B
Corrosion (4.3.5)	--	--	--	X	--	--	--	--	--	--	--	C

1/ Leakage test is not required for bulk quantities
2/ Plain self-lubricating bearings, sleeves, rod ends shall not require the fingerprint corrosion test.

4.3.1 Daily sample for corrosion test and fingerprint corrosion test. A daily sample shall consist of one day's production or processing of bearings, regardless of bearing dimensions and subject to the same packaging method and cleanliness level (see footnotes 1/ and 2/ of table IV).

4.3.2 Sample for heat seal test. Samples from each heat sealer shall be tested daily with each type of materials used. If the heat sealer is dedicated to a specific material and the temperature setting is not changed, the sealer may be tested monthly. The monthly testing shall not be started until thirty days of continuous testing results with no failures. A log shall be maintained for recording the results of this test by heat sealer. Sealers tested shall be selected from intimate pack, primary and secondary pack areas.

4.3.3 Leakage and heat-sealed seam tests. The leakage and heat sealed seam test shall be in accordance with Methods 5009 and 2024 of MIL-STD-3010. Bag heat seals shall be checked/tested daily.

a. The leakage tests shall be performed in accordance with Method 5009 of MIL-STD-3010. The requirement for the technique used for this test shall depend on the method of preservation utilized in the packaging process. It is possible that the contractor will use one or more techniques in performing the leakage test.

b. The heat seal seam test shall be conducted in accordance with Method 2024 of MIL-STD-3010. In addition, the test shall be performed at room temperature using a static load weight as specified herein. When the barrier materials conform to A-A-3174, MIL-PRF-121, MIL-PRF-131, or MIL-PRF-22191, the static load weight shall be 56 ounces ± 1/2 ounce. Heat seals shall not separate during the final 3 minutes of the test. Partial separation in the area of partial fusion adjacent to the actual seam is acceptable within the first two minutes of the test. The weight shall be allowed to act for a minimum of 5 minutes.

4.3.4 Fingerprint corrosion and cleanliness test. Sample specimens shall be selected in accordance with 4.3.1 and footnote 1/ of table IV. Samples shall be cleaned and dried in accordance with 3.3.3, 3.4.2, 3.5.2, and 3.6.3 along with the production lot. The test shall be performed by suspending the unpacked samples in the air over the water in a static humidity chamber at 75 ± 5 °F for 24 hours. If no corrosion is seen without visual aid at the conclusion of the test, satisfactory cleanliness has been achieved.

4.3.5 Corrosion test. Packaged bearings, selected in accordance with 4.3.1 and footnote 2/ of table IV, shall be exposed for 1 week (168 hours) at 90 ± 5 percent R.H. at 120 °F ± 5°. If no corrosion is seen without visual aid at the conclusion of the test, satisfactory preservation and packaging has been achieved.

4.4 Atmosphere in work rooms.

4.4.1 Temperature, humidity, and airborne particle count. Relative humidity and temperature for workrooms shall be tested daily for conformance to 3.5.1, 3.6.2, 3.6.4, 3.7.1, 3.7.2, 3.8.2, and 3.9.2. Recorders shall be installed to record the temperature and humidity on a 24-hour 7-day week basis. Testing for airborne particle count shall be performed on a quarterly basis in accordance with Class 5, Class 7, and Class 8 of ISO 14644-1 and ISO 14644-2. Applicable workrooms shall be tested in accordance with 4.4.3.1 quarterly to determine conformance to these requirements.

4.4.2 Equipment calibration. Equipment used to control and monitor clean room and work station condition shall be calibrated annually.

4.4.3 Environment and process cleanliness tests.

4.4.3.1 Clean room environment test (airborne particle counting methods). This test shall be conducted in accordance with ISO 14644-1 and ISO 14644-2.

4.4.4 Cleanliness of general purpose and precision bearings manufactured to ABEC or RBEC 3 or better, excluding 5T for torque and extra thin bearings. Contamination on cleaned or preserved bearings visible to the unaided eye is unacceptable. Verification of abrasive or metal

(except silver) particles may be accomplished by the following or equivalent method. Flush the bearing with solvent capable of dissolving the preservative or lubricant. The solvent used to flush the bearing shall be filtered through a one-inch diameter 0.5 micron absolute filter, or finer, marked in 1/8 inch by 1/8 inch grids, in accordance with ASTM F 311. The filter shall be inspected in accordance with ASTM F 312, Method B, for particle abrasive or metal (except silver) contamination to the acceptability limits below. Cause and corrective action is required for any failure of this test.

Particle size range (inches)	Maximum allowable number of particles
0.002 to 0.005	15 max allowable per 4 random grid squares
>0.005 to 0.010	10 entire filter
>0.005	0 entire filter

5. PACKAGING. This section is not applicable to this specification.

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 specification is intended for use as a reference in section 5 of bearing commodity specifications and for direct reference in acquisition documents. It is intended to furnish direction in the packaging of bearings at military and other government activities and at plants of commercial subcontractors. The packaging requirements specified herein are intended to ensure proper and safe transportation, storage, and stowage of bearings for shipment to government activities.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Lubricant or preservative compound (see 3.3.4.7).
c. Operational lubricant (grease or oil), if required (see 3.3.4.7).
d. Preservation method (see 3.10).
e. Type II or III desiccant, if required (see 3.10.14.1).
f. Unit packs, if different than intermediate (see 3.11.3).
g. Bar coding, if different (see 3.12.3).
h. Level of packing (see 4.1.1.6).

6.3 Cleanliness.

6.3.1 Cleaning the exterior of the bearing package before opening. This note is directed particularly toward instrument precision ball bearings, although it can apply generally to all types. After the bearings have been properly packaged under clean room conditions, the exterior of the package may become dirty. Containers and packages frequently generate small amounts of static electricity that attracts dirt and dust particles, and contamination adheres to the package. Particularly for instrument precision ball bearings, control should be established to clean the exterior parts of the package before entry into the processing area. A recommended method is to

have the package blasted with absolutely clean dry air or remove static electricity charge with an appropriate solvent. Once entering the processing area and placed in a laminar flow hood, the package should be washed again with the appropriate solvent for approximately 5 to 10 seconds to remove exterior contaminants before being placed in a clean container ready to be cut open. The package should be opened carefully so that there will be no chips of the packaging material generated and the bearing should be removed with tweezers, or suitable handling tools. Bearings should never be handled with bare hands or fingers.

6.3.2 Visual inspection of bearings before installation. The bearings should be inspected under suitable lighting conditions to assure that bearings are free from contamination, corrosion, and rust prior to installation. Bearings should be handled in a manner that does not result in contamination.

6.3.3 Bearing cleanliness. Cleaning is a most important part of bearing preservation. It is essential that the cleaning method not leave residues that either may react unfavorably with the preservative, lubricant, or packing material, or may be unstable and decompose to form corrosive residues.

6.3.4 Bearing (support item). When bearings are acquired by equipment contractors for subsequent delivery to the Government as spares, proof of conformance to the provisions of this document by the bearing manufacturer, including the environment and process cleanliness provisions of 4.4.4, may serve as the basis for government acceptance.

6.3.5 Air cleanliness classes. The information contained in ISO 14644-1 and ISO 14644-2 should be utilized to the fullest in achieving and maintaining the air cleanliness classes required herein for clean rooms and work stations.

6.3.6 Oxygen use bearings. Oxygen use bearings must be free of any contamination by hydrocarbons. Hydrocarbons in the form of oil, grease, lint, debris, or combustible foreign matter create explosion hazards in the presence of oxygen.

6.4 Lubricant information. Item description requirements include lubrication requirements as may be cited in the bearing item description, original equipment manufacturer (OEM) or military drawing, military/federal specification, commercial item description (CID), or bearing manufacturer's part number (see 3.3.4).

6.4.1 Lubricant certification. Lubricants used to preserve bearings in accordance with this document should be certified to meet all requirements of the appropriate lubricant specification. Re-certification of lubricants should occur at 2 years for organic based oils, 3 years for organic based greases, and 5 years for silicone and perfluorinated oils and greases. MIL-STD-3004 provides the test requirements for re-certification of most lubricants.

6.5 Definitions.

6.5.1 Annular Bearing Engineers Committee (ABEC). The class or degree of precision of ball bearings. See ABMA 20, ABMA 12.1, and ABMA 12.2.

6.5.2 ABMA. American Bearing Manufacturers Association.

6.5.3 Bearing closure. Bearing closure is defined in accordance with 6.5.4 and 6.5.10.

6.5.4 Closed bearings. Closed bearings are those having either seals, shields, bands, or retainment plates, or other devices completely closing both sides of bearings, or a single contact seal on one side only, rendering cleaning and re-lubrication difficult.

6.5.5 General purpose bearings. General purpose bearings are bearings which fall into the following tolerance classification: Tolerances coinciding with those of unground bearings up to and including the ABMA tolerances of ABEC 1 or RBEC 1.

6.5.6 Intimate bag/wrap. The inner bag or wrap used directly against the bearing/bearing component.

6.5.7 Instrument bearings. Instrument bearings are ball bearings with outside diameter not over 30 mm or 1.1811 inches and ABEC 3 tolerance or better.

6.5.8 Instrument precision bearings. Instrument precision bearings are ball bearings with outside diameters not over 30 mm or 1.1811 inches and ABEC tolerances of ABEC 5P, 5T, or better.

6.5.9 Large bearings. Large bearings are those bearings exceeding 16 inches outside diameter or greater than 10 pounds in weight.

6.5.10 Open bearings. Open bearings are those having a single seal, or shield, or those having no seals or shields, or those that are separable.

6.5.11 Oxygen equipment bearings. Oxygen equipment bearings are those bearings used in gaseous or liquid oxygen systems and high-pressure submersible, life support systems. They must be free from combustible materials, lubricants, or debris.

6.5.12 Precision bearings. Precision bearings are bearings manufactured to, or better than, the following ABMA tolerances:

a. ABEC 3 and RBEC 3 for metric ball and roller bearings.

b. ABEC 5T for torque tube and extra thin type bearings.

c. Class 3 for inch tapered roller bearings.

6.5.13 Preservation (unit protection). Preservation (unit protection) is the application of protective measures, barrier materials, cushioning, and containers when necessary. Preservation is the process and procedures used to protect material from deterioration and damage. It includes cleaning, drying, preserving, packing, marking, and unitization.

6.5.14 Roller Bearing Engineers Committee (RBEC). The class or degree of precision of radial roller bearings (see ABMA 20).

6.5.15 Small bearings. Small bearings are those bearings that do not exceed 16 inches outside diameter or less than 10 pounds in weight.

6.6 Cross-reference table. Table VI contains cross-reference data for the military preservation methods.

TABLE VI. Military preservation methods cross-reference.

Description of method	Method MIL-DTL-197	Method MIL-P-197	Method MIL-P-116
Physical protection of bearing	-	-	III
Bearing dipcoated with preservative, or operating lubricant followed by intimate aluminum wrap then greaseproof wrapped (see 3.10.3)	20B	A	IB2
Waterproof or waterproof-greaseproof with preservation	-	-	IC
Container, waterproof bag, sealed (see 3.10.4)	32B	-	IC2
Greaseproof-waterproof bag, sealed (see 3.10.5)	33B	-	IC1
Vacuum formed plastic skin package, bearing dipcoat preserved or lubricated (see 3.10.6)	40B	L	IA19
Bearing preserved or lubricated; wrapped; placed in water-vaporproof bag, sealed (see 3.10.7)	41B	G	IA8
Container, water-vaporproof bag, sealed container	-	-	IA14
Floating water-vaporproof bag, sealed	-	-	IA16
Vials (transparent plastic), bearings, balls or rollers immersed in preservative oil, sealed (see 3.10.8)	44B	F	IA6
Metal rigid container, sealed (see 3.10.9)	45B	-	IA5
Vials (transparent plastic), bearings, balls, or rollers dipcoat preserved or lubricated; wrapped, cushioned, sealed (see 3.10.10)	46B	H	IA13
Bearing preserved with operating fluid; wrapped in greaseproof spiral inner wrap, overwrapped with self adhering greaseproof spiral wrap; external surface coated with hot wax, cushioned, and unit packed in a container of fiberboard or wood (see 3.10.11)	49B	M	IA20
Water-vaporproof protection with desiccant	-	-	II
Water-vaporproof bag, sealed	-	-	IIc
Container, water-vaporproof bag, sealed container (see 3.10.12)	52B	B	IIb
Floating water-vaporproof bag, sealed	-	-	IIa
Rigid container (other than metal), sealed (see 3.10.13)	54B	-	IIf
Bulk quantities (see 3.10.14)	55B	B	IId

6.7 Subject term (key word) listing.

Drying
Intimate wrap
Lubricant compounds
Marking
Preservation
Preservative compounds

6.8 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.

Custodians:
Army - AR
Navy - SH
Air Force - 99

Preparing activity:
DLA - GS4

(Project PACK-1135)

Review activities:
Army - AT, SM
Navy - AS, OS, SA
Air Force - 11, 70, 84

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST database at http://assist.daps.dla.mil/.