



Designation: D6573/D6573M – 13 (Reapproved 2020)

Standard Specification for General Purpose Wirebound Shipping Boxes¹

This standard is issued under the fixed designation D6573/D6573M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers the fabrication of new wirebound general purpose (GP) panelboard (hereafter referred to as wirebound boxes) shipping boxes intended for use as containers for domestic and overseas shipment of general materials and supplies, not exceeding 500 lb [226.8 kg] for Class 1 domestic, 400 lb [181.4 kg] for Class 2 overseas shipments or 300 lb [136.0 kg] for Class 3 extreme distribution hazard conditions or military contingency purposes.

1.2 Wirebound box performance is dependent on its fabricated components; therefore, a variety of types of load, classes, styles, and treatments reflecting varied performance are specified. This specification does not cover wirebound box performance under all atmosphere, handling, shipping, and storage conditions. Wirebound boxes in compliance with Hazardous Material Modal Regulations or United States Code of Federal Regulations (CFRs) are found in the Supplementary Requirements.

1.3 The use of other construction methods or techniques are acceptable and shall be permitted, provided the resulting packaging systems are of equal or better performance than would result from the use of these specified materials and procedures. The appropriate Practice D4169 distribution cycle(s) can be used to develop comparative procedures and criteria.

1.4 *Units*—The values stated in inch-pound units are to be regarded as standard. The SI values given in brackets are mathematical. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in non-conformance with the standard. See [IEEE/ASTM SI 10](#) for conversion of units.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate*

appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[A641/A641M Specification for Zinc-Coated \(Galvanized\) Carbon Steel Wire](#)

[D996 Terminology of Packaging and Distribution Environments](#)

[D3951 Practice for Commercial Packaging](#)

[D3953 Specification for Strapping, Flat Steel and Seals](#)

[D4169 Practice for Performance Testing of Shipping Containers and Systems](#)

[D4442 Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials](#)

[D4444 Test Method for Laboratory Standardization and Calibration of Hand-Held Moisture Meters](#)

[D6199 Practice for Quality of Wood Members of Containers and Pallets](#)

[D6253 Practice for Treatment and/or Marking of Wood Packaging Materials](#)

[D6254/D6254M Specification for Wirebound Pallet-Type Wood Boxes](#)

[F1667 Specification for Driven Fasteners: Nails, Spikes, and Staples](#)

[IEEE/ASTM SI 10 Standard for Use of the International System of Units \(SI\) \(the Modern Metric System\)](#)

2.2 *Code of Federal Regulations:*³

[CFR Parts 107–180, Title 49 Hazardous Materials Regulations](#)

¹ This specification is under the jurisdiction of ASTM Committee D10 on Packaging and is the direct responsibility of Subcommittee D10.12 on Shipping Containers, Crates, Pallets, Skids and Related Structures.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from U.S. Government Printing Office, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, www.access.gpo.gov.

2.3 Federal Standard:

Fed-Std-123 Federal Standard Marking for Shipment (Civil Agencies)⁴

2.4 Military Handbook:

MIL-HDBK-129 Department of Defense Handbook Military Marking⁵

2.5 National Motor Freight Traffic Association Standard:

National Motor Freight Classification⁶

2.6 ANSI Standard:

ANSI/ASQC Q91-1987 Quality Systems-Model for Quality Assurance and Design/Development, Production, Installation, and Servicing⁷

2.7 Hardwood Plywood and Veneer Association Standard:⁸

ANSI/HPVA HP-1-2004 American National Standard for Hardwood and Decorative Plywood

2.8 National Institute of Standards and Technology (NIST) Standard:⁹

PS 1-07 Structural Plywood

PS 20-05 American Softwood Lumber Standard

2.9 International Standard:¹⁰

International Standards for Phytosanitary Measures Publication No. 15 (ISPM 15) Regulation of Wood Packaging Material in International Trade

3. Terminology

3.1 *Definitions*—General definitions for packaging and distribution environments are found in Terminology **D996**.

3.2 *Definitions of Terms Specific to This Standard*: The wood box components discussed herein were selected on the basis of part function. Alternate names are sometimes used by the wood packaging industry and end-users.

3.2.1 *batten*—lumber reinforcement nailed or stapled to the end faceboards together to create rigidity.

3.2.2 *binding wire*—round steel wire stapled to the faceboards which ends in a loop, the prong of which is firmly anchored in a board or twisted to form a loop.

3.2.3 *cleat*—lumber pieces which form the wirebound box framework and to which the faceboards are stapled.

3.2.4 *end*—composed of faceboard to which liners, battens, or both are attached forming a subassembly.

3.2.5 *faceboard*—sheathing materials used for the container faces (top, bottom, sides, and ends).

3.2.6 *liner*—thin wood board staples to the end to reinforce the end faceboard.

3.2.7 *lumber*—manufactured wood product derived from a log through sawing or planing.

3.2.8 *plywood*—panel built up of sheers of veneer called plies, united under pressure by a bonding agent to create a panel with an adhesive bond between plies.

3.2.9 *staple*—U-shaped piece of wire with pointed ends, driven astride the binding wires in fabricating the blank or attaching boards to battens.

3.2.10 *veneer*—thin layer or sheet of wood.

4. Classification

4.1 Type of Load:

4.1.1 *Type 1*—Easy load, one interior container that supports the top, bottom, and sides of the outer wirebound shipping box. 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. As examples, canned and boxed articles, which are repacked in a fiberboard box which completely fills the outer shipping box. 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. As examples, wood or metal chests, tool kits, and boxed sturdy instruments packed one in a shipping box.

4.1.2 *Type 2*—Average load, interior or intermediate containers that support and fill the voids of outer wirebound container. 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 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. As examples, goods in metal cans, which are packed in an inner container, bottles individually cushioned, hardware in cartons.

4.1.3 *Type 3*—Difficult load, interior contents that require a high degree of protection. Interior contents will not support outer wirebound shipping container top, bottom, or sides. Contents are articles, which are highly concentrated, required a high degree of protection, or do not support the faces of the shipping box. As examples, wrenches, long bolts, and rods, which can 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.

4.2 Class:

4.2.1 *Class 1*—Domestic shipments capable of passing Practice **D4169**, distribution Cycle 1 testing as a minimum, with no maritime shipment testing required.

⁴ Available from ASSIST Quicksearch, assist.daps.dla.mil/quicksearch.

⁵ Available from ASSIST Quicksearch, assist.daps.dla.mil/quicksearch.

⁶ Available from the National Motor Freight Traffic Association (NMFTA), 1001 N Fairfax St., Ste 600, Alexandria, VA 22314, www.nmfta.org.

⁷ Available from the American National Standards Institute, 25 West 43rd St., New York, NY 10036.

⁸ Available from Hardwood Plywood and Veneer Association (HPVA), P.O. Box 2789, Reston, VA 22090-0789, www.hpva.org.

⁹ Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 1070, Gaithersburg, MD 20899-1070, www.nist.gov.

¹⁰ Available from the International Plant Protection Convention (IPPC), www.ipc.int.

4.2.2 *Class 2*—Overseas shipments capable of passing Practice D4169 distribution Cycles 1 with 15, 16, or 17 as applicable to the type of shipping container selected.

4.2.3 *Class 3*—Extreme Distribution hazards or military contingency operations the wirebound container will be capable of passing Practice D4169 distribution cycle 18 testing as a minimum requirement.

4.3 *Style* (based on the method of closure, see Fig. 1):

4.3.1 *Style 1*—Twisted wire closure.

4.3.2 *Style 2*—Looped wire closure.

4.3.3 *Style 3*—Looped wire closure with wired ends.

4.4 *Treatment*:

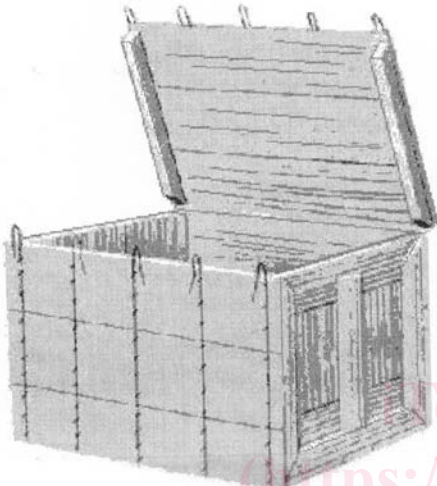
4.4.1 *Grade A*—With preservative treatment.

4.4.2 *Grade B*—Without water preservative.

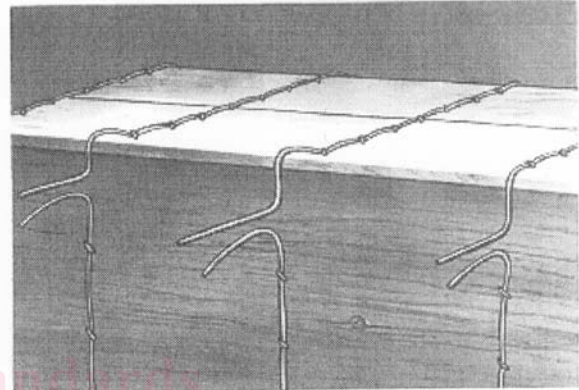
5. Ordering Information

5.1 Purchasers should cite the following information in procurement and purchase order documents:

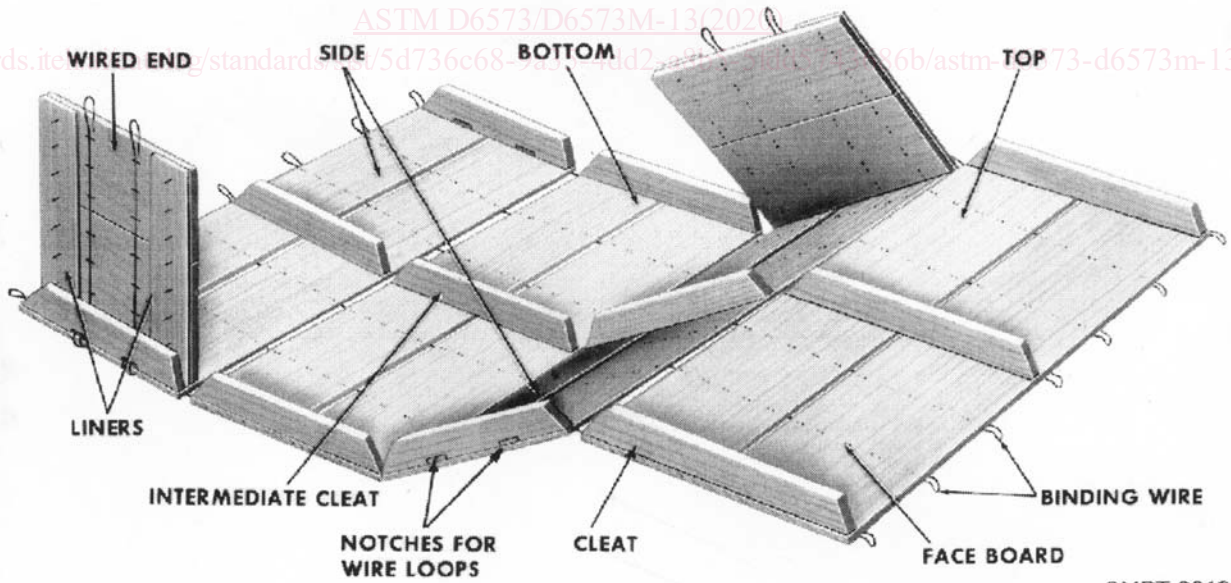
5.1.1 Specification title, number, and date.



STYLE 2



STYLE 1



STYLE 3

FIG. 1 Box Styles Based on Method of Closures

5.1.2 Type of load, box, class, and style, and treatment, if specified, (see 4.1 – 4.4 and S2).

5.1.3 Inside box dimensions (see 7.1).

5.1.4 Intermediate cleats for special designs, their size and location. (see 7.3.1).

5.1.5 Weight of contents or load specified in lb (kg).

5.1.6 Type of girth wire (see 7.7.2).

5.1.7 When palletization is required (see S3.4.3).

5.1.8 Marking required (see S4).

5.1.9 Exceptions to these specifications, if authorized.

5.1.10 When preservative treatment Grade A is required for Class 2 or 3 boxes for overseas shipments (see 6.1.5).

5.1.11 When four-way entry skids are required and when 3½ × 4-in. [76 × 89 mm] built-up skids are required (see 7.13).

5.1.12 Purchasers should reference by paragraph number any supplemental requirements applicable to their purchase request (see S1.1).

5.1.13 When ISPM 15 compliance is required (See 9.3).

6. Materials and Manufacture

6.1 *Materials*—Materials shall be as specified herein. Materials not specified shall be selected by the contractor or box builder and shall be subject to all provisions of this specification. Materials shall be free of defects, which adversely affect performance or serviceability of the finished product.

6.1.1 *Lumber*—Lumber shall conform to Practice D6199, PS 20 or the NHLA rules. All lumber sizes specified herein shall be nominal and shall be the minimum acceptable sizes for lumber components. Lumber components shall have a target thickness and width uniform in dimension and 50 % of components shall meet or exceed the target dimensions at the time of component manufacture.

6.1.2 *Plywood Panel*—Plywood shall conform to ANSI/HPVA HP-1-2004 or PS 1, Exposure 1 or Exterior panel. Plywood shall have no defects (knot holes, worm holes, and so forth) extending through the panel. Unless otherwise specified, plywood shall be finished unsanded.

6.1.3 *Wires*:

6.1.3.1 *Binding Wire and Staple Wire*—Binding wire shall be low carbon annealed steel wire and have the properties listed in Table 1. Staple wire shall be hard tempered, low carbon steel wire, and have the properties listed in Table 1.

6.1.3.2 *Wire Coatings*—The surfaces 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 Specification A641/A641M.

6.1.4 *Fasteners*:

6.1.4.1 *Nails*—Nails shall be made of steel wire and shall conform to the requirements of Specification F1667 or other industry standards. Nails are classified as plain-shank, helically threaded, annularly threaded, fluted, or twisted square wire. Nails will be clinched, cement-coated, or chemical etched to prevent premature withdrawal.

6.1.4.2 *Staples or Wire Stitches*—Staples have either round-wire or approximately square-wire legs, referring to the cross-sectional shape of the wire. Staples or wire stitches shall be made of steel wire not less than 0.0625 in. 16 gage [2 mm] and comply with Specification F1667 or other industry standards.

6.1.5 *Wood Preservative, Water Repellent*—Water repellent preservative shall be composed of either a 2 % copper naphthenate, a 3 % zinc naphthenate, or a 1.8 % oxine copper (formerly referred to as copper-8-quinolinolate) solution.

7. Construction

7.1 *Dimensions*—Boxes shall be furnished having the dimensions as specified (see 5.1.3). Dimensions of boxes are measured between the inside surfaces of the faceboards, and calculated to the nearest ¼ in. [3 mm], the preferred sequence length, width, and depth is used to communicate size in the purchase order or contract.

7.2 *Faceboards*—The thickness of the faceboard can be determined by selecting the appropriate information from Tables 2 and 3. Weight of box contents, type of load and the groups of wood based on box class determine the appropriate faceboard.

7.2.1 *Grain of Faceboards*—End faceboards for Styles 1 and 2 boxes shall be placed with the grain horizontal, except that when horizontal battens are used in end panels, the grain of the faceboards shall be vertical. End faceboards for Style 3 boxes shall be placed with the grain vertical. A line of staples shall be located approximately 1 in. [25 mm] from the parallel to each horizontal edge of the end faceboard (see 7.8). The direction of grain of the plywood to which the end wire is stitched shall be vertical.

7.3 *Cleats*—The cleats shall be made of Group II (medium density softwoods), III (medium density hardwoods), or IV (high density hardwoods and softwoods) woods only as listed with Practice D6199. Each cleat shall be single piece of wood without joints. Cleats shall be made with mitered ends or with mortised and tenoned ends tongue- and groove. Dimensions shall be actual dimensions, 1½/32 in. [9 mm]. Edge cleats of all styles of boxes shall be 13/16 in. [21 mm] wide and 7/8 in. [22 mm] in thickness for boxes having weight of contents up to 300 lb [136 kg]. Boxes having weight of contents from 300 to 500 lb [136 to 227 kg] edge cleats shall be 1½ in. [29 mm] wide and 1½ in. [29 mm] in thickness, except that horizontal and vertical battens (HVB) or HVBW end patterns are used (see Fig. 2), edge cleats shall be 13/16 in. [21 mm] wide and 7/8 in. [22 mm] in thickness.

7.3.1 *Intermediate Cleats*—Boxes for Types 2 and 3 loads, having greater between-cleat dimensions than specified in Table 4, 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

TABLE 1 Tensile Strength of Binding and Staple Wire

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

TABLE 2 Minimum Thickness of Faceboards

Weight of Box Contents in lb [kg]		Group I Woods in. [mm]		
Exceeding	Not Exceeding	Type 1 Load	Type 2 Load	Type 3 Load
Class 1 Boxes				
0	85 [38.5]	7/32 [6]	1/4 [6]	5/16 [8]
85 [38.5]	125 [56.7]	1/4 [6]	5/16 [8]	3/8 [10]
125 [56.7]	200 [90.7]	5/16 [8]	3/8 [10]	7/16 [11]
200 [90.7]	300 [136.1]	3/8 [10]	7/16 [11]	A
300 [136.1]	400 [181.4]	A	A	A
400 [181.4]	500 [226.8]	A	A	A
Class 2 Boxes				
0	85 [38.5]	5/16 [8]	3/8 [10]	A
85 [38.5]	125 [56.7]	3/8 [10]	3/8 [10]	A
125 [56.7]	200 [90.7]	A	A	A
200 [90.7]	300 [136.1]	A	A	A
300 [136.1]	400 [181.4]	A	A	A
Class 3 Boxes				
0	85 [38.5]	3/8 [10]	3/8 [10]	A
85 [38.5]	125 [56.7]	A	A	A
125 [56.7]	200 [90.7]	A	A	A
200 [90.7]	500 [226.8]	A	A	A

Weight of Box Contents in lb [kg]		Group II and III Woods in. [mm]		
Exceeding	Not Exceeding	Type 1 Load	Type 2 Load	Type 3 Load
Class 1 Boxes				
0	85 [38.5]	1/2 [4]	1/6 [4]	3/16 [5]
85 [38.5]	125 [56.7]	1/6 [4]	3/16 [5]	7/32 [6]
125 [56.7]	200 [90.7]	3/16 [5]	7/32 [6]	1/4 [6]
200 [90.7]	300 [136.1]	7/32 [6]	7/32 [6]	1/4 [6]
300 [136.1]	400 [181.4]	1/4 [6]	1/4 [6]	5/16 [8]
400 [181.4]	500 [226.8]	5/16 [8]	5/16 [8]	3/8 [10]
Class 2 Boxes				
0	85 [38.5]	3/16 [5]	7/32 [6]	5/16 [8]
85 [38.5]	125 [56.7]	7/32 [6]	1/4 [6]	5/16 [8]
125 [56.7]	200 [90.7]	7/32 [6]	1/4 [6]	5/16 [8]
200 [90.7]	300 [136.1]	1/4 [6]	3/8 [10]	3/8 [10]
300 [136.1]	400 [181.4]	5/16 [8]	3/8 [10]	3/8 [10]
Class 3 Boxes				
0	85 [38.5]	1/4 [6]	1/4 [6]	5/16 [8]
85 [38.5]	125 [56.7]	1/4 [6]	5/16 [8]	5/16 [8]
125 [56.7]	200 [90.7]	1/4 [6]	5/16 [8]	3/8 [10]
200 [90.7]	500 [226.8]	5/16 [8]	3/8 [10]	3/8 [10]

Weight of Box Contents in lb [kg]		Group IV Woods in. [mm]		
Exceeding	Not Exceeding	Type 1 Load	Type 2 Load	Type 3 Load
Class 1 Boxes				
0	85 [38.5]	1/2 [4]	1/2 [4]	1/6 [4]
85 [38.5]	125 [56.7]	1/2 [4]	1/6 [4]	3/16 [5]
125 [56.7]	200 [90.7]	1/6 [4]	3/16 [5]	7/32 [6]
200 [90.7]	300 [136.1]	3/16 [5]	7/32 [6]	1/4 [6]
300 [136.1]	400 [181.4]	7/32 [6]	1/4 [6]	5/16 [5]
400 [181.4]	500 [226.8]	1/4 [6]	1/4 [6]	5/16 [5]
Class 2 Boxes				
0	85 [38.5]	3/16 [5]	3/16 [5]	7/32 [6]
85 [38.5]	125 [56.7]	3/16 [5]	3/16 [5]	7/32 [6]
125 [56.7]	200 [90.7]	3/16 [5]	7/32 [6]	1/4 [6]
200 [90.7]	300 [136.1]	7/32 [6]	1/4 [6]	5/16 [5]
300 [136.1]	400 [181.4]	1/4 [6]	5/16 [5]	3/8 [10]
Class 3 Boxes				
0	85 [38.5]	1/4 [6]	1/4 [6]	1/4 [6]
85 [38.5]	125 [56.7]	1/4 [6]	1/4 [6]	5/16 [5]
125 [56.7]	200 [90.7]	1/4 [6]	1/4 [6]	5/16 [5]
200 [90.7]	500 [226.8]	1/4 [6]	5/16 [5]	3/8 [10]

^A Group I Woods (low density hardwoods and softwoods) are not permitted.

TABLE 3 Minimum Faceboard Requirements

Resawn faceboard thickness not less than 1/2 in. [1 mm] Less than specified in Table 2	Faceboard edge piece not less than 2-1/2 in. [63.5 mm] wide	Space between Faceboards not more than 1/4 in. [6 mm]
Faceboards no less than 2 1/2 in. [63.5 mm] in width	One full piece of plywood thickness not less than 25 %	

between adjacent rows of cleats shall not exceed the distance indicated in Table 4. In special designs for Types 2 and 3 loads, where required, size and location of intermediate cleats shall be specified (see 5.1.4) If the use of intermediate cleats may be omitted but the thickness of faceboards shall be increased to the thickness specified for the between cleat dimension indicated in Table 4.

7.3.2 *Cleat Sizes*—Unless otherwise specified in the contract or purchase order (see 5.1.9), any of the sizes of cleats shown in Table 5 shall be used for intermediate rows. No part of any intermediate cleat shall be more than 1/32 in. [1 mm] less than the dimension shown in Table 5, for dimensions exceeding 1 3/16 in. [21 mm], or 1/16 in. [2 mm] less than the dimensions exceeding 1 3/16 in. [21 mm].

7.4 *Battens*—Battens shall be attached to the outside face of the end faceboard 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 in. [45 mm] wide and those made from Groups II, III, and IV woods shall be not less than 1 3/8 in. [35 mm] wide. Battens shall be the same thickness as the cleats on the boxes. No part of a batten shall be more than 1/32 in. [1 mm] less than the specified thickness nor more than 1/16 in. [2 mm] less than the specified width.

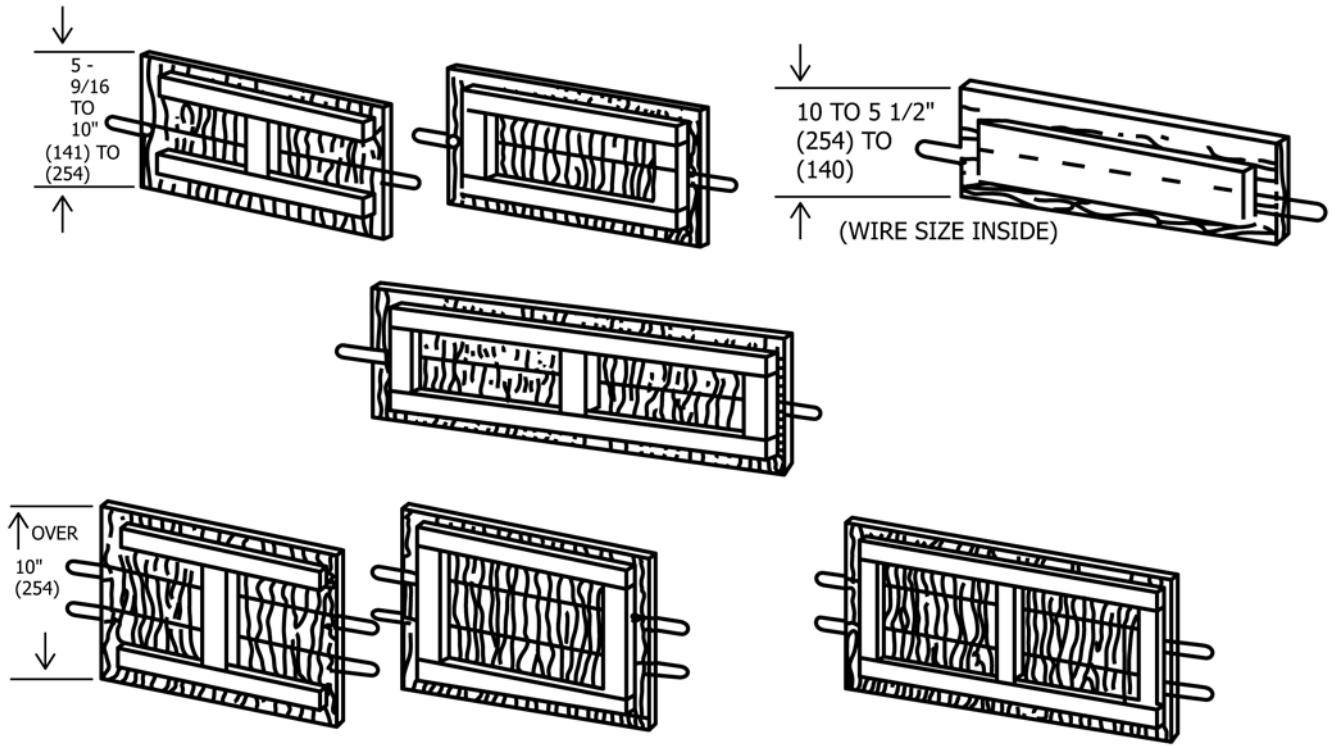
7.5 *Liners*—The grain of the liner shall be at right angles to the grain of the end face board. Liners for Styles 1 and 2 boxes shall always be vertical; liners for Style 3 boxes shall always be horizontal. When liners are attached to the edges of ends, the liners shall be not less than 1 3/16 in. [30 mm] wide. For Style 3 boxes more than 14 in. [356 mm] in depth, or having vertical battens, the liners shall be not less than 2 7/8 in. [73 mm] wide. The thickness of the liner shall be not less than the thickness of the end board, except that it need not exceed 1/4 in. [6 mm], when the thickness of the end face board exceeds 1/4 in. [6 mm]. Each edge and intermediate liner shall be fastened to the end face board by staples. Liners which are 2 7/8 in. [73 mm] wide shall have two rows of staples.

7.6 Ends:

7.6.1 *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 7.11.2. 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 sawed boards when battens are not used. When ends are made from one-piece plywood, no liner is required. Standard arrangements of battened ends and lined ends for Styles 1 and 2 boxes are shown in Fig. 3.

7.6.2 *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, liners are not required. Standard arrangements of battens on the ends of Style 3 boxes are shown in Fig. 4.

7.7 *Wires*—Each girth wire shall be continuous around the girth of the box. Whenever practicable, all girth wires shall be spaced uniformly, except that when rows of intermediate cleats



	Maximum Spacing of Vertical Battens in in. (mm)		
	Class 1	Class 2	Class 3
Type 1 Load [Easy]	18 [457]	15 [381]	12 [305]
Type 2 Load [Average]	16 [406]	13 [330]	10 [254]
Type 3 Load [Difficult]	14 [356]	11 [279]	7 [178]

NOTE 1—Wires may be placed on either side of face material.

FIG. 2 End Panel Patterns for Style 3 Boxes

TABLE 4 Maximum Distance Between Adjacent Rows of Cleats

Thickness of faceboards in fractional in. [mm] ^A	Type 2 Load [Average]			Type 3 Load [Difficult]		
	Group I Woods, in. [mm]	Groups II and III Woods, in. [mm]	Group IV Woods, in. [mm]	Group I Woods, in. [mm]	Group II and III Wood in. [mm]	Group IV Woods in. [mm]
Class 1 Boxes						
1/8 [4]	—	32 [813]	36 [914]	—	—	24 [610]
7/32 [6]	—	40 [1016]	44 [1118]	—	28 [711]	32 [813]
1/4 [6]	32 [813]	44 [1118]	48 [1219]	—	32 [813]	36 [914]
5/16 [8]	36 [914]	48 [1219]	48 [1219]	24 [610]	36 [914]	40 [1016]
3/8 [10]	36 [914]	48 [1219]	48 [1219]	24 [610]	40 [1016]	40 [1016]
Class 2 and 3 Boxes						
7/32 [6]	—	28 [711]	32 [813]	—	—	20 [508]
1/4 [6]	—	32 [813]	36 [914]	—	20 [508]	24 [610]
5/16 [8]	—	36 [914]	40 [1016]	—	24 [610]	28 [711]
3/8 [10]	32 [813]	40 [1016]	44 [1118]	—	28 [711]	32 [813]

^A When intermediate cleats are not desired (see 7.3.1). For Type 1 loads, intermediate cleats are not required.

TABLE 5 Sizes of Intermediate Cleats

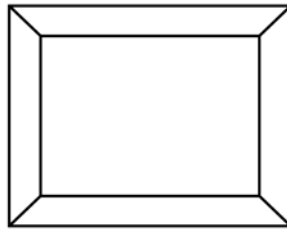
Width, in. [mm]	Thickness, in. [mm]
2 3/4 [70]	3/8 [10]
2 1/4 [57]	1/2 [13]
1 3/4 [45]	5/8 [16]
1 1/4 [32]	3/4 [19]
1 1/16 [21]	1 1/16 [21]

7.8. 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 6 for the weight of contents and inside length of box specified.

7.7.1 *Wire Gage*—The gage of end wires on Style 3 boxes shall conform to the requirements of Table 7 for the weight of contents and class of box specified.

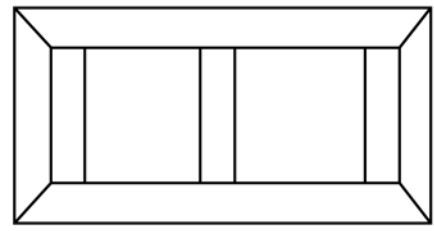
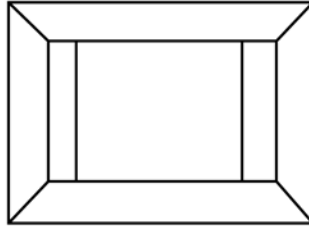
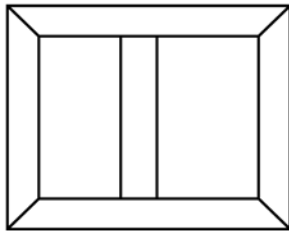
7.7.2 *Girthwise Wire Closure for Box Styles*—The length of girth wires for twisted and looped wire fasteners on Styles 1 and 2 boxes shall be such as to make satisfactory closure. The length of looped wire on the ends of Style 3 boxes shall be such as to make a satisfactory assembly of the box. On Style 1 boxes, for twisted wire closures, the ends of the girth wires shall not be less than 2 1/4 in. [57 mm] beyond the edge of the top boards and not less than 1 in. [25 mm] 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

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



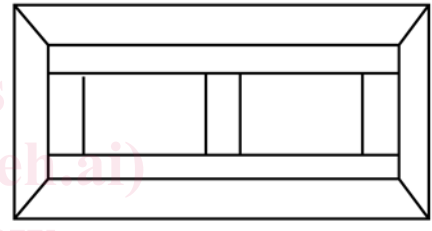
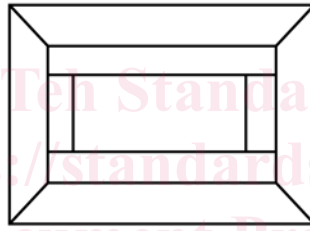
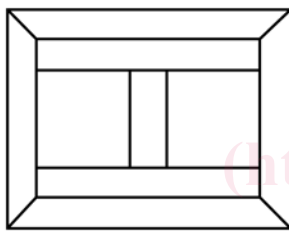
VL PATTERN VERTICAL LINERS

HORIZONTAL FACEBOARD GRAIN



VB PATTERN VERTICAL BATTENS

HORIZONTAL FACEBOARD GRAIN



HVB PATTERN HORIZONTAL & VERTICAL BATTENS

VERTICAL FACEBOARD GRAIN

	Maximum Spacing of Vertical Battens		
	Class 1 in. [mm]	Class 2 in. [mm]	Class 3 in. [mm]
Type 1 Load [Easy]	15 [381]	12 [305]	12 [305]
Type 2 Load [Average]	13 [330]	10 [254]	10 [254]
Type 3 Load [Difficult]	11 [2793]	7 [178]	7 [178]

FIG. 3 End Panel Patterns for Styles 1 & 2 Boxes (see 7.11.1 – 7.11.3)

ends of the wire through the boards and clinching. 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. When specified in the contract or purchase order (see 5.1.6), each end of each girth wire may be a twisted wire closure, as specified for Style 1 closures above.

7.8 *Staples*—Staples shall be used for fastening binding wires for both faceboards and cleats and for fastening liners to end faceboards. Staples also may be used for fastening end faceboards to battens. Binding wires shall be applied mechanically and be fastened by staples astride the wire. Staples shall pass through the faceboards and be clinched smooth, or shall pass through the faceboards 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 in. [51 mm] when driven over binding wires for Class 1 boxes. For Class 2 and 3 boxes, spacing of staples shall not exceed 1½ in. [38 mm], except where the requirements for positioning end wires or the length of the cleat requires more staples then the spacing shall not exceed 1½ in. [38 mm]. Staples driven over binding wires into faceboards only, shall be not less than 0.0475 in. in diameter 18-gage [1.20 mm]. The length of staples shall be not less than indicated in Table 8 and shall be long enough to penetrate the boards and be clinched smooth.

7.8.1 *Staples for Securing Binding Wire to Cleats*—Staples driven over binding wires and through faceboards into cleats shall be not less than 0.0625 in. diameter 16 gage [1.6 mm], except that staples driven into cleats 1⅛ in. [29 mm] wide × 1⅛ in. [29 mm] deep shall be not less than 0.072 in. diameter 15 gage [1.8 mm]. Staples shall not be deformed or protrude from the cleats, except that when the thickness of the