

INCH-POUND

PPP-B-585D
December 31, 1992
SUPERSEDING
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AMENDMENT-2
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FEDERAL SPECIFICATION

BOXES, WOOD, WIREBOUND

The General Services Administration has authorized the use of this federal specification, for all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers the requirements for new wirebound wood boxes for domestic and overseas shipment of supplies and material (see 6.1).

1.2 Classification.

1.2.1 Class. Wirebound boxes covered by this specification shall be furnished in the following classes as specified (see 6.3):

- Class 1 - Domestic (see 6.1.1).
- Class 2 - Normal overseas (see 6.1.2).
- Class 3 - Military overseas (see 6.1.3).

1.2.2 Style. Wirebound boxes covered by this specification shall be of the following styles based on method of closure as specified (see figure 1 and 6.3):

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be used in improving this document should be addressed to: U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5018 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8115

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- Style 1 - Twisted wire closure.
- Style 2 - Looped wire closure.
- Style 3 - Looped wire closure with wired ends.

1.2.3 Grade. Unless otherwise specified (see 6.3), the grade of preservative treatment shall be B.

- Grade A - With preservative treatment (see 3.8)
- Grade B - Without preservative treatment

1.2.4 Types of loads. The boxes covered by this specification are furnished for shipment of type I (easy), type II (average), or type III (difficult) loads (see 6.2). The type of load applicable to each procurement shall be as specified (see 6.3).

2. APPLICABLE DOCUMENTS

2.1 Government documents. The following documents, of the issues in effect on the date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

Federal Specifications

- FF-N-105 - Nails, Brads, Staples, and Spikes: Wire, Cut and Wrought
- PPP-V-205 - Veneer, Paper-Overlaid, Container-Grade

Federal Standard

- FED-STD-123 - Marking for Shipment (Civil Agencies)

Commercial Item Description

- A-A-55057 - Panels, Wood/Woodbased; Construction and Decorative

(Activities outside the federal Government may obtain copies of federal specifications, standards, and commercial item descriptions as outlined under General Information in the Index of Federal Specifications, Standards, and commercial item descriptions. The Index, which includes cumulative bi-monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-0001.)

(Single copies of this specification, and other federal specifications and commercial item descriptions required by activities outside the Federal Government for bidding purposes, are available without charge from General Services Administration Business Service Centers, Regional Offices in Boston, MA; New York, NY; Washington, DC; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; and Seattle, WA.)

(Federal Government activities may obtain copies of Federal Standardization Documents and the Index of Federal Specifications, Standards and Commercial Item Descriptions from established distribution points in their agencies.)

Military Standards

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
- MIL-STD-129 - Marking for Shipment and Storage
- MIL-STD-147 - Palletized Unit Loads
- MIL-STD-731 - Quality of Wood Members for Containers and Pallets

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

Federal Regulation

Regulation Governing United States Code Congressional and Administrative News - Resource Conservation and Recovery Act of 1976 (Public Law 94-580)

U.S. Department of Transportation (DOT)

Code of Federal Regulations 49 CFR Parts 100-199 Transportation

U.S. Department of Commerce (USDC)

PS 1 - Product Standard for Construction and Industrial Plywood

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-0001.)

(The code of Federal Regulations (CFR) and the Federal Register (FR) are for sale on a subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. When indicated, reprints of certain regulations may be obtained from the federal agency responsible for issuance thereof.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

American Plywood Association (APA)

- APA PRP-108 - Performance Standards and Policies for Structural-Use Panels

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(Application for copies should be addressed to the American Plywood Association, 7011 South 19th Street, P.O. Box 11700, Tacoma, WA 98411-0700.)

American Society for Testing and Materials (ASTM)

- A 641 - Standard Specification for Zinc Coated Galvanized Carbon Steel Wire
- A 809 - Standard Specification for Aluminum Coated (Aluminized) Carbon Steel Wire
- A 818 - Standard Specification for Coppered Carbon Steel Wire
- D 3951 - Standard Practice for Commercial Packaging

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

Hardwood Plywood Manufacturer's Association (HPMA)

American National Standards Institute (ANSI)

ANSI/HPMA HP-1 1992 - Interim Standard for Hardwood Plywood

(Application for copies should be addressed to the Hardwood Plywood Manufacturer's Association, 1825 Micheal Faraday Drive, P.O. Box 2789, Reston, VA 22090-2789.)

(Federal Government activities may obtain copies of those non-Government documents which have been indexed in the Department of Index of Specifications and Standards from the DoD Single Stock Point, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

3. REQUIREMENTS

3.1 Materials. The offeror/contractor is encouraged to use recovered materials in accordance with Public Law 94-580 to the maximum extent practicable.

3.1.1 Wood. The wood species shall conform the group I, II, III or IV of MIL-STD-731, as applicable. When any group is specified, any species in that group may be used. The contractor may use a more dense species of wood for any part of the box specified. For face boards certain exceptions are permitted (see 3.3.1).

3.1.1.1 Decay. Each piece of wood shall be free from decay.

3.1.1.2 Checks, splits, and shakes. Checks, splits, and shakes (see 6.4) occurring through the full thickness that are longer than the width of the

member shall not be permitted. Checks, splits, and shakes occurring which do not penetrate the full thickness, do not exceed 1/8 inch in width at surface point of a cleat or batten, and which do not extend more than 1/2 of the length of the wood member will be permitted. Checks, splits, and shakes occurring through the full thickness that are longer than 1/2 the length of the liner, and which exceed 1/8 inch in width shall not be permitted.

3.1.1.3 Bark or wane. Bark or wane (see 6.4), along any edge of a cleat or batten will be permitted for the full length of the member, provided it does not exceed 3/8 inch in either direction from the edge of the member.

3.1.1.4 Grain divergence. In cleats, battens, and liners, the divergence of the grain shall not exceed 1 inch in 10 inches of length. In sawed or veneer face boards, the divergence of the grain shall not exceed 1 inch in 8 inches of length.

3.1.1.5 Knots (face board). Knots shall be as specified in MIL-STD-731 and of the sizes specified herein.

3.1.1.5.1 Sound knots. Sound knots shall not exceed 1-1/2 inches in diameter, shall not exceed 1/3 the width of the board nor be closer to any edge of the board than 1 inch. Knot clusters shall not exceed 2 inches in diameter or exceed 1/3 the width of the board, whichever is the lesser.

3.1.1.5.2 Loose knots and knotholes. Loose knots or knotholes shall not exceed 1-1/8 inches in diameter, shall not exceed 1/3 the width of the board, and shall not be closer to any edge of the board than 1 inch. There shall be no more than one loose knot or knothole per face between adjacent binding wires. A knot cluster which contains a loose knot or knothole shall not exceed 2 inches in diameter or exceed 1/3 the width of the board, whichever is the lesser. Not less than 1/2 inch of clear wood shall separate a loose knot or knothole from another knot of the cluster.

3.1.1.6 Knots (cleats, battens, and liners). In cleats and battens, the diameter of any knot or knothole shall not exceed 1/4 the width or depth of the cleat or batten or shall be closer than 1-1/4 inch from the end of the member. No knot or knothole in any liner shall exceed 1/2 inch in diameter or be closer than 1-1/4 inches from the end of the liner.

3.1.1.7 Moisture content. The moisture content of cleats, battens, and sawed face boards shall be not less than 9 percent nor more than 18 percent of their dry weight at the time of manufacture of the boxes. The moisture content for veneer shall be not less than 9 percent nor more than 15 percent of its dry weight at the time of manufacture of the boxes. Moisture content of wood shall be determined as specified in 4.3.1.

3.1.2 Plywood panel. The panel shall be of the following minimum grades as specified below and in A-A-55057.

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Wirebound wood box	HPMA HP-1 1992	PS 1 and APA PRP-108
Class 1 (domestic)	Grade 3 - 4 type II	Exposure 2
Class 2 (normal overseas)	Grade 3 - 4 type I	Exposure 1
Class 3 (military overseas)	Grade 3 - 4 type I	Exposure 1

3.1.3 Veneer, paper-overlaid. The paper-overlaid veneer shall comply with the requirements of PPP-V-205. For class 1 boxes, type I paper-overlaid veneer shall be used; for classes 2 and 3 boxes, type II paper-overlaid veneer shall be used. The grain direction of paper-overlaid veneer shall be the grain direction of the core material.

3.1.4 Wires.

3.1.4.1 Binding wire and staple wire. Binding wire shall be low carbon annealed steel wire and have the properties listed in table I. Staple wire shall be hard tempered, low carbon steel wire and have the properties listed in table I.

TABLE I. Tensile strength of binding and staple wire

Type	K psi	MPa	Use
Twist binding	45 - 70	(310 - 483)	Twist closure
Medium binding	60 - 75	(414 - 517)	Group I, II, III woods
Hard binding	70 - 85	(483 - 586)	Group IV woods
Stapling wire	95 - 125	(655 - 862)	Group I, II, III woods
Stapling wire (special)	Up to 180	(Up to 1241)	Group IV woods

3.1.4.2 Wire coatings. The surface of binding wire and staple wire for class 2 and 3 boxes shall be galvanized. The surface of binding and staple wires for class 1 boxes need not be galvanized. Galvanized coating shall be smooth and shall not flake or peel when tested in accordance with ASTM A 641.

3.1.5 Nails. Nails shall be in accordance with FF-N 105. Nails of the types hereinafter specified shall be chemically etched or cement coated. When nails are to be clinched, cement coating or chemical etching will not be required.

3.1.6 Wood preservative, water repellent. Water repellent preservative shall be composed of either a 2 percent copper naphenate or a 3 percent zinc naphenate (M-GARD W 550) or 1.8 percent copper-8-quinolinolate PQ 56 (see 3.6).

3.2 Dimensions. Boxes shall be furnished having the dimensions as specified (see 6.3). Dimensions of boxes shall be the inside dimensions measured between the inside surfaces of the face boards, and shall be given to the nearest 1/16 inch in the sequence - length, width, and depth. The first two dimensions shall be the open face of the box. In special designs, for types II and III loads where intermediate cleats and their size and location are required, they shall be as specified in 3.3.2.1. A tolerance of $\pm 1/8$ inch will be permitted in the dimensions of the assembled box.

3.3 Requirements of components. Components of a box shall be made from materials specified in 3.1 through 3.1.6.

3.3.1 Face boards. Face boards are the sheathing boards on the top, bottom, sides, and ends of a box. Face boards may be resawn lumber, veneer, plywood, or paper-overlaid veneer. The following species of group I woods of the same thickness permitted for groups II and III woods for the corresponding type of load and class of box may be used for face boards: cottonwood, cypress, magnolia, fir (true firs), and spruce. The thickness of face boards shall conform to table II as indicated for the class of box specified, the group of woods used, the type of load, and the weight of contents. The width of any face board shall be not less than 2-1/2 inches at any point, except that when matched resawn lumber (tongue-and-groove) face boards are used, not more than one piece 1-1/2 inches wide for each 12 inch width of face, or fraction thereof, shall be permitted. No edge piece shall be less than 2-1/2 inches wide. When fabricated, there shall be no opening greater than 1/4 inch between face boards.

3.3.1.1 Thickness of face boards. No part of any resawn lumber face board shall be more than 1/32 inch less than the thickness specified in table II for boards up to and including 7/32 inch thick and not more than 1/32 inch less than the thickness specified for boards 1/4 inch or more in thickness. No part of any plywood, paper-overlaid veneer, or single thickness veneer face board specified in table II shall have a tolerance of 1/32 inch plus nominal. The sum of the thickness of the two plies of veneer in 2-ply face boards shall be not less than 95 percent of the thickness specified in table II. When paper-overlaid veneer face board is used, the thickness may be reduced 25 percent below the thickness specified in table II, provided the paper-overlaid veneer is full width of face, and provided group III or IV woods are used as the core of the paper-overlaid veneer; verification for the

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latter requirement shall be by certificate of compliance submitted by the manufacturer. When one piece plywood is used full width of faces, the thickness may be reduced 25 percent below the values of table II.

TABLE II. Minimum thickness of face boards

Weight of contents (Pounds)		Group I woods (Inch)		
Exceeding	Not exceeding	Type I load	Type II load	Type III load
<u>Class 1 boxes</u>				
0	85	7/32	1/4	5/16
85	125	1/4	5/16	3/8
125	200	5/16	3/8	7/16
200	300	3/8	7/16	*
300	400	*	*	*
400	500	*	*	*
<u>Class 2 boxes</u>				
0	85	5/16	3/8	*
85	125	3/8	3/8	*
125	200	*	*	*
200	300	*	*	*
300	400	*	*	*
<u>Class 3 boxes</u>				
0	85	3/8	3/8	*
85	125	*	*	*
125	200	*	*	*
200	500	*	*	*
Weight of contents (Pounds)		Group II and III woods (Inch) $\frac{1}{2}$		
Exceeding	Not exceeding	Type I load	Type II load	Type III load
<u>Class 1 boxes</u>				
0	85	1/7	1/6	3/16
85	125	1/6	3/16	7/32
125	200	3/16	7/32	1/4
200	300	7/32	7/32	1/4
300	400	1/4	1/4	5/16
400	500	5/16	5/16	3/8

TABLE II. Minimum thickness of face boards (cont'd)

Weight of contents (Pounds)		Group II and III woods (Inch) 1/ (cont'd)		
Exceeding	Not exceeding	Type I load	Type II load	Type III load
<u>Class 2 boxes</u>				
0	85	3/16	7/32	5/16
85	125	7/32	1/4	5/16
125	200	7/32	1/4	5/16
200	300	1/4	3/8	3/8
300	400	5/16	3/8	3/8
<u>Class 3 boxes</u>				
0	85	1/4	1/4	5/16
85	125	1/4	5/16	5/16
125	200	1/4	5/16	3/8
200	500	5/16	3/8	3/8
Weight of contents (Pounds)		Group IV woods (Inch)		
Exceeding	Not exceeding	Type I load	Type II load	Type III load
<u>Class 1 boxes</u>				
0	85	1/7	1/7	1/6
85	125	1/7	1/6	3/16
125	200	1/6	3/16	7/32
200	300	3/16	7/32	1/4
300	400	7/32	1/4	5/16
400	500	1/4	1/4	5/16
<u>Class 2 boxes</u>				
0	85	3/16	3/16	7/32
85	125	3/16	3/16	7/32
125	200	3/16	7/32	1/4
200	300	7/32	1/4	5/16
300	400	1/4	5/16	3/8
<u>Class 3 boxes</u>				
0	85	1/4	1/4	1/4
85	125	1/4	1/4	5/16
125	200	1/4	1/4	5/16
200	500	1/4	5/16	3/8

* Group I woods are not permitted.
1/ See exceptions in 3.3.1.

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3.3.1.2 Grain of face boards. End face boards for styles 1 and 2 boxes shall be placed with the grain horizontal, except that when horizontal patterns are used in end panels, the grain of the face boards shall be vertical. End face boards for style 3 boxes shall be placed with the grain vertical. When 2-ply veneer ends are used for style 3 boxes, the two plies of single thickness veneer shall be crossed with the grains at right angles

and stapled together with not less than two lines of staples. A line of staples shall be located approximately 1 inch from the parallel to each horizontal edge of the end face board (see 3.3.7.2). The direction of grain of the ply to which the end wire is stitched shall be vertical.

3.3.2 Cleats. Cleats are pieces of lumber which form the framework of the box and to which face boards of the top, bottom, and sides are stapled. Cleats shall be made of group II, III, or IV woods only. Each cleat shall be a single piece of wood without any joints. Cleats shall be made with mitered ends or with mortised and tenoned ends tongue-and-groove. Dimensions shall be actual dimensions, 1-1/32 inch. Edge cleats of all styles of boxes shall be 13/16 inch wide and 7/8 inch in thickness for boxes having weight of contents up to 300 pounds. For boxes having weight of contents from 300 to 500 pounds, edge cleats shall be 1-1/8 inches wide and 1-1/8 inches in thickness, except that when HVB or HVBW end patterns are used (see 3.4), edge cleats shall be 13/16 inch wide and 7/8 inch in thickness.

3.3.2.1 Intermediate cleats. Boxes for types 2 and 3 loads, having greater between-cleat dimensions than specified in table III, shall be reinforced with one or more rows of intermediate cleats, except as below. Rows of intermediate cleats are not required on boxes for type 1 loads. The distance between adjacent rows of cleats shall not exceed the distance indicated in table III. In special designs for types 2 and 3 loads, where required, size and location of intermediate cleats shall be specified (see 6.3). If the use of intermediate cleats is undesirable or impractical, the intermediate cleats may be omitted but the thickness of face boards shall be increased to the thickness specified for the between cleat dimension indicated in table III.

TABLE III. Maximum distance between adjacent rows of cleats

Thickness of face boards <u>1/</u> Inch	Type II load (average)			Type III load (difficult)		
	Group I woods Inches	Groups II & III woods Inches	Group IV woods Inches	Group I woods Inches	Groups II & III woods Inches	Group IV woods Inches
Class 1 boxes:						
1/6	--	32	36	--	--	24
7/32	--	40	44	--	28	32
1/4	32	44	48	--	32	36
5/16	36	48	48	24	36	40
3/8	36	48	48	24	40	40
Classes 2 and 3 boxes:						
7/32	--	28	32	--	--	20
1/4	--	32	36	--	20	24
5/16	--	36	40	--	24	28
3/8	32	40	44	--	28	32

1/ When intermediate cleats are not desired, see 3.3.2.1.

NOTE: For type I (easy) load, intermediate cleats are not required.

3.3.2.2 Cleat sizes. Unless otherwise specified in the contract or purchase order (see 6.3), any of the sizes of cleats shown in table IV shall be used for intermediate rows. No part of any intermediate cleat shall be more than 1/32 inch less than the dimensions shown in table IV, for dimensions exceeding 13/16 inch or 1/16 inch less than the dimensions exceeding 13/16 inch.

TABLE IV. Sizes of intermediate cleats

Width (Inches)	Thickness (Inch)
2-3/4	3/8
2-1/4	1/2
1-3/4	5/8
1-1/4	3/4
13/16	13/16

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3.3.3 Battens.

3.3.3.1 A batten is a wooden board to which the end face board is nailed or stapled. Battens shall be attached to the outside face of the end face board and may be positioned horizontal, vertical, or both horizontal and vertical. Battens made for group I woods shall be not less than 1-3/4 inches wide and those made from groups II, III, and IV woods shall be not less than 1-3/8 inches wide. Battens shall be the same thickness as the cleats on the boxes. No part of any batten shall be more than 1/32 inch less than the specified thickness nor more than 1/16 less than the specified width.

3.3.4 Liners.

3.3.4.1 A liner is a thin wooden board stapled to the end to reinforce the end face board. The grain of the liner shall be at right angles to the grain of the end face board. Liners may be stapled to either the outside or inside face of the ends. Liners for styles 1 and 2 boxes shall always be vertical; liners for style 3 boxes shall always be horizontal. When liners are attached to the edges of ends, the liners shall be not less than 1-3/16 inches wide. For style 3 boxes more than 14 inches in depth, or having vertical battens, the liners shall be not less than 2-7/8 inches wide. The thickness of the liner shall be not less than the thickness of the end face board, except that it need not exceed 1/4 inch, when the thickness of the end face board exceeds 1/4 inch. Each edge and intermediate liner shall be fastened to the end face board by staples. Liners which are 1-3/16 inches wide shall have one row of staples. Liners which are 2-7/8 inches wide shall have two rows of staples.

3.3.5 Ends. Ends are composed of end face boards to which liners, battens, or both shall be attached (see 3.3.5.1 and 3.3.5.2).

3.3.5.1 Ends for styles 1 and 2 boxes. Battens shall be required on the ends of styles 1 and 2 boxes, except that vertical liners are permitted in lieu of battens under the conditions specified in 3.4. The number and arrangement of battens or liners depend on the class of box, type of load, dimensions, and weight of contents. Vertical liners shall be required on ends made from veneer or sawed boards when battens are not used. When ends are made from one piece plywood or paper-overlaid veneer, no liners are required. Standard arrangements of battened ends and lined ends for styles 1 and 2 boxes are shown in figure 2.

3.3.5.2 Ends for style 3 boxes. Ends of style 3 boxes shall have liners, battens, or both. The number and arrangement of battens, liners, and end wires depend on the class of box, type of load, dimensions, and weight of contents. When ends shall be made from one piece plywood or paper-overlaid veneer, liners are not required. When 2-ply ends are indicated, no liners are required. Standard arrangements of battens on the ends of style 3 boxes are shown in figure 3.

3.3.6 Wires. Each girth wire shall be continuous around the girth of the box. Whenever practicable, all girth wires shall be uniformly spaced, except that when rows of intermediate cleats are used, a girth wire shall be placed over each row of cleats. On the ends of style 3 boxes, each wire shall be continuous across the end. These wires should be generally stapled to the outside face of the end or may be stapled to the inside face if it is more practical to do so. Stapling shall be as specified in 3.3.7. Splicing or welding of a binding wire during manufacture is acceptable. The number and gage of girth wires shall conform to the requirements of table V for the weight of contents and inside length of box specified (see 6.3).

TABLE V. Minimum number and gage of girth wires

Weight of contents (Pounds) Range	Inside length of box (inches)									
	Up to 8-1/2		8-9/16 to 13		13-1/6 to 17-1/2		17-9/16 to 22-1/2		22-9/16 to 29-1/2	
	No. of wires	Gage	No. of wires	Gage	No. of wires	Gage	No. of wires	Gage	No. of wires	Gage
0-85	2	13	3	13	4	14	5	14	6	14
85-125	2	13	3	13	4	13	5	14	6	14
125-200	--	--	3	12	4	12	5	13	6	13
200-300	--	--	--	--	4	12	5	13	6	13
300-400	--	--	--	--	--	--	5	12	7	13
400-500	--	--	--	--	--	--	--	--	7	13

Weight of contents (Pounds) Range	Inside length of box (inches)							
	29-9/16 to 35-1/2		35-9/16 to 42-1/2		42-9/16		51-1/6	
	No. of wires	Gage	No. of wires	Gage	No. of wires	Gage	No. of wires	Gage
0-85	6	14	7	14	8	14	9	14
85-125	6	13	7	13	8	13	9	13
125-200	6	13	7	13	8	13	9	13
200-300	7	13	8	13	8	13	9	13
300-400	7	13	8	13	8	13	9	13
400-500	7	13	9	13	9	13	9	13

3.3.6.1 Wire gage. The gage of end wires on style 3 boxes shall conform to the requirements of table VI for the weight of contents (see 6.3) and class of box specified.

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TABLE VI. Gage of end wires on style 3 boxes

Weight of contents (Pounds)		Gage of wires	
Exceeding	Not exceeding	Class 1 boxes	Classes 2 & 3 boxes
0	85	16	15
85	200	15	14
200	500	14	14

3.3.6.2 Girthwise wire closure for box styles. The length of girth wires for twisted and looped wire fasteners on styles 1 and 2 boxes shall be such as to make satisfactory closure (see figures 6, 7, 8 and 9). The length of looped wire fasteners on the ends of style 3 boxes shall be such as to make a satisfactory assembly of the box. On style 1 boxes, for twisted wire closures, the ends of the girth wires shall extend not less than 2-1/4 inches beyond the edge of the top boards and not less than 1 inch beyond the edge of the side boards. On style 2 boxes, each end of each girth wire shall be a looped fastener formed by twisting the wires or by bending the wire back in the opposite direction, driving the ends of the wire through the boards and clinching (see figure 9). The manner of forming the looped fastener shall be at the option of the manufacturer. On style 3 boxes, each end of each end wire shall be a looped fastener formed by bending the wire back in the opposite direction, driving the end of the wire through the boards and clinching (see figure 9). When specified in the contract or purchase order (see 6.3), each end of each girth wire may be a twisted wire closure, as specified for style 1 closures above.

3.3.7 Stapling. Staples shall be used for fastening binding wires to both face boards and cleats and for fastening liners to end face boards. Staples may also be used for fastening end face boards to battens. Binding wires shall be applied mechanically and be fastened by staples astride the wire. Staples shall pass through the face boards and be clinched smooth, or shall pass through the face boards and into the cleats. The points of the staples shall not protrude from the surface of the wood, but if driven through a board or cleat, they shall be clinched. Spacing of staples shall not exceed 2 inches when driven over binding wires for class 1 boxes. For classes 2 and 3 boxes, spacing of staples shall not to exceed 1-1/2 inches, except where the requirements for positioning end wires or the length of the cleat requires more staples then the spacing shall not exceed 2-1/2 inches. Staples driven over binding wires into face boards only, shall be not less than 0.0475 inch in diameter (18 gage). The length of staples shall be not less than indicated in table VII and shall be long enough to penetrate the boards and be clinched smooth.

TABLE VII. Length of staples driven over wires into face boards only

Thickness of face boards (Inch)	Length of staples, minimum (Inch)
1/6	3/8
Over 1/6 but not over 5/16	1/2
Over 5/16	9/16

3.3.7.1 Staples for securing binding wire to cleats. Staples driven over binding wires and through face boards into cleats shall be not less than 0.0625 inch diameter (16 gage), except that staples driven into cleats 1-1/8 inches wide by 1-1/8 inches deep shall be not less than 0.072 inch diameter (15 gage). Staples shall not be deformed or protrude from the cleats, except that when the thickness of the cleats is 9/16 inch or less, the staples shall be driven through the cleats and shall be sufficiently long to produce a smooth clinch. The length of staples shall be not less than indicated in table VIII.

TABLE VIII. Length of staples driven over wires and through face boards into cleats

Size of Cleat (Inch)	Thickness of face boards (Inch)	Length of staples (Inch)
13/16 x 7/8	1/6 only	1
13/16 x 7/8	Over 1/6 by not over 1/4	1-1/8
13/16 x 7/8	Over 1/4	1-1/4 ^{1/}
1-1/8 x 1-1/8	1/4 or less	1-3/8
1-1/8 x 1-1/8	Over 1/4	1-1/2

^{1/} Need not be longer than 1-1/8 inches for cleats made from group IV woods.

3.3.7.1.1 Number of cleat staples. The minimum number of staples in any cleat shall comply with the requirements of table IX. Not less than two staples shall be driven over each girth wire through each face board, except that when a board is less than 2-1/2 inches wide, only one staple need be driven through the board.

TABLE IX. Minimum number of staples required in any cleat

Weight of contents (Pounds)		Minimum number of staples
Exceeding	Not exceeding	
0	85	3
85	125	4
125	200	5

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TABLE IX. Minimum number of staples required in any cleat (cont'd)

Weight of contents (Pounds)		Minimum number of staples
Exceeding	Not exceeding	
200	300	7
300	400	9
400	500	11

3.3.7.2 Placement of staples. At each corner of the box the distance from the end of the cleat to the nearest staple shall not exceed 1-5/8 inches. Staples used for fastening edge and intermediate liners to end face boards or for fabricating 2-ply face boards shall be not less than 0.0475 inch diameter (18 gage), and shall be sufficiently long to pass through the liner and face board or through the 2-ply crossed veneer and produce a smooth clinch. Staples shall be spaced not more than 2 inches apart. Staples used for fastening end face boards to battens shall be not less than 16 gage (0.0625 inch diameter). The length of each staple shall be not less than the thickness of the end face board plus three-fourths of the thickness of the batten, unless clinched. The points of the staples shall not protrude from the battens unless clinched. Staples used for fastening end face boards more than 1/6 inch thick to battens shall be clinched. The spacing of staples shall not exceed 2 inches, measured along the length of the batten.

3.3.8 Nailing. Nails used for fastening end face boards to end battens shall be not less than 14-1/2 gage (0.076 inch diameter). The length of each nail shall be not less than the thickness of the end face board plus three-fourths of the thickness of the batten, unless clinched. The point of the nail shall not protrude from the batten, unless clinched. Nails used to fasten end face board more than 1/6-inch thick to battens shall be clinched. When nails are clinched, they shall have a smooth clinch of 1/8 inch to 1/4 inch. The spacing of nails shall not exceed 2-1/2 inches, measured along the length of the batten.

3.4 Construction requirements.

3.4.1 Types of loads. For types I and II loads, the inside dimensions of wire bound boxes shall be sufficiently exact so that the contents fit into the box when packed and give support to the faces of the box. If contents do not fit the box and permit shifting, a type III load results and a box meeting the requirements for type III load shall be used. For type III loads, other than bulk loads, the contents shall be firmly bolted, blocked, braced, or otherwise anchored to the frame of the box in such manner that shifting of contents will not occur during handling of shipment.

3.4.2 Styles 1 and 2 boxes. Styles 1 and 2 boxes shall be constructed with end patterns shown in table X for the class of box, type of load, and

weight of contents indicated. The end patterns shall be constructed with vertical liners (VL-pattern), vertical battens (VB-pattern), horizontal and vertical battens (HVB-pattern) as shown on figure 2. The maximum spacing between vertical battens shall be as shown in the table on figure 2. The following additional provisions and limitations for these end patterns shall also apply:

3.4.2.1 VL-pattern. The maximum inside width or depth of box for which VL-pattern ends may be used is 16 inches for type 1 loads or 14 inches for type 2 loads. VL-pattern end shall not be used for type 3 loads, for class 3 boxes, or when strapping is required (see appendix). When the box width or depth exceeds the dimensions permitted for the VL-pattern, the VB pattern shall be used.

3.4.2.2 VB-pattern. VB-pattern ends shall be used in lieu of VL pattern ends when the box width or depth exceeds the dimensions permitted for the VL-pattern. When the inside depth or width exceeds 16 inches, at least two vertical battens shall be used, with a batten placed adjacent to each side cleat. A single center vertical batten may be used only when the end face board is 2-ply crossed veneer or paper-overlaid veneer or plywood. At least two vertical battens shall be used for type III loads in class 1 boxes and for type II or III loads in class 2 or 3 boxes.

3.4.2.3 HVB-pattern. The HVB-pattern ends shall be used where indicated on table X and may be used in lieu of VB pattern ends. When the inside depth exceeds 16 inches, or the inside width exceeds 24 inches for type I or II loads or 18 inches for type III loads, at least two vertical battens shall be used with a batten placed adjacent to each side cleat.

TABLE X. Selection of end pattern for styles 1 and 2 boxes (see figure 2)

Weight of contents (Pounds)		Class 1 box			Class 2 box			Class 3 box		
Exceeding	Not exceeding	Type 1 load	Type 2 load	Type 3 load	Type 1 load	Type 2 load	Type 3 load	Type 1 load	Type 2 load	Type 3 load
0	125	VL	VL	VB	VL	VL	VB	VB	VB	VB
125	200	VL	VB	VB	VB	VB	VB	VB	VB	VB
200	300	VB	VB	VB	VB	VB	VB	VB	VB	HVB
300	400	VB	VB	HVB	VB	HVB	HVB	--	--	--
400	500	VB	VB	HVB	--	--	--	--	--	--

3.4.3 Style 3 boxes. Style 3 boxes shall be constructed with ends of the pattern shown in table XI for the class of box, type of load, and weight of contents shown. The end patterns shall be constructed with horizontal liners

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(HLW-pattern), horizontal battens (HBW-pattern), horizontal liners and vertical battens (HLVBW-pattern), or horizontal and vertical battens (HVBW-pattern), as shown on figure 3. The maximum spacing between vertical battens shall be as shown in the table on figure 3. In addition, the following provisions and limitations shall also apply:

3.4.3.1 HLW-pattern. The HLW-pattern shall be used only when both the inside width and inside depth of box do not exceed 16 inches, except that this pattern may be used for class 1 boxes when the inside width or inside depth does not exceed 30 inches, provided the edge cleats are increased to be not less than 1-1/8 inches by 1-1/8 inches in size. When the box width or width and depth exceed the dimensions permitted for this pattern, the HBW-pattern shall be used. When only the box depth exceeds the dimensions permitted for this pattern, the HLVBW-pattern shall be used.

3.4.3.2 HBW-pattern. The HBW-pattern ends shall be used only when the inside depth of box does not exceed 30 inches for class 1 boxes or 24 inches for classes 2 and 3 boxes. When the box depth exceeds the dimensions permitted for this pattern, the HVBW-pattern shall be used.

3.4.3.3 HLVBW-pattern. The HLVBW-pattern ends shall be used only when the inside width of box does not exceed 16 inches, and when the inside depth of box does not exceed 30 inches for class 1 boxes or 24 inches for classes 2 and 3 boxes. When the box width or depth exceeds the dimensions permitted for this pattern, the HVBW-pattern shall be used.

3.4.3.4 HVBW-pattern. The HVBW-pattern ends shall be used where indicated on table XI and shall be used in lieu of the HBW-pattern or HLVBW-pattern when the box dimensions exceed the dimensions permitted for those patterns. When the inside depth exceeds 16 inches, or the inside width exceeds 24 inches for type I or II loads or 18 inches for type III loads, at least two vertical battens shall be used. A vertical batten shall be placed adjacent to each side cleat.

TABLE XI. Selection of end pattern for style 3 boxes
(see figure 3)

Weight of contents (Pounds)		Class 1 box		
Exceeding	Not exceeding	Type I load	Type II load	Type III load
0	125	HLW	HLW	HLW
125	200	HLW	HLW	HLW
200	300	HLW	HLW	HBW
300	400	HLW	HBW	HVBW
400	500	HLVBW	HLVBW	HVBW

TABLE XI. Selection of end pattern for style 3 boxes
(see figure 3) (cont'd)

Weight of contents (Pounds)		Class 2 box		
Exceeding	Not exceeding	Type I load	Type II load	Type III load
0	125	HLW	HLW	HLW
125	200	HLW	HLW	HLW
200	300	HLVEW	HLVEW	HVEW
300	400	HLVEW	HLVEW	HVEW
400	500	--	--	--

Weight of contents (Pounds)		Class 3 box		
Exceeding	Not exceeding	Type I load	Type II load	Type III load
0	125	HLW	HLW	HLW
125	200	HLVEW	HLVEW	HLVEW
200	300	HLVEW	HLVEW	HVEW
300	400	--	--	--
400	500	--	--	--

3.4.4 Skids. Each box intended for use with loads having a gross weight in excess of 200 pounds or when the box gross weight exceeds 100 pounds and the length and width dimensions are 48 inches by 24 inches or more, then each box shall be provided with a minimum of two skids. Additional skids shall be provided when the distance between skids, measured between the inside edges, exceeds 48 inches. Additional skids, as required, shall be positioned so as to divide the area between the end skids into units of equal space. When bolt holes are provided in an end item or equipment, additional skids, if required, shall be located so as to enable the item to be bolted to the skids. The skids or built-up skids and rubbing strips shall be a minimum of 2-1/2 inches high and 3-1/2 inches wide. The skids shall be placed parallel to and extend the full width of the box (the shortest dimension of the bottom of the box), and shall be set not less than 2-1/2 inches or more than 1/6 the box length from each end. When skids only are used, a bevel of $45^{\circ} \pm 5^{\circ}$ shall be applied to the bottom third of the skid ends. When rubbing strips are used in conjunction with skids, the skid ends shall not be beveled and the rubbing strips shall be set back from the ends of the skids a distance of 2-1/2 to 4 inches to allow for sling placement. When 4-way fork entry is required (see 6.3), skids shall be nominal 4 x 4, placed lengthwise not less than 1-1/2 inches nor more than 2-1/2 inches from the container sides and cut out a minimum of 2 inches in depth and of such width as to accommodate forks and slings for handling. When specified (see 6.3), 4-way fork entry shall be

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accomplished with built up skids and rubbing strips having minimum dimensions of 3-1/2 inches in width and 4 inches in height with the cutouts being not less than 1-1/2 inches in depth. Each skid shall be notched sufficiently to provide clearance for strapping. Filler cleats of the same thickness as the end or side cleats of the bottom panel and not less than the width of the skids shall be provided between each skid and the bottom panel of the shipping container. The skids shall be secured to the box by nails conforming to type II, style 18 of FF-N-105, and shall be of such length as to penetrate a minimum of 3/4 the skid thickness. These nails shall not protrude through the bottom surface of the skid. The nails shall be arranged in two rows in a staggered pattern, with spacing between nails in each row to be not more than 6 inches. Each row of nails shall be approximately 1-1/4 inches from the edge of the skid, and the nailing pattern shall begin and end approximately 1-1/2 inches from the end of each skid and shall not be nailed through the strap notch.

3.5 Assembly, closure, and strapping of filled boxes. When commodities are furnished or shipped in boxes conforming to this specification, the assembly, closure, and strapping of boxes shall be in accordance with the appendix.

3.6 Preservative treatment. When specified (see 6.3) class 2 or 3 boxes shall be grade A treated with one of the preservatives specified in 3.1.6. The preserved box shall show evidence of change in color when tested in accordance with 4.3.2. Each preserved box shall be marked with the letters PA when preserved with preservative PQ 56 and with PB when M-GARD is used (see 6.3). When boxes are painted, wood preservative shall be applied and be dry prior to painting.

3.7 Container manufacturer's identification. Each container shall be marked with the specification number, class and style of box, container manufacturer's name and address, maximum weight of contents, type of load, and style of box (as applicable). All markings shall be limited to 15 square inches in area and shall be located in a lower corner of one side panel in letters approximately 5/16 inch high except that the specification number shall be in letters approximately 3/4 inch high. Arrangement of the markings shall be as follows:

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 Box manufacturer's name
 Plant location
 Maximum weight of contents.....lbs.
 Class.....box. For type.....load. Style....box.

3.8 Workmanship. Boxes shall be free of loose or protruding nails or staples. There shall be no splinters or loose pieces of wood or wire.

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 (examinations and tests) 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 this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall 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 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 to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Responsibility for dimensional requirements. Unless otherwise specified in the contract or purchase order, the contractor is responsible for ensuring that all specified dimensions have been met. When dimensions cannot be examined on the end item, inspection shall be made at any point, or at all points in the manufacturing process necessary to ensure compliance with all dimensional requirements.

4.2 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-105.

4.2.1 Component and material examination. In accordance with 4.1, components and materials shall be examined in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

4.2.1.1 Testing of components and materials. Tests shall be performed on samples from each lot of lumber offered for inspection at one time used in the construction of the end item for the characteristic listed in table XII.

TABLE XII. Component testing

Component	Characteristic to be tested	Sample unit	Sample size
Lumber 1/	Moisture content 2/	1 piece	5

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- 1/ Testing shall be performed in accordance with the requirements of MIL-STD-731.
- 2/ Three determinations shall be made on each sample unit and the average of the three determinations shall represent the moisture content of the sample. If the average of all determinations fails to be within the tolerance ranges specified, the lot shall be rejected.

4.2.2 End item examination.

4.2.2.1 End item visual examination. The end items shall be examined for the defects listed in table XIII. The lot size shall be expressed in units of boxes of the same style, class, and size. The sample unit shall be one completely fabricated knocked-down box. The inspection level shall be S-3 and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 2.5 for major defects and 10.0 for minor defects.

TABLE XIII. End item visual defects

Examine	Defect	Category	
		Major	Minor
Cleats, battens, and liners	Not specified wood group		201
	Decay in wood	101	
	Bark or wane on cleat exceeding 3/8 inch long any edge		202
	Bark or wane on batten exceeding 3/8 inch along any edge		203
	Knots or knotholes in cleats and battens exceeding 1/4 the width or depth of cleat or batten and closer than 1-1/4 inch from the end		204
	Knot or knothole in liner exceeding 1/2 inch in diameter or closer than 1-1/4 inch from the end		205
	Slope of grain exceeds 1 inch in 10 inches of length		206
	Cleat not single piece of wood		207
	Ends of cleat not mitered or mortised and tenoned	102	
	Face boards	Sound knots exceeding 1-1/2 inch in diameter or exceeding 1/3 the width of board	
Loose knots or knotholes exceeding 1 square inch or more than one per face between adjacent binding wires		103	

TABLE XIII. End it can visual defects (cont'd)

Examine	Defect	Category	
		Major	Minor
Face boards (cont'd)	Sound knots closer than 1 inch to any edge of the board		209
	Not material specified (see 3.3.1)	104	
	Knot clusters exceed 2 inches in diameter or exceed 1/3 of the width of the board		210
	Decay in wood	105	
	Slope of grain exceeds 1 inch in 8 inches length in sawed lumber or veneer		211
	Grain of end face boards not horizontal for styles 1 and 2 boxes		212
	When paper-overlaid veneer is used, not full width of face	106	
	Opening more than 3/8 inch between face boards		213
	Grain of end face boards not vertical for style 3 box		214
	Built-up ends for style 3 boxes not constructed as specified		215
	Grain of core of paper-overlaid veneer not at right angles to wires, liners, or battens	107	
	Grain of ply of built-up ends of style 3 boxes to which end wires are stitched not vertical	108	
	Wire coating	Binding wire for class 2 and 3 boxes not galvanized	109
Construction	Intermediate cleats not as specified	110	
	Less than the required number of cleats	111	
	Binding wire not continuous around girth of box	112	
	Girth wires not spaced as specified		217
	Ends of girth wire extend less than 2-1/4 inches beyond edge of top boards or less than 1 inch beyond edge of sideboard (style 1 box)	113	
	Ends of wires not formed to loop fastener for style 2 box	114	

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TABLE XIII. End item visual defects (cont'd)

Examine	Defect	Category	
		Major	Minor
Construction (cont'd)	Ends of girth or end wire not loop fastener formed for style 3 box	115	
	Wire not continuous across the ends on style 3 boxes	116	
	Battens not properly positioned	117	
	Staples or nails not spaced as specified or not clinched where required		218
	Batten or liner missing when required	118	
	Grain of liner not at right angles to end face board		219
	Binding wire loose		220
	Staples or nails not fully driven		221
	Staple or nail points protruding	119	
	Skids	When skids are required; missing or not positioned as specified in 3.4.4	120
Marking	Omitted, illegible, incomplete, incorrect, or wrong size, type, or location		222
Preservative treatment	Missing when specified (see 1.2.3)	121	

4.2.2.2 End item dimensional examination. The end items shall be examined for conformance to the dimensions specified. Any dimensions not within the specified tolerance shall be classified as a defect. The lot size shall be expressed in units of boxes of the same style, class, and size. The sample unit shall be one completely fabricated knocked-down box. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 2.5.

4.2.2.3 End item packing and marking examination. The end items shall be examined for the defects listed in table XIV. The lot size shall be expressed in units of bundles of knocked-down and packages of box ends, or assembled boxes, as applicable. The sample unit shall be one bundle of knocked-down and one package of unattached of box ends, or one assembled box, as applicable. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 2.5 for major defects and 10.0 for minor defects.

TABLE XIV. End item packing and marking defects

Examine	Defect	Category	
		Major	Minor
Packing	Not tied in bundles	101	
	Bundles do not contain the number of boxes specified		201
	Ends, when not attached to knocked-down boxes, not tied in bundles of 40 ends or less, or alternatively stacked in sufficient number of set-up boxes	102	
	Small unattached parts or components (when applicable) not packed in set-up boxes	103	
Workmanship	Not securely, neatly, and uniformly tied in bundles		202
Marking	Bundles or set-up boxes not marked in accordance with FED-STD-123 or MIL-STD-129, as applicable	104	

4.2.2.4 Palletization examination. The fully packaged and palletized end items shall be examined for the defects listed below. The lot size shall be expressed in units of palletized unit loads. The sample unit shall be one palletized unit load. The inspection level shall be S-1 and the AQL, expressed in terms of defects per hundred units, shall be 6.5.

<u>Examine</u>	<u>Defect</u>
Finished dimension	Length, width, or height exceeds specified maximum requirement
Palletization	Loads not interlocked Load not bonded with required straps specified
Weight	Exceeds maximum load limits
Marking	Omitted; incorrect; illegible; of improper size, location, sequence or method of application

4.3 Tests.

4.3.1 Moisture content. The moisture content of wood (see 3.1.1.7) shall be determined by testing in accordance with MIL-STD-731.

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4.3.2 Preservative test. The completely assembled boxes shall be tested for dryness of preservative. The lot size shall be expressed in terms of completely assembled boxes. The sample unit shall be one completely assembled box, and the inspection level shall be S-4. The assembled box shall be placed on either end with top open. Any failure to meet the color requirements specified in 4.3.2.1 and 4.3.2.2 shall be cause for rejection of the lot.

4.3.2.1 PQ 56 (copper-8-quinolinolate) preservative test. Two drops of a formulation containing 10 parts, by weight, of sodium diethyl-dithiocarbamate trihydrate (see 6.6.3) and 90 parts, by weight, of distilled water shall be applied to the wood surface. An immediate dark brown coloration and the spreading of drops shall indicate the presence of PQ 56 treatment. An alternate method is to spray, over the dried wood surface, a solution of dissolved 0.5 grams chrome azurol S concentrate (see 6.4.4) and 5.0 grams of sodium acetate in 80 mL of distilled water, and diluted further to 500 mL total distilled water. A deep blue color reveals the presence of copper (from copper-8-quinolinolate).

4.3.2.2 M-GARD W550 (zinc naphenate emulsifiable) preservative test. Prepare daily a solution of 0.1 gram of dissolved dithizone (diphenylthiocarbazone) (see 6.6.5) in 100 mL of chloroform and spray evenly over dried wood. A pink color indicates the presence of zinc. (NOTE: The pink color fades with light.) An alternate method is to prepare a mixture of 10 mL each of three stock solutions and pour them into an atomizer (sprayer). The first stock solution is comprised of 1 gram of potassium ferricyanide dissolved in 100 mL of distilled water. The second solution is made of 1 gram of potassium iodide dissolved in 100 mL of distilled water with a starch indicator. The starch indicator solution is made from a paste of 1 gram of soluble starch in about 5 mL of distilled water which is added to 100 mL of distilled water and boiled for one minute with constant stirring, and then cooled. (NOTE: This solution is subject to biodegradation and should not be used longer than three days.) Spray the mixture evenly over the dried wood surface. The solution will cause the treated wood to turn a deep blue immediately, and the untreated part will retain its original color.

5. PREPARATION FOR DELIVERY

5.1 Packing. Packing shall be level C.

5.1.1 Level C. Wirebound boxes shall be shipped knocked-down to occupy a minimum amount of space and, where practicable, shall be tied in bundles of not more than ten. When the ends are not attached to the knocked-down boxes, they shall be either tied in bundles of not more than forty or sufficient number of the boxes shall be set-up to pack the unattached ends. Small unattached parts will be packed in boxes as described herein. Shipment shall be in accordance with ASTM D 3951.

5.2 Palletization. When specified (see 6.3), the knocked-down boxes shall be palletized on a pallet in accordance with MIL-STD-147.

5.3 Marking. Marking shall be in accordance with 5.3.1 or 5.3.2, as specified (see 6.3).

5.3.1 Civil agencies. Shipments shall be marked in accordance with FED-STD-123.

5.3.2 Military requirements. In addition to any marking specified in the contract or purchase order, shipments shall be marked in accordance with MIL-STD-129.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Boxes covered by this specification are intended to be used for domestic and overseas shipment of general materials and supplies.

6.1.1 Class 1 boxes. For domestic shipments not involving sea transportation, subject to storage, rehandling, or reshipment to domestic destinations.

6.1.2 Class 2 boxes. For off-shore and overseas shipments contemplating protected storage and commercial-type handling.

6.1.3 Class 3 boxes. For overseas shipments and handling in military supply systems, subject to repeated rehandling and unprotected storage and which may also be subjected to extreme climatic conditions.

6.1.4 Exceptions (see 6.3).

6.1.4.1 Weight of boxes. The tables in this specification make provisions for weight limits of (1) 500 pounds for class 1, (2) 400 pounds for class 2, and (3) 300 pounds for class 3 boxes. This should not be construed to prohibit the use of this specification for boxes to carry greater weights when, in the experience and judgment of the procuring activity, the nature of the article or material to be packed justifies its use with either the maximum specification requirements herein, or with suitable amendments or modifications for the specific commodity in a manner acceptable to the procuring agency.

6.1.4.2 Exceptional boxes. Exceptional commodities or hazardous materials may require boxes other than are specified herein. In every case, the

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container must comply with specifications prescribed in the Code of Federal Regulations, Title 49, Department of Transportation (DOT), subchapter C, Hazardous Materials Regulations; Parts 172-178, for the particular materials to which these specifications apply. (DOT regulations apply to such materials as explosives, flammable and corrosive liquids, compressed gases, flammable solids, oxidizing materials, poisons, etc.)

6.2 Types of loads. Type of load determines weight and size limitations applicable. The type of load falls in one of the following categories:

6.2.1 Type I (easy load).

(a) Articles of moderate density packed in and completely filling one and only one interior box, which, in turn, completely fills and supports all the faces of the outer shipping box into which it is packed.

Examples: Canned and boxed articles which are prepacked in a fiberboard box which completely fills the outer shipping box.

(b) A single article of moderate density which contacts and completely supports all the faces of the shipping box and has sufficient strength, even though not boxed, to withstand the forces encountered in transportation and handling, but required the protection of the box to prevent scratching or marring.

Examples: Wood or metal chests, tool kits, and boxed sturdy instruments packed one in a shipping box.

6.2.2 Type II (average load). Contents are moderately concentrated articles which may either be packed directly into the outer shipping box or subject to an intermediate stage of packing, such as wrapping or packing in interior boxes, or protected by other types of suitable interior packing. The contents or interior packing provide support for all the faces of the shipping box.

Examples: Goods in metal cans which are packed in an inner container, bottles individually cushioned, hardware in cartons.

6.2.3 Type III (difficult load). Contents are articles which are highly concentrated, require a high degree of protection, or do not support the faces of the shipping box.

Examples: Wrenches, long bolts, and rods which exert highly concentrated forces on faces of shipping box. Rivets, drop forgings, and bulk hardware which are packed loosely and according to no definite pattern and apply force on all faces of the shipping box; fragile articles and delicate instruments which require special protection; valves, fittings, and machine parts which do not completely fill the shipping box.

6.3 Acquisition requirements. Acquisition documents must specify the following:

- (a) Title, number, and date of this specification.
- (b) Class of box required (see 1.2.1).
- (c) Style of box required (see 1.2.2).
- (d) Type of load (see 1.2.3).
- (e) Inside dimensions of box (see 3.2).
- (f) Size and location of intermediate cleats for special designs, if specified (see 3.3.2.1 and 3.3.2.2).
- (g) Weight of contents (see 3.3.6 and 3.3.6.1).
- (h) Type of girth wire (see 3.3.6.2).
- (i) When palletization is required (see 5.2).
- (j) Marking required (see 5.3.1 and 5.3.2).
- (k) Exceptions to these specifications, if authorized (see 6.1.4).
- (l) When preservative treatment grade A is required for class 2 or 3 boxes for overseas shipments (see 3.6 and 6.8).
- (m) When 4-way entry skids are required and when 3-1/2 by 4 inch built up skids are required (see 3.4.4.5).

6.4 Definitions. Checks, splits, and shakes are lengthwise grain separations of the wood.

6.4.1 Checks. Checks usually result from stress set-up during seasoning. Through checks extend through the full thickness of the members.

6.4.2 Splits. Splits normally extend through the full thickness of the members and often take a radial direction.

6.4.3 Shakes. Shakes are separations between rings of annual growth that extend through the full thickness of the members.

6.4.4 Wane. Wane is bark or lack of wood from any cause on the edge or corner of a piece of wood.

6.5 Disposability. One or more of the following methods shown in order of their preference shall be used to accomplish disposal of PPP-B-585 wooden boxes: reuse, pyrolysis bailing, incineration, recycle, composting, sanitary landfill, or sea disposal.

6.6 Preservative treatment solution information.

6.6.1 PO 56 (copper-8-quinolate). Product may be obtained from ISK Biotech, Industrial Biosides Division, 6075 Poplar Ave., Suite 306, Memphis, TN 38119 or equivalent manufacturer.

6.6.2 M-GARD W550 (zinc naphthenate emulsifiable). Product may be obtained from OMG, Inc., 2301 Scranton Road, Cleveland, OH 44113 or equivalent manufacturer.

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6.6.3 Sodium diethyldithiocarbamate trihydrate. Product may be obtained from J.T. Baker, Inc., 222 Red School Lane, Phillipsbury, NJ 08865 or equivalent manufacturer.

6.6.4 Chrome azurol S. Product may be obtained from Eastman Fine Chemical, Laboratory & Research Products, Building 701, Rochester, NY 14652-3512 or equivalent manufacturer.

6.6.5 Dithizone (diphenylthiocarbazon). Product may be obtained from Mallinckrodt, Inc./Mallinckrodt Specialty Chemicals Co., Science Products Division, 675 Mc Donnell Blvd., P.O. Box 5840, St. Louis, MO 63134 or equivalent manufacturer.

6.7 Subject term (key word) listing.

Battens
Binding wire
Checks
Cleat size
Face board
Girthwise
Liner
Panel
Preservative treatment
Plywood
Resawed lumber
Staple wire
Veneer over layed

6.8 Changes from previous issue. Asterisks (or vertical lines) are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

APPENDIX

USE OF WIREBOUND BOXES AND REQUIREMENTS FOR ASSEMBLING,
CLOSING, AND STRAPPING

10. SCOPE

10.1 Scope. This appendix covers requirements for steel strapping and the specifications for assembling, closing, and strapping of filled wirebound boxes.

20. APPLICABLE DOCUMENTS

20.1 Documents. The following documents of the issues in effect on date of invitation for bids, form a part of this appendix:

Federal Standard:

FED-STD-101 - Test Procedures for Packaging Materials

Other publications:

American Society for Testing and Materials

A 777 - Standard Specification for Galvanized Steel Tying Wire
D 3953 - Standard Specification for Strapping Flat, Steel and Seals

30. ASSEMBLING OF BOXES

30.1 Box assembly. Styles 1 and 2 boxes shall be assembled in the following manner: The end boards shall be fastened to each side cleat by either nails (cemented-coated or chemically etched) or staples as shown on figure 4. Staples shall be not less than 0.0625 inch diameter (16 gage). Unless otherwise specified in the contract or order, staples for class 2 or 3 boxes shall be galvanized (see 3.1.4.1). Nails shall be not less than 0.076 inch diameter (14-1/2 gage). The length of each fastening shall be not less than the thickness of the end boards plus three-quarters the thickness of the cleats or battens. The points of the fastening shall not protrude from the cleats or battens, but if driven through they shall be clinched. The average spacing of the fastenings shall not exceed 2-1/2 inches.

30.2 Style 3 boxes. Style 3 boxes shall be assembled by bending the looped end wires at right angles to the end, passing the loops through notches in the cleats, and bending back the looped wire over and around the girth wire, as shown in figure 5.

30.3 Assembly nailing. In addition to the assembly requirements specified in 30.1 and 30.2, the following assembly nailing shall be provided, except that when specified, this nailing may be omitted for types I and II loads.

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Boxes having vertical battens adjacent and parallel to cleats, and having no horizontal battens (VB- and HLVEW-patterns), shall be fastened by nailing through the side face boards and cleats into the battens. Boxes having horizontal battens adjacent and parallel to the bottom cleats (HVB-, HEW-, and HVEW-patterns) shall be fastened by nailing through the bottom face boards and cleats into the battens. Boxes having both vertical and horizontal battens adjacent and parallel to cleats shall be fastened by nailing through the bottom faceboards and cleats into the battens only. Spacing of nails shall not exceed 5 inches. Boxes having intermediate vertical battens butting directly against side cleats, shall be fastened by driving one nail through the bottom or side face boards and cleats into each end of each batten. Nails shall be 7-penny cement-coated or chemically etched cooler or sinker nails conforming to FF-N-105.

40. CLOSING OF BOXES

40.1 Box closing. Style 1 boxes shall be closed by using the following special tools as indicated:

- Hand twister (figure 6).
- Crank twister (figure 7).
- Power twister (figure 8).

40.2 Style 2 box closing. Style 2 boxes shall be closed with a Sallee Closer, as shown on figure 9, by bringing the top cleats in contact with the side cleats and by inserting the side loop through the top loop and binding it down and against the side of the box. That portion of the top loop which is bent down shall be essentially parallel to the side of the box and the end of the side loop shall be not more than 1/4 inch away from the side of the box.

40.3 Style 3 box closing. Style 3 boxes shall be closed with a Sallee Closer as shown on figure 9, by bringing the top cleats in contact with the side cleats and by inserting the side loop through the top loop and binding it down and against the side of the box. That portion of the top loop which is bent down shall be essentially parallel to the side of the box and the end of the side loop shall be not more than 1/4 inch away from the side of the box.

40.4 Closure nailing. In addition to the closure requirements specified in 40.1, 40.2, and 40.3, the following closure nailing shall be provided, except that when specified, this nailing may be omitted for types 1 and 2 loads: Boxes having horizontal battens adjacent to and parallel to the top cleats (HVB-, HEW-, and HVEW-patterns) shall be closed by nailing through the top face boards and cleats into the battens. Spacing of nails shall not exceed 5 inches. Boxes having intermediate vertical battens butting directly against the top cleats (VB- and HLVEW-patterns) shall be closed by driving

one nail through the top face boards and cleats into the end of each batten. Nails shall be 7-penny cement-coated or chemically etched cooler or sinker nails conforming to FF-N-105.

40.5 Strapping application. Where strapping is required, the top cleats shall be brought into contact with the side cleats and strapping applied before wires at closing edges are twisted or looped. This eliminates occasional slack which may develop when strapping is applied after closure is made.

50. STRAPPING REQUIREMENTS

50.1 Strapping. Strapping shall be performed by the activity by which the box is packed. The strapping is not to be furnished by the boxmaker unless specifically required by the contract or order. Straps shall be applied straight, at right angles to the edges of the box, and under sufficient tension to firmly grip the edges of the face board material. Straps shall be joined using steel seals securely crimped and meeting the requirements of 50.1.3.

50.1.1 Class 1 boxes. Strapping when specified herein for class 1 boxes, shall be 5/8 by 0.020 inch type I finish flat strapping, (uncoated) conforming to ASTM D 3953, or shall be 0.0915 inch diameter (13 gage) uncoated (bare) round wire strapping conforming to ASTM A 777 (see 50.2.1).

50.1.2 Classes 2 and 3 boxes. Strapping, when specified herein for classes 2 and 3 boxes, shall be 5/8 by 0.020 inch type I, finish A, or type I, finish B, grade 2 conforming to ASTM D 3953, or shall be 0.0915 inch diameter (13 gage), type I, finish B (zinc-coated) round wire strapping conforming to ASTM A 777.

50.1.3 Joint strength. The breaking strength of the joint for joined metal bands shall be at least 75 percent of the required breaking strength of the band only, when tested as specified in 60.2.

50.2 Lengthwise strapping. Boxes shall be reinforced with one flat or round lengthwise strap under the following conditions:

1. Class 1 boxes.

(a) On all boxes where the weight of contents exceed 400 pounds.

(b) On style 1 or 2 boxes having 13/16 by 7/8 inch cleats, where the length of top cleat exceeds the amount indicated below for the weight of contents:

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Weight of contents (Pounds)		Length of cleat (Inches)
<u>Exceeding</u>	<u>Not exceeding</u>	
0	125	40
125	200	25
200	400	16

2. Class 2 boxes.

(a) On all boxes where the weight of contents exceeds 250 pounds.

(b) On style 1 or 2 boxes having 13/16 by 7/8 inch cleats, where the length of top cleat exceeds the amount indicated below for the weight of contents:

Weight of contents (Pounds)		Length of cleat (Inches)
<u>Exceeding</u>	<u>Not exceeding</u>	
0	125	40
125	200	25
200	250	20

3. Class 3 boxes.

(a) On all boxes where the weight of contents exceeds 150 pounds.

(b) On style 1 or 2 boxes having 13/16 by 7/8 inch cleats, where the length of top cleat exceeds 32 inches.

50.2.1 Special lengthwise strapping. On styles 1, 2, and 3 boxes having a center vertical batten, the strap shall be applied lengthwise over the center of the top, bottom, and ends of the box. If an intermediate batten is not in the center, the strap shall be applied over the intermediate batten closest to the center and toward the closing edge of the box. On style 3 boxes having horizontal battens only, the strap shall be applied lengthwise over the center of the side and ends of the box. If the lengthwise strap does not pass over a batten on each end of the box, such battens shall be applied.

50.3 Girthwise strapping.

50.3.1 General application. On all styles of boxes, and for all types of loads, two flat or round wire straps shall be placed girthwise around the top, sides, and bottom when the weight of contents exceeds 350 pounds for class 2 boxes or 250 pounds for class 3 boxes. Straps shall be placed as near as practicable but not more than 3 inches from each end edge of the box.

50.3.2 Intermediate cleats application. On boxes having rows of intermediate cleats, an additional flat or round wire strap shall be applied directly over each row of cleats and located next to the binding wire girthwise around the top, sides, and bottom of the box when the weight of contents exceeds:

- 400 pounds for class 1 boxes
- 250 pounds for class 2 boxes
- 150 pounds for class 3 boxes

60. INSPECTION

60.1 Examination of appendix requirements. Boxes shall be examined in accordance with 60.1.1 to determine compliance with assembly, closure, and strapping requirements of this appendix. Sampling shall be performed in accordance with MIL-STD-105. The sample unit shall be one filled, assembled, and closed box, with or without straps, as required. The sample size shall be as indicated by inspection level S-3 and the (AQL), expressed in terms of defects per hundred units, shall be 4.0 for major defects and 10.0 for total (major and minor combined) defects.

60.1.1 Assembly, closure, and strapping defects.

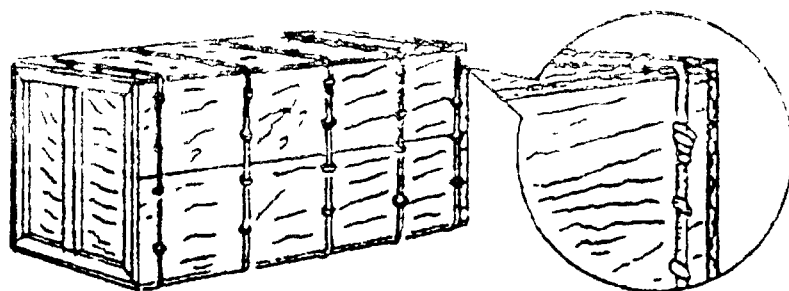
Examine	Defect	Category	
		Major	Minor
Assembly: Styles 1 and 2	Endboards not fastened to side cleats by nails or staples	101	
	Nails or staples for fastening endboard to side cleats not type or gage specified		201
	Length of fastenings less than thickness of endboards plus 3/4 thickness of cleats or battens		202
	Point of fastening protrudes from cleat or batten		203
	Point of fastening driven through cleats and battens not clinched		204
	Average spacing of fastenings more than 2-1/2 inches		205
	Battens adjacent or parallel to cleats not fastened as specified	102	
	Spacing of nails, exceeds 5 inches		206
	Intermediate battens not fastened to bottom cleats as specified	103	

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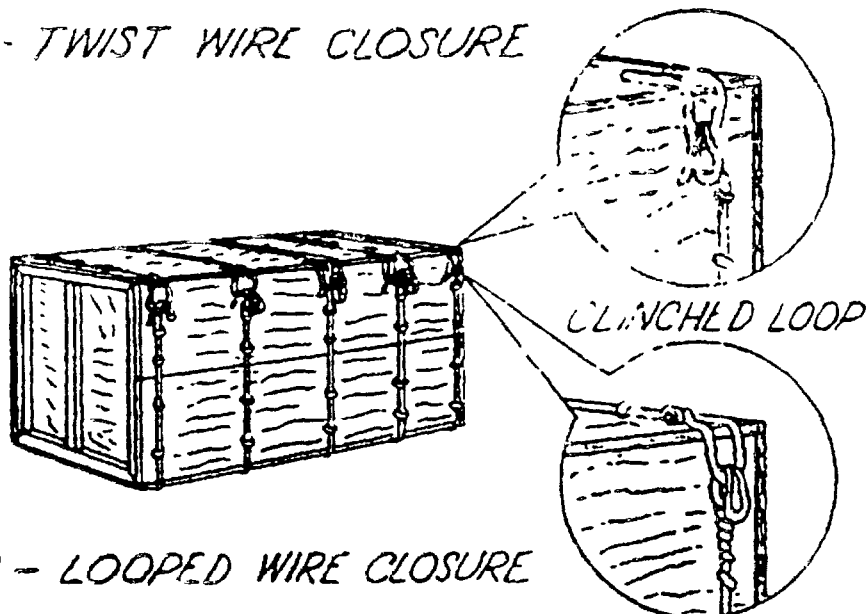
Examine	Defect	Category	
		Major	Minor
Assembly: Style 3	Looped wires not assembled as indicated	104	
	Boxes having battens adjacent to bottom cleats; battens not fastened as specified	105	
	Spacing of nails more than 5 inches		207
	Intermediate battens not fastened to side cleats as specified	106	
Wire closure	Not closed as specified	107	
Nail closure	Size and type of nail not as specified		208
	Not nailed in places specified	108	
	Spacing of nails, where specified for style 3 boxes, more than 5 inches apart		209
	Not nailed securely (nails not completely driven, loose, etc.)	109	
Strapping (when required)	Size, type, class, or finish of strapping not as specified	110	
	Strapping not placed as specified (see 50.2 and 50.3)	111	
	Strap missing	112	
	Torn or cut strap	113	
	Strap not crossing box edges at approximate right angles; for example, angle great enough to result in looseness of strap		210
	Loose strap		211
Condition of box	Broken wooden component	114	
	Broken wire	115	

60.2 Tests.

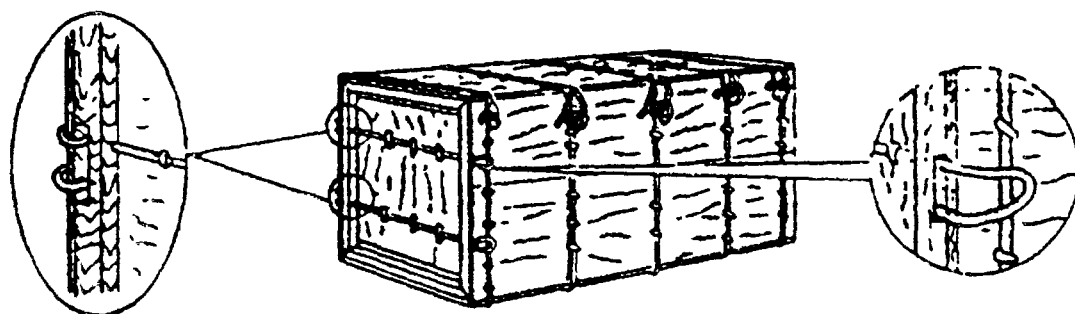
60.2.1 Joint strength of steel strapping. The tensile strength of the joint shall be tested in accordance with method 2044, of FED-STD-101 (see 50.1.3).



STYLE 1 - TWIST WIRE CLOSURE



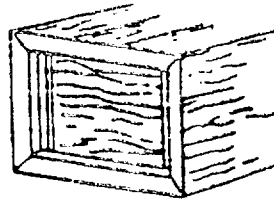
STYLE 2 - LOOPED WIRE CLOSURE



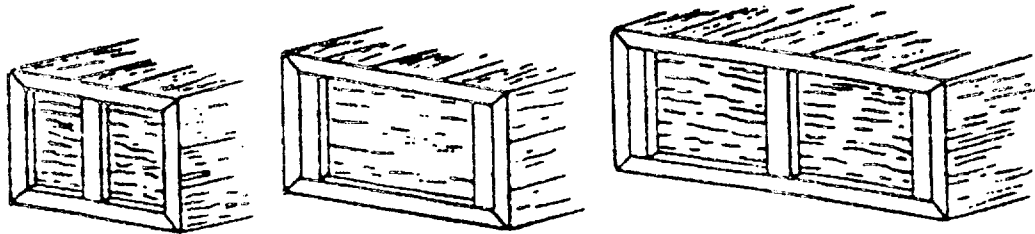
STYLE 3 - LOOPED WIRE CLOSURE WITH WIRED ENDS

FIGURE 1. STYLES OF CLOSURES.

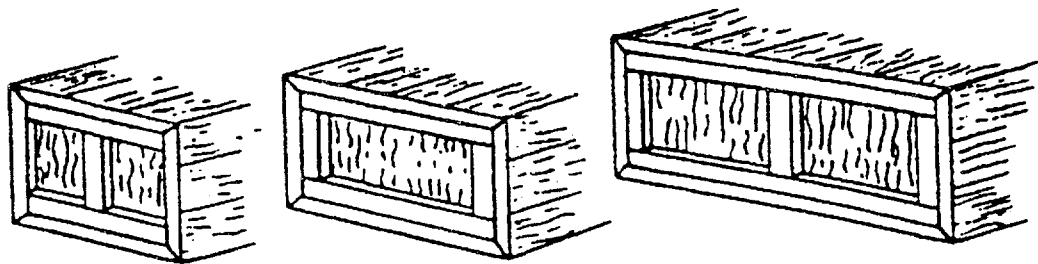
PPP-B-585D



VL-PATTERN-VERTICAL LINERS
(SEE 3.4.1.1)



VB-PATTERN-VERTICAL BATTENS
(SEE 3.4.1.2)

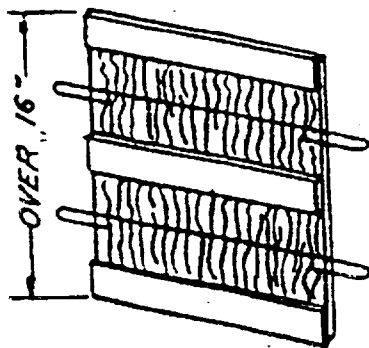
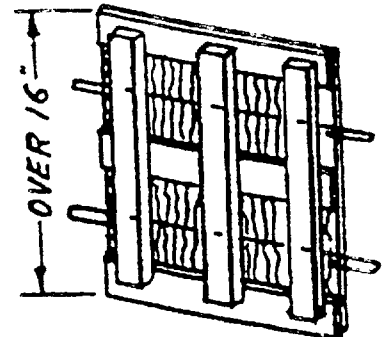
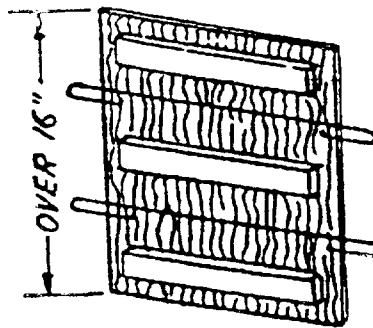
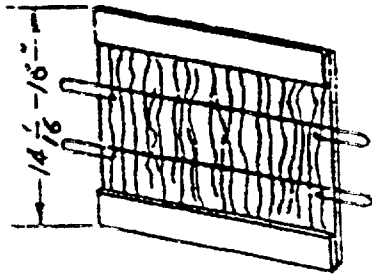
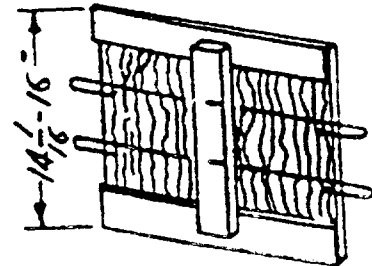
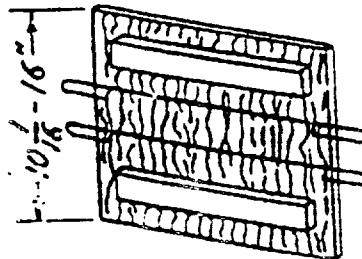
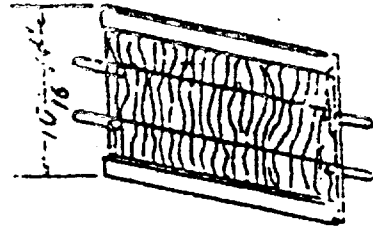
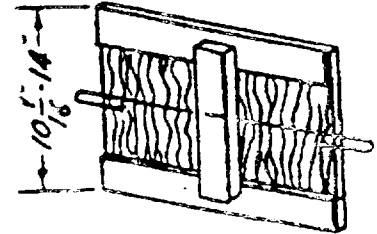
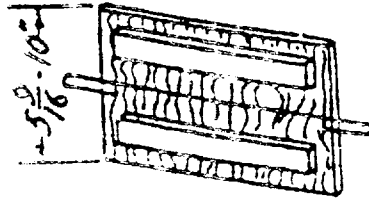
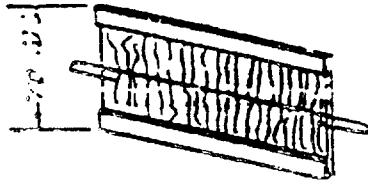
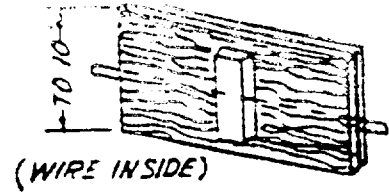
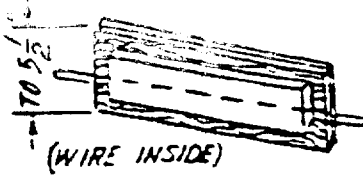
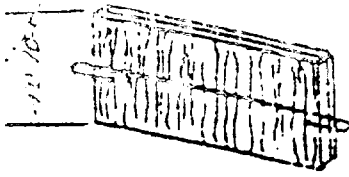


HVB-PATTERN-HORIZONTAL & VERTICAL BATTENS
(SEE 3.4.1.3)

MAXIMUM SPACING OF VERTICAL BATTENS (IN.)		CLASS 1	CLASS 2	CLASS 3
TYPE 1	LOAD	15	12	12
TYPE 2	LOAD	13	10	10
TYPE 3	LOAD	11	7	7

FIGURE 2. END PANEL ARRANGEMENTS FOR STYLES 1 AND 2 BOXES.

NOTE: WIRES MAY BE PLACED ON EITHER SIDE OF FACE MATERIAL.



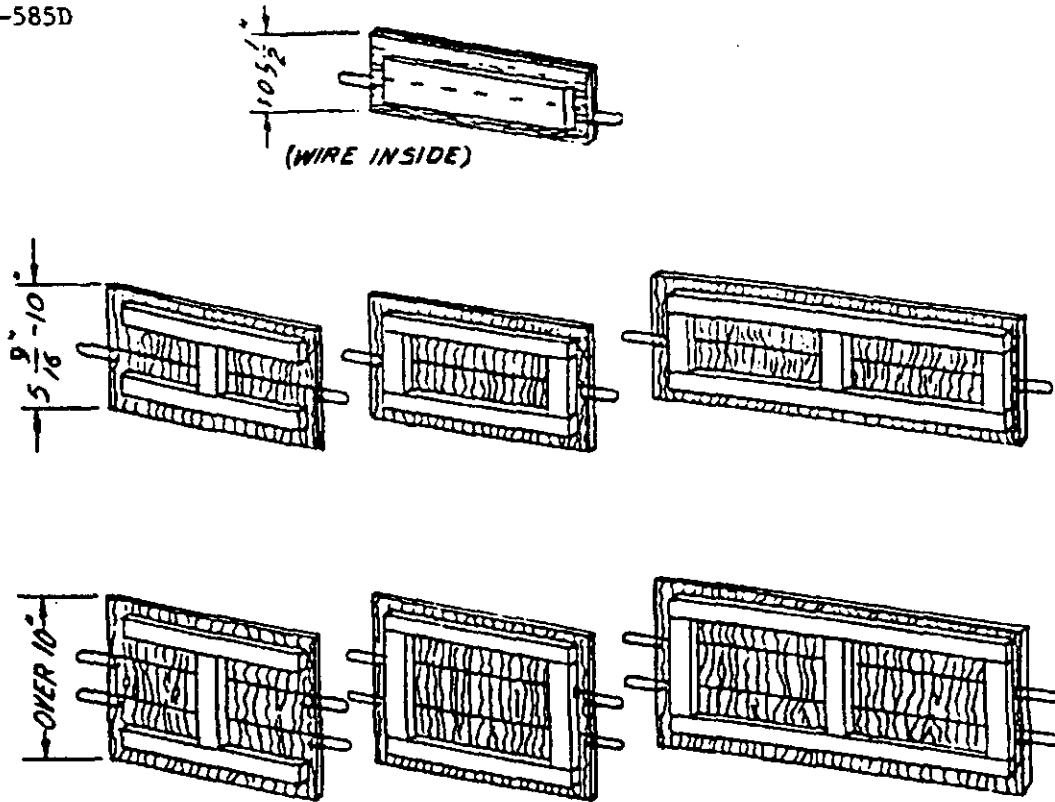
HLW - PATTERN
HORIZONTAL
LINERS
WITH WIRES
(SEE 3.4.2.1)

HBW - PATTERN
HORIZONTAL
BATTENS
WITH WIRES
(SEE 3.4.2.2)

HLVBW - PATTERN
HORIZONTAL LINERS
& VERTICAL BATTENS
WITH WIRES
(SEE 3.4.2.3)

FIGURE 3. END PANEL ARRANGEMENTS FOR STYLE 3 BOXES.

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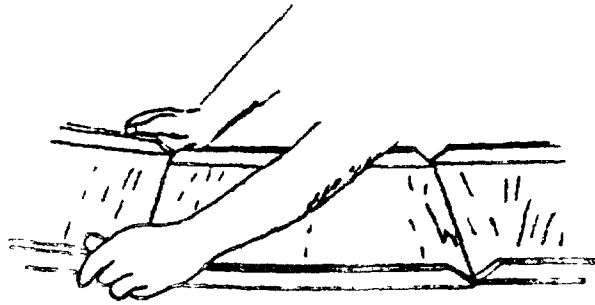
HVBW - PATTERN

HORIZONTAL & VERTICAL BATTENS
WITH WIRES
(SEE 3.4.2.4)

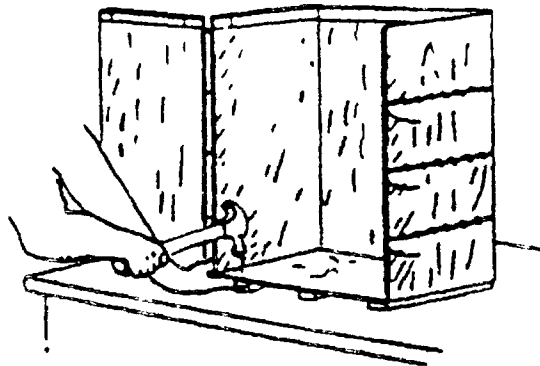
NOTE: WIRES MAY BE PLACED ON EITHER SIDE
OF FACE MATERIAL

MAXIMUM SPACING OF VERTICAL BATTENS (IN.)			
	CLASS 1	CLASS 2	CLASS 3
TYPE 1 LOAD	18	15	12
TYPE 2 LOAD	16	13	10
TYPE 3 LOAD	14	11	7

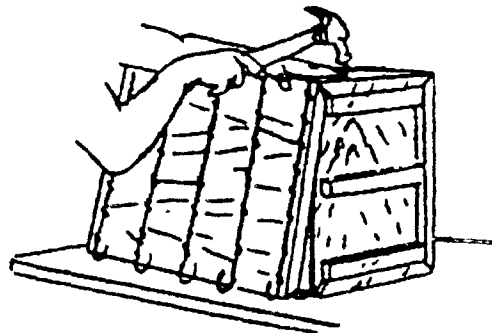
FIGURE 3 (CONT'D). END PANEL ARRANGEMENTS FOR STYLE 3 BOXES.



① LIFT SIDES SLIGHTLY BEFORE FOLDING. FOLD BOX BY RAISING SIDES AT RIGHT ANGLES TO BOTTOM.

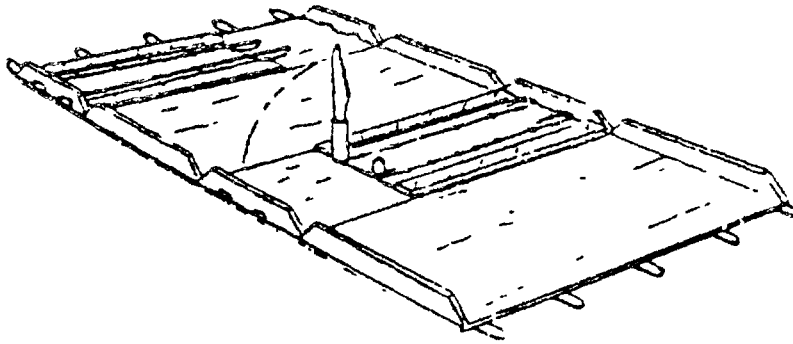


② FASTEN ENDS TO SIDE CLEATS USING NAILING TABLE OR END STAPLING MACHINE.

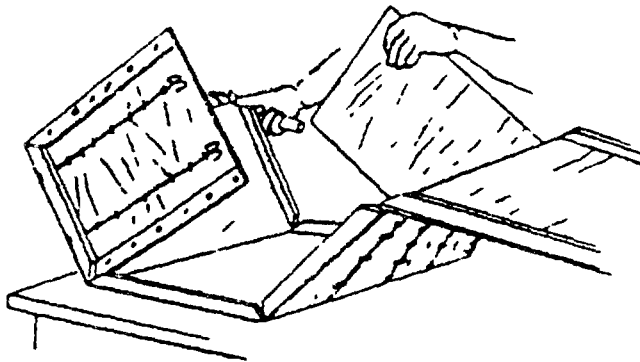


③ DRIVE NAILS THROUGH SIDE CLEATS INTO ADJACENT BATTENS & THROUGH BOTTOM CLEAT INTO INTERMEDIATE BATTEN.

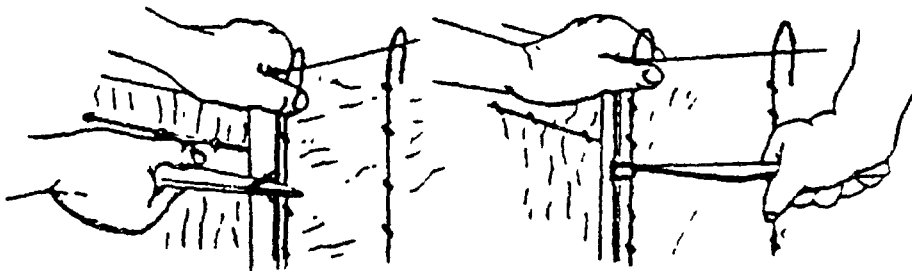
FIGURE 4. SETTING UP STYLES 1 AND 2 BOXES



① BEND UP END FASTENERS USING BON ENDER.



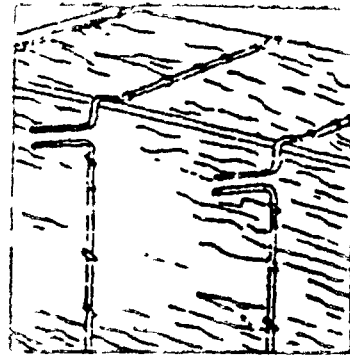
② LIFT SIDES SLIGHTLY BEFORE FOLDING AND RAISE SIDES AT RIGHT ANGLES TO BOTTOM.



③ SECURE END FASTENERS WITH BON ENDER.

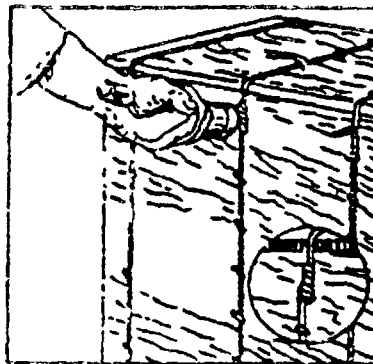
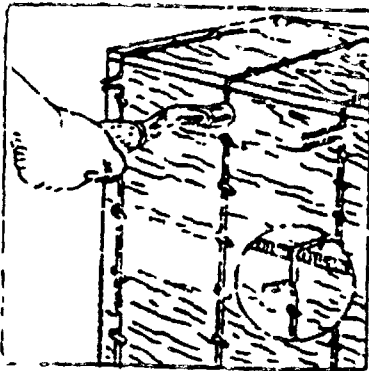
FIGURE 5. SETTING UP STYLE 3 BOXES.

HAND TWISTER



1. AFTER THE BOX IS PREPARED FOR CLOSING, THE WIRES ARE BLAST AT RIGHT ANGLES TO THE BOX APPROXIMATELY $\frac{5}{8}$ " FROM THE CLOSING EDGE.

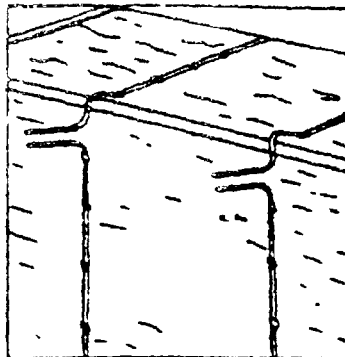
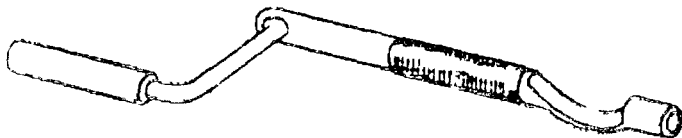
2. THE END OF THE BIT IS PUSHED OVER THE WIRES AGAINST THE BOX. THEN THE HAND TWISTER IS ROTATED UNTIL THE WIRES ARE CUT OFF.



3. AFTER ALL OF THE TWISTS ARE COMPLETED, THEY ARE KNOCKED AGAINST THE BOX - PARALLEL TO THE BINDING WIRE - WITH THE BUTT END OF THE TOOL.

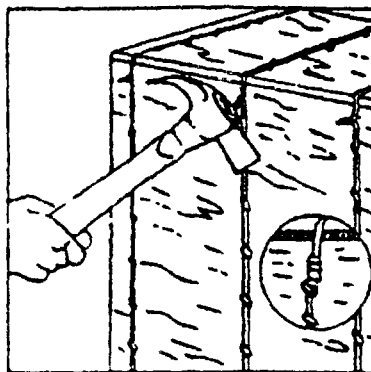
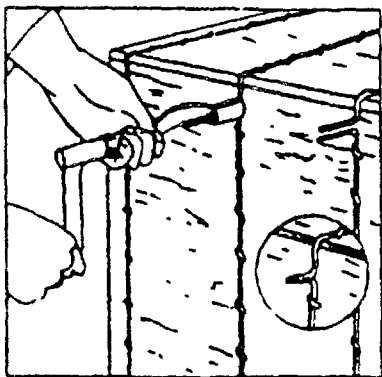
FIGURE 6. CLOSING STYLE 1 BOX WITH HAND TWISTER.

CRANK TWISTER



1 AFTER THE BOX IS PREPARED FOR CLOSING, THE WIRES ARE BENT AT RIGHT ANGLES TO THE BOX APPROXIMATELY 5/8" FROM THE CLOSING EDGE.

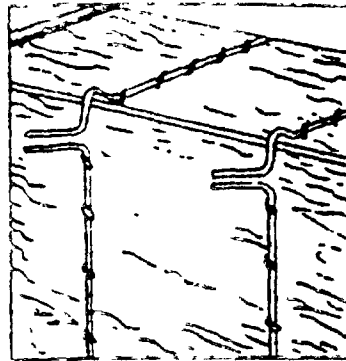
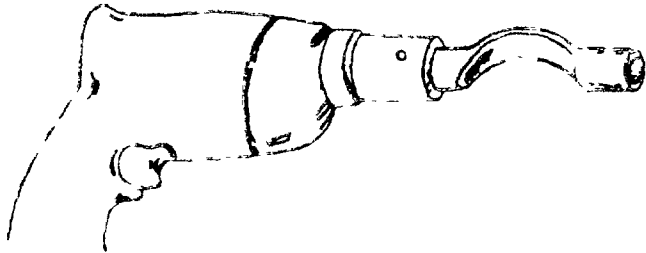
2 THE END OF THE BIT IS PUSHED OVER THE WIRES AGAINST THE BOX; THEN THE CRANK IS ROTATED UNTIL THE WIRES ARE CUT OFF.



3 AFTER ALL OF THE TWISTS ARE COMPLETED, THEY ARE KNOCKED AGAINST THE BOX-PARALLEL TO THE BINDING WIRE.

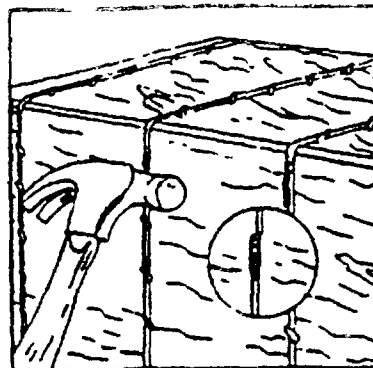
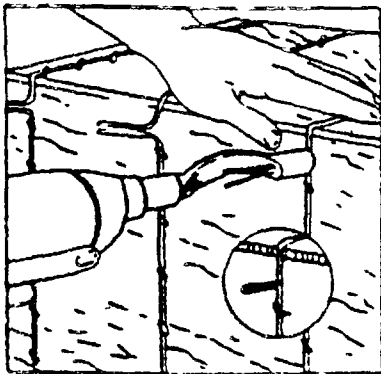
FIGURE 7. CLOSING STYLE 1 BOX WITH CRANK TWISTER.

**POWER TWISTER
(ELECTRIC OR PNEUMATIC)**



1. AFTER THE BOX IS PREPARED FOR CLOSING, THE WIRES ARE BENT AT RIGHT ANGLES TO THE BOX APPROXIMATELY 5/8" FROM THE CLOSING EDGE.

2. THE END OF THE BIT IS PUSHED OVER THE WIRES AGAINST THE BOX. THE TRIGGER IS PULLED AND HELD FOR ABOUT TWO SECONDS TO FORM A TWIST. THEN THE TOOL IS REMOVED FROM THE FINISHED TWIST.



3. AFTER ALL OF THE TWISTS ARE COMPLETED, THEY ARE KNOCKED AGAINST THE BOX PARALLEL TO THE BINDING WIRE.

FIGURE 8. CLOSING STYLE 1. BOX WITH POWER TWISTER.

NCE B 385D

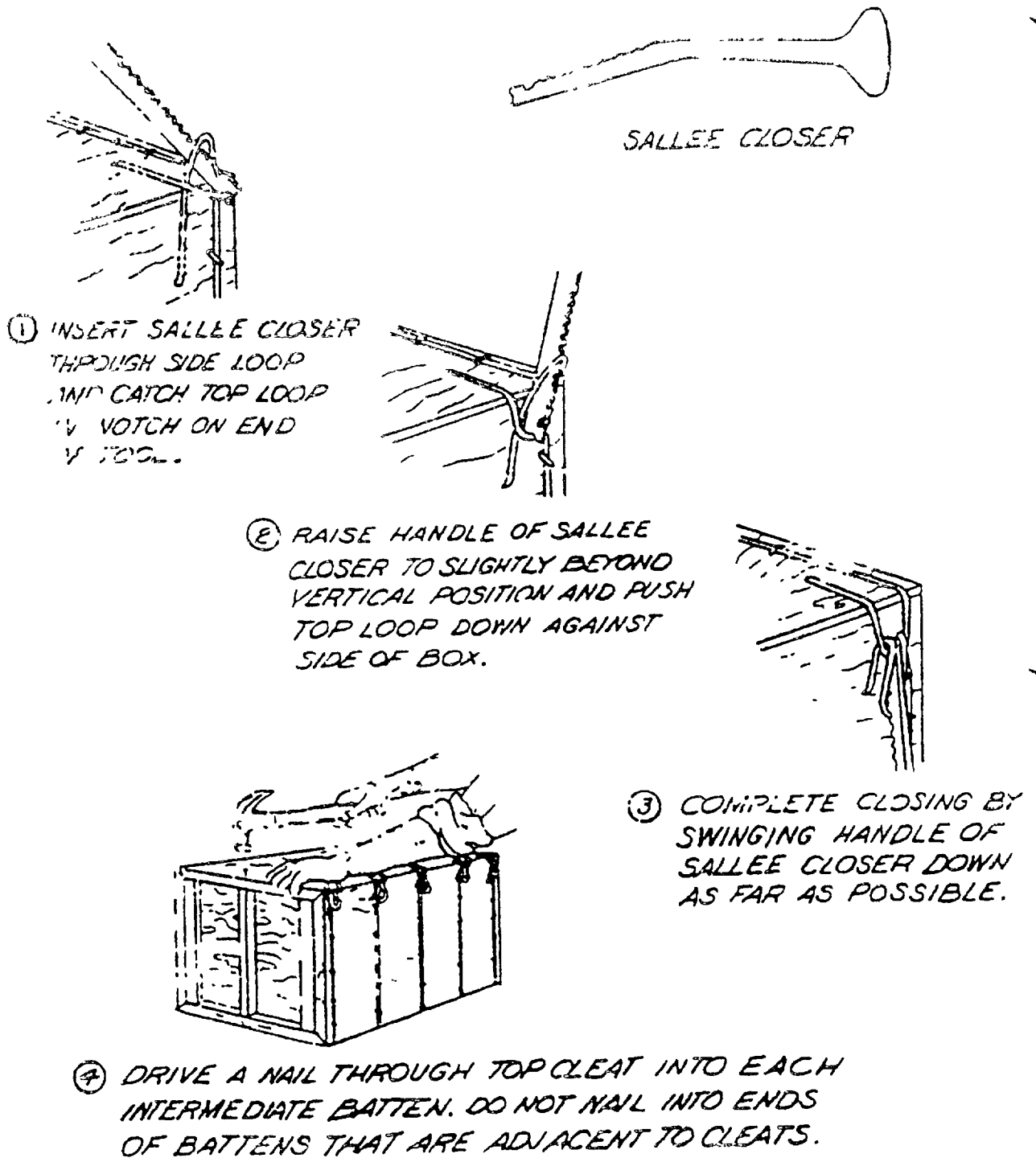


FIGURE 9. CLOSING STYLES 2 AND 3 BOXES WITH SALLEE CLOSER.

MILITARY INTERESTS:

Custodians:

Army - GL
Navy - SA
Air Force - 69

Review activities:

Army - MB, AR, SM
Navy - AS, YD
Air Force - 84, 99
OLA SS

User activities:

Army - CR, AV, MD
Navy - OS, MC, SH

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - FSS

Preparing activity:

Army - GL

Project No. 8115-0529

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision factor should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

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1. RECOMMEND A CHANGE:		1. DOCUMENT NUMBER MPP P 5857	2. DOCUMENT DATE (YYMMDD) .992 December 31
3. DOCUMENT TITLE BOXES, WOOD, WIREBOUND			
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)			
5. REASON FOR RECOMMENDATION			
6. SUBMITTER a. NAME (Last, First, Middle Initial)		6. ORGANIZATION	
6. ADDRESS (include Zip Code)		6. TELEPHONE (include Area Code) (1) Commercial (2) AUTOVON (if applicable)	7. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY a. NAME U.S. Army Natick RD&E Center		b. TELEPHONE (include Area Code) (1) Commercial 508-651-4501	(2) AUTOVON/DSN 256-4501
ADDRESS (include Zip Code) Commander, U.S. Army Natick RD&E Center ATTN: SATNC-WTP Natick, MA 01760-5018		IF YOU DO NOT RECEIVE A REPLY WITHIN 15 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	