MILITARY SPECIFICATION

BEARINGS, ANTIFRICTION; ASSOCIATED PARTS

AND SUBASSEMBLIES; PREPARATION FOR DELIVERY OF

This amendment forms a part of Military Specification MIL-B-197F, dated 1 March 1977, and is approved for use by all Departments and Agencies of the Department of Defense.

PAGE 1

1.1 and 1.2: Delete and substitute:

"1.1 Scope. This specification covers the cleaning, drying, packaging, packing, and marking of stock and production antifriction bearings. Packing methods are covered for two classes of bearings:

(a) Bearings which do not exceed either 16 inches outside diameter (o.d.) or 40 pounds weight.
(b) Bearings which exceed either of these values.

This specification also covers the processing requirements for bearing parts and subassemblies acquired as separate items."

"1.2 Classification of methods. Packaging of bearings and bearing parts shall be level A or C, as specified (see 3.3 and 6.1). Level A packaging shall be in accordance with the following methods and symbols, as specified (see 3.3.1.9 and 6.1):

Method	Symbol	Description
IA-5	C	Rigid metal container; bearing dipcoat preserved or lubricated; wrapped, cushioned, sealed.
IA-6	F	Vials (transparent plastic), bearings, balls or rollers immersed in preservative oil, vial sealed.
IA-8	G	Bearing preserved or lubricated; wrapped; placed in greaseproof, waterproof, water-vaporproof bag; sealed.
IA-13	H	Vials (transparent plastic), bearings, balls or rollers dipcoat preserved or lubricated; wrapped, cushioned, vial sealed.
IA-13	J	Fiber cans; bearings preserved, wrapped, cushioned.
IA-19	L	Vacuum formed plastic skin pack, bearing dipcoat preserved or lubricated (method IA-19 is specifically for ship bearings unless otherwise required by the contracting officer).

IA-20	M	Bearing preserved with operating fluid wrapped in greaseproof spiral inner wrap; overwrapped with self-adhering greaseproof spiral wrap; external surface coated with hot brushed-on wax, cushioned; unit packaged in a container of fiberboard or wood (see 3.4.1.2).
IB-2	A	Bearing dipcoated with preservative, or operating lubricant followed by intimate aluminum wrap, then greaseproof wrapped.
IId	B	Metal drums, bearings wrapped, desiccated (bulk)."

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2.1, "SPECIFICATIONS, FEDERAL" add: "VV-S-190 - Sealing Compound (Dipcoat)."

2.1, "SPECIFICATIONS, MILITARY": Delete reference to "MIL-B-13239" and; delete "MIL-G-24508 - Grease, High Performance, Ball and Roller Bearing.", and substitute "DOD-G-24508 - Grease, High Performance, Multi-Purpose (METRIC)."

2.1, "SPECIFICATIONS, MILITARY": Add the following:

"MIL-C-104 - Crates, Wood, Lumber and Plywood Sheathed, Nailed and Bolted.
"MIL-B-26195 - Boxes, Wood-Cleated, Skidded, Load-Bearing Base.
"MIL-G-27617 - Grease, Aircraft and Instrument, Fuel and Oxidizer Resistant.
"MIL-C-52211 - Components and Assemblies for Industrial Gas Production, Storage and Transport Equipment, Packaging of."

2.1, "STANDARDS, MILITARY" add:

"MIL-STD-1188 - Commercial Packaging of Supplies and Equipment."

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3.1, line 1: Delete "Preservation-packaging" and substitute "Packaging".

3.1.1.1: Delete and substitute:

"3.1.1.1 Prior to cleaning. Bearings shall be protected against damage and shipped to the packager with a minimum of storage and transport time. The packager shall perform cleaning, drying, and packaging operations in accordance with 3.3."

3.1.1.2: Delete and substitute:

"3.1.1.2 Prior to packaging. Preserved bearings (see 3.3.1.8), scheduled for transfer to a commercial packager, shall be placed individually or in bulk, in a clean dust-excluding container, made of or lined with antistatic nylon, mylar or other compatible materials conforming to MIL-B-81705, type II. Containers and lining shall afford protection to the bearings against damage, corrosion and deterioration when shipped in the protective container. Storage and transport time shall be held to a minimum. Intimate wrapping shall be applied in the required packaging environment."

Add as paragraph 3.1.2:

"3.1.2 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. Work benches, 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 which will prevent transferring contaminants to bearing surfaces."

3.2.1, line 1: Delete "preservation-packaging" and substitute "packaging".

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TABLE I: Delete and substitute:

"TABLE I. Lubricants and preservative compounds. 1/

Bearing class (see 6.5.1)	Bearing closure (see 6.5.2)	Lubricant or preservative compound
General purpose (ABEC 1 and less) 3/	Open	MIL-C-11796, Class 3 2/ or VV-L-800
	Closed	MIL-G-81322, DOD-G-24508
Precision (ABEC 5 and greater) 3/	Open	MIL-C-11796, Class 3 2/ or VV-L-800
	Closed	MIL-G-81322, DOD-G-24508
Instrument o.d. 1.1811 and less (ABEC 1 or ABEC 3)	Open Closed	MIL-L-6085, MIL-L-81846 MIL-G-81322, DOD-G-24508, MIL-G-81937

See footnotes at end of table.

TABLE I. Lubricants and preservative compounds. 1/ - Continued

Bearing class (see 6.5.1)	Bearing closure (see 6.5.2)	Lubricant or preservative compound
Instrument precision o.d. 1.1811 and less (ABEC 5 and greater)	Open Closed	MIL-L-6085, MIL-L-81846 MIL-G-81322, DOD-G-24508, MIL-G-81937
Oxygen Equipment (free of hydrocarbons) 3/	Open Closed	Fluorocarbon Grease MIL-G-27617
Large (over 16 inches or 3/ 40 lbs)	Open Closed	Operating Lubricant

1/ For bearings that will not tolerate preservative due to special application or otherwise specified (see 3.3.1.9).
2/ MIL-C-11796, Class 3 is recommended in accomplishing methods IA-5, IA-8, and IB-2 for open bearings. Bearings shall cool to ambient temperature before packaging.
3/ Same tolerance levels apply also to roller bearings (RBEC)."

Add as paragraph 3.2.2.1:

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

3.2.3.1, title: Delete and substitute: "Intimate wrapping for other than instrument and instrument precision ball bearings and oxygen equipment bearings."

3.2.3.2: Delete and substitute:

"3.2.3.2 Intimate wrapping for instrument precision ball bearings. Intimate wrapping materials shall be anti-static in accordance with MIL-B-81705, type II, a minimum of 2 mils thick. Materials selected and used shall be cleaned to the requirements of NASA MSC C-25, level II. A certificate of compliance for material cleanliness shall be kept on file for 5 years by the facility applying the wrapping. These films shall have antistatic properties which are a result of compounding."

Add as paragraph 3.2.3.3.1:

"3.2.3.3.1 Intimate wrapping of large bearings exceeding 16 inches o.d. and 40 pounds (method IA-20 Symbol M). Bearing shall be wrapped with an intimate wrap of material in accordance with MIL-B-121, grade A (greaseproof) and shall be wound in a spiral fashion from inside diameter (i.d.) to outside diameter (o.d.) to i.d. An overwrap of material in accordance with MIL-B-121, grade C 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 in accordance with VV-S-190. The hot wax shall be applied with a brush in order to form a seal as water vaporproof and waterproof as possible."

3.2.4: Delete and substitute:

"3.2.4 Metal cans (method IA-5). Metal cans shall conform to PPP-C-96, type I, class 1 or 2 as modified in 3.2.4.1, or MIL-C-26094. The nearest can size that will provide minimum weight and cube shall be used. Cans in accordance with MIL-C-26094 shall be provided with either a scored tear strip lid opening device or a scored key opening band near the top of the can body similar to type I, class 1 or class 2 of PPP-C-96."

3.2.6: Delete and substitute:

"3.2.6 Containers for bearings. Container selection shall be determined by the size and weight of the bearing (e.g., fiberboard box, cleated plywood, nailed box or wood crate (see 3.4.1.2)). 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. The container shall be marked in a conspicuous place with letters not less than 1/2-inch high as follows: 'Use nylon sling straps to remove bearing from container.'"

3.2.7, last sentence: Delete and substitute: "Vials shall be capable of being reclosed but need not be leakproof when reclosed."

3.2.8: Delete.

3.3: Delete and substitute:

"3.3 Cleaning, drying, and packaging. Cleaning, drying, and packaging shall be level A, or C as specified (see 6.1)."

3.3.1, line 2: Delete "preservation-packaging" and substitute "packaging".

3.3.1.1, line 2 after "instrument" add "and instrument".

Add as paragraph 3.3.1.1.1:

"3.3.1.1.1 Cleaning, drying and packaging of oxygen equipment bearings. The method of cleaning and drying as well as cleanliness classification which determines the type of inspection shall be as specified (see 6.1). Cleaning and drying of oxygen equipment shall be as specified in MIL-C-52211 and the appendix thereto. Packaging shall be level A, method IA-8G and shall include the special marking requirements of MIL-C-52211."

3.3.1.2, line 2: Delete "precision ball bearings." and substitute "and instrument precision and oxygen equipment bearings."

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3.3.1.3.1: Delete title and substitute "Cleaning of other than instrument and instrument precision ball bearings."

3.3.1.3.2: Delete title and substitute "Cleaning of instrument and instrument precision ball bearings."

3.3.1.4: Delete and substitute:

"3.3.1.4 Drying. Immediately after cleaning, bearings shall be dried. Slow rotation or oscillation methods may be used. Dried bearings shall be packaged by method IA-19. Bearings which have been processed in the environment of 3.3.1.1 shall be immediately transferred to the packaging area as they emerge from the dryer."

3.3.1.4.1: Delete title and substitute "Drying of other than instrument and instrument precision ball bearings."

3.3.1.4.2: Delete and substitute:

"3.3.1.4.2 Drying of instrument and instrument precision ball bearings. Bearings shall be dried with warm, dry air which has been filtered through a 2 micrometer filter."

3.3.1.5, lines 1 and 2: Delete and substitute:

"3.3.1.5 Packaging area environment and process control for instrument and instrument precision ball bearings and for packaging method IA-19. Packaging".

3.3.1.5.1: Delete and substitute:

"3.3.1.5.1 Unless otherwise specified (see 6.1), instrument precision ball bearings shall be wrapped in accordance with 3.2.3.2 in an environment meeting the requirements of class 100 of FED-STD-209 (see 6.7)."

3.3.1.6, line 2: Delete and substitute: "and instrument precision ball bearings and other than packaging method IA-19. Area control shall".

3.3.1.7: Delete title and substitute "Packaging area environment for other than instrument and instrument precision ball bearings and other than packaging method IA-19."

3.3.1.8: Delete and substitute:

"3.3.1.8 Application of preservative. Bearing and bearing parts shall be coated with the lubricant or preservative compound specified in 3.2.2 unless lubricant or preservative is not compatible with the applicable parts. Bearing shall be completely immersed in the preservative so as to obtain a continuous coating on all surfaces. During or after preservation with compound, the bearing shall be rotated by manual or mechanical (including centrifugal) means to insure complete internal coverage. When an operational lubricant (grease or oil) is specified, the quantity applied shall be as specified in the item description or applicable technical data associated with the assigned NSN (or other identification number when an NSN has not been assigned). When no quantity is specified, it shall be in accordance with the manufacturer's standard practice. Grease lubricated bearings shall have external surfaces coated with the specified grease."

Add as paragraph 3.3.1.8.1:

"3.3.1.8.1 For Department of the Air Force. Unless otherwise specified (see 6.1), instrument precision bearings shall be protected in storage by controlled quantities of the specified grease or oil. Preservative oils or compounds shall not be used."

3.3.1.9: Delete and substitute:

"3.3.1.9 Unit protection. Methods of unit protection shall be in accordance with 3.3.1.9.1 through 3.3.1.9.8. Unless otherwise specified (see 6.1), unit protection for instrument precision ball bearings shall be method IA-8 and for all other bearings shall be in accordance with one of the methods listed in table III for the applicable bearing size. Bearings shall be packaged individually in pairs, or as a set, as applicable. Unit quantities for bearing parts and for bulk packaging of bearings shall be as specified (see 6.1)."

TABLE III: Delete and substitute:

"TABLE III. Methods of unit protection.

Size	Open bearings		Closed bearings	
	Method	Symbol	Method	Symbol
Up to and including 1.1811 inches o.d.	IA-8	G	IA-8	G
	IA-6	F	--	-
	IA-13	H	IA-13	H
	II-d	B	II-d	B
Over 1.1811 inches but not exceeding 16 inches o.d.1/	IA-19	L	IA-19	L
			IA-5	C
	IA-8	G	IA-8	G
	IA-13	J	IA-13	J
	IA-20	M	IA-20	M
Greater than 16 inches o.d. or 40 pounds	IB-2	A	IB-2	A

1/ Method IB-2 may be used for bearings with o.d. over 4.86 inches."

3.3.1.9.2.1 and 3.3.1.9.2.2: Delete.

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3.3.1.9.3, line 4 after "fold" add "(as specified in FED-STD-75)"; at end of paragraph add "This method shall not be used on bearings that exceed 10 pounds in weight (see 3.3.1.10)."

3.3.1.9.5: Delete.

3.3.1.9.6, end of paragraph: Add "(see 3.3.1.10)".

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3.3.1.9.7, end of paragraph: Add "(see 3.3.1.10)".

3.3.1.10 and 3.3.1.10.1: Delete and substitute:

"3.3.1.10 Unit packaging. Bearings, unit protected in accordance with methods IA-8, IA-19, and IB-2 shall be individually packaged in a unit container conforming to PPP-B-566, PPP-B-665, or PPP-B-676 for contents not exceeding 5 pounds, and PPP-B-636 or PPP-B-665 for contents in excess of 5 pounds. Method IA-5 units weighing more than 5 pounds shall be individually unit packaged as specified above. All methods shall be construed as being unit packaged when properly identified.

"3.3.1.10.1 Closure of unit packs. Unit packs shall be closed as specified in the appendices or notes of the applicable container specifications. When level A packing is specified and PPP-B-636 class weather-resistant or class domestic boxes are not to be intermediate packed, weather-resistant boxes shall be closed method V and domestic boxes closed method I in accordance with the appendix to PPP-B-636. Vial closures shall be in accordance with 3.2.7."

3.3.1.11 and 3.3.1.11.1: Delete and substitute:

"3.3.1.11 Intermediate packing. Unless excepted by 3.3.1.11.1, or unless otherwise specified (see 6.1), unit packs shall be intermediate packed as specified in 3.3.1.11.2 or 3.3.1.11.3, as applicable. Intermediate containers shall provide a snug fit for contents and shall contain identical items only. Gross weight of intermediate packs shall be governed by the applicable container specification or a limit of 20 pounds, 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 IA-5 (5 pounds or less), IA-6 symbol F, and IA-13, fiberboard separators of material conforming to PPP-F-320 shall be provided to separate unit packs both horizontally and vertically. Intermediate packages shall be marked to indicate the top of the container.

"3.3.1.11.1 Exceptions. Intermediate packing shall not be required when any of the following apply:

(a) Level C packing is required.
(b) Shipments do not exceed 20 pounds gross weight.
(c) Packs include a carton conforming to PPP-B-636 as the unit package."

3.3.1.11.2 and 3.3.1.11.3, lines 1 and 2: Delete "packaging" and substitute "packing".

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Add as paragraph 3.3.3:

"3.3.3 Commercial packaging. Commercial packaging shall be in accordance with MIL-STD-1188 except that procedures, facilities and material for cleaning, drying, and application of preservatives or lubricant shall conform to level A requirements (see 3.3.1 and 6.12)."

3.4.1, lines 13 and 14: Delete "or MIL-B-13239".

3.4.1.2: Delete and substitute:

"3.4.1.2 Exception. Exceptions shall be as follows:

(a) Bearings packaged method IA-5 (5 pounds or less) or IA-6 and IA-13 (where shipments do not exceed 20 pounds gross weight) the shipping container shall be in accordance with

PPP-B-636 class weather resistant. Fiberboard separators, or other devices, of material in accordance with PPP-F-320 shall be provided to separate unit packages both horizontally and vertically.

(b) Bearings packaged method IA-20, shipping containers not exceeding 1000 pounds gross weight shall be in accordance with PPP-B-601 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."

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3.5 through 3.5.2: Delete and substitute:

"3.5 Marking.

"3.5.1 Levels A, B, and C. In addition to the marking required in 3.5.1 through 3.5.4 and in the contract or order (see 6.1 and 6.3) interior (unit and intermediate) packages exterior shipping containers and palletized unit loads shall be marked in accordance with MIL-STD-129.

"3.5.1.1 Commercial. Bearings packaged commercially shall be marked in accordance with MIL-STD-1188.

"3.5.2 Labeling (method IB-2). In addition to the required markings on containers, bearings packaged to method IB-2 shall be labeled as follows:

(a) A label shall be affixed to the circumference of the outer race 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.
(c) The label shall include applicable data such as the following: Navy stock no., Manufacturer, Manufacturer's serial number, Date, Noise tested, Complete word description of the bearing, bearing dimensions, ABEC (or RBEC) number, all special features (e.g., shields, seals type retainer, special materials), Internal clearance stickout or preload, preservative and operating lubricant and any additional information necessary to uniquely describe the bearing or to insure its successful operation."

3.5.4, line 1 of items (a) and (b): Delete "preservation-packaging" and substitute "packaging".

3.5.4, item (d): Delete and substitute:

"(d) For oxygen equipment bearings:
PACKAGED MIL-B-197
LIQUID OXYGEN/GASEOUS OXYGEN SYSTEM
(Special Marking and Labeling in accordance with MIL-C-52211 also required)."

Add as paragraph 3.5.5:

"3.5.5 Handling markings. Each bearing and shipping container packaged Method IA-20 symbol M shall be labeled or marked with the following: 'Nylon sling straps shall be used to lift bearings from the shipping container.'"

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4.2.4, line 1: Delete "(method IA-18 and IA-19)." and substitute "method IA-19.".

TABLE V, column 6 entitled "Method IA-18 IA-19": Delete reference to "IA-18".

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TABLE VI, line 2: Delete "Methods IA-18 and IA-19" and substitute "Method IA-19".

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6.1, items (b), (c), and (c)(1): Delete "preservation-packaging" and substitute "packaging".

6.1, item (e), end of line 1: Delete "(see 3.3.1.11.2.1" and add "(see 3.3.1.8.1, 3.3.1.11.2.1,".

6.1, add as items (j), (k), and (l):

"(j) Lubricants and preservative compounds if other than specified in 3.2.2.1 and table I).
"(k) Level of cleaning, drying and packaging (see 3.3).
"(l) Method of cleaning, drying, and cleanliness classification for oxygen service bearings (see 3.3.1.1.1)."

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6.5.1.1: Delete and substitute:

"6.5.1.1 General purpose bearings. General purpose bearings are bearings which fall into the following tolerance classifications: Tolerances coinciding with those of ungrounded bearings up to and including the AFBMA tolerances of ABEC 1 and RBEC 1."

6.5.1.3: Delete and substitute:

"6.5.1.3 Instrument bearings. Instrument bearings are ball bearings with outside diameters not over 1.1811 inches and tolerances of ABEC 1 or ABEC 3."

Add as paragraphs 6.5.1.4, 6.5.1.5, and 6.5.1.6:

"6.5.1.4 Instrument precision bearings. Instrument precision bearings are ball bearings with outside diameters not over 1.1811 inches and AFBMA tolerances of ABEC 5 or better.

"6.5.1.5 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 combustable materials, lubricants, or debris.

"6.5.1.6 Large bearings. Large bearings are those bearings exceeding 16 inches o.d. or 40 pounds in weight."

Add as paragraphs 6.10 and 6.11:

"6.10 Oxygen use bearing must be free of any contamination from hydro-carbons. Hydro-carbons in the form of oil, grease, lint or combustable foreign matter present an explosion hazard in the presence of oxygen.

"6.11 Intended use. It is intended that this specification be used for reference in section 5 of bearing commodity specification and for direct reference in acquisition documents. It is intended that it furnish direction in the packaging of bearings at military and other government activities and at plants of commercial subcontractors. The cleaning, drying, packaging, packing, and marking requirements specified herein are intended to insure proper and safe storage and transportation of bearings for direct shipment to Government activities."

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FIGURE 1: Delete.

Custodians:
Army - AR
Navy - SH
Air Force - 99
Review activities:
Army - AT, SM
Navy - AS, OS, SA, YD
DLA - IS
User activities:
Navy - CG, MC

Preparing activity:
Navy - SH
(Project PACK-0577)

☆U.S. GOVERNMENT PRINTING OFFICE: 1981—703-023/2641