

MIL-B-233D (NAVY)
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SUPERSEDING
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(See 6.7)

MILITARY SPECIFICATION

BOXES, SUPPLY SUPPORT ITEMS, STOWAGE AND STORAGE

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

1. SCOPE

1.1 Scope. This specification covers the design, fabrication, testing, packaging, and use of special purpose boxes for the protection and stowage or storage of supply support items (see 6.5.2) for mechanical, electrical and electronic systems and equipments.

1.2 Classification.

1.2.1 Types and classes. Boxes shall be of the following types and classes, as specified (see 6.2.1).

Type M - Steel.

Type W - Nonmagnetic.

Class 1 - Wood or plywood.

Class 2 - Aluminum.

Class 3 - Plastic or reinforced plastic.

1.2.2 Sizes. Sizes shall be as specified in table I (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, Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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TABLE I. Sizes.

Nominal inside dimensions				Nominal cubic capacity (inches)
Length (inches)	Width (inches)	Height (inches)	Load group	
12	6	6	I	432
12	9	6	I	648
12	12	6	I	864
12	9	9	I	972
18	6	6	I	504
18	9	6	I	972
18	12	6	II	1296
18	9	9	II	1458
18	12	9	II	1944
18	15	9	II	2430
18	12	12	II	2592
24	12	9	II	2592
24	15	12	III	4320
24	15	15	III	5400
30	15	9	III	4050
30	15	12	III	5400
36	15	12	III	6480
42	9	9	III	3402
42	15	15	III	9450

1.2.2.1 Additional sizes. When specified (see 6.2.1), additional sizes may be provided. When additional sizes are specified, the increased dimension shall be in multiples of 6 inches in length and 3 inches in width and 3 inches in height. Unless otherwise specified (see 6.2.1), boxes shall not be furnished in sizes smaller than that specified in table I. When a smaller box is required because of the small quantity of parts involved, approval for the use of fiber-board boxes in accordance with PPP-B-636 shall be obtained from the concerned activity. Boxes should be limited to a minimum size of not less than 4 inches long or 3 inches high. The height dimensions should not exceed the width and the width should not exceed the length. Unless otherwise specified (see 6.2.1), boxes shall not be provided for an individual item when the weight of the individual item and the box exceeds 200 pounds. The design of a container for an individual item when the gross weight exceeds 200 pounds shall be approved by the concerned activity.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

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

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SPECIFICATIONS

FEDERAL

- QQ-A-250 - Aluminum and Aluminum Alloy Plate and Sheet: General Specification for.
- QQ-S-698 - Steel Sheet and Strip, Low-Carbon.
- QQ-S-700 - Steel Sheet and Strip, Medium and High Carbon.
- TT-P-645 - Primer, Paint, Zinc Chromate, Alkyd Type.
- TT-P-664 - Primer Coating, Synthetic, Rust-Inhibiting, Lacquer-Resisting.
- TT-P-1757 - Primer Coating, Zinc Chromate, Low-Moisture-Sensitivity.
- TT-T-291 - Thinner, Paint, Mineral Spirits, Regular and Odorless.
- TT-W-571 - Wood Preservation: Treating Practices.
- TT-W-572 - Wood Preservative: Water-Repellent.
- MMM-A-188 - Adhesive; Urea-Resin-Type (Liquid and Powder).
- PPP-B-576 - Boxes, Wood, Cleated, Veneer, Paper Overlaid.
- PPP-B-585 - Boxes, Wood, Wirebound.
- PPP-B-591 - Boxes, Shipping, Fiberboard, Wood-Cleated.
- 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.

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- MIL-P-116 - Preservation, Methods of.
- MIL-C-5541 - Chemical Conversion Coatings on Aluminum and Aluminum Alloys.
- MIL-A-8625 - Anodic Coatings, for Aluminum and Aluminum Alloys.
- MIL-E-15090 - Enamel, Equipment, Light-Gray (Formula No. 111).
- DOD-P-15328 - Primer (Wash), Pretreatment (Formula No. 117 for Metals). (Metric)
- MIL-P-17549 - Plastic Laminates, Fibrous Glass Reinforced, Marine Structural.
- MIL-W-18142 - Wood Preservative Solutions, Oil-Soluble, Ship and Boat Use.
- MIL-L-19140 - Lumber and Plywood, Fire-Retardant Treated.

STANDARDS

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- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-129 - Marking for Shipment and Storage.
- MIL-STD-1186 - Cushioning, Anchoring, Bracing, Blocking and Water-Proofing; with Appropriate Test Methods.

(Copies of specifications and standards required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted shall be those listed in the issue of the DoDISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

HPMA HP 83 - American National/Standard for Hardwood and
Decorative Plywood.

MH15.1 - Glossary of Packaging Terms.

(Application for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018.)

AMERICAN PLYWOOD ASSOCIATION (APA)

PS 1-83 - U.S Product Standard for Construction and
Industrial Plywood with Typical APA Trademarks.

(Application for copies should be addressed to the American Plywood Association, P.O. Box 11700, Tacoma, WA 98411.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 682 - Standard Specification for Steel, Strip, High-Carbon,
Cold-Rolled, Spring Quality, General Requirements for.
(DoD adopted)

A 684 - Standard Specification for Steel, Strip, High-Carbon,
Cold-Rolled Soft, Untempered Spring Quality. (DoD
adopted)

D 996 - Standard Terminology of Packaging and Distribution
Environments.

D 1272 - Standard Specification for Pentachlorophenol.
(DoD adopted)

D 3951 - Standard Practice for Commercial Packaging. (DoD adopted)

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

(Nongovernment standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Definitions or explanation of packaging terms. Definitions or explanation of packaging terms applicable to this specification shall be as stated in the applicable referenced documents, specifications and 6.5. For definitions or explanation of packaging terms not specified herein, ANSI MH15.1 or ASTM D 996 shall apply.

3.2 General.

3.2.1 Materials. Unless otherwise specified (see 6.2.1), internal framing, partitions, supports, and trays shall be fabricated of the materials specified for the required type and class of box. Dissimilar metals shall not be used in intimate contact unless suitably protected against electrolytic corrosion. When any combination of dissimilar metals is assembled, an interposing coating shall be used. The boxes shall be as light in weight as practicable, consistent with the required strength to withstand repeated rough handling without damage, bending, buckling, bulging, crushing, puncturing, splitting or other damage. Handles shall not fail or pull out in use. Edges and corners shall be free of burrs, sharp projections and slivers, and shall be rounded where practicable and finished to a smooth surface to prevent injury to personnel.

3.2.1.1 Recovered materials. Unless otherwise specified herein, all material and articles incorporated in the products covered by this specification shall be new and may be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified.

3.2.2 Drawings. When specified in the contract or order, drawings shall be prepared (see 6.2.2).

3.3 Type M boxes. Type M boxes, together with arrangements of fittings and attached hardware, shall be in general accordance with the construction shown on figure 1. Constructional modifications may be made as required for the purpose of meeting performance tests specified in 4.4. Seams or joints shall be as tight as practicable.

3.3.1 Material. Type M boxes shall be made of sheet steel in accordance with QQ-S-698 hot rolled annealed finish, ASTM A 682, or ASTM A 684. (Steel in accordance with QQ-S-698 or QQ-S-700 is more suitable for boxes fabricated by drawing and forming.) The thickness of sheet steel shall be not less than 0.054 inch for all sizes of boxes and shall be fabricated into a welded, riveted or drawn construction that shall withstand the rough handling and imposed load tests specified in 4.4.1.1 and 4.4.1.3. The maximum center-to-center distance between adjacent spot welds or rivets shall not exceed 1-1/2 inches.

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3.3.2 Hardware.

3.3.2.1 Hasp. Boxes shall be provided with a hinge hasp. The size and weight of the hasp shall be consistent with the required duty. The staple for the hinge hasp shall have a minimum opening $3/8$ inch in diameter for use of a padlock. The keeper shall be so installed that it does not bear on the staple when the lid is pressed down to its fullest extent.

3.3.2.2 Hinges. Box covers shall be fitted with not less than two standard steel hinges. The size and weight of the hinges shall be consistent with their required duty.

3.3.2.3 Handles. Two heavy-duty chest handles shall be provided, one on each end, above the center of gravity, for boxes 12 inches in length, 6 inches in width, and 6 inches in height and larger. The handle opening shall be not less than $3-1/2$ inches wide and $1-3/8$ inches deep, and shall be stopped to open at 90 degrees. Handles shall be secured and shall not pull loose or otherwise indicate structural weakness (see 4.4.1.2).

3.3.2.4 Latches. Boxes having a nominal inside length of more than .24 inches shall be provided with two snap-type trunk latches or draw-pull toggle latches on the front side near each corner, in addition to the hasp.

3.3.2.5 Protective coatings. All hinges, hasps, staples, handles, handle supports, internal framing partitions and trays, shall be of steel, securely fastened in a manner that will ensure free functioning of all parts without excessive looseness and shall be protected against corrosion by one of the following methods:

3.3.2.5.1 Cleaning and primer treatment. Phosphate or suitable cleaning treatments shall be followed by the application of zinc chromate primer in accordance with TT-P-645.

3.3.2.5.2 Corrosion-resisting treatments. Satisfactory corrosion-resisting treatments are as follows:

(a) Electroplating of:

Chromium; nickel; zinc.

(b) Galvanizing:

Hot dip: Metal spray (for small areas).

3.3.3 Cover fabrication. The sides of the cover shall be approximately 1 inch deep. Where covers are not formed by drawing, corners shall be of lap construction and shall be welded either by a minimum of four spot welds or by continuous welded seams. The hinged box cover shall be fitted with a staple and hasp for use of a padlock. The cover shall make a close fit when the hasp is down and shall be as nearly tight and verminproof as practicable.

3.3.4 Accessory framing and trays. Internal framing shall be provided as necessary to protect contents and sealed packages from damage due to rough handling. When specified (see 6.2.1), trays, partitions, compartments, or other means shall be provided for the storage of small parts such as screws and washers.

3.3.5 Index sheet support. Each type M box shall be provided with an index sheet support located on the interior side of the cover. The support shall consist of steel Z-shaped channel strips welded to the cover to hold the index sheet from three sides, and so arranged as to accommodate a list with overall dimensions of 8-1/2 by 11 inches. Where the size of the box does not permit the insertion of an index list, the support shall accommodate the index sheet in a folded position. The Z-channels shall be of such width as to hold the index sheet in position under all service conditions.

3.3.6 Finish. Steel boxes shall be cleaned and painted, inside and outside, in accordance with the following order of operations:

- (a) Complete all fabricating operations, such as welding, machining, drilling, and tapping.
- (b) Remove all welding flux.
- (c) Remove all rust and other visible corrosion products.
- (d) Remove all grease, oil, and dirt by solvent wiping, vapor degreasing, or caustic washing and rinsing.
- (e) Apply pretreatment and anti-corrosive primer as specified in 3.3.6.1.
- (f) Apply enamel.

3.3.6.1 Primers. The primers shall be applied in accordance with the following method: One coat of treatment in accordance with DOD-P-15328, applied as a continuous film 0.0002 to 0.0005 inch thick followed by one coat of primer in accordance with TT-P-664, TT-P-645, or TT-P-1757, applied as a continuous film 0.0004 to 0.001 inch thick.

3.3.6.2 Enamel. Two coats of gray enamel in accordance with type II or III, class 2 of MIL-E-15090 shall be applied as continuous films, each approximately 0.001 inch thick, except that type I enamel may be used over primer in accordance with TT-P-645. (Note: Lifting of this primer may occur when type II or III enamel is used.)

3.4 Type W - nonmagnetic.

3.4.1 Class 1, wood or plywood. Type W, class 1 boxes, together with arrangement of fittings and attached hardware, shall be in general accordance with the construction shown on figure 2. Unless otherwise specified (see 6.2.1), boxes shall be fire-retardant treated in accordance with MIL-L-19140, type II. Boxes shall withstand the tests specified in 4.4.

3.4.1.1 Construction. Boxes shall be constructed in accordance with the requirements for a style 2, or style 2-1/2 wood box in accordance with PPP-B-621 and with the exceptions and additional requirements which follow:

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3.4.1.1.1 Lumber. Boxes shall be made of any of the following woods:

<u>Softwoods</u>	<u>Hardwoods</u>	
Pine	Gum	Beech
Douglas fir	Yellow poplar	Buckeye
Fir (abies species)	Oak	Butternut
Hemlock	Maple	Elm
Spruce	Birch	Hackberry
Larch	Cottonwood	Magnolia
Cedar	Ash	Sycamore
Cypress	Aspen	Willow
Redwood	Basswood	Alder
		West coast maple

The lumber shall be at a moisture content between 8 and 12 percent at time of fabrication. Decay, splits, knot holes, loose knots, worm holes or other defects which will admit dust and dirt to the interior will not be permitted, but sapwood, tight knots, sap stain and discoloration, if not excessive, will be permitted. Open pitch pockets or gum soaked wood will not be permitted. Where softwood lumber is used, the finished thickness of material shall be not less than 25/32 inch. Where hardwood lumber is used, the finished thickness of the material shall be not less than 5/8 inch. Edges of lumber used in sides, bottoms, and ends shall be surfaced to ensure a close tight fitting joint. Pieces may be edge-joined in accordance with PPP-B-621.

3.4.1.1.2 Plywood. Plywood in lieu of lumber may be used for box construction. Plywood shall be of minimum 1/2-inch thickness for hardwood and minimum 15/32-inch thickness for softwood and as follows:

- (a) Hardwood. Hardwood plywood shall be in accordance with the ANSI HP 83, type I or II, grade A or B.
- (b) Softwood. Softwood plywood shall be in accordance with APA PS 1-83 and as follows:
 - (1) Grade C-C, unsanded or
 - (2) Grade C-D, unsanded, with exterior glue (exposure 1).

3.4.1.1.3 Cleats and battens. Selection of cleats and battens for thickness, width, fastening, and arrangement shall be in accordance with PPP-B-621, as determined by weight of contents for type III loads.

3.4.1.1.4 Hardware. Type W, class 1 boxes shall be provided with hardware as specified in 3.3.2 except as follows:

3.4.1.1.4.1 Nonmagnetic properties. Hardware, including wood screws or other fastening devices, shall be nonmagnetic. Nonmagnetic material is defined for this specification as a material which has a maximum magnetic permeability of less than 2.0 after fabrication. Brass shall be a suitable material for nonmagnetic hardware.

3.4.1.1.4.2 Chest handles. Boxes which are 12 by 9 by 9 inches or smaller will not require chest handles. Chest handles for larger boxes shall be of non-magnetic construction and shall be in accordance with 3.3.2.3. When specified (see 6.2.1), rope handles will be permitted. Rope shall be fabricated from Musa textilis fiber and shall have a "Becker" value of not less than 36 for all sizes of rope and of strength to meet the load. Handles shall be secured and shall not pull loose or otherwise show structural weakness (see 4.4.1.2).

3.4.1.1.4.3 Screws. Boxes shall be completely assembled with nonmagnetic flat-head wood screws instead of nails. Selection, size, arrangement and spacing of screws shall be in accordance with PPP-B-621, based on the minimum thickness of lumber or plywood as specified in 3.4.1.1.1 or 3.4.1.1.2. Heads of screws shall be countersunk.

3.4.1.1.5 Covers. Covers for boxes shall be edge glued or Linderman jointed or shall be one-piece lumber or plywood. Adhesive shall be in accordance with MMM-A-188. Covers shall be constructed with edge supports or internal braces to prevent warping or twisting. Covers of boxes containing only one repair part item shall be secured by nonmagnetic screws (see 3.4.1.1.4.3). Screws shall be placed not more than 1-1/4 inches from corners and shall be spaced not more than 4 inches apart including those screws used in sides of boxes. Hinges and hasps will not be required for boxes containing only one item.

3.4.1.1.6 Bottom. Bottoms of boxes shall be secured with nonmagnetic screws (see 3.4.1.1.4.3) located not more than 1-1/4 inches from corners and shall be spaced not more than 4 inches apart in lieu of 8 inches as specified in PPP-B-621.

3.4.1.1.7 Accessory framing and trays. Inner trays and partitions, if furnished (see 3.3.4), shall be of the species and quality of wood or plywood as specified in 3.4.1.1.1 or 3.4.1.1.2, as applicable. A suitable reduction in thicknesses of material utilized in construction of trays is permitted provided that strength of material, consistent with requirements, is maintained. When required, internal framing and partitions shall be held in place by suitable glued joints or supporting blocks. Adhesive shall be in accordance with MMM-A-188. When required, additional fastening shall be provided by means of suitable nonmagnetic wood screws.

3.4.1.2 Preservative treatment. Prior to preservative treatment wood and plywood members shall be clean and smooth, free of tape, sander marks and foreign matter. Upon completion of the machining and sanding operations all wood and plywood box members shall be totally submerged for a minimum of 3 minutes in one of the wood preservatives specified herein. Upon removal from the preservative the members shall be dried without degrade until the surfaces are sufficiently solvent-free to permit painting. Necessary precautions shall be taken to protect the treated members from the adverse effects of handling. Surfaces from which the preservative is subsequently removed by jointing and which are exposed in the assembled box shall be liberally brushed or swabbed with one of the preservatives specified herein.

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3.4.1.2.1 Type A preservative. Type A preservative shall have a copper naphthenate content equivalent to not less than 0.15 pound (68 grams) calculated as elemental copper per gallon of solution measured at 77 degrees Fahrenheit (°F) (25 degrees Celsius (°C)), or be in accordance with type A of MIL-W-18142 or composition B of TT-W-572.

3.4.1.2.2 Type B preservative. Type B preservative shall consist of at least 0.35 pound (159 grams) of pentachlorophenol per gallon of solution measured at 77°F in accordance with ASTM D 1272, or in accordance with type B of MIL-W-18142 or composition A of TT-W-572.

3.4.1.2.3 Solvent. The solvent for each type shall be in accordance with type I of TT-T-291. The addition of pine oil or equally effective agents to prevent precipitation of nonvolatile material or to improve penetration will be permitted to the extent of 10 percent of the total volume of solvent. Type B solution shall contain approximately 1.0 percent by weight of Prussian blue paste-in-oil, which will color wood sufficiently to show that it has been treated, but which will not interfere with the satisfactory application and performance of paint. The preservative solution shall contain no sludge which will adversely affect appearance of treated wood or effectiveness of treatment. A light sludge caused by settling of coloring material will be permitted.

3.4.1.2.4 Alternative. Alternatively, boxes or all of the finished wood or plywood members or parts shall be pressure treated in accordance with TT-W-571, table III therein using preservative concentrations, "for use above ground", using ammoniacal copper arsenite or chromated copper arsenate types I, II, or III, acid copper chromate or fluor-chrome-arsenate-phenol mixtures. Fasteners (nails, bolts, screws, and so forth) for boxes treated in accordance with TT-W-571 shall be galvanized or corrosion treated (see 3.3.2.5).

3.4.1.3 Finish. Wood and plywood boxes shall be painted with two coats of gray enamel in accordance with type I or II, class 2 of MIL-E-15090.

3.4.2 Class 2, aluminum. Type W, class 2 boxes, together with arrangements of fittings and attached hardware, shall be in accordance with the construction shown on figure 1. Seams or joints shall be as tight as practicable. Boxes shall withstand the rough handling and imposed load tests specified in 4.4.1.1 and 4.4.1.3. Additional interior braces, partitions or framing members shall be added as necessary to ensure strength and rigidity.

3.4.2.1 Material. Boxes shall be constructed of sheet aluminum in accordance with the following formulations specified in QQ-A-250:

3003 - Temper H 14
 5052 - Temper H 32
 5456 - Temper H 321
 5454 - Temper H 32

Aluminum sheet shall have a minimum thickness of 0.078 inch when the long dimension of the box is 16 inches or less and a minimum thickness of 0.091 inch when the long dimension exceeds 16 inches.

3.4.2.2 Cover fabrication. Covers shall be constructed as specified in 3.3.3.

3.4.2.3 Hardware. Hardware shall be furnished in accordance with 3.4.1.1.4. Handles shall not pull loose or otherwise indicate structural weakness (see 4.4.1.2). All hardware shall be nonmagnetic (see 3.4.1.1.4.1).

3.4.2.4 Accessory framing and trays. Internal framing and trays shall be in accordance with 3.3.4.

3.4.2.5 Index sheet support. Index sheet supports shall be furnished as specified in 3.3.5, but shall be made of nonmagnetic material (see 3.4.1.1.4.1).

3.4.2.6 Finish. Boxes fabricated with aluminum do not require painting. If painting is specified (see 6.2.1), it shall be in accordance with the following:

- (a) Complete all fabricating operations such as welding, machining, drilling and tapping.
- (b) Remove all welding flux and visible corrosion products.
- (c) Remove all grease, oil and dirt by solvent wiping, vapor degreasing or any other suitable method.
- (d) Apply coating system specified in 3.4.2.6.1.

3.4.2.6.1 Coating system.

3.4.2.6.1.1 Pretreatment. One of the following shall be applied:

- (a) Anodic treatment in accordance with MIL-A-8625.
- (b) Chemical conversion treatment in accordance with MIL-C-5541.
- (c) Wash primer pretreatment in accordance with DOD-P-15328.

3.4.2.6.1.2 Enamel. The pretreatment shall be followed by two coats of gray enamel in accordance with MIL-E-15090, class 2, types I, II, or III. The enamel shall be applied as a continuous film, each coat approximately 0.001 inch thick.

3.4.3 Class 3, plastic or reinforced plastic. Unless otherwise specified (see 6.2.1), design and dimensions of type W, class 3 boxes shall be in general accordance with construction shown on figure 1. Design alterations necessary to provide required strength or to allow use of current plastic box fabrication processes, as an economy measure, may be permitted when approved by the acquiring activity. Seams or joints shall be as tight as practicable. Boxes shall withstand the rough handling and imposed load tests specified in 4.4.1.1 and 4.4.1.3. Additional interior braces, partitions or framing members shall be added as necessary to ensure adequate strength and rigidity.

3.4.3.1 Material. Boxes shall be constructed of material in accordance with grade 5 or better of MIL-P-17549, or other hi-impact plastic material having properties that shall meet the box requirements specified herein.

3.4.3.2 Hardware. Hardware shall be furnished as specified in 3.4.1.1.4. Handles shall not pull loose or otherwise indicate structural weakness (see 4.4.1.2).

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3.4.3.3 Accessory framing and trays, or partitions. Inner trays, partitions, or other framing members shall be constructed in the same manner and of the same material as the box.

3.4.3.4 Finish. Boxes shall be furnished pigmented to a color similar to the gray enamel required for type M boxes (see 3.3.6.2).

3.5 Padlocks. Padlocks shall not be furnished with boxes.

3.6 Workmanship. All parts, components and assemblies of the box shall be clean, free of jagged edges and defects that may cause injury and free from ingredients that would prevent the box from meeting the requirements specified herein and which will affect container durability, strength and serviceability.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by 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 supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.2 Sampling for quality conformance inspection.

4.2.1 Lot. All boxes of the same type and class offered for delivery at one time shall be considered a lot for purposes of quality conformance inspection.

4.2.2 Sampling for visual and dimensional examination. A random sample of boxes shall be selected from each lot in accordance with MIL-STD-105 at inspection level S-2 for the examination of 4.3. The acceptance quality level (AQL) shall be 1.0 percent defective.

4.2.3 Sampling for tests. A random sample of boxes shall be selected from each lot in accordance with table II for the tests specified in 4.4.

TABLE II. Sampling for tests.

Lot size number of boxes	Sample size number to be tested	Acceptance number	Rejection number
		(Number failing any test)	
Up to 15	1	0	1
16 to 40	2	0	1
41 to 110	3	0	1
111 to 300	5	0	1
301 to 800	7	0	1

4.3 Visual and dimensional examination. Each of the samples selected in accordance with 4.2.2 shall be visually and dimensionally examined to verify conformance to the requirements of this specification not involving tests.

4.4 Tests.

4.4.1 Performance tests. For purposes of these tests, boxes of standard sizes are classified into load groups as specified in table I. Boxes in load group I shall be packed to effect a simulated gross load (see 6.3) of 30 ± 1 pound; boxes in load group II shall be packed to effect a simulated gross load of 70 ± 1 pound; boxes of load group III shall be packed to effect a simulated gross load of 200 ± 1 pound. Approval shall be obtained from the activity concerned for boxes designed for a single item where the gross weight exceeds 200 pounds.

4.4.1.1 Rough handling test. Boxes in load groups I and II shall be tested in accordance with the free fall drop test of MIL-P-116 and limited to the eight corner drop requirement.

4.4.1.1.1 Load group III. Load group III boxes shall be tested in accordance with the edgewise drop test of MIL-P-116, except that the opposite end shall be raised to a height that the bottom face is 60 degrees to the floor. The test shall be applied to diagonally opposite edges.

4.4.1.1.2 Evaluation. At the conclusion of the test there shall be no mechanical failure of the box. Covers of boxes shall open and reclose with ease. Hinges, hasps and other fittings shall be in operative condition. Minor denting or crushing of box corners, scratching or chipping of finish or other signs of minor wear from dropping shall not be cause for rejection.

4.4.1.2 Handle test. Boxes with simulated gross loads shall be suspended by the handles and another weight equal to the simulated gross load specified in 4.4.1 shall be placed on the box. This may be accomplished by placing another box with simulated load on top of the box being tested. Boxes furnished without handles such as cleated boxes (see 3.4.1.1.4.2) shall not be subjected to this test.

4.4.1.3 Simulated load test. Boxes loaded as specified in 4.4.1 with covers closed shall have a load added on top of the box equal to five times the simulated load contained therein but not exceeding 1000 pounds. Boxes shall not collapse, buckle, or otherwise indicate structural weakness when subjected to this test.

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4.4.2 Test results. When specified in the contract or order, test results shall be prepared (see 6.2.2).

4.5 Inspection of packaging. Sample packages and packs, and the inspection of the preservation-packaging, packing and marking for shipment and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisition.)

5.1 Preservation (unit protection). Preservation shall be level A, C or commercial as specified (see 6.2.1).

5.1.1 Level A. Boxes shall be individually unit packed in fiberboard containers in accordance with PPP-B-636, type CF class weather resistant. Unless otherwise specified (see 6.2.1), variety, grade and style shall be at the contractor's option. Cushioning, blocking and bracing, as applicable, shall be provided to eliminate free movement of the box within the unit pack and to prevent subsequent damage to the hardware and box. Container closure shall be in accordance with method V of the appendix to PPP-B-636. When the unit pack is also the shipping container reinforcing shall be provided in accordance with the reinforcing requirements for class weather resistant boxes of the appendix to PPP-B-636. The preservation procedure shall be in accordance with MIL-P-116, method III.

5.1.2 Level C. Boxes shall be individually preserved as specified for level A except that fiberboard containers shall be of the non-weather resistant domestic class and closure shall be in accordance with method I of the appendix to PPP-B-636.

5.1.3 Commercial. Commercial preservation of boxes shall be in accordance with ASTM D 3951.

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

5.2.1 Level A. Unless otherwise specified (see 6.2.1), boxes preserved as specified (see 5.1) shall be packed in containers in accordance with the following specifications at the contractor's option.

<u>Specification</u>	<u>Container</u>	<u>Type, grade or class</u>
PPP-B-585	Boxes, wood, wirebound	Class 3
PPP-B-601	Boxes, wood, cleated- plywood	Overseas type
PPP-B-621	Boxes, wood, nailed and lock-corner	Class 2 - overseas

5.2.1.1 Closure, caseliners and gross weight. Shipping containers shall be closed, reinforced, or banded in accordance with the applicable container specification or appendix thereto. Waterproof caseliners shall be in accordance with MIL-STD-1186. Waterproof caseliners shall not be required when shipping containers are packed with class weather resistant fiberboard boxes (see 5.1.1). The gross weight of a shipping container shall not exceed 200 pounds.

5.2.2 Level B. Unless otherwise specified (see 6.2.1), boxes preserved as specified (see 5.1) shall be packed in containers in accordance with any of the following specifications at the contractor's option.

<u>Specification</u>	<u>Container</u>	<u>Type, grade or class</u>
PPP-B-576	Box, wood, cleated, veneer paper overlaid	Class 2 - overseas
PPP-B-585	Boxes, wood, wirebound	Class 2
PPP-B-591	Boxes, shipping, fiber- board, wood-cleated	Class II
PPP-B-601	Boxes, wood, cleated- plywood	Domestic type
PPP-B-621	Boxes, wood, nailed and lock-corner	Class 1 - domestic
PPP-B-636	Boxes, shipping, fiber- board	Class weather resistant
PPP-B-640	Boxes, fiberboard, corrugated, triple- wall	Class 2 - weather resistant

5.2.2.1 Closure reinforcing and gross weight. Shipping containers shall be closed and reinforced in accordance with the applicable container specification or appendix thereto. Boxes in accordance with PPP-B-636 shall be closed in accordance with method V of the appendix to PPP-B-636, and reinforced with nonmetallic banding or pressure sensitive adhesive filament tape. Unit packs in accordance with PPP-B-636, class weather resistant, closed and reinforced as specified herein and used as the shipping container need not be overpacked. The gross weight of wood, plywood, wood-cleated and triple wall fiberboard boxes shall not exceed 200 pounds. Fiberboard boxes in accordance with PPP-B-636 shall not exceed the weight limitation of the box specification.

5.2.3 Level C. Boxes preserved as specified (see 5.1) shall be packed as specified for level B except that containers may be of the non-weather resistant domestic type or grade and closure in accordance with PPP-B-636, method I, shall apply for PPP-B-636 containers.

5.2.4 Commercial. Boxes preserved as specified (see 5.1) shall be packed in accordance with ASTM D 3951.

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5.3 Loaded boxes. Boxes containing supply support items shall be packaged or prepared for shipment in accordance with the applicable equipment specification.

5.4 Marking.

5.4.1 Standard markings. In addition to any special markings required (see 6.2.1 and herein), each box, unit and exterior pack for levels A, B and C shall be marked in accordance with MIL-STD-129, for commercial in accordance with ASTM D 3951. Bar coding shall apply to unit and exterior packs.

5.4.2 Special markings.

5.4.2.1 Loaded boxes. Boxes furnished with supply support items packed therein shall be lettered on the outside with white or black paint. The identification data shall be repeated on the top and all four sides of the box when the total weight exceeds 50 pounds; when the total weight is less than 50 pounds, the identification data may be shown on the top and on one side only. The identification data shall be:

- (a) Blank space for ships' class designation and number (space to be left blank by manufacturer).
- (b) Designation of contents.
- (c) Name of equipment with which used; if more than one, then all should be listed.
- (d) Box number and total number of boxes making up a complete set of parts for an equipment (as 1 of 3); if only one, then no parts box number need be given.
- (e) Contract or order number, where appropriate.
- (f) Gross weight of box and contents and net weight of contents.

The following legend is offered as an example for a set of on board parts for a motor-driven lubricating oil pump:

REPAIR MOTOR ARMATURE
FOR
LUBRICATING OIL PUMPS
FORWARD AND AFT MAIN TURBINES
BOX 1 OF 2 BOXES
CONTRACT _____
WEIGHT: GROSS (BOX AND CONTENTS)
200 LBS, NET (CONTENTS) 170 LBS

6. NOTES

6.1 Intended use. This specification covers boxes that are intended to be used for the protection, stowage and storage of supply support items for mechanical, electrical and electronic equipment.

6.1.1 Type M boxes. Type M boxes are intended for the protection of on board supply support items stowed in boxes aboard ship. The type M box is also intended for use where permanent storage facilities for supply support items accompanying an equipment are not available at shore installations.

6.1.2 Type W boxes. Type W boxes are intended for the protection of on board supply support items stowed on ships where a low magnetic signature is important (such as wood hulled minesweepers). Type W boxes are not intended for use as a shipping container to be disposed of after use.

6.1.3 This specification is not intended to cover the types of boxes used as shipping containers and boxes from which supply support items are removed for stowage in bin or drawer type stowage systems on board ship.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Box type, class and size (nominal inside dimensions) required (see 1.2.1 and 1.2.2).
- (c) When smaller size box is required (see 1.2.2.1).
- (d) When boxes for individual items are required (see 1.2.2.1).
- (e) Internal material other than specified (see 3.2.1).
- (f) When trays, partitions, or compartments are required (see 3.3.4).
- (g) When fire retardant treatment is not required (see 3.4.1).
- (h) Rope handles, when permitted (see 3.4.1.1.4.2).
- (i) Whether aluminum boxes are to be painted (see 3.4.2.6).
- (j) Design, if other than specified (see 3.4.3).
- (k) Level of preservation and packing required (see 5.1 and 5.2).
- (l) Box selection, if other than specified (see 5.1.1, 5.2.1 and 5.2.2).
- (m) Special markings required (see 5.4.1).

6.2.2 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DoD FAR Supplement, Part 27, Sub-Part 27.410-6 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification are cited in the following paragraphs.

<u>Paragraph no.</u>	<u>Data requirement title</u>	<u>Applicable DID no.</u>	<u>Option</u>
3.2.2	Drawings, engineering and associated lists	DI-E-7031	Level 2 or 3
4.4.2	Report, preservation-packaging and packing test	UDI-T-23766	---

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5010.12-L., AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

6.2.2.1 The data requirements of 6.2.2 and any task in sections 3, 4, or 5 of this specification required to be performed to meet a data requirement may be waived by the contracting/acquisition activity upon certification by the offeror that identical data were submitted by the offeror and accepted by the Government under a previous contract for identical item acquired to this specification. This does not apply to specific data which may be required for each contract regardless of whether an identical item has been supplied previously (for example, test reports).

6.3 Loads. Simulated loads should be composed of a number of small sand bags, a quantity of paperboard cartons or laminated paper bags packed with steel shot or other similar articles. A load should not be an individual article such as a snug fitting block of wood which lends considerable inner support to the box being tested.

6.4 Supply support items. Mechanical, electrical and electronic parts for the same equipment should be packed in the same parts box when practicable.

6.5 Definitions or explanation of terms.

6.5.1 Levels of protection. The following levels of protection apply equally to preservation and packing.

- (a) Level A. This packaging provides maximum protection. It is needed to protect material under the most severe worldwide shipment, handling, and storage conditions. Preservation and packing will be designed to protect material against direct exposure to extremes of climate, terrain, and operational and transportation environments, without protection other than that provided by the pack. The conditions to be considered include, but are not limited to:
- (1) Multiple handling during transportation and intransit storage from point of origin to final user.
 - (2) Shock, vibration, and static loading during shipment.
 - (3) Loading on ship deck, transfer at sea, helicopter delivery, and offshore or over-the-beach discharge, to final user.
 - (4) Environmental exposure during shipment or during intransit operations where port and warehouse facilities are limited or nonexistent.
 - (5) Outdoor storage in all climatic conditions for a minimum of 1 year.
 - (6) Static loads imposed by stacking.
- (b) Level B. This packaging provides intermediate protection. It is needed to protect material under anticipated favorable environmental conditions of worldwide shipment, handling, and storage.

Preservation and packing will be designed to protect material against physical damage and deterioration during favorable conditions of shipment, handling, and storage. The conditions to be considered include, but are not limited to:

- (1) Multiple handling during transportation and intransit storage.
 - (2) Shock, vibration, and static loading of shipments worldwide by truck, rail, aircraft, or ocean transport.
 - (3) Favorable warehouse environment for a minimum of 18 months.
 - (4) Environmental exposure during shipment and intransit transfers, excluding deck loading and offshore cargo discharge.
 - (5) Stacking and supporting superimposed loads during shipment and extended storage.
- (c) Level C. This packaging provides minimum protection. It is needed to protect material under known favorable conditions. The following criteria determine the equipments for this degree of protection:
- (1) Use or consumption of the item at the first destination.
 - (2) Shock, vibration, and static loading during the limited transportation cycle.
 - (3) Favorable warehouse environment for a maximum of 18 months.
 - (4) Effects of environmental exposure during shipment and intransit delays.
 - (5) Stacking and supporting superimposed loads during shipment and temporary storage.
- (d) Commercial. Although not specifically defined by any Government regulation or instruction, commercial packaging (preservation and packing) is understood to be those practices by manufacturers and suppliers to protect and identify material and items packaged for retail and wholesale distribution purposes. ASTM D 3951 provides guidance in the application of commercial packaging. It has been determined by joint DoD instructions that commercial, also in some areas addressed as industrial packaging, should only be used or specified when such packaging is known to satisfy DoD needs. Such use should be determined before a contract for supplies is awarded or within the life cycle of the contract in which substantial savings to the Government may result. Commercial (industrial) packaging should not be specified where multiple shipments and handlings are anticipated or desired.

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6.5.2 Packaging and supply terms.

6.5.2.1 Exterior pack. An exterior pack is a container, bundle, or assembly which is sufficient by reason of material, design, and construction to protect material during shipment and storage. This can be the unit pack or a container with any combination of unit or intermediate packs.

6.5.2.2 Marking. Marking is the application of numbers, letters, labels, tags, symbols, or colors for handling or identification during shipment and storage.

6.5.2.3 Military packaging. Military packaging is materials and methods or procedures prescribed in Federal and Military specifications, standards, drawings or other authorized documents, which are designed to provide the degree of packaging protection determined necessary to prevent damage and deterioration during worldwide distribution of material.

6.5.2.4 Packaging. Packaging is the process and procedures used to protect material from deterioration and damage. It includes cleaning, drying, preserving, packing, marking, and unitization.

6.5.2.5 Packing. Packing is the assembling of items into a unit, intermediate, or exterior pack with necessary blocking, bracing, cushioning, weatherproofing, reinforcement and marking.

6.5.2.6 Preservation. Preservation is the application of protective measures, including cleaning, drying, preservative materials, barrier materials, cushioning, and containers when necessary.

6.5.2.7 Repair parts. Repair parts are those support items that are coded to be not repairable (that is, consumable items) (see MIL-STD-1561).

6.5.2.8 Spares. Spares are those support items that are coded to be repairable (that is, repairable items) (see MIL-STD-1561).

6.5.2.9 Support items. Support items are items subordinate to, or associated with, an end item (that is, spares, repair parts, tools, test equipment, support equipment and sundry materials) and required to operate, service, repair, or overhaul an end item (see MIL-STD-1561).

6.5.2.10 Unit pack. A unit pack is the first tie, wrap, or container applied to a single item or quantity thereof, or to a group of items of a single stock number, preserved or unpreserved, which constitutes a complete or identifiable package.

6.6 Subject term (key word) listing.

Boxes, Stowage and Storage
Hardwood
Packaging terms
Primers
Protective coatings
Softwood
Welding flux

6.7 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodian:
Navy - SH

Preparing activity:
Navy - SH
(Project 8115-N475)

Review activities:
Navy - AS, EC

User activities:
Navy OS, SA

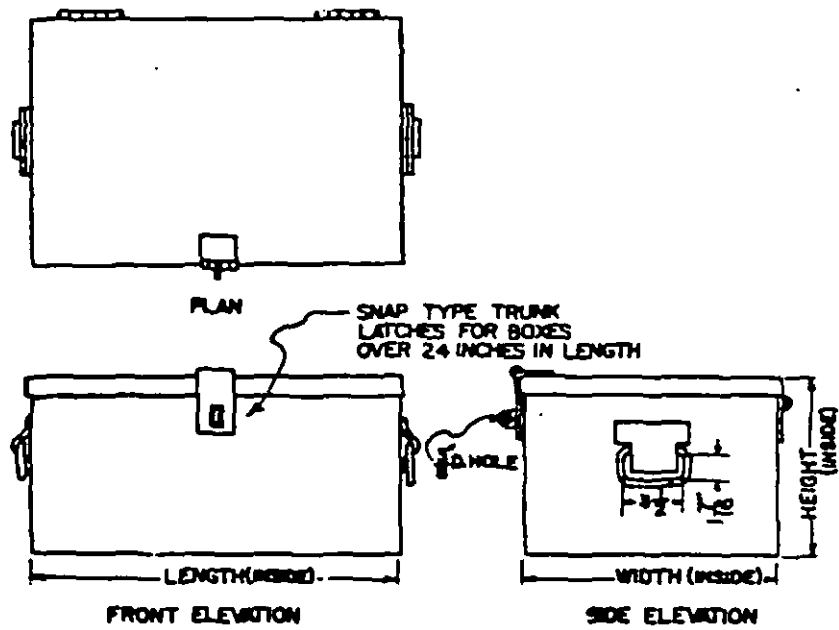


FIGURE 1. Type M; type W, class 2; type W, class 3
box construction.

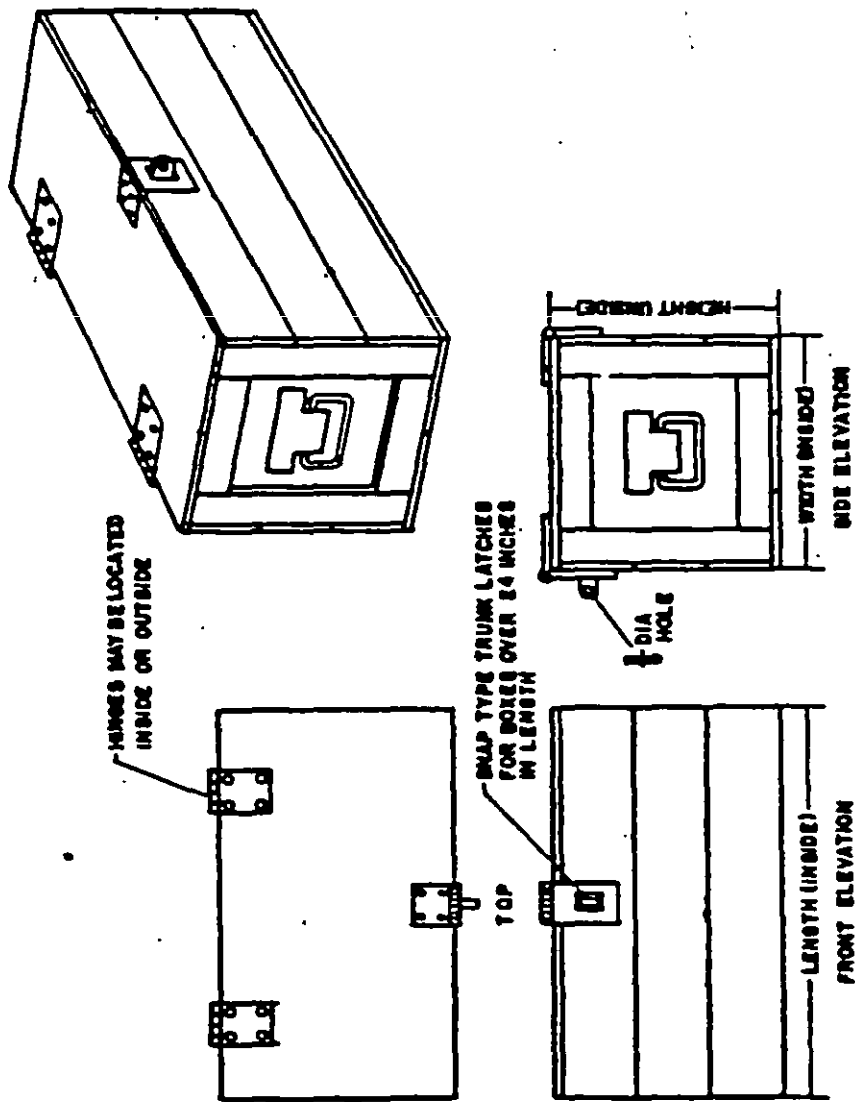


FIGURE 2. Type W, class I box construction.

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