

MIL-C-52950 - Military Specification – Crates, Wood, Open and Covered

Subject/Scope:

This specification covers five types and two styles of open wood crates designed for net loads not exceeding 4000 pounds.

Keywords:

member, crate, nail, strut, lumber, type, bolt, style, diagonal, cleat, skid, base, lag, plywood, assembly, inspection, requirement, specification, rubbing, material, std, wood, floorboard, headers, government, carriage, classification, handling, astm, strapping, standard, grade, marking, shipment, test, packaging, packing, batten, strut, procedures, class, joist, moisture, container, military, component, federal, construction, waterproof

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Table of Contents

1. Scope.....	1
1.1 Classification	1
2. APPLICABLE DOCUMENTS	2
2.1 Government documents.....	2
2.1.1 Specifications and standard	2
2.2 Other Government documents, drawings and publications	2
2.3 Order of precedence.....	3
3. REQUIREMENTS.....	3
3.1 Description.....	3
3.2 Preproduction pack	4
3.3 Materials.....	4
3.3.1 New materials	4
3.3.2 Safety.....	4
3.3.3 Lumber	4
3.3.4 Plywood	4
3.3.5 Paper-overlaid veneer	4
3.3.6 Nails and staples	5
3.3.7 Bolts and nuts	5
3.3.8 Lag bolts	5
3.3.9 Washers	5
3.3.10 Metal strapping.....	5
3.4 Construction	5
3.4.1 Nails and nailing.....	5
3.4.2 Bolt application	6
3.4.3 Staples	7
3.4.4 Splices.....	7
3.5 Type I Crates	7
3.5.2 Style B	8
3.6.1 Style A	8
3.7 Type III Crates	10
3.7.1 Style B	10
3.7.2 Nailing	11
3.7.3 Rubbing Strips	11
3.7.4 Assembly	11
3.8 Type IV crates	11

3.8.1	Style A (see figure 8).....	11
3.9	Type V crates.....	12
3.9.1	Style A.....	12
3.9.2	Style B.....	15
3.10	Assembly instructions.....	19
3.11	Tolerances.....	19
3.12	Workmanship.....	19
4.	QUALITY ASSURANCE PROVISIONS.....	20
4.1	Responsibility for inspection.....	20
4.1.1	Responsibility of compliance.....	20
4.1.2	Material inspection.....	20
4.2	Classification of inspections.....	20
4.3	Preproduction pack inspection.....	20
4.4	Quality conformance inspection.....	20
4.4.1	Sampling.....	21
4.5	Inspection procedure.....	21
4.5.1	Examination.....	21
4.5.2	Tests.....	21
4.6	Packaging inspection.....	21
5.	Packaging.....	22
5.1	Preservation.....	22
5.2	Packing.....	22
5.2.1	Level A.....	22
5.2.2	Commercial.....	22
5.3	Marking.....	22
5.3.1	Special marking.....	22
6.	NOTES.....	23
6.1	Intended use.....	23
6.2	Ordering data.....	23
6.3	Preproduction pack.....	24
6.4	Recycled materials.....	24
6.5	Sampling procedures.....	24
6.5.1	Sampling for examination.....	24
6.5.2	Sampling for test.....	24
6.6	Subject term (keyword) listing.....	24
6.7	Changes from previous issue.....	24

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MILITARY SPECIFICATION
CRATES, WOOD, OPEN AND COVERED

This document includes Amendments 1 and 2 – The final amendments.

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

1. Scope

This specification covers five types and two styles of open wood crates designed for net loads not exceeding 4000 pounds.

1.1 Classification

Crates covered by this specification shall be of the types and styles shown in Table I for maximum net loads and maximum dimensions, as specified (see 6.2).

TABLE I. Crate Classification

Type	Style A - Heavy Duty				Style B – Light Duty			
	Maximum				Maximum			
	Net Load	Max. Length	Inside Width	Dimensions Height	Net Load	Max. Length	Inside Width	Dimensions Height
	(pounds)	(feet)	(feet)	(feet)	(pounds)	(feet)	(feet)	(feet)
I	250	4	3	3	200	4	3	3
II 1/	1000	12	4	2	No Style B			
III	No Style A				No load or size restriction except as limited by handling methods			
IV	1000	6	4	4	No Style B			
V 2/	2500	12	6	6	4000	32	6	10

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer (Code 156), Naval Construction Battalion Center, Port Hueneme, CA 93043-5000, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8115

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

1/ Items such as ladders, tubing, and extrusions weighing less than 200 pounds and not exceeding 20 feet long, 3 feet wide and 2 feet high may be packed in Type II crates.

2/ Type V, Styles A and B crates shall be further classified as being either nondemountable or demountable. Type V, Style B crates may be open or covered.

2. APPLICABLE DOCUMENTS

2.1 Government documents

2.1.1 Specifications and standard

The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

FF-B-561	- Bolts, (Screw), Lag
FF-B-584	- Bolts, Square Neck; Tee Head
FF-N-105	- Nails, Brads, Staples and Spikes, Wire, Cut and Wrought
FF-N-836	- Nut: Square, Hexagon, Cap, Slotted, Castle, Knurled, Welding and Single Ball Seat
FF-W-92	- Washers, Metal, Flat (Plain)
NN-P-530	- Plywood, Flat Panel
PPP-B-1055	- Barrier Material, Waterproofed, Flexible
PPP-V-205	- Veneer, Paper Overlaid, Container-Grade

MILITARY

MIL-C-104	- Crates, Wood, Lumber and Plywood Sheathed, Nailed and Bolted
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STANDARDS

MILITARY

MIL-STD-105	- Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129	- Marking for Shipment and Storage.
MIL-STD-731	- Quality of Wood Members for Containers and Pallets.
MIL-STD-1186	- Cushioning, Anchoring, Bracing, Blocking, and Waterproofing; with Appropriate Test Methods.

~~(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Military Specifications and Standards, BLDG, 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)"~~

2.2 Other Government documents, drawings and publications

The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation (see 6.2).

ASTM

- [ASTM D 3951](#) - Standard Practices for Commercial Packaging
- [ASTM D 3953](#) - Standard Specification for Strapping, Flat Steel and Seals
- [ASTM D 4442](#) - Standard Test Methods for Direct Moisture Content of Wood and Wood-Base Materials
- [ASTM D 4444](#) - Standard Test Methods for Use and Calibration of Hand-Held Moisture Meters

(Application for copies should be addressed to the ASTM, 1916 Race Street, Philadelphia, PA 19103.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Application for copies should be addressed to the American Trucking Association, Inc., Traffic Department, 1616 P Street, N.W., Washington, DC 20036.)

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, Tariff Publishing Officer, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

(Non-Government standards and other publications are normally available from the organizations that prepare or 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, the text of this specification shall take precedence. Nothing in this specification, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Description

The crates shall be shown on the applicable figures and as specified herein. Unless otherwise specified (see 6.2), the crates shall be furnished knocked down as top, base, side, and end panels. When knocked down type I, Style B crates shall consist of individual cut-to-length boards.

3.2 Preproduction pack

When specified (see 4.3 and 6.2) the contractor shall furnish a preproduction pack for examination and test within the time frame specified (see 6.2) to prove prior to starting production packaging, that the applied preservation, packaging, packing, and marking comply with the requirements of this specification. Examination and test shall be as specified in section 4 and shall be subject to surveillance and approval by the government (see 6.3).

3.3 Materials

Material shall be as specified herein and in applicable specifications and standards, and other referenced documents. Materials not specified shall be selected by the contractor and shall be subject to all the provisions of this specification. Materials shall be free of defects which adversely affect performance or serviceability of the finished product (see 6.4).

3.3.1 New materials

The use of newly developed packaging materials or procedures is encouraged and recommended and shall be permitted under conditions specified herein, provided they are equal or better than the specified materials or procedures.

3.3.2 Safety

Materials used for the crates shall present no environment or toxicological hazards as defined by current industry standard or applicable federal or state laws or regulations.

3.3.3 Lumber

Wood members shall be selected from the wood groups listed in and shall conform to the requirements of [MIL-STD-731](#) as follows:

- Class 1 - All load-bearing floorboards. Skids for Style A crates
- Class 2 - All framing members. Skids for Style B crates.
- Class 3 - All rubbing strips and non-load-bearing floorboards.

Unless otherwise specified herein, the nominal sizes as specified in MIL-STD-731, Table I shall be the minimum acceptable sizes for lumber components.

3.3.4 Plywood

All plywood shall conform to [NN-P-530](#), Group A or B. Softwood plywood shall be Group B, Grade CD interior with exterior glue. Hardwood plywood shall be Group A, Grade 3-4, Type I.

3.3.5 Paper-overlaid veneer

Paper-overlaid veneer shall conform to [PPP-V-205](#), Type II.

3.3.6 Nails and staples

Nails and staples shall be steel and shall conform to [FF-N-105](#).

3.3.7 Bolts and nuts

Bolts shall conform to FF-B-584, Type I, Class 1, Style A. Nuts shall conform to [FF-N-836](#), Type I, or Type 11, Style 4.

3.3.8 Lag bolts

Lag bolts shall conform to [FF-B-561](#), Type I, Grade B.

3.3.9 Washers

Washers shall conform to [FF-W-92](#), Type A, Grade I, Class, A.

3.3.10 Metal strapping

Strapping used to reinforce crates shall conform to [ASTM D 3953](#) Type 1, 2, or 3 as applicable. Strapping finish shall be as specified herein.

3.4 Construction

3.4.1 Nails and nailing

Nails used shall be sinkers, coolers, corks, or common. For fastening covering materials to members, nails shall be not less than 1" long and, but shall not exceed the sum of the thickness of the covering material and the member. Nail sizes specified for the fabrication of the various crates are based on Groups I and II wood. When group III and IV woods are used, nail sizes may be one penny size smaller than those specified. The patterns to be used for the nailing of two flat pieces of lumber shall conform to the details shown in figure 1 or as specified herein. Unless otherwise specified herein, the following requirements shall determine size, placement, and quantity of nails:

- a. All adjacent crate members shall be securely fastened to each other, either directly or by means of the covering.
- b. All nails that are not to be clinched shall be cement coated or mechanically deformed (helically or annularly threaded).
- c. Nails shall be driven through the thinner member into the thicker member wherever possible.
- d. When the flat faces of lumber are nailed together and the combined weakness is 3" or less (except for the top joists and covering material), nails shall be long enough to pass through both thicknesses and shall be clinched not less than 1/4" nor more than 3/8".
- e. When the flat faces of lumber are nailed together and the combined thickness is more than 3" or when the flat face of one or more pieces is nailed to the edge or end face of another, nails shall not be clinched. The portion of the nail in the thicker piece shall not be less than 2" times the length of the nail in the thinner pieces for ten penny nails and smaller, and not less than 1-1/2" for twelve penny nails and larger.

- f. When splitting occurs with the use of diamond-point nails, the nails shall be slightly blunted. When blunting does not prevent the splitting, holes slightly smaller than the diameter of the nail shall be drilled for each nail.
- g. Nails shall be driven so that neither the head nor the point projects above the surface of the wood. Occasional overdriving will be permitted, but nails shall not be over driven more than one-eighth the thickness of the piece holding the head.
- h. Nails shall be positioned not less than the thickness of the piece from the end nor less than one-half the thickness of the piece from the side edge of the lumber whenever possible. Nails driven into the side edge of lumber shall be centered on the side edge.
- h. When two members having parallel grain are attached, the number of rows of nails shall be determined by the nominal width of surfaces in contact, one row for widths up to and including 2", two rows for widths greater than 2" but not greater than 6" and three rows for widths over 6".
- i. When plywood is nailed to cleats, nails shall be spaced not more than 4" apart on centers placed in staggered rows which are not less than 1-3/4" apart or less than 3/4" from the edge of the cleat.

3.4.2 Bolt application

Holes shall be prebored to receive carriage bolts and shall be the exact diameter of the bolt. The lead holes for lag bolts shanks shall be the same diameter as the shank, even through the threaded portion may have a greater diameter than the shank. The diameter of the lead hole for the threaded part of the lag bolt shall be as follows:

<u>Diameter of Threaded Portion of Lag Bolt</u>	<u>Diameter of Lead Hole</u>	
(inch)	<u>Group I, II and III Woods</u>	<u>Group IV Woods</u>
(inch)	(inch)	(inch)
1/4	3/16	3/16
5/16	1/4	1/4
3/8	1/4	5/16
1/2	3/8	7/16
5/8	3/8	1/2
3/4	1/2	5/8

Lag bolts shall be placed by being turned in the holes the full length of the bolt and shall not be driven in with a hammer or by any similar means. If for any reason the thread in the wood is stripped when the lag bolts are placed, the lag bolt shall be removed and placed in a new hole near the old position. A flat washer shall be used under the head of each lag bolt and under the nut of each carriage bolt. After the nut is placed, the thread of the carriage bolt projecting beyond the nut shall be painted with a suitable metal primer or similar material.

3.4.3 Staples

The crown of the staples used for fastening covering materials to frame members shall not be less than 3/8". The length of the staples shall not exceed the sum of the thickness of the covering material and the frame member; however, staples shall be not less than 1" in length.

3.4.4 Splices

Splices and butt joints made in frame members and skids of long crates shall be as shown in figure 2.

3.5 Type I Crates

3.5.1 Style A

The load and size limitations shall be as specified in Table I. Style A crates shall be used only for items forming a Type I load and weighting not more than 250 pounds.

3.5.1.1 Base

Skids shall be 2- by 4-inch lumber. Diagonals shall be 1 by 4 inches in size. End floor members shall be the same thickness and width as the skids except that when used as load-bearing members, their sizes shall be as specified in Table 11. End floor members shall be bolted to each skid with 3/8-inch-diameter carriage bolts as specified in 3.4.2. Single piece rubbing strips used on each skid shall be minimum 3- by 4-inch in size and beveled at each end at an angle of 45 degrees for at least one-half their thickness. Rubbing strip length shall be less than the skid length to allow open space at each end for sling and fork truck handling. The open space shall be not less than 4 inches and not more than 10 inches long. On crates over 36 inches long, the rubbing length shall be adjusted to provide a distance of not more than 28 inches between end openings.

TABLE II Allowable Load Per Inch of Load-bearing Floorboard
Width of Groups I and II Woods

<u>Nominal Thickness of Floorboard (inches)</u>						
Distance between skids	1	2	3	4	6	8
12	50	200	557	1090	2690	4680
18	34	134	370	740	1790	3140
24	25	100	280	545	1350	2330
30	20	80	222	450	1150	1870
36	17	66	185	361	895	1560
42	15	57	158	311	767	1335
48	12	50	139	272	671	1170
54	11	45	124	242	596	1039
60	10	40	111	218	537	936
66	9	37	104	198	488	850

Note: When Group IV woods are used, the above allowable loads may be increased by 20 percent.

3.5.1.2 Side, end, and top panels

All members of the side, end, and top panels shall be 1- by 4-inch lumber. Nailing and nailing patterns shall be as specified in 3.4.1 and as shown in figure 1.

3.5.1.3 Assembly

Assembly of crates shall be as shown in figure 3 and as specified herein. Nailing shall be as specified herein and in 3.4.1. The sides shall be fastened to the base by nailing the extensions of the vertical struts and diagonals to the skids with eight penny nails. The ends shall be fastened to the base by nailing the lower edge member of the end panels to the end floor member with eight penny nails spaced 6 to 8 inches apart. The sides shall be fastened to the ends by nailing the end vertical struts of the sides to the vertical struts of the ends with eight penny nails spaced 8 to 10 inches apart. The sides shall be fastened to the top by nailing the extensions of the diagonals and vertical struts of the longitudinal members of the top with eight penny nails. The top shall be fastened to the ends by nailing the extensions of the longitudinal and diagonal members of the top to the upper edge member of the ends with eight penny sinker nails. The upper edge members of the ends shall be nailed to the edge lateral members of the top with eight penny sinker nails spaced 8 to 10 inches apart.

3.5.2 Style B

The load and size limitations shall be as specified in Table I. Style B crates shall be used only for items forming a Type I load and weighting not more than 200 pounds.

3.5.2.1 Frame member sizes

All frames members shall be 1 by 3 inches in size for net loads up to 100 pounds and 1 by 4 inches in size for loads between 100 and 200 pounds.

3.5.2.2 Assembly

Assembly of the crates shall be as shown in figure 4. Diagonals, struts, cross members, and longitudinal members shall be nailed together in patterns as show in figure 1 with sixpenny nails.

3.6 Type II crates

3.6.1 Style A

The load and size limitations shall be as specified in Table I.

3.6.1.1 Ends

The ends shall be of lumber of cleated-plywood as shown in figure 5. The cleats shall be fastened to the end boards or to the plywood with two rows of nails spaced 4 inches apart in each row, staggered and clinched. The minimum thickness of the end boards and plywood and the minimum size of the end cleats shall be as follows:

Thickness of Ends

Maximum Net Load (pounds)	<u>Plywood</u> (inch)	<u>Lumber</u> (Inches)	Size of End <u>Cleats</u> (Inches)
100	1/4	1/4	3/4 by 2-3/4
250	3/8	3/4	3/4 by 3-1/2
500	1/2	1-1/16	1-1/16 by 3-1/2
1000	1/2	1-5/16	1-1/2 by 3-1/2

Additional vertical filler cleats shall be used in the ends when the unsupported span between cleats is greater than 3 feet.

3.6.1.2 Sides

The sides of the crates shall be of lumber or cleated-plywood as shown in figure 5. When lumber is used, the sides shall be constructed of not more than 3 pieces for heights of 1 foot 3 inches or more, not more than two pieces for heights between 7-1/2 inches and 1 foot 3 inches, and one piece for heights 7-1/2 inches or less. The minimum thickness of the lumber and plywood, and the minimum size of cleats for plywood sides shall be as follow:

Thickness of Sides

Maximum Net Load (pounds)	<u>Plywood</u> (inch)	<u>Lumber</u> (Inches)	Size of Cleats <u>For plywood sides</u> (Inches)
100	1/4	3/4	3/4 by 2-3/4
250	3/8	3/4	3/4 by 2-3/4
500	1/2	1-1/16	7/8 by 3-1/2
1000	1/2	1-5/16	7/8 by 3-1/2

When lumber sides are composed of two or more pieces, battens the same thickness and width as the top and bottom cross members as specified in 3.6.1.3 shall be extend the full depth of the sides and shall be fastened to the inside surfaces of the sides shown in figure 5. The battens or cleats of the sides shall be placed to coincide with the cross members of the top, and spacing shall be not greater than 3 feet. Battens or cleats shall be fastened to the side boards or plywood with two rows of nails spaces 4 inches apart in each row, staggered, and clinched. When the overall length of the crate exceeds 14 feet, pieces of lumber used in the construction of the sides shall be either the required full length or shall be made of two pieces which together make up the full length. The joint of such pieces shall abut on a full depth batten, and both pieces shall be nailed to the batten. When plywood is used, the sides shall be constructed of one-piece material for width requirements. Butt joints of plywood at an intermediate cleat location will be permitted when two lengths of plywood are required for crates in excess of 8 feet in length. Crates may be one of the following combinations of sides and end panels, as specified (see 6.2): (a) lumber ends and sides; (b) cleated-plywood ends and sides; and, (c) lumber ends and cleat-plywood sides.

3.6.1.3 Top and bottom members

The top and bottom members shall be 1- by 4-inch lumber and all crates up to and including 2 feet 6 inches in width and 1-by 6-inch lumber for crates more than 2 feet 6 inches in width. The angle between the diagonals and sides shall be between 30 degrees and 60 degrees. Cross members and supporting side battens or cleats shall be placed not more than 3 feet apart. The

cross members of the top and bottom shall be directly opposite each other. Bottom diagonals shall be in reverse direction with the top diagonals as shown in figure 5.

3.6.1.4 Exterior side cleats

When specified (see 6.2), for gross weights exceeding 200 pounds, exterior side cleats shall be used to facilitate fork truck handling of crates on their sides. On lumber sides, the exterior cleats shall replace the interior side battens. On plywood sides, filler pieces shall be used under the exterior side cleats; filler pieces shall pass between the horizontal cleats and shall be the same width as the exterior cleats. Spacing of cleats shall be as shown in figure 6. Size of exterior side cleats shall be 3 by 4 inches. Exterior side cleats shall be secured to the side sheathing with nails as specified for battens in 3.6.1.2. Short one-panel crates with lumber ends shall have end cleats a nominal 3 inches thick in lieu of exterior cleats.

3.6.1.5 Assembly

3.6.1.5.1 Sides to ends

The sides shall be nailed with sinker or corker nails to the ends as specified in Table III. Nailing shall be as specified in 3.4.1.

3.6.1.5.2 Top and bottom member to sides

The top and bottom cross members and diagonals shall be nailed to the cleats of the sides or to the lumber sides with eight penny sinker nails when the side cleats or sides are less than 1 inch in thickness and nine penny sinker nails when side members are 1 inch or more in thickness. The end top and bottom cross members shall be nailed to the end sheathing or cleats if the ends are lumber or plywood, respectively. The nailing patterns, location of nails, and nailing procedures shall be as shown in figure 1 and, as specified in 3.4.1.

Table III Nailing Schedule for Assembly of Type II. Style A Crates

<u>Cleated-Plywood Sides</u>					
<u>to Plywood or lumber ends 1/</u>			<u>Lumber sides to lumber ends 1/</u>		
<u>Plywood Thickness</u> (inch)	<u>Nail Size</u> (penny)	<u>Spacing</u> (inches)	<u>Thickness of sides</u> (inches)	<u>Nail size</u> (penny)	<u>Spacing</u> (inches)
1/4	8	3	3/4	8	2-1/2
3/8	10	3-1/4	1-1/16	10	2-3/4
1/2	12	3-1/2	1-5/16	12	3

1/ Nails shall be staggered when ends are lumber.

3.7 Type III Crates

3.7.1 Style B

Style B crates shall be shown in figure 7. There shall be no size or load restrictions for this crate except as limited by handling methods (see 6.1). The size and spacing of members shall be as

specified in Table IV. Vertical end cleats shall be long enough to permit full nailing to the upper horizontal end cleats when the crate is assembled.

3.7.2 Nailing

The upper and lower halves of the crate shall be fabricated with sixpenny nails; the vertical end cleats shall be fastened to the lower half with clinched nails to the lower horizontal end cleats. Two nails shall be used in each end of 3- and 4- inch-wide longitudinal members and three nails shall be used in 6-inch wide longitudinal members.

3.7.3 Rubbing Strips

Beveled rubbing strips, of sizes shown in Table IV, shall be attached to the undersurface of each lower cross member to facilitate fork lift handling. Rubbing strips shall be fastened to the cross members with sixteen penny nails placed in two rows and spaced 5 inches apart in each row and clinched. Rubbing strips shall be applied at time of crate packing after strapping has been secured to cross members.

3.7.4 Assembly

Assembly of the crates shall be as shown in figure 7. After items have been nested in the lower half of the crate, the upper half shall be position and strapping shall be in accordance with in MIL-STD-1186. The upper ends of the vertical end cleats shall be nailed to the upper horizontal end cleats with four penny nails. The upper longitudinal members of the sides shall be nailed to the vertical end cleats with eight penny nails.

3.8 Type IV crates

3.8.1 Style A (see figure 8)

The load and size limitations shall be as specified in Table I.

3.8.1.1 Base

Skid shall be 2- by 4-inch lumber for loads through 500 pounds and 2- by 6-inch lumber for over 500 pounds. The size of load-bearing floor member shall be as specified in Table II. Floorboards over 2 inches in nominal thickness shall be bolted to the skids with 3/8-inch-diameter carriage bolts as specified in 3.4.2. Diagonals shall be 1 by 6 inches in size. The size and placement of end floor members and rubbing strips shall be as specified in 3.5.1.1. On crates over 5 feet long, the rubbing strips shall be in three pieces, with the center piece 16 inches long, the fork openings 12 inches long, and the end pieces of a length which will allow end sling openings of 4 inches.

TABLE IV. Member Sizes and Spacing for Type III, Style B Crates.

Member	Member Size		Member Spacing
	Depth of Crate		
	Over 8 0-8 to 12 over 12 (inches)	0-24 over 24 (inches)	Over 10 0-10 to 20 over 20 (feet-inches)
Longitudinal members	1 X 3 1 X 4 1 X 6		
Vertical end cleats	1 X 3 1 X 4 1 X 6		
Horizontal end cleats	1 X 3 1 X 4 1 X 6		
Top and Bottom cross members		1 X 4 1 X 6	2 2-6 3
Rubbing Strips		3 X 4 3 X 6	

3.8.1.2 Side, end, and top panels

All members of the side, end, and top panels shall be 1- by 6-inch lumber. Three vertical struts shall be used in the side panels when the length of the crate is greater than 4 feet or greater than 1-1/2 times the height. The lateral members of the top panel shall coincide with the vertical struts of the side panels and shall be equal in number. Nailing and nailing patterns shall be as specified in 3.4.1 and as shown in figure 1.

3.8.1.3 Crate assembly

Assembly of the crates shall be as specified in 3.5.1.3 and as shown in figure 8. The longitudinal members of the top shall bear on the upper frame members of the sides and the end lateral members of the top shall be adjacent to the upper members of the ends.

3.9 Type V crates

3.9.1 Style A

The load and size limitations shall be as specified in Table I. Nailing shall be as specified in 3.4.1, as shown in figure 1, and as specified herein. Crates shall be assembled with nails or shall be demountable, as specified (see 6.2).

3.9.1.1 Base

3.9.1.1.1 Skids

The skids shall consist of 4- by 4-inch lumber. An intermediate 4- by 4-inch skid shall be used when the distance between the outer skids is greater than 36 inches.

3.9.1.1.2 Load-bearing floor members

The size of the load-bearing floor members shall be as specified in Table 11. Floor boards over 2 inches in nominal thickness shall be bolted to each outside skid with 3/8-inch carriage bolts as specified in 3.4.3.

3.9.1.1.3 Diagonals

The diagonals shall be 1- by 6-inch lumber and the angle between the skid and the diagonal shall be between 30 degrees and 60 degrees, except that when the angle of a single diagonal is less than 30 degrees, two diagonals and a 1- by 6-inch center cross member shall be used.

3.9.1.1.4 Cross members

End cross members shall be 2- by 6-inch lumber for crates not greater than 4 feet in width and 4- by 4-inch lumber for crates over 4 feet in width. End cross members shall be bolted to each skid with 3/8-inch-diameter carriage bolts as specified in 3.4.2.

3.9.1.1.5 Rubbing strips

Rubbing strips shall be as specified in 3.5.1.1 and 3.8.1.1.

3.9.1.2 Ends

Vertical struts shall be 2- by 4-inch lumber. An intermediate strut shall be used when the width of the crate is greater than 3 feet. All struts shall coincide with the skids and shall bear upon the end cross members of the base. The upper and lower frame members of the ends shall be 1- by 6-inch lumber except that a 1- by 8-inch lower member shall be used when the end cross members of the base are 4 by 4 inches. The diagonals of the ends shall be 1- by 6-inch lumber.

3.9.1.3 Sides

All side framing members, struts, and diagonals shall be 1-by 6-inch lumber. Intermediate struts shall be placed so that diagonals form an angle of between 30 and 60 degrees with the lower frame member. Struts shall have a maximum spacing of 42 inches. A horizontal intermediate frame member is required when the height of the side exceeds 4 feet. Diagonals shall be used between each two adjacent struts.

3.9.1.4 Top

All members of the top shall be 2- by 4-inch lumber. The longitudinal members shall coincide with the vertical struts of the ends. An intermediate longitudinal member is required when the width of the crate is greater than 3 feet and shall coincide with the intermediate struts of the ends. The joists shall be placed flat. Joists shall coincide with each strut of the side but shall be spaced not more than 40 inches apart for crates up to 3 feet wide and not more than 30 inches apart for crates more than 3 feet wide. The diagonals shall be nailed to the longitudinal members. When more than three joists are used, only each end panel of the top assembly shall be braced as shown in figure 9.

3.9.1.5 Nondemountable crate assembly

The assembly shall be reinforced by the application of metal straps as shown in figure 9 and in accordance with MIL-STD-1186.

3.9.1.5.1 Sides to base

The sides shall be fastened to the base by nailing the overlap of the vertical struts and diagonals to the skids with twelve penny sinker nails. The nailing patterns shall follow those shown in figure 1.

3.9.1.5.2 End to base

The ends shall be fastened to the base by nailing the lower frame member of the end panels to the end cross member of the base with twelve penny sinker nails spaced 6 to 8 inches apart.

3.9.1.5.3 Sides to end and ends to sides

The edge struts of the sides shall be fastened to the edge struts of the ends with eight penny sinker nails spaced 8 to 10 inches apart. The extensions of the upper and lower frame members and the diagonals of the end shall be nailed to the edge struts of the side with eight penny sinker nails as shown in figure 1.

3.9.1.5.4 Top to sides and ends

The top shall be fastened to the sides and ends by nailing the upper frame members of the ends and the extensions of the vertical struts and diagonals of the sides to the adjacent edge members of the top with eight penny sinker nails as shown in-figure 1.

3.9.1.6 Demountable crate assembly

All demountable crates shall be assembled with lag bolts. Lead holes shall be used for all lag bolts as specified in 3.4.2. When specified (see 6.2), as an alternate, the top, side, and end panels may be nailed to each other as specified in 3.9.1.5.3 and 3.9.1.5.4 and the units may be fastened to the skids and end cross members of the base by means of lag bolts for demountable crates as specified in 3.9.1.6.1 and 3.9.1.6.2.

3.9.1.6.1 Sides to base

Lag bolts, 3/8 by 3-1/2 inches, shall be used to fasten the sides to the skids. Diagonals shall be arranged to provide the maximum number of fastening points to the base near the center of the skids. The minimum number of lag bolts shall correspond to the following tabulation. Not less than one lag bolt shall be placed in each strut and diagonal.

Gross Load (Crates and Contents) (pounds)	Minimum number of 3/8 Lag Bolts for Each Side of Crate
1000	4
2000	5
3000	8

3.9.1.6.2 Ends to base, sides to ends, and ends to top

Lag bolts, 5/16 by 3 inches, spaced 12 to 14 inches apart, shall be used to fastened: (a) the lower edge members of the ends to the end cross-members of the base; (b) the end vertical struts of the sides to the edge struts of the ends; and, (c) the upper edge members of the end to the edge joists of the top.

3.9.1.6.3 Sides to top

One 5/16- by 3-inch lag bolt shall be used to fastened each strut and diagonal of the sides to the edge longitudinal members of the top.

3.9.2 Style B

The load and size limitations shall be as specified in Table I. Nailing shall be as specified in 3.4.1 as shown on figure 1 and as specified herein. Type V, Style B crates shall be as shown in figure 10 through 18 and as specified herein. They shall be open or covered, and demountable or nondemountable, as specified (see 6.2).

3.9.2.1 Base

3.9.2.1.1 Skids

Skid sizes shall conform to the following tabulation:

Net Load (pounds)	Skid Size (Nominal)	
	2 Skids (inches)	3 Skids (inches)
Up to 500	2 X 4 (flat)	2 X 4 (flat)
501-2000	3 X 4 (flat)	3 X 4 (flat)
2001-3000	4 X 4	3 X 4 (flat)
3001-4000	4 X 4	4 X 4

Crates over 42 inches wide shall have three skids. Splices shall be located no further from the ends than one-third of the length of the skids, and splice locations shall be alternated in adjacent skids. All 4 x 4 members may also consist of two 2 x 4's placed on edge and laminated in accordance with figure 2.

3.9.2.1.2 Rubbing strips

Rubbing strips shall be a minimum of 3 by 4 inches in size. The strips shall be as specified in 3.5.1.1 and positioned as shown in figure 10. They shall be nailed to the skids with two rows of nails spaced 1 foot apart in each row in a staggered pattern; nail sizes shall be sixteen penny when skids are 2 by 4 inches, and twenty penny for 3- by 4-inch and 4- by 4-inch skids.

3.9.2.1.3 End headers

Two headers spaced 2 feet apart shall be bolted to each end of the skids as shown in figure 10 with 3/8-inch-diameter carriage bolts. The end headers shall be the same cross section as the skids. When the crate ends have 2- by 4-inch struts, bolts in the outer headers shall be placed to clear the struts.

3.9.2.1.4 Load-bearing floorboards

When concentrated loads occur, load-bearing floorboards shall be used to transfer the load to skids. The sizes shall be as specified as in Table 11. When end headers are used as a load-bearing member, the end header size shall be chosen from the load-bearing floorboard width specified in Table 11. Floorboards 2 inches or less in thickness shall be nailed to each skid in patterns as shown in figure 1, and floorboards over 2 inches thick shall be bolted to each skid with 3/8-inch-diameter carriage bolts. Two bolts shall be used for floorboards over 6 inches wide.

3.9.2.1.5 Diagonals and floorboards

Diagonals shall be used between headers and load-bearing floorboards or other cross members and shall be placed at an angle as close as 45 degrees as possible. Diagonals and floorboards other than load-bearing floorboards shall be 1-by 4-inch members for net loads up to 500 pounds and outside widths not exceeding 3 feet, and shall be 1- by 6-inch members for all other conditions.

3.9.2.2 Sides

Sides shall be shown in figure 11, 12, and 13. Single-panel sides shall be used for heights through 6 feet. An intermediate longitudinal member shall be added for heights over 4 feet. Double-panel sides shall be used for heights over 6 feet and through 8 feet. Triple-panel sides shall be used for heights over 8 feet. Longitudinal members shall be in single pieces for lengths not exceeding 16 feet, and may be spliced as shown in figure 2 for lengths greater than 16 feet. Splice locations shall be alternated. Member sizes and spacing shall be as specified in Table V.

TABLE V. Frame Member Sizes for Sides of Type V. Style B Crates

Limits of Dimensions and Net Loads				Member Sizes (nominal)				
Length (foot)	Net Load (pound)	Max. Strut Spacing (on center)		Longitudinals			Struts (inch)	Diagonals (inch)
		Single Panel	Double and Triple Panel	Upper	Lower	Intermediate (inch)		
12	300	42	42	1 X 4	1 X 3	1 X 3	1 X 3 1/	1 X 4
32	500	48	54	1 X 6	1 X 4	1 X 4	1 X 4 1/	1 X 4
28	1000	42	54	1 X 6	1 X 4	1 X 4	1 X 4 1/	1 X 4
24	2000	36	48	1 X 6	1 X 6	1 X 6	1 X 6	1 X 6
20	3000	36	48	1 X 8	1 X 6	1 X 4	1 X 6 2/	1 X 6
16	4000	36	42	1 X 8	1 X 8	1 X 8	1 X 8	1 X 8

1/ For edge struts use 1 x 4 except that 1 x 6 members shall be used when edge struts of ends are 2 x 4 inches in size.

2/ For edge struts use 1 x 8 members.

3.9.2.3 Ends

Ends shall be as shown in figure 14 and 15. All members shall be 1 by 4 inches in size for net loads up to 500 pounds, and 1 by 6 inches for net loads over 500 pounds, with the following exceptions:

- (a) Struts shall be 2 by 4 inches in size when crate height is over 5 feet.
- (b) The lower frame member shall be 1 by 6 inches in size when the end headers of the base are 2-inch-thick members and 1 by 8 inches in size when larger end headers are used.

3.9.2.4 Top

The top shall be as shown in figure 16. The spacing of the cross members shall be the same as the spacing of the side struts. Diagonals shall be nailed to the inner faces of the cross members. The longitudinal members shall be 1 by 4 inches in size for loads up to 500 pounds and widths to 4 feet, and 1 by 6 inches for all other conditions. Cross members and diagonals shall be 1 by 4 inches for loads to 1000 pounds and widths to 4 feet, and 1 by 6 inches for all other conditions. Splicing of longitudinal members shall be as shown in figure 2 and as specified in 3.9.2.2.

3.9.2.4.1 Top reinforcing joists

When the gross weight of the crate is over 500 pounds or the inside width is over 3 feet 6 inches, a 2- by 4-inch top-reinforcing joist shall be nailed to the top at the loaded center of balance as shown in figure 16 to prevent the top of the crate from being crushed when the crate is lifted with a single set of grab hooks. The joist shall be placed flat and the ends shall contact the inner face of the upper longitudinal members of the side when the crate is assembled. The joist shall be fastened to the longitudinal and diagonal members of the top with seven penny nails placed as shown in figure 1 and to the upper longitudinal members of the sides with two ten penny nails in each ends.

3.9.2.5 Assembly

Unless demountability is specified, the crate shall be assembled by nailing. When demountability is specified, the sides, ends, and top as a unit shall be secured to the base with lag bolts. Eight penny nails, spaced 8 to 10 inches apart, shall be used to fasten: (a) the edge struts of the sides to the edge struts of the ends; (b) the longitudinal members of the top to the upper frame members of the sides; (c) the end cross members of the top to the upper frame members of the ends; and (d) the lower frame members of the ends to the end headers of the base. Eight penny nails as shown in figure 1 nailing patterns shall be used to fasten: (a) the upper ends of the side struts and diagonals to the longitudinal members of the top; and (b) the ends of upper and lower frame members, horizontal members, and diagonals of the ends to the edge struts of the sides. The bottom ends of struts and diagonals of the sides shall be secured to the skids with eight penny nails as follows: A minimum of three nails shall be used for each 3- and 4-inch-wide member, four nails for each 6-inch-wide member, and five nails for each 8-inch and wider member. Nails shall be staggered and shall be placed in two rows whenever possible. For demountable crates, each strut and diagonal of the sides shall be fastened to the skids with a minimum of one lag bolt. The size of the lag bolts and the total number required shall be not less than that specified in Table VI. When more than one lag bolt is required in each strut or diagonal, the additional lag bolts shall be placed in the wider members, near the load-bearing points, and in a staggered pattern when possible. One-half the total number of lag bolts required shall be used for each side. For demountable crates, the lower frame members of the ends shall be fastened to the end headers of the base with 5/16-by 3-inch lag bolts, spaced 12 inches apart.

3.9.2.6 Covered crates

The structural framework of the covered crates shall be as specified in 3.9.2. The covered crates shall also be as shown in figures 11 through 18. Unless otherwise specified (see 6.2), the covering shall consist of plywood or paper-overlaid veneer with a minimum thickness of 1/8 inch. When joints are required in the covering, they shall butt over the centerline of struts or cross members. Covering shall be fastened with two rows of nails or staples, spaced 8 inches apart in each row, staggered, and unclinched. Filler pieces between struts, diagonals, and cross members of sides, ends, and top shall be fastened with two rows of nails, spaced 10 inches apart in each row, staggered, and clinched. Filler pieces shall be the same thickness as adjacent panel framing members.

3.9.2.6.1 Sides

Four-inch-wide filler pieces shall be fastened to the upper and lower frame members between the struts and diagonals. Fillers shall extend beyond the edge of the upper frame member so as to be flush with the ends of the struts and diagonals. The lower edges of the fillers shall be flush with the bottom edge of the lower frame members.

3.9.2.6.2 Ends

Three-inch-wide filler pieces shall be nailed to the edge struts as shown in figures 14 and 15. When specified (see 6.2), end ventilation shall be provided in accordance with MIL-C-104.

3.9.2.6.3 Tops

Two-inch-wide filler pieces shall be fastened to the longitudinal members. The covering of the top shall be extended to overlap the covering of the sides and ends. During nailing, a 4-inch-wide strip of waterproof barrier material conforming to PPP-B-1055, class suitable for crate liners, shall be placed under each covering joint. The strips extend across the full width of the top.

TABLE VI. Number and Size of Lap Bolts Required to Assemble Sides to Base (Demountable Base) of Type V. Style B Crates

Total Minimum Number of Lag Bolts
Size of Bolts for Each Skid Size

Gross Weight (crate and contents) (pounds)	5/16- X 3-inch Bolt for 2- X 3- or 2- X 4-inch Skid (flat)	3/8- X 3-inch Bolt for 3- X 3-inch Skid	1/2- X 3-1/2-inch Bolt for 4- X 4-inch or two 2- X 4-inch Skids (on edge and laminated)
1000	8	8	6
2000	14	10	10
3000	18	16	12
4000	24	20	14
5000	30	26	18

3.9.2.7 Covered crate assembly

The assembly of covered, Type V, Style B crates shall be as shown in figure 18 and the assemble requirements specified in 3.9.2.5, except for the following: Nine penny nails, spaced 8 to 10 inches apart, shall be used through the covering to fasten: (a) the edge struts of the sides to the edge struts of the ends; (b) the struts, diagonals, and fillers of the sides to the edge longitudinal members of the top; (c) the end cross members of the top to the upper frame members of the ends; (d) the upper, lower, and horizontal members, diagonals, and fillers of the ends to the edge struts of the sides; (e) the lower frame members of the ends to the end headers of the base; and, (f) the struts, diagonals, and fillers at the lower edge of the sides to the skids of the base. The covering of the top shall be nailed to the fillers of the sides with four penny nails, spaced 4 to 6 inches apart. When demountability is specified (see 6.2), the sides and ends shall be fastened to the base with lag bolts as specified in 3.9.2.5.

3.10 Assembly instructions

When specified (see 6.2), the contractor shall furnish applicable assembly instructions.

3.11 Tolerances

A tolerance of plus or minus 1/8 inch is allowable on the overall length and width of individual crate panels. Out-of-square deviation of individual panels shall not be more than 3/16 inch (3/8-inch difference in diagonals).

3.12 Workmanship

Workmanship shall be of such quality so as to provide adequate protection, when packaged in accordance with the requirements contained herein, to prevent corrosion, deterioration, and physical damage during handling, shipment, and storage.

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 preform 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 of compliance

All items must meet requirements of section 3. 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 manufactures operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated of actual, nor does it commit the Government to accept defective material.

4.1.2 Material inspection

The contractor is responsible for insuring that supplies and materials are inspected for compliance with all the requirements specified herein and in applicable referenced documents.

4.2 Classification of inspections

The inspection requirements specified herein are classified as follows:

- a. Preproduction pack inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).

4.3 Preproduction pack inspection

When specified (see 3.2 and 6.2), a preproduction pack inspection shall be preformed on one complete pack, packed as for shipment and meeting the requirements of this specification. This inspection shall include the examination of 4.6. The preproduction pack may be a preproduction model, first production model or a production unit. If a preproduction model is used, any preservation, packaging, and packing shall be removed by the contractor at no expense to the Government, when requested by the Government to facilitate comparison of the preproduction model and the production units.

4.4 Quality conformance inspection

The quality conformance inspection shall include the examination of 4.5.1 and the tests of 4.5.2.

4.4.1 Sampling

Sampling and inspection procedures shall be in accordance with MIL-STD-105. A unit of product shall consist of one exterior container or one unitized load, as applicable. All units of the same classification, offered for delivery at one time, shall be considered a lot for the purpose of inspection (see 6.5).

4.5 Inspection procedure

4.5.1 Examination

The crate, or the unassembled components to make a complete crate, as applicable, shall be examined as specified herein for the following defects:

101. Nails of improper length and type.
102. Carriage bolts of improper size.
103. Lag bolts of improper size.
104. Wood components not in accordance with MIL-STD-731.
105. Frame members not as size specified.
106. Skids and rubbing strips not as specified.
107. Plywood not of the type specified.
108. Crate not of type or style specified
109. Nails not spaced or in placement pattern as specified.
110. Headers not secured with carriage bolts as specified.
111. Crate panels not fabricated as specified.
112. Crate panels not of the sizes specified.
113. Crate panels not square with specified tolerances.
114. Type V, Style B crates not covered when specified.
115. Fork truck openings not of size specified.
116. Assembly instructions not provided when specified.

4.5.2 Tests

4.5.2.1 Moisture content

Moisture content shall be as specified as in MIL-STD-731 and determined by using Method A, oven-drying, of ASTM D4442. If hand-held moisture meters are used they shall be in accordance with ASTM D4444. A minimum of six readings, at least one reading on a frame member of each panel, shall be taken. The average of the six reading shall meet the requirements of 3.3.3.

4.5.2.2 Assembly test

A crate shall be completely assembled to insure achievement of a container which can properly and easily assembled which is square, and is of the proper size. Clarity of the assembly instructions shall also be determined.

4.6 Packaging inspection

The preservation, packing, and marking of the item shall be inspected to verify conformance to the requirements of section 5.

5. Packaging

5.1 Preservation

Assembly instructions, when required, shall be enclosed in a polyethylene envelope. The envelope shall be sealed with waterproof tape, heat sealing, or other equivalent means to prevent entrance of water.

5.2 Packing

Packing shall be level A or commercial as specified (see 6.2)

5.2.1 Level A

Crates shall be unassembled with the base, sides, ends, and top secured together to form a single bundle. The bundle shall be secured with at least two straps conforming to ASTM D 3953, Type 1 or 2, and having a minimum size of 5/8 x 0.020 inches. Unless otherwise specified, strapping shall be zinc-coated (galvanized), grade 1, 2 or 3. When specified (see 6.2), strapping shall be coated-finished (organic), grade N, P or M. Strapping shall be located one-sixth the length of the bundle from each end; intermediate straps shall be used when the distance between straps exceeds 60 inches. Prior to bundling, the preserved assembly instructions shall be secured to the crate base in a protected location.

5.2.2 Commercial

Crates shall be shipped either assembled or unassembled and bundled, as specified (see 6.2). when bundled, components panels for one complete crate shall be secured together or a number of like panels (sides, ends, base, etc.) shall be secured together in a manner which will assure carrier acceptance and safe delivery to destination at the lowest rating in compliance with Uniform Freight Classification rules or National Motor Freight Classification rules. Preserved assembly instructions, if required, shall be secured in a protected location on the bundle of complete crates or bundles of component panels.

5.3 Marking

Marking for shipment and storage shall be in accordance with MIL-STD-129

5.3.1 Special marking

Special marking shall be placed on the crate after closure as follows:

- a. Center of balance location and a warning against use of hooks shall be in accordance with MIL-STD-129.

- b. Type V, Style A and B demountable crates shall have each side marked "DEMOUNTABLE CRATE, REMOVE LAG BOLTS" in black letter not less than 1 inch high.

6. NOTES

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

6.1 Intended use

Open crates are suitable for shipment of items which are not readily susceptible to damage from outside forces and which require only limited protection against the elements. If additional protection is necessary, use shrouds, or covered, Type V, Style B crates should be considered. With the exception of Type 111, Style B crates, the crates covered by this specification are for use in domestic and overseas shipment of net loads not over 4000 pounds. Use shall be confined to items falling within the dimensions and weight limitations of the types and grades specified in Table I. In general, Style A crates have heavier components and are to withstand rather severe handling and multiple shipment (heavy-duty) while Style B crates should be confined to handling and shipping that impose only light to moderate hazards on the container (light-duty). Types I, IV, and V crates are general purpose types; Type I1 crates are designed for items such as ladders, tubing, extrusions, or wallboard which do not require blocking, bracing, or cushioning; and Type 111, Style B crates are designed for such self-supporting material as channels, angles, or other structural members where the container serves only as a means for more convenient stacking and handling.

6.2 Ordering data

Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type and style of crate required (see 1.2).
- c. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents reference (see 2.1 and 2.2).
- d. When the crates are to be furnished other than knocked down (see 3.1).
- e. When a preproduction pack is required and the time frame required for submissions of the preproduction pack (see 3.2 and 4.3).
- f. Combination of end and side panels required (see 3.6.1.2).
- g. When interiors side battens shall be replaced by exterior side cleats for forklift handling (see 3.6.1.4).
- h. Alternate method of assembly of demountable crate if required (see 3.9.1.6.)
- i. When demountability is required for Type V crates (see 3.9.1 and 3.9.2)'.- j. Whether Type V, Style B crates shall be open or covered (see 3.9.2).
- k. Whether covering material shall be other than as specified (see 3.9.2.6).
- l. When end ventilation is required (see 3.9.2.6.2).
- m. When demountability is required for covered crates (see 3.9.2.7)
- n. When assembly instructions shall be furnished (see 3.10).
- o. When coated-finished (organic), grade N, P or M strapping is required (see 5.2.1).
- p. Packing shall be level A or Commercial as specified (see 5.2).
- q. Whether Level Commercial packed crates shall be assembled or bundled (see 5.2.2).

6.3 Preproduction pack

Any changes or deviations of production packs from the approved preproduction pack shall be subject to the approval of the contracting officer. Approval of the preproduction pack shall not relieve the supplier of his obligation to preserve, package, pack and mark in accordance with this specification

6.4 Recycled materials

Recycled materials are encouraged for use as long as they meet the requirements specified herein and in applicable specifications, standards, and other reference documents (see 3.3).

6.5 Sampling procedures

6.5.1 Sampling for examination

Recommended Inspection level is S-2 and acceptable Quality level is 6.5 (see 4.4.1).

6.5.2 Sampling for test

Recommended Inspection level is S-4 and acceptable Quality level is 4.0 (see 4.4.1.).

6.6 Subject term (keyword) listing

Bolted
Crate
Panels
Shipping

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.

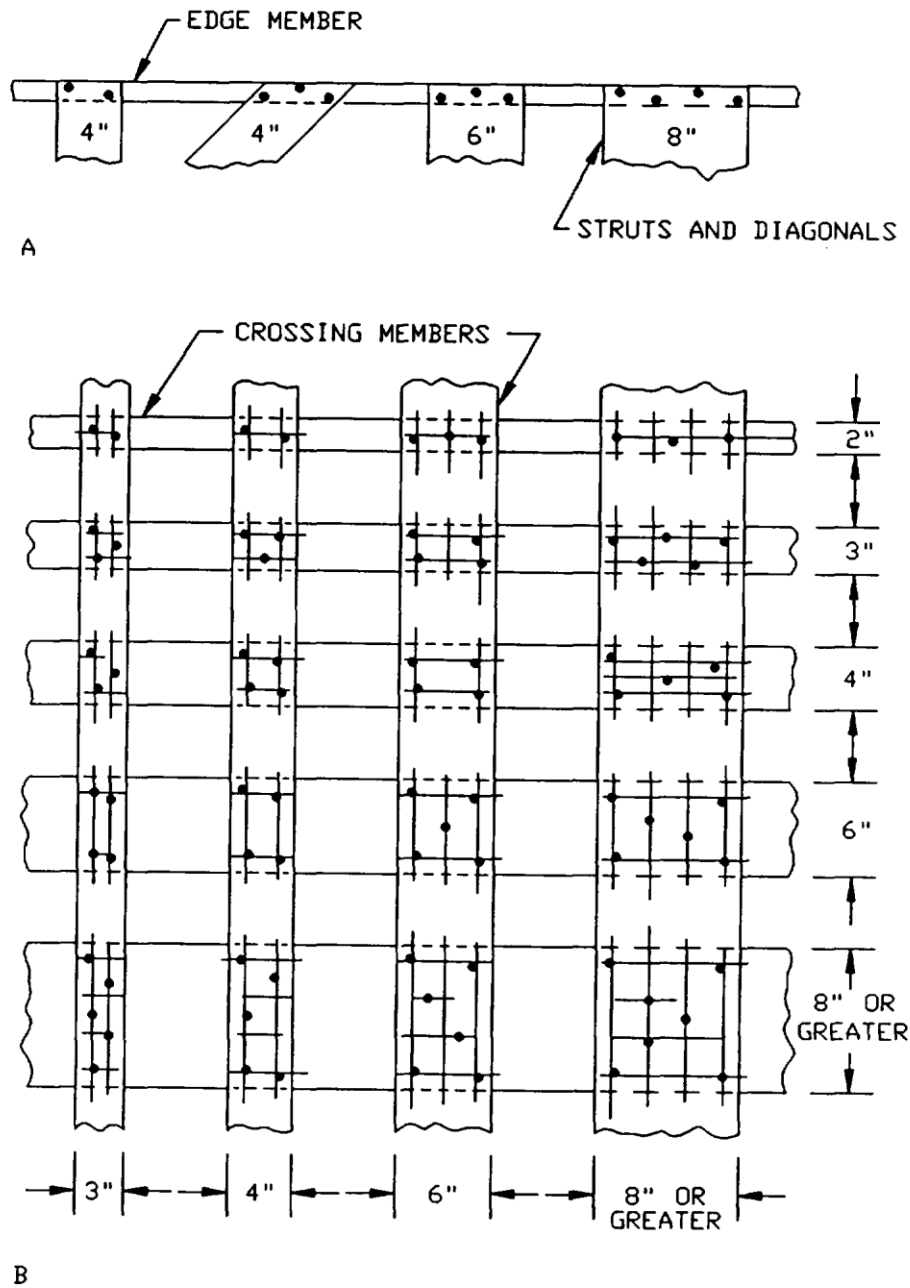


FIGURE 1. Nailing patterns. (All widths are nominal. Similar patterns shall be used when boards cross at angles other 90°.)

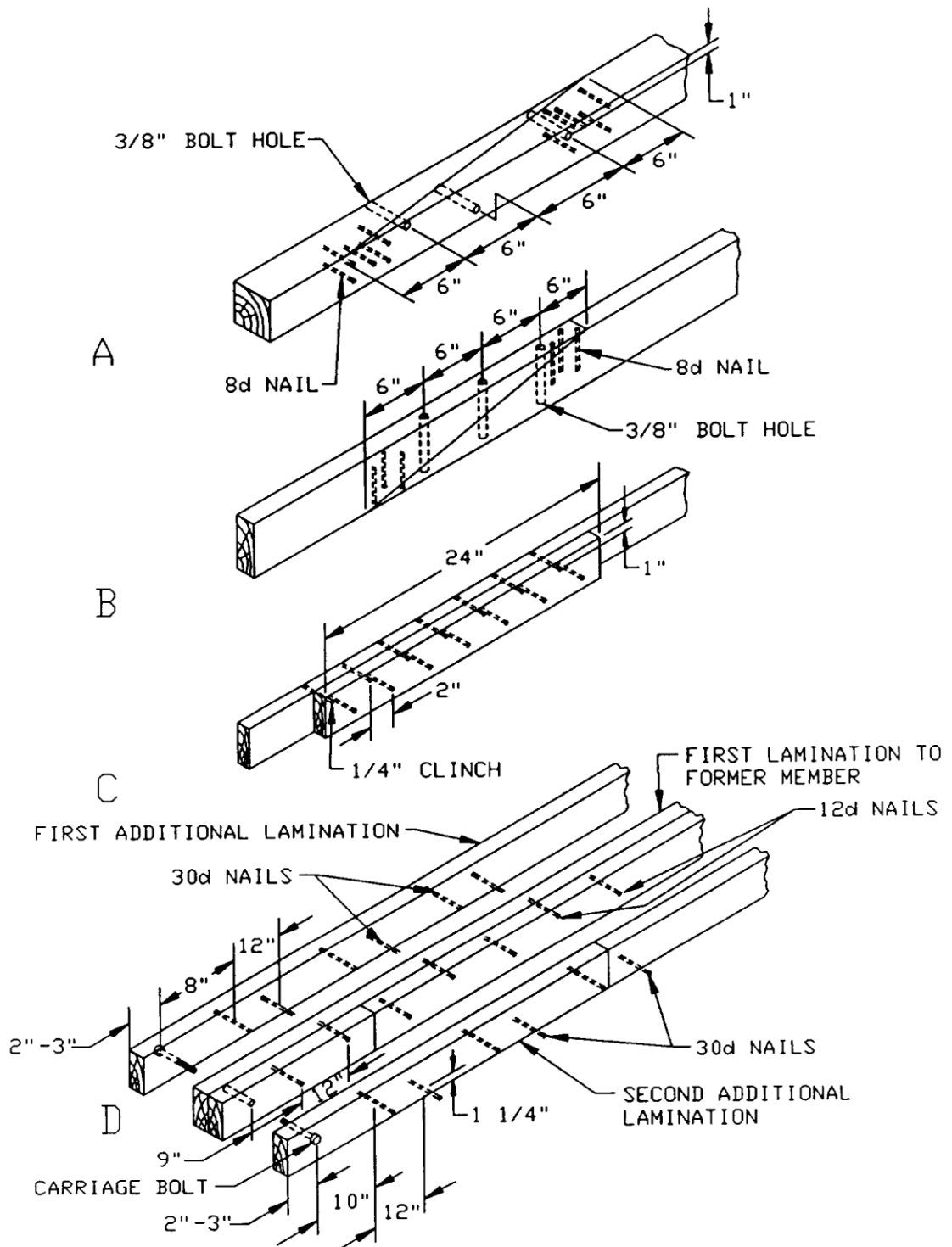


FIGURE 2. Splicing of members; A, splice of 4-by-4 inch or 4-by-6 inch skids; B, splice of 2-inch member; C, splice of 1-inch member; D, lamination of skid.

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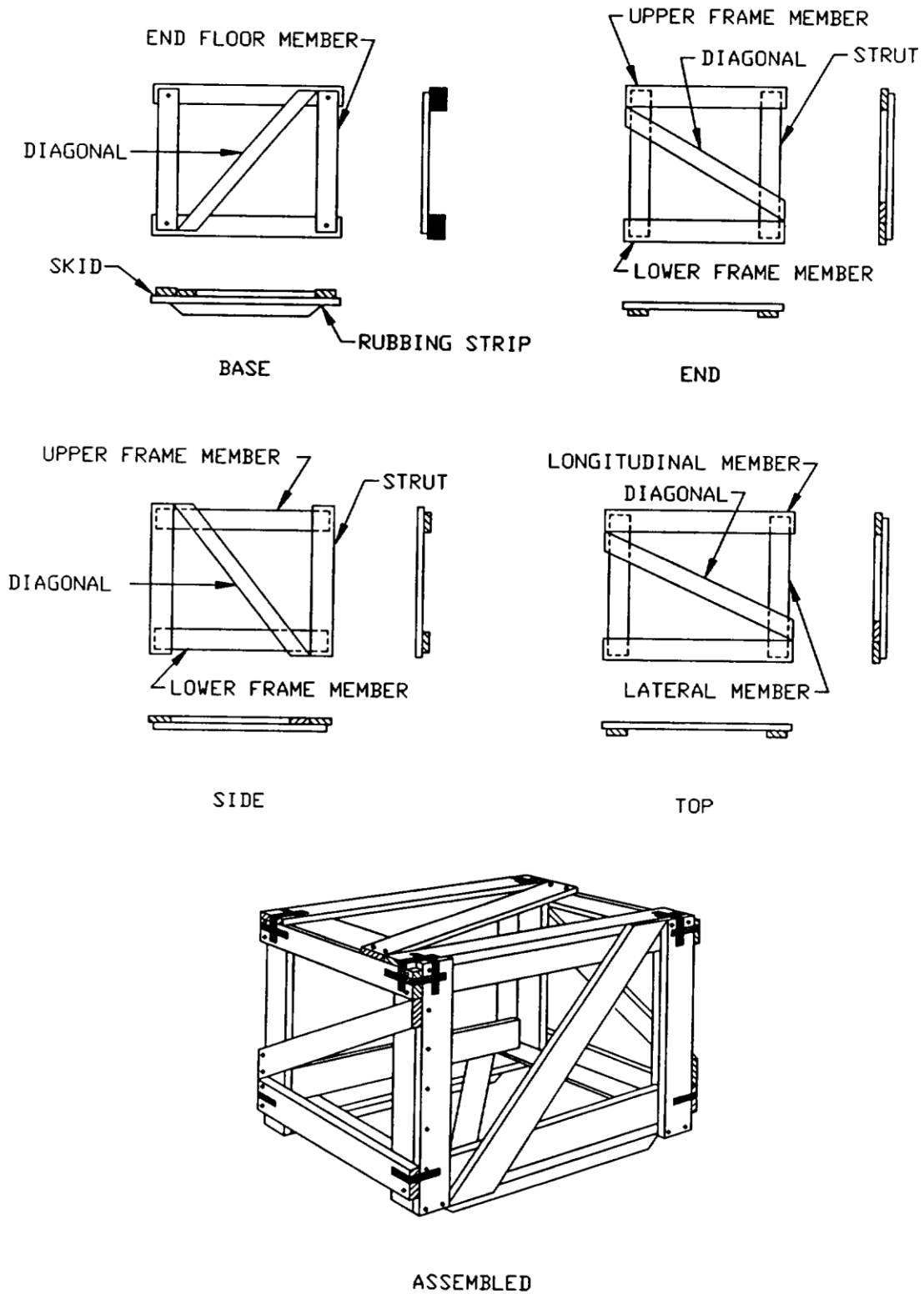


FIGURE 3. Type I, style A crate assembly.

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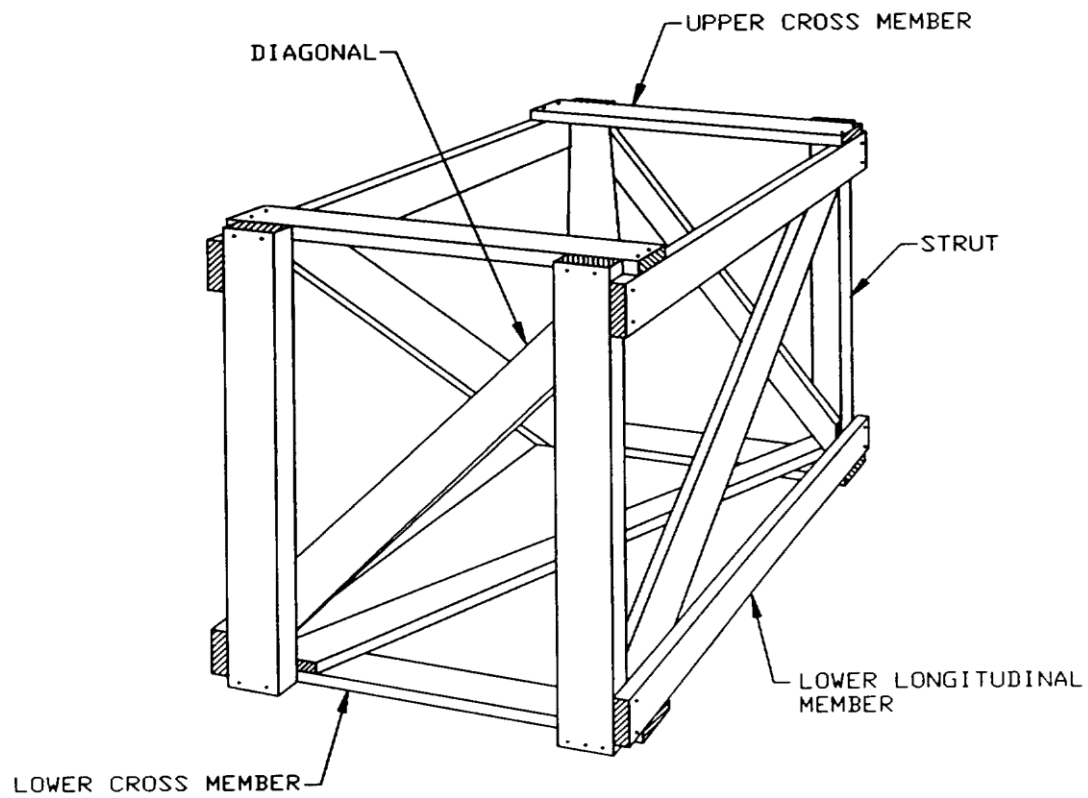


FIGURE 4. Type I, style B crate assembly.

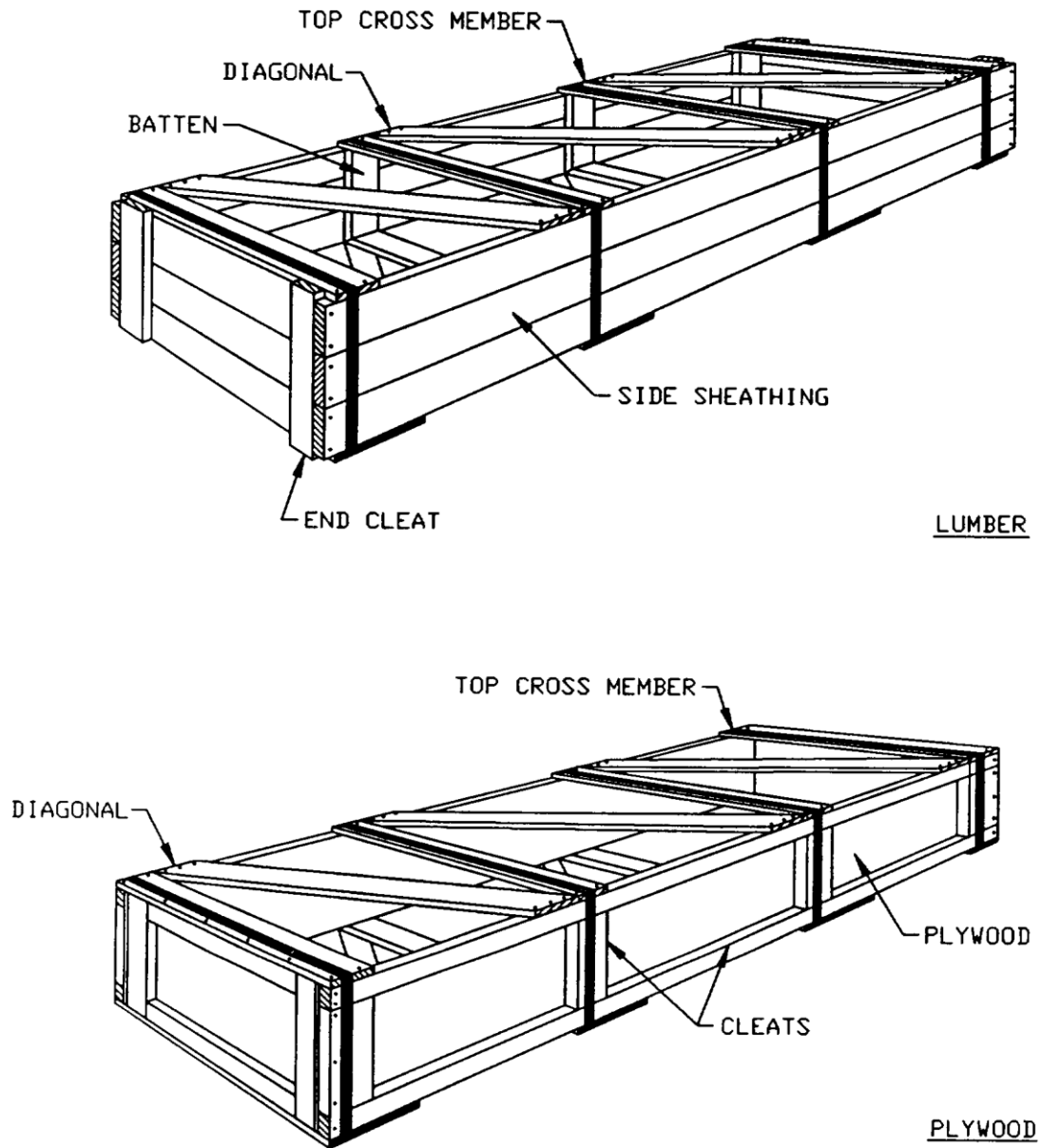
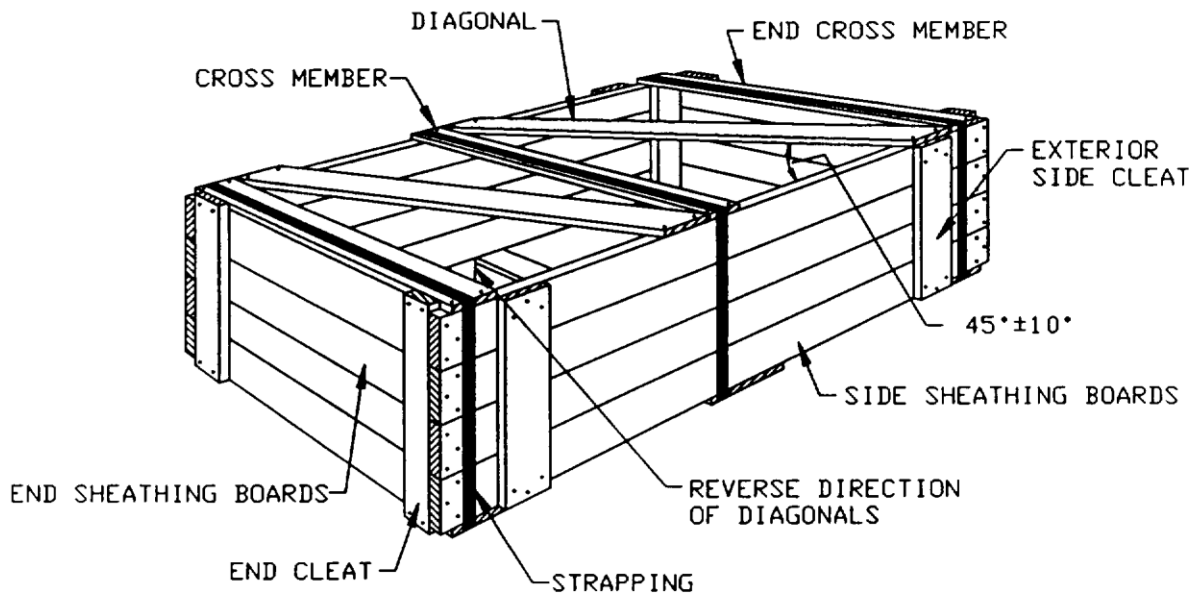
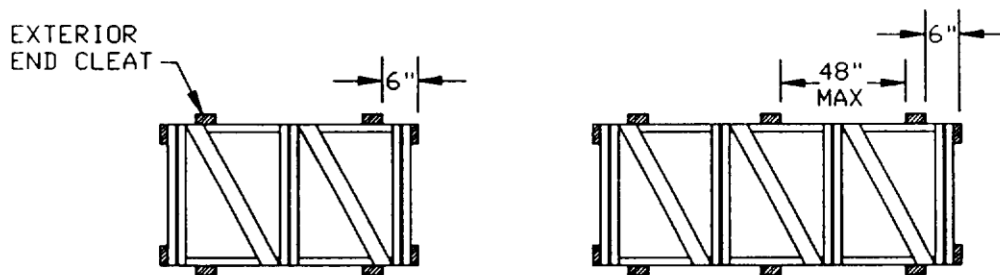


FIGURE 5. Type II, style A, crate assembly.

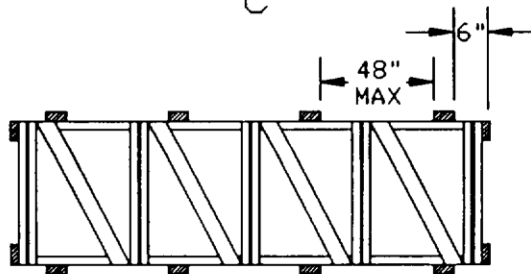


A



B

C



D

FIGURE 6. Type II, crate with exterior side cleats:
A, complete crate; B, two panel; C, three panel;
and D, four panel.

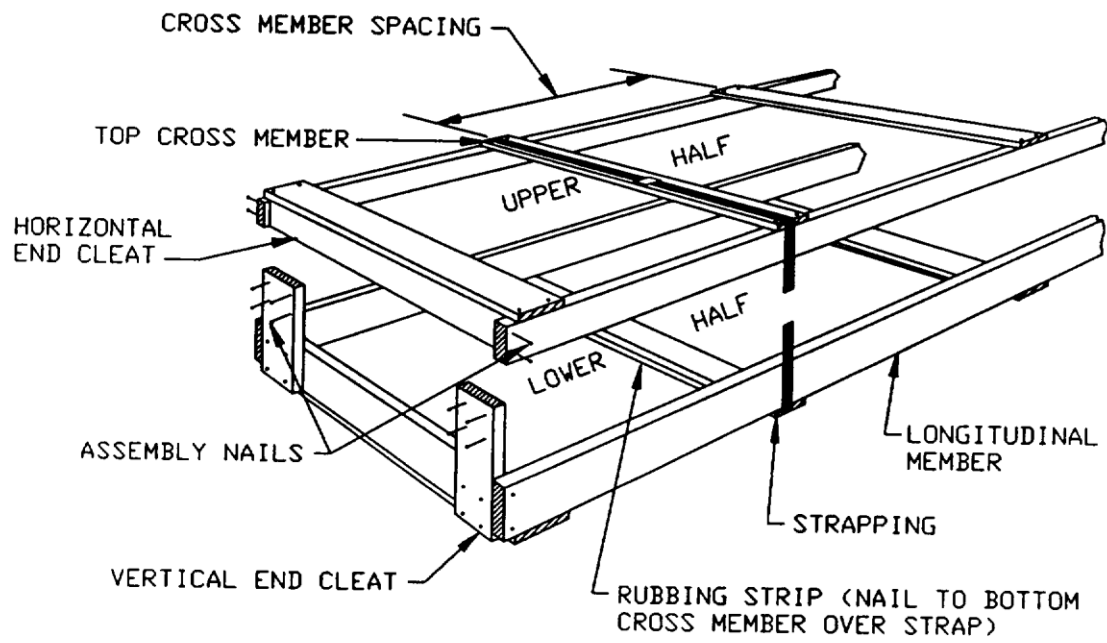


FIGURE 7. Type III, style B, crate assembly.

MIL-C-52950A

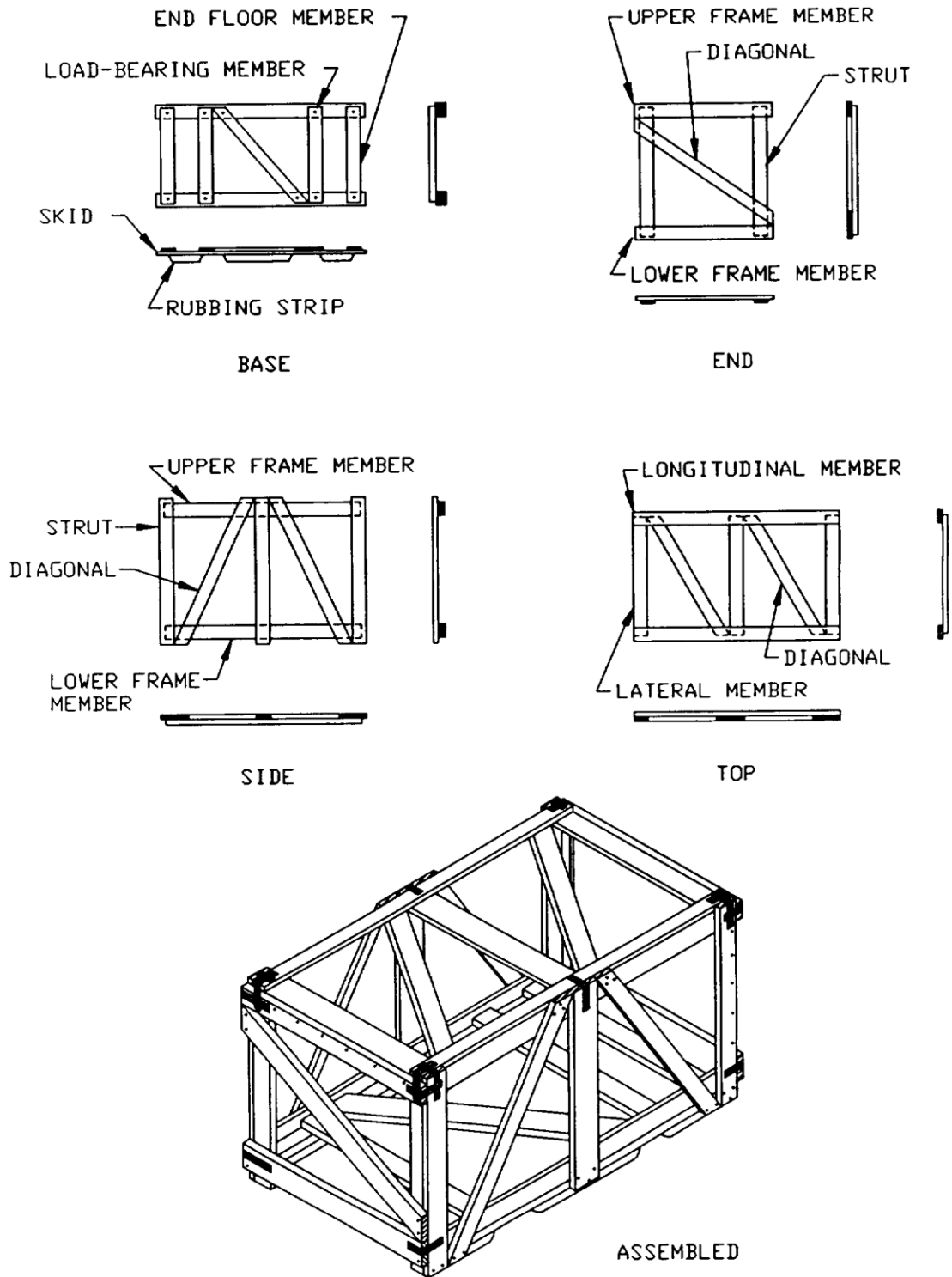


FIGURE 8. Type IV, style A crate assembly.

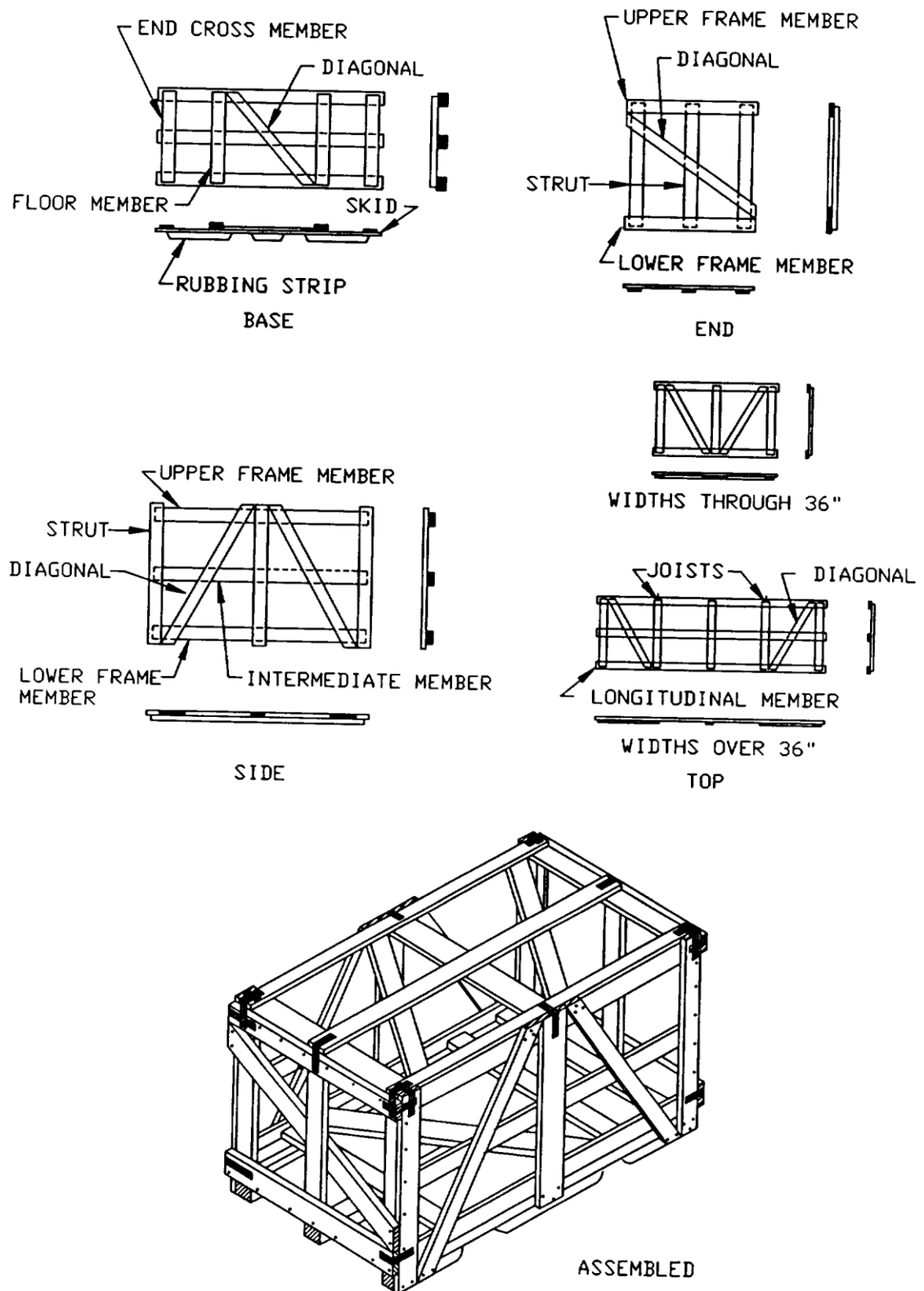
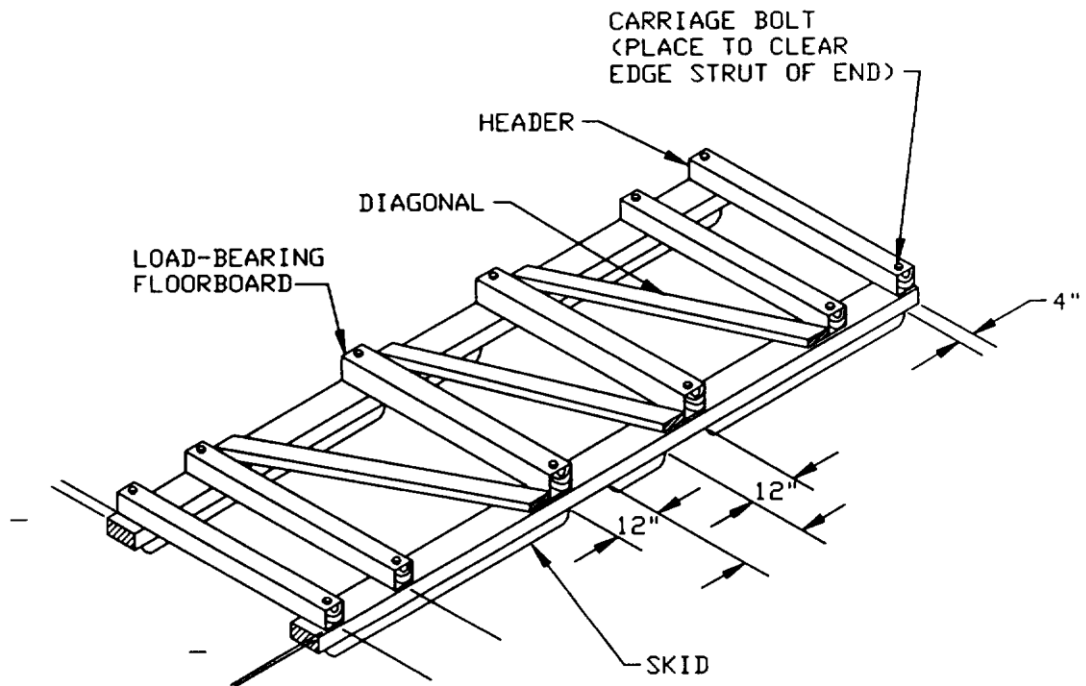
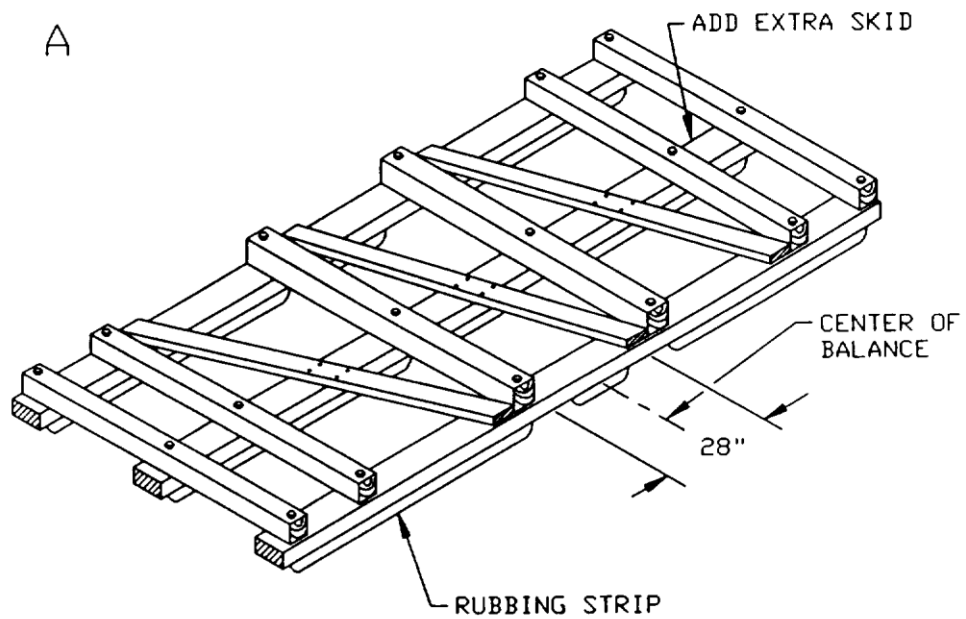


FIGURE 9. Type V, style A crate assembly.

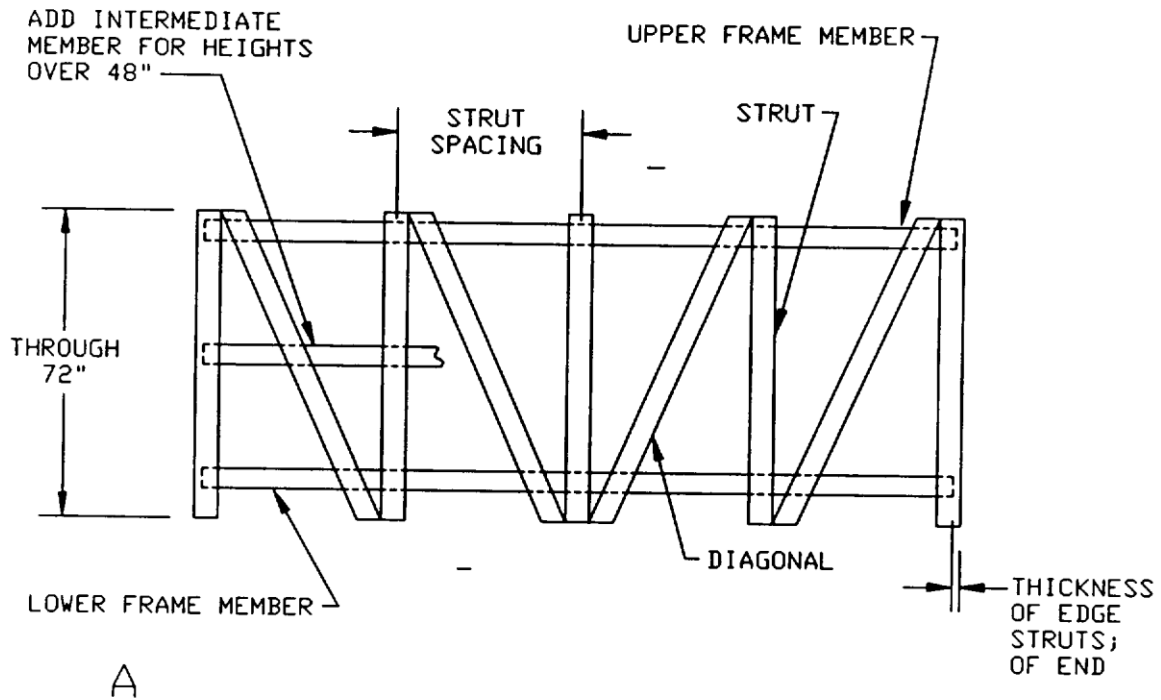


A

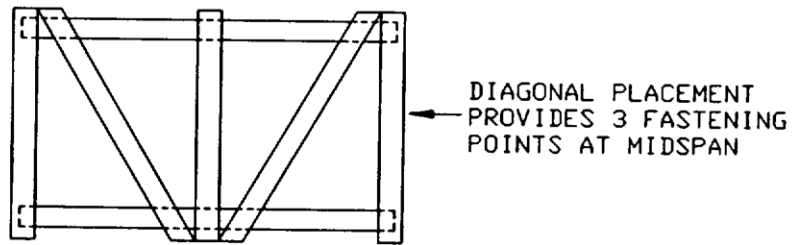


B

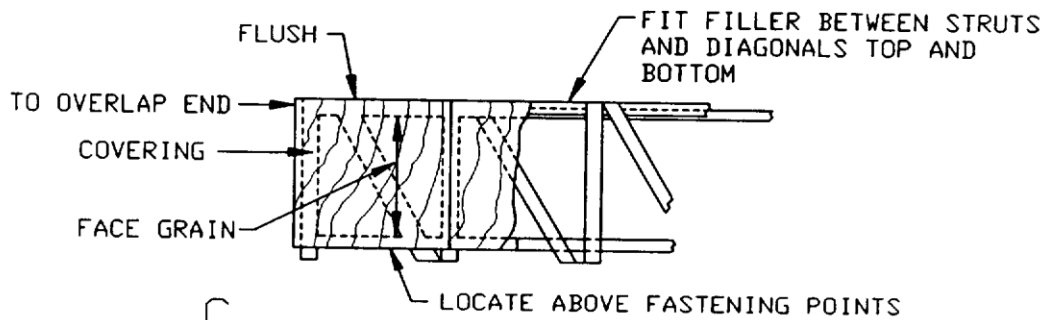
FIGURE 10. Bases for type V, style B crates:
A, up through 42 inches wide;
B, over 42 inches wide.



A



B



C

FIGURE 11. Single - panel sides for Type V, style B crates:
A, side of long crate; B, side of short crate;
C, covered side.

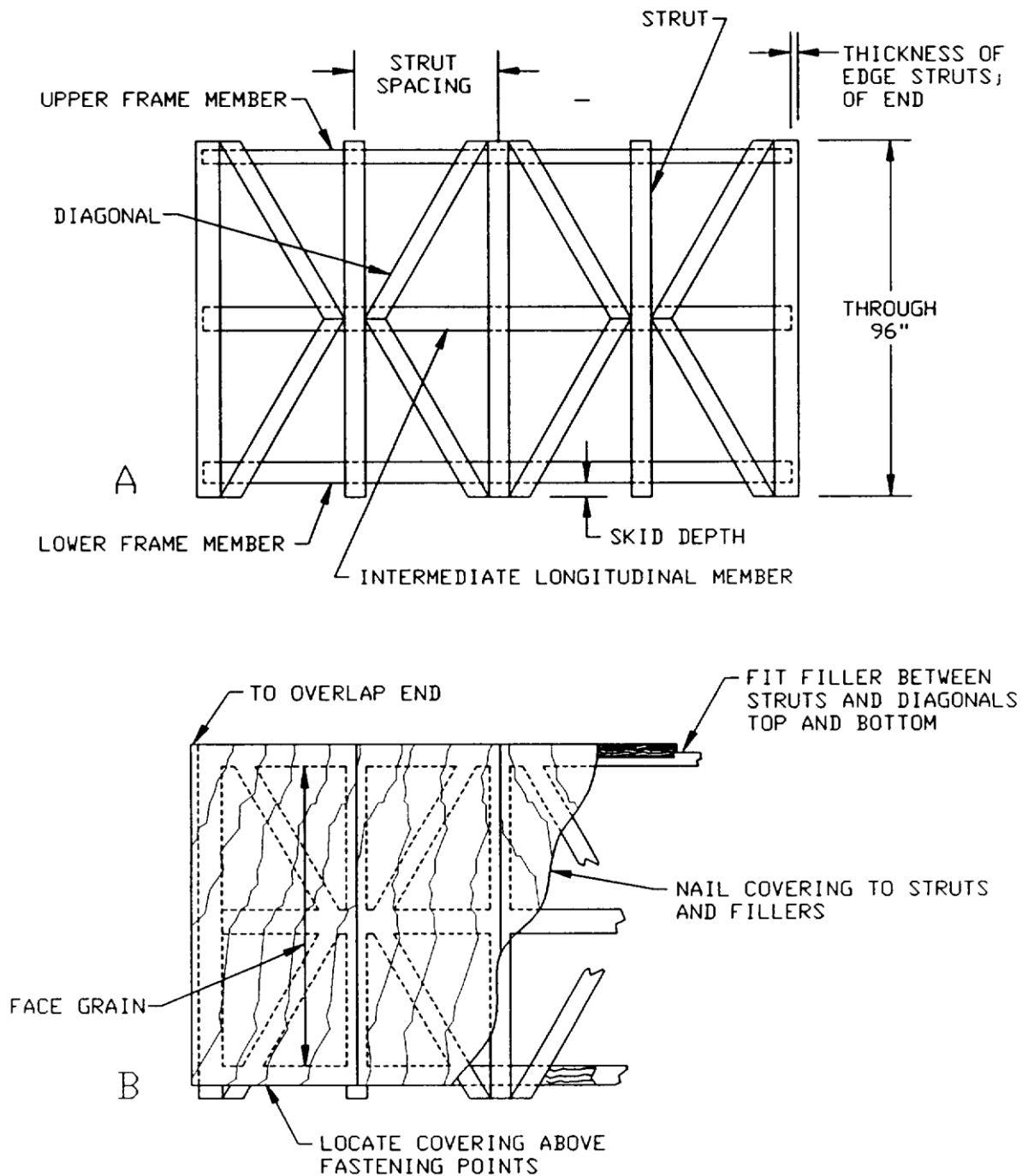


FIGURE 12. Double - panel sides for type V, style B crates
for heights through 96 inches: A, open side;
B, covered side.

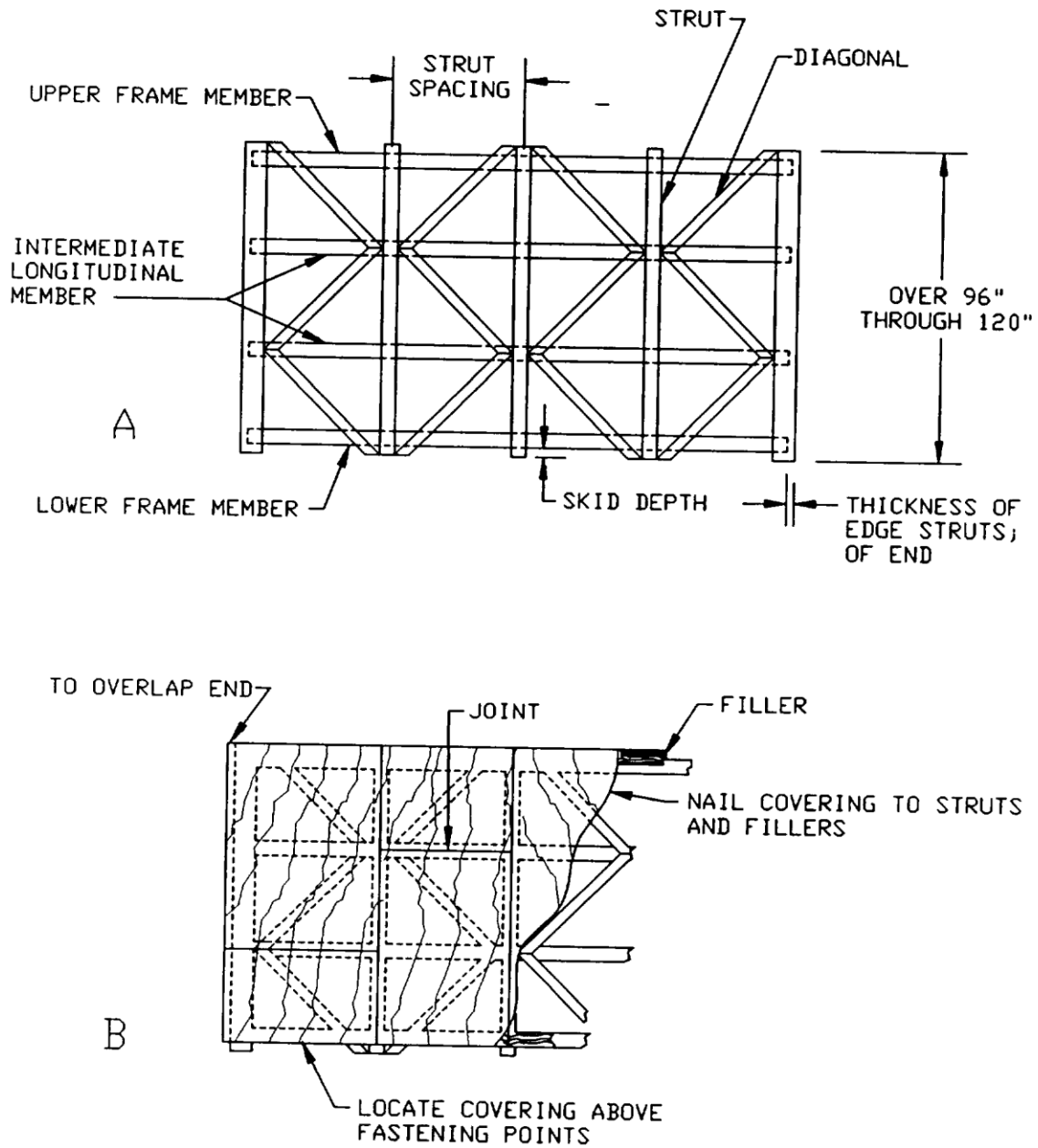


FIGURE 13. Triple - panel sides for type V, style B crates for heights over 96 inches: A, open side; B, covered side.

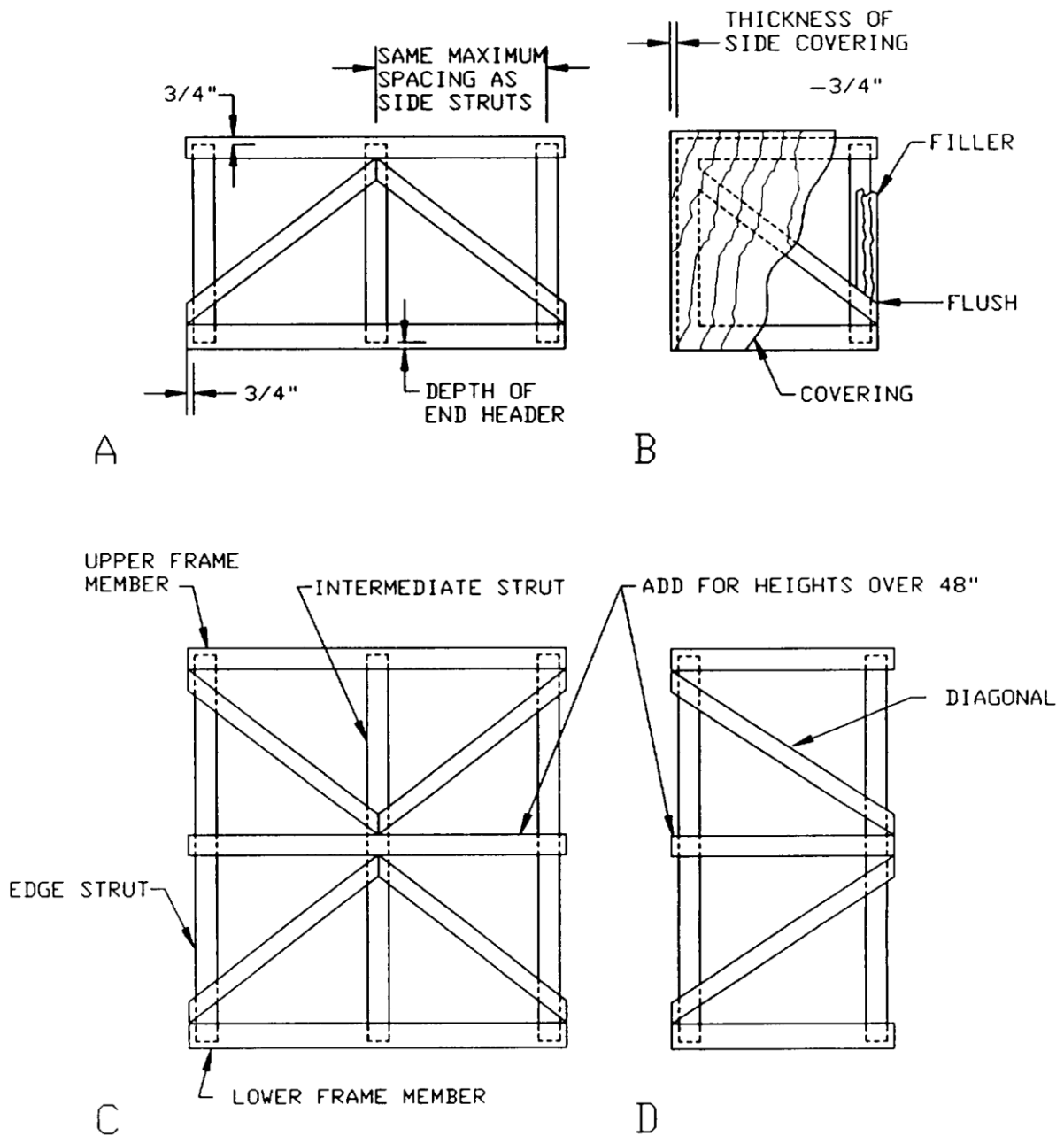


FIGURE 14. Ends for type V, style B crates: A, two - panel horizontal; B, single - panel (covered); C, four - panel; D, two - panel vertical.

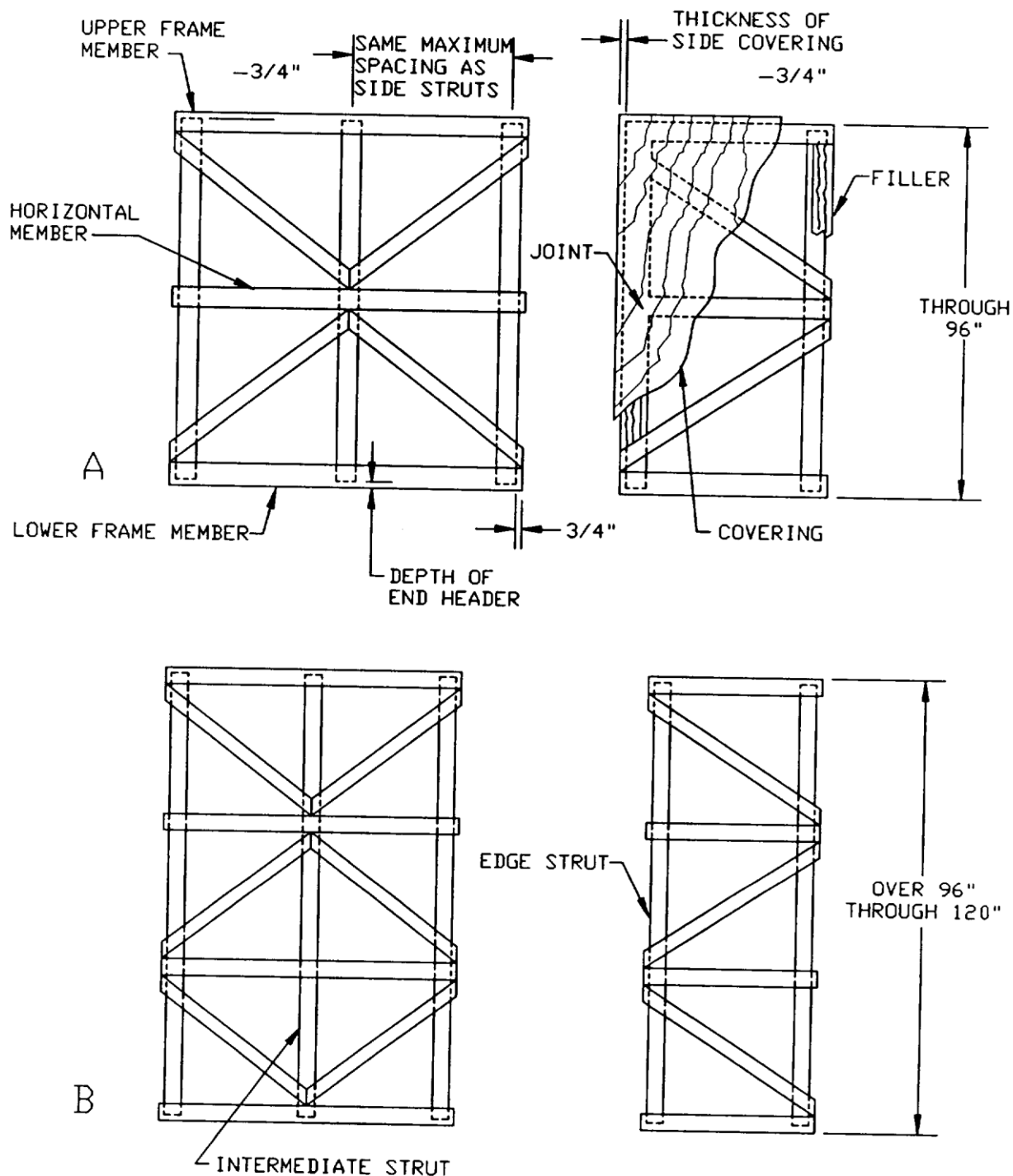


FIGURE 15. Ends for type V, style B crates: A, wide and narrow double - panel ends; B, wide and narrow triple - panel ends.

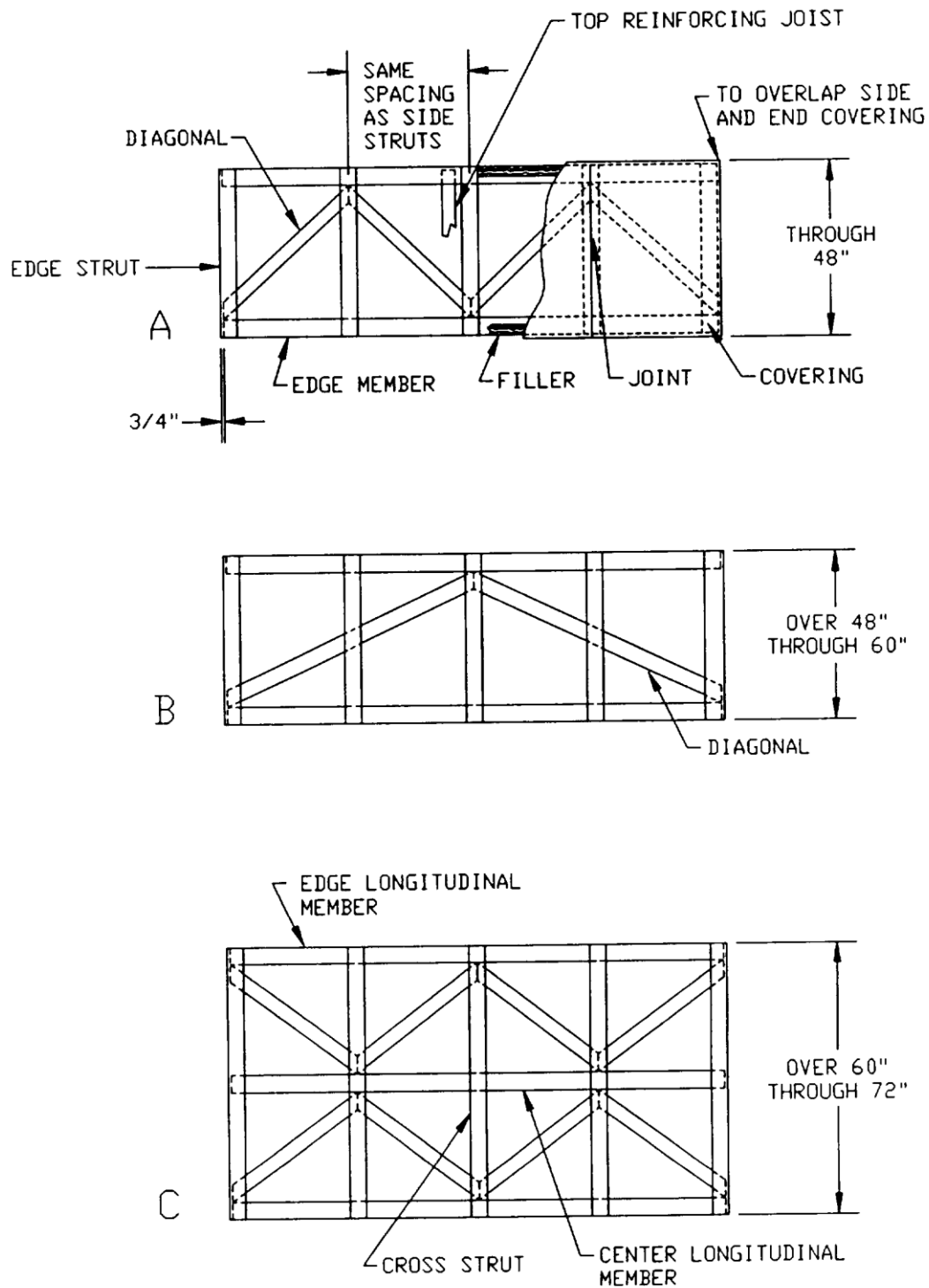


FIGURE 16. Tops for type V, style B crates:
A, narrow top; B, medium - wide top;
C, wide top.

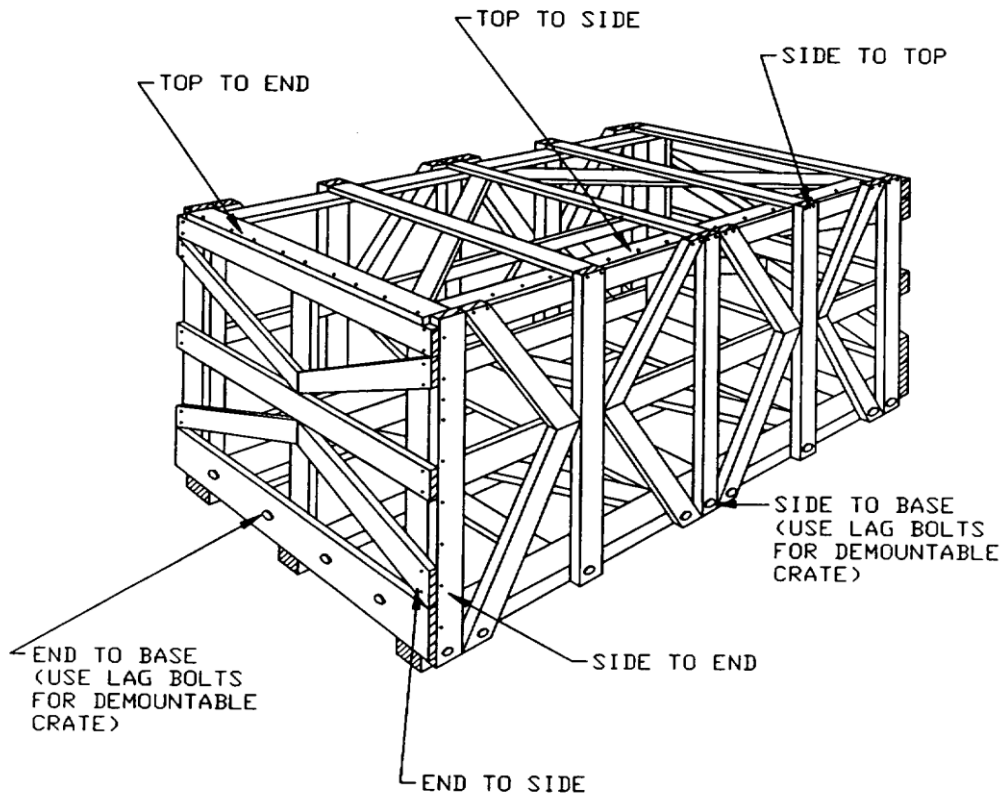


FIGURE 17. Type V, style B crate assembly (open).

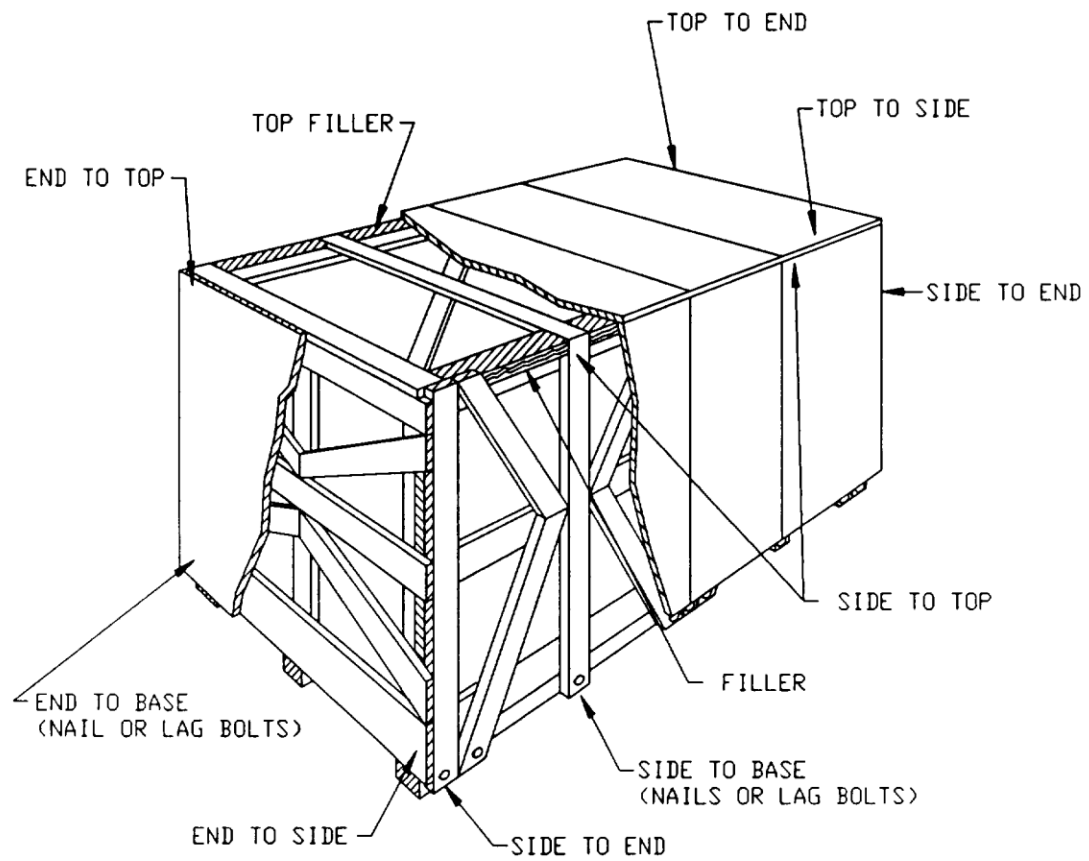


FIGURE 18. Type V, style B crate assembly (covered).

Custodians:

Army – ME
Navy – YD
Air Force – 69

Preparing Activity:

Navy - YD

Review Activities:

Army – CR, SM, GL, EA
Navy – SA

(Project Pack – 8115-0513)

User Activities:

Army – AT, AR
Navy – MC

Instructions and form for submitting changes has been removed.

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