

Inch-Pound

MIL-B-45977B  
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SUPERSEDING  
MIL-B-45977A  
21 February 1984

**MILITARY SPECIFICATION**  
**BINS, CABINETS, SHELVING, AND**  
**WORKTABLES, PACKAGING OF**

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

**1 SCOPE**

1.1 This specification covers the requirements for materials, and methods for cleaning, drying, preservation, packing, and marking of bins, cabinets, shelving, and worktables for various conditions of protection for handling, shipments, and storage.

**2 APPLICABLE DOCUMENTS**

**2.1 Government documents.**

2.1.1 Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2.1).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, US Army Armament Research, Development and Engineering Center, ATTN: SMCAR-EST-S, Rock Island, IL 61299-7300 by using the self-addressed Standardization Document Improvement proposal (DD Form 1426) appearing at the end of this document or by letter.

MSC N/A

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## SPECIFICATIONS

## FEDERAL

- L-P-378 - Plastic Sheet and Strip, Thin Gauge, Polyolefin
- PPP-B-585 - Boxes, Wood, Wirebound
- PPP-B-601 - Boxes, Wood, Cleated-Plywood
- PPP-B-621 - Boxes, Wood, Nailed and Lock-corner
- PPP-B-636 - Boxes, Shipping, Fiberboard
- PPP-B-640 - Boxes Fiberboard, Corrugated, Triple-wall
- PPP-C-705 - Cushioning Material, Packaging (Flexible, Cellular, Plastic Film) for Packaging Applications
- PPP-C-1797 - Cushioning Material, Resilient, Low Density, Unicellular, Polypropylene Foam
- PPP-F-320 - Fiberboard; Corrugated and Solid, Sheet Stock (Container Grade), and Cut Shapes
- PPP-T-60 - Tape: Packaging, Waterproof
- PPP-T-97 - Tape, Pressure-Sensitive Adhesive, Filament Reinforced

## MILITARY

- MIL-P-116 - Preservation, Methods of
- MIL-B-117 - Bags, Sleeves and Tubing
- MIL-B-121 - Barrier Material, Greaseproofed, Waterproofed, Flexible
- MIL-M-7866 - Molybdenum Disulfate, Technical, Lubrication Grade

## STANDARDS

## MILITARY

- MIL-STD-129 - Marking for Shipment and Storage
- MIL-STD-147 - Palletized Unit Loads
- MIL-STD-1186 - Cushioning, Anchoring, Bracing, Blocking, and Waterproofing; With Appropriate Test Methods
- MIL-STD-1190 - Minimum Guidelines for Level C Preservation, Packing and Marking.

(Unless otherwise indicated, copies of federal and military specifications and standards are available from the Naval Publications and Forms Center, (ATTN: NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5000.)

2.1.2 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents which are current on the date of the solicitation (see 6.2).

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## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

## ASTM D 3951-82- Standard Practice for Commercial Packaging

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103).

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

**3 REQUIREMENTS**

**3.1 First article.** When specified, (see 6.2.1), the supplier shall furnish one complete pack for first article inspection. Whenever first article inspection is specified or performed, unit pack examination and tests for packaging may also be performed. The first article may be either a preproduction pack or an initial production pack which conforms to the requirements of this specification. In either case, the approved first article and the production packs shall be identical and in accordance with the terms of the contract. Approval of the first article shall not relieve the supplier of the responsibility to furnish equipment and packaging in accordance with the requirements of this specification.

**3.2 Disassembly.** When practical, for the protection of components, attachments and accessories against damage, pilferage or to reduce cubage, items may be disassembled only to a necessary basic degree. Disassembled parts shall be preserved, anchored, braced, blocked, and cushioned to prevent damage. Disassembled parts shall be clearly and legibly marked as to identity and proper location on the assembled item. All fasteners removed during disassembly shall be secured in one of the mating parts. A part shall not be removed from an assembly unless it can be reassembled readily in the field without special skills or tools.

**3.3 Disassembled parts marking.** Disassembled parts shall be marked, when necessary with instructions, to facilitate reassembly. Removed parts and mating parts on the item shall be marked by stenciling, on the parts, or by use of tags. Tags shall be waterproofed and ink used (on parts or tags) shall be waterproof. Tags shall be firmly secured to each individual part.

**3.4 Processing conditions.** Preservation and packing shall be accomplished within buildings which have facilities to limit the accumulation of dust and moisture on the equipment being processed. Bins, cabinets, shelving, and worktables brought into processing areas from outside shall be allowed sufficient time to reach ambient temperature before processing. Cleaning, drying, and application of preservatives shall progress in an uninterrupted series of operations. When periods of interruption are necessary, temporary protection shall be provided to partially processed items, as required, to assure against contamination.

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3.5 Preservation. Preservation shall be level A, C or Commercial as specified (see 6.2.1).

3.5.1 Level A.

3.5.1.1 General requirements. Bins, cabinets, shelving, and worktables shall be cleaned, dried, and preserved as specified herein. Parts and assemblies which are not covered by this specification shall be cleaned, dried, and preserved utilizing the materials and methods specified for similar parts and assemblies described herein. Methods of preservation specified herein shall conform to the criteria and guidelines of MIL-P-116. (The fundamental principles and approved methods and techniques of preservation and packing are prescribed in the references given in 6.6).

3.5.1.2 Materials. Materials used in preservation and packing of bins, cabinets, shelving, and worktables shall be as specified herein. Materials shall be new and free from all defects and imperfections which may affect the serviceability of the completed package.

3.5.1.3 Cleaning and drying. Noncritical ferrous metal surfaces shall be cleaned in accordance with process C-1 and dried in accordance with applicable procedures of MIL-P-116. Critical surfaces (screw-threads and bearing surfaces) shall be cleaned in accordance with process C-5 and dried in accordance with applicable procedures of MIL-P-116.

3.5.1.4 Assembly hardware (nuts, bolts, washers, etc.). The assembly hardware shall be processed method I. The hardware shall be coated with a P-7 preservative. The hardware shall be consolidated in suitable quantities and placed in bags conforming to type I, class C, style 1 of MIL-B-117.

3.5.1.5 Small miscellaneous components. Small miscellaneous components shall be grouped in suitable quantities interleaved, wrapped, or protected by some other applicable means to prevent marring of the painted surfaces. Unpainted ferrous metal components shall be coated with P-7 preservative and wrapped or covered with a greaseproof material conforming to MIL-B-121.

3.5.1.6 Locks and keys. Lock and key mechanisms shall be coated with Molybdenum conforming to MIL-M-7866. The locks shall be operated to assure penetration of the preservative within the mechanism of the lock. Seal the key openings with tape conforming to PPP-T-60, type III. The key(s) shall be packaged IC-1 and secured in a location on the cabinet adjacent to the lock with tape conforming to PPP-T-60, type III, class optional.

3.5.1.7 Technical data. Technical publications furnished with equipment shall be processed method IC-1. The package shall be secured to the basic unit in a conspicuous location with tape conforming to PPP-T-60, type III, class optional.

3.5.1.8 Consolidated package. The assembly hardware as specified in 3.5.1.4 and other small miscellaneous components as specified in 3.5.1.5 shall be consolidated and placed in a corrugated fiberboard box conforming to PPP-B-636, class weather-resistant. The components shall be cushioned with material conforming to PPP-C-795, Class 1, or PPP-C-1797. The box shall be closed in accordance with the appendix to the box specification.

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3.5.1.9 Bins, rotary. The rotary bin shelve section, with detachable components removed, shall be disassembled from the tube column. All ferrous, unplated, or unpainted metal surfaces shall be preserved with P-7 preservative and wrapped or covered with greaseproof material conforming to MIL-B-121. Removable bearings shall be coated with the type P-11 preservative and processed method IA-8. The disassembled and detached components of the rotary bin shall be placed in boxes conforming to PPP-B-636, class weather-resistant. The components shall be immobilized with pads, cells, or cut shapes fabricated from weather-resistant corrugated fiberboard conforming to PPP-F-320, variety and grade optional or from cushioning material conforming to PPP-C-795, Class 1, or PPP-C-1797. Painted components shall be interleaved with sheets of plastic conforming to L-P-378, type and class optional to prevent marring of painted surfaces. The fiberboard boxes shall be closed in accordance with the appendix to the box specification.

3.5.1.10 Shelving. Unpainted shelving surfaces exposed by disassembly shall be coated with P-9 preservative and wrapped or covered with greaseproof material conforming to MIL-B-121. Disassembled components shall be grouped together in bundles and secured with tape conforming to PPP-T-97, type III, width optional. Components shall be interleaved with sheets of plastic conforming to L-P-378, type and class optional to prevent marring of painted surfaces. Contractor is encouraged to completely paint all shelving surfaces that will otherwise be exposed during disassembly to reduce the need for preserving shelving with P-9 preservative.

3.5.1.10.1 Shelf boxes. A maximum of 12 shelf boxes shall be packed in a snug-fitting fiberboard box conforming to PPP-B-636, style optional, class weather-resistant. The fiberboard box shall be closed in accordance with the appendix to the box specification.

3.5.1.11 Cabinets (assembled or disassembled). Latches and other operational surfaces shall be preserved with type P-11 preservative and wrapped or covered with greaseproof material conforming to MIL-B-121. Tops of cabinets fabricated from wood shall be covered with PPP-B-636 fiberboard covering the full length and width, and tops fabricated from hardboard or particleboard shall be shrouded with plastic material conforming to L-P-378, type and class optional. The shroud shall be secured in place with tape conforming to PPP-T-60, type III, class optional. Components of disassembled cabinets shall be grouped together in bundles and secured with tape conforming to PPP-T-97, type III, width optional. Components shall be interleaved with sheets of plastic material conforming to L-P-378, type and class optional to prevent marring of the painted surfaces. Assembled or disassembled cabinets not exceeding 90 pounds gross weight or having a total dimension of 90 inches (length, width, and depth added) shall be processed method III, utilizing a fiberboard box conforming to PPP-B-636, class weather-resistant as the unit container. The cabinets shall be immobilized in fiberboard boxes with pads, cells, or cut shapes fabricated from weather-resistant corrugated fiberboard conforming to PPP-F-320, variety and grade optional. Cabinets exceeding these requirements shall be packed according to paragraph 3.5.2 or 3.5.3. Doors of assembled cabinets shall be closed and latched. Locking bars shall be in place and secured with facilities provided. The fiberboard box shall be closed in accordance with the appendix to the box specification.

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3.5.1.12 Worktables (assembled). Worktables shall be processed method I. Operational guide surfaces of drawers shall be coated with type P-11 preservative and wrapped or covered with greaseproof material conforming to MIL-B-121. Drawers shall be secured in a closed position. Tops of worktables fabricated from wood shall be covered with PPP-B-636 fiberboard covering the full length and width and tops fabricated from hardboard or particleboard shall be shrouded with plastic material conforming to L-P-378, type and class optional. The shroud shall be secured in place with tape conforming to PPP-T-60, type 111, class optional.

3.5.1.13 Worktables (folding legs, portable). Worktables shall be processed method III. Each table, with legs folded and locked in closed position, shall be placed in a snug-fitting box conforming to PPP-B-636, class weather-resistant. Dimensional limitations of the fiberboard box shall be waived. The worktable shall be immobilized in the fiberboard box with pads, cell, or cut shapes fabricated from weather-resistant corrugated fiberboard conforming to PPP-F-320, variety and grade optional. The fiberboard box shall be closed in accordance with the appendix to the specification.

3.5.2 Level C. Bins, cabinets, worktables, and shelving shall be preserved in accordance with MIL-STD-1190.

3.5.3 Commercial preservation. Bins, cabinets, worktables, and shelving shall be preserved in accordance with ASTM D 3951-82.

3.6 Packing. Packing shall be level A, B, C or Commercial as specified (see 6.2.1).

3.6.1 General requirements for levels A and B. Shipping containers shall be uniform in size and construction.

3.6.1.1 Selection of containers. Selection of containers shall be governed by the size and weight limitations of the applicable container specification.

3.6.1.2 Cushioning, blocking, and bracing. Arrangement of contents, cushioning, blocking, and bracing shall be in accordance with MIL-STD-1186.

3.6.1.3 Closure and strapping. Closure and strapping of shipping containers shall be in accordance with the appendix of the applicable shipping container specification.

3.6.2 Level A. Unless otherwise specified (see 6.2.1), bins, cabinets, shelving, and worktables preserved as specified in 3.5 shall be individually packed in a shipping container conforming to PPP-B-601, overseas type, style optional, grade B; or PPP-B-621, class 2, style optional; or PPP-B-585, class 3, style 2. Units weighing less than 90 pounds, shall be consolidated in wooden containers as specified, providing they do not exceed the maximum weight requirements.

3.6.3 Level B. Unless otherwise specified (see 6.2.1), bins, cabinets, shelving, and worktables preserved as specified in 3.4 shall be individually packed in a shipping container conforming to PPP-B-601, domestic type, style optional; PPP-B-621, class 1, style optional; PPP-B-585, class and style optional; or PPP-B-640, class 2. The selection of the shipping container shall be governed by the size and weight limitations of the applicable container specification. Items packaged in PPP-B-636 may not require overpacking.

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3.6.4 Level C. Preserved supplies and equipment shall be packed in accordance with requirements of MIL-STD-1190.

3.6.5 Commercial packing. Bins, cabinets, worktables, and shelving shall be packed in accordance with ASTM D 3951-82.

3.6.6 Unitization. When specified (see 6.2.1), shipments shall be palletized in accordance with MIL-STD-147.

### 3.7 Marking.

3.7.1 Military. When military levels of protection are specified, marking shall be in accordance with MIL-STD-129. Special marking shall be as required by contract or purchase order.

3.8 Workmanship. Standards of workmanship shall be such as to assure preservation and packing of a neat uniform general appearance in compliance with the requirements specified herein. Defects, imperfections, or omissions which would tend to impair the effectiveness of the completed pack or part thereof shall not be permitted.

## 4 QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet the requirements of section 3. The inspection set forth in this specification shall become a part of the contractors overall inspections system or quality program. The absence of any inspections requirements in this specification shall not relieve the supplier of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance requirements, however, this does not authorize submission of known defective material, either indicted or actual, nor does it commit the Government to accept defective material.

4.2 Classification of inspection. Inspection shall be classified as follows:

- a. First article inspection (see 4.2.1).
- b. Quality conformance inspection (see 4.2.2).

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4.2.1 First article inspection. When a first article sample is required by the contract or purchase order, the supplier shall subject the first article pack to the examinations in 4.3 and the applicable examinations and tests in the unit pack design validation specified in the Quality Assurance Provisions of MIL-P-116 to determine conformance with the requirements of the specification. When specified (see 6.2.1), first article packages shall be subjected to the rough handling and cyclic exposure test (s) (one or both) as contained in the unit pack design validation requirements of MIL-P-116. Failure of the first article to pass any of the tests shall be cause for rejection.

4.2.2 Quality conformance inspection. Quality conformance inspection shall be applied in all cases for acceptance under the contract or purchase order. Quality conformance inspection shall consist of the examinations in 4.3 and the applicable examinations and tests specified in the quality conformance inspection of MIL-P-116, with sampling to be conducted as specified in MIL-P-116. When specified (see 6.2.1), the package shall be subjected to rough handling and cyclic exposure test(s) (one or both) as contained in the quality conformance inspection requirements of MIL-P-116.

4.3 Product examination. Visually, dimensionally, and manually examine each item to determine conformance with the requirements of 3.2 through 3.8. Visual examination shall include verification of completeness of manufacture and assembly, conformance to specified standards, adequacy of markings, proper cleaning, and freedom from the identified defects. Dimensional examination includes measuring dimensions as specified. Manual examinations shall include the operations of movable parts by hand to assure proper functioning. The examination provisions may be applied at the earliest practical point in manufacturing at which it is feasible to inspect for acceptance without risk of change in the characteristic by subsequent operation. Any inspection of test performed in accordance with MIL-P-116 (see 4.2.1 and 4.2.2) does not need to be repeated. Failure of the contractor to provide objective evidence that the item and its components conform to all the preservation, packaging, packing, and marking standards and specifications cited in section 3, and have passed the examinations prescribed for them by the contractor's inspection system shall be cause for rejection.

4.4 Packing inspection. Inspection of packing, marking and unitization shall be in accordance with applicable specification and packing level requirements specified in the contract or purchase order.

## 5 PACKAGING

5.1 This section is not applicable to this specification.

## 6 NOTES

6.1 Intended use. This specification is intended to be used for reference in section 5 of commodity specifications or direct reference in contracts or orders. The preservation, packing, and marking requirements specified herein are intended to insure proper and safe transportation of bins, cabinets, shelving, and worktables for direct shipment to Government activities or shipments to be processed at a military activity or agency.



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6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. First article inspection, when required (see 3.1).
- c. Specify level A,C, or Commercial preservation (3.5.1); Specify level A, B, C, or Commercial packing (see 3.6).
- d. Selection of shipping container to be utilized, if different (see 3.5.1 or 3.5.1.1).
- e. Unitization (see 3.6.5).
- f. Special marking, if required (see 3.7.1).
- g. Rough handling and cyclic exposure tests, if required (see 4.2.1 and 4.2.2).

6.3 General information. A first article inspection test will not be required when:

- a. Level C preservation and packing is specified.
- b. The procuring activity waives first article inspection tests after establishing that prior successful first article tests have been conducted on items similar in all respects to the new item and its packaging details.
- c. For other reasons waived by the procuring agency.

6.4 Contract data requirements. Required technical data such as operator manuals, parts list, and other instructions for operation and maintenance, as identified on a numbered DD form should be specified on a DD 1423 incorporated in the contract.

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6.4.1 Related equipment. The following groups listed herein are considered as applicable to this specification:

- a. Bins, solid circular base (maintenance).
- b. Bins, two-tube fitting (shipboard).
- c. Cabinets, wood top, folding legs.
- d. Cabinets, all steel.
- e. Cabinets, steel, with locks (disassembled and assembled).
- f. Cabinets, steel, with wood tops.
- g. Shelving, storage and display, steel, clip type.
- h. Shelving, storage and display, steel, boltless.
- i. Shelving, storage and display, steel, interchangeable, nut and bolt type.
- j. Worktables, steel top, folding legs.
- k. Worktables, wood top, folding steel legs.
- l. Worktables, steel, stationary.
- m. Worktables, wood, stationary.
- n. Worktables, steel, with wood tops (shelves, drawers, etc) stationary.

6.5 First Article. When first article is required it shall be tested and approved under the appropriate provisions of the Federal Acquisition Regulation. The first article should be a preproduction sample, or a standard production item from the contractors.

6.6 Supplemental information. Supplemental information on preservation and packing may be found in the following Government publications in the references given:

a. Packing of Materiel: Preservation (Vol I) ARMY TM 38-230-1, NAVY - NAVSUP PUB 502, AIR FORCE - AFP 71-15.

b. Packing of Materiel: Packing (Vol II) Army TM38-230-2, Navy - NAVSUP PUB 503, Air Force - AFP 71-16

(Copies of the above documents may be obtained from Superintendent of Documents, US Government Printing Office, Washington, DC 20402.)

6.7 Disposability methods. Environmental pollution preventative measures are contained in the materials' specifications indicated herein. Refer to the materials' specifications (or preparing activity) for recommended disposability methods.

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6.8 Subject term (key word listings).

Cleaning

Materials

Methods

Preservation

Storage

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

Custodians

Army - AL

Navy - YD

Air Force - 99

Preparing Activity:

Army - AL

Project No: PACK-0929

Review activity:

Army - SM



**STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL**OMB Approval  
No. 22-R255

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**DOCUMENT IDENTIFIER AND TITLE**

MIL-B-45977B, Bins, Cabinets, Shelving, and Worktables, Packaging of

NAME OF ORGANIZATION AND ADDRESS

CONTRACT NUMBER

MATERIAL PROCURED UNDER A

 DIRECT GOVERNMENT CONTRACT  SUBCONTRACT

1. HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY DOCUMENT REQUIREMENT CONSIDERED TOO RIGID

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 YES  NO (If "Yes", in what way?)

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