



Designation: ~~D6254/D6254M-99 (Reapproved 2005)~~ Designation: D 6254/D 6254M - 07

Standard Specification for Wirebound Pallet-Type Wood Boxes¹

This standard is issued under the fixed designation D 6254/D 6254M; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers the fabrication of new fully enclosed wirebound pallet-type wooden boxes intended for use as containers for domestic and overseas shipment of general materials and supplies, not exceeding 2500 lb [1134 kg] (see 10.1).

1.2 Wirebound pallet-type wooden box performance is dependent on its fabricated components; therefore, a variety of types, classes, and treatments reflecting varied performance are specified. This specification, however, does not cover wirebound pallet-type wooden box performance under all atmosphere, handling, shipping, and storage conditions.

1.3 If the use of other construction methods or techniques is acceptable and permitted (see 5.1.11), the resulting packaging systems shall be of equal or better performance than would result from the use of these specified materials and procedures. The appropriate distribution cycle provided in Practice D 4169 can be used to develop comparative procedures and criteria.

1.4 The values stated in either inch-pound or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. 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 nonconformance 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 safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

D 996 Terminology of Packaging and Distribution Environments ~~D1990~~ Practice for Establishing Allowable Properties for Visually-Graded Dimension Lumber from In-Grade Tests of Full-Size Specimens

D 3951 Practice for Commercial Packaging ~~ASTM D6254/D6254M-07~~

D 3953 Specification for Strapping, Flat Steel and Seals

D 4169 Practice for Performance Testing of Shipping Containers and Systems

D 4442 Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials

D 4444 Test Methods for Use and Calibration of Hand-Held Moisture Meters

D 6199 Practice for Quality of Wood Members of Containers and Pallets

F 1667 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 Federal Specifications:³

~~TT-W-572 Wood Preservative: Water-Repellent~~ TT-W-572B Fungicide: Pentachlorophenol

2.3 Code of Federal Regulations:⁴

CFR Parts 107-180, Title 49, Hazardous Materials Regulations

2.4 ~~APA—The Engineered Wood Association Standard~~ National Institute of Standards and Technology (NIST) Standard:⁵

~~PSI-95 Construction and Industrial Plywood~~ PS1-07 Voluntary Product Standard, Structural Plywood

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 the Federal Supply Service Bureau, Specification Section, Suite 8100, 480 L'Enfant Plaza, SW, Washington, DC 20408.

⁴ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401.

⁵ Available from APA—The Engineered Wood Association, 7011 South 19th St., PO Box 11700, Tacoma, WA 98411-0700; 98446-5399.

2.5 *Hardwood Plywood and Veneer Association Standard:*⁶

~~HPVA HP-1-1994 Hardwood and Decorative Plywood~~ ANSI/HPVA HP-1-2004 American National Standard for Hardwood and Decorative Plywood

2.6 *National Motor Freight Traffic Association:*⁷

National Motor Freight Classification

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⁶ Available from Hardwood Plywood and Veneer Association, PO Box 2789, Reston, VA 2290-0789.

⁷ Available from National Motor Freight Traffic Association, 2200 Mill Rd., Alexandria, VA 22302.

2.7 *Uniform Classification Committee Standard:*⁸

Uniform Freight Classification

2.8 *American Wood Preservers' Association (AWPA):*⁹

P8-99 Standard for Oil-Borne Preservatives

P9-98 Standards for Solvents and Formulations for Organic Preservative Systems

2.9 *Material Handling Industry (MHIA)/ANSI Standard:*¹⁰

MHIA/ANSI MH1-2005 Pallets, Slip Sheets, and Other Bases for Unit Loads

3. Terminology

3.1 *Definitions*— General definitions for packaging and distribution environments are found in Terminology D 996.

4. Classification

4.1 *Type:*

4.1.1 *Type I*—Sheathed lumber, 2500-lb [1134-kg] maximum load (see Fig. 1).

4.1.2 *Type II*—Sheathed lumber and veneer, 1500-lb [680-kg] maximum load (see Fig. 2).

4.1.3 *Type III*—Sheathed lumber and veneer with two different length sidewalls, 1500-lb [680-kg] maximum load (see Fig. 3).

4.1.4 *Type IV*—Sheathed plywood, 2500-lb [1134-kg] maximum load (see Fig. 4).

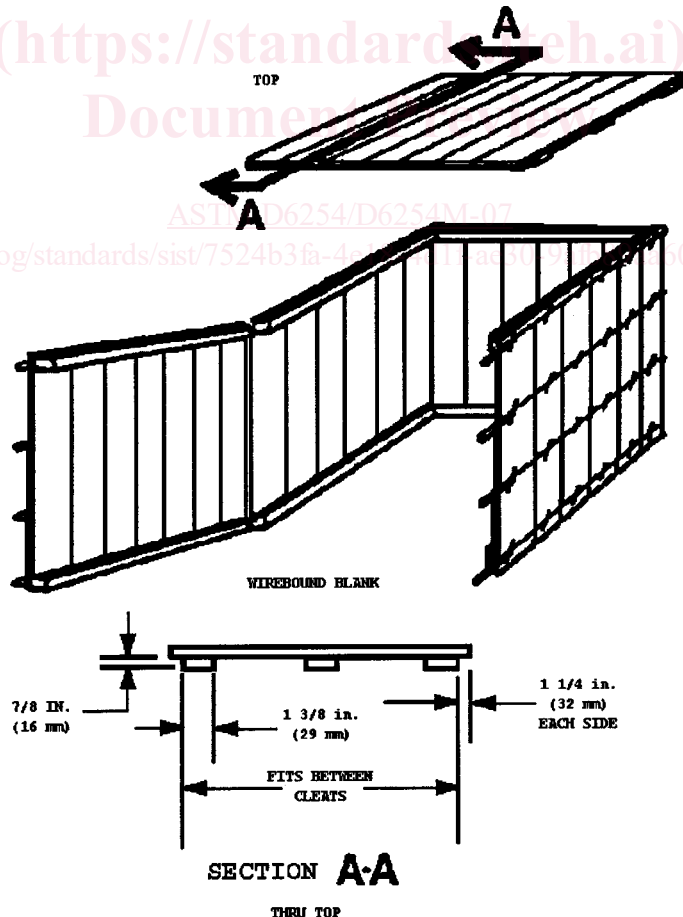
⁸ Available from the Uniform Classification Committee, Tariff Publishing Officer, 151 Ellis St., N.E. Suite 200, Atlanta, GA 30335.

⁹ Product may be obtained from Mallinckrodt Baker, Inc., 222 Red School Lane, Phillipsburg, NJ 08865, Chemical Abstracts Service (CAS) Registry Number 20624-25-3 (J.F. Baker Product Number 8624) or an equivalent manufacturer.

⁹ Available from American Wood Preservers' Association (AWPA), P.O. Box 5690, Granbury, TX 76049.

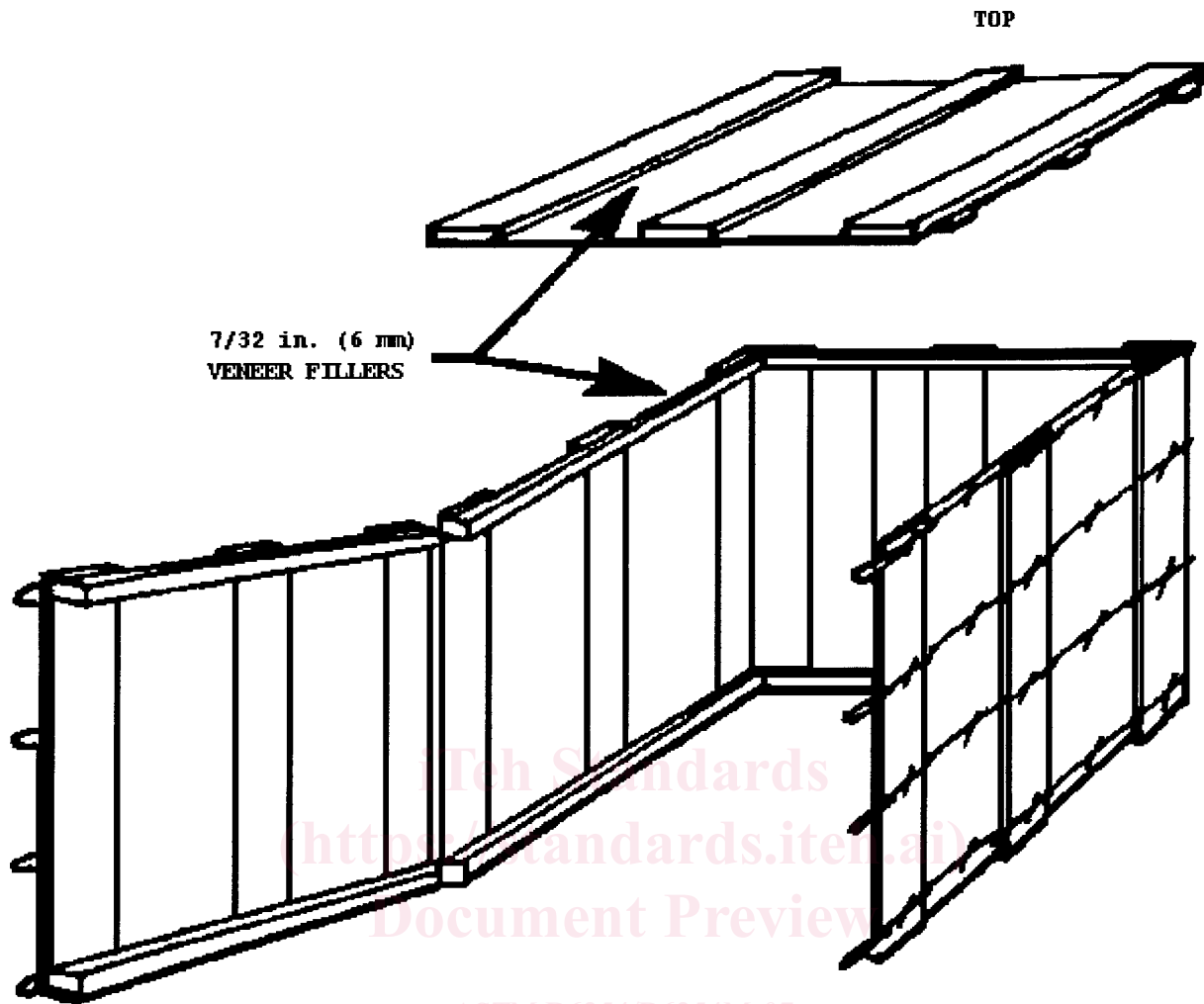
¹⁰ Product may be obtained from Fisher Scientific, 711 Forbes Ave., Pittsburgh, PA 15219-4785, CAS Registry Number 1667-99-8 (Fisher Scientific Product Number AC190050250) or an equivalent manufacturer.

¹⁰ Available from Material Handling Industry (MHIA) MH1 Secretariat, 8720 Red Oak Blvd., Suite 201, Charlotte, NC 28217, <http://www.mhiastore.org>.



NOTE 1—All cleats (see Fig. 5 and Fig. 7), 1/16 by 7/8 in. nominal [16 by 16 mm]. Type I wirebound box (Select Class 1 or 2 base from Fig. 5).

FIG. 1 Type I Wirebound Box (Select Class 1 or 2 Base from Fig. 5)



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NOTE 1—Top battens (see Fig. 1 and Fig. 7) $\frac{7}{8}$ by $1\frac{3}{8}$ in. nominal [16 by 29 mm].
All cleats (see Fig. 5 and Fig. 7) $1\frac{3}{16}$ by $\frac{7}{8}$ in. nominal [16 by 16 mm].

FIG. 2 Type II Wirebound Box (Select Class 1 or 2 Base from Fig. 5).

4.2 Class:

4.2.1 Class 1—Partial four-way entry base (see Fig. 5).

4.2.2 Class 2—Two-way entry base (see Fig. 5).

4.2.3 Class 3—Partial four-way entry base with two different length sidewalls (see Fig. 6).

4.2.4 Class 4—Two-way entry base with two different length sidewalls (see Fig. 6).

4.3 Treatment:

4.3.1 Treatment A— With water preservative treatment (see 6.1.1.9).

4.3.2 Treatment B— With water preservative treatment (see 6.1.1.9).

4.3.3 Treatment C— Without preservative treatment.

5. Ordering Information

5.1 Purchasers should select the preferred permitted options and include the following information in procurement documents:

5.1.1 Specification title, number, and date.

5.1.2 Box type, class, and treatment required (see 4.1-4.3 and 7.1).

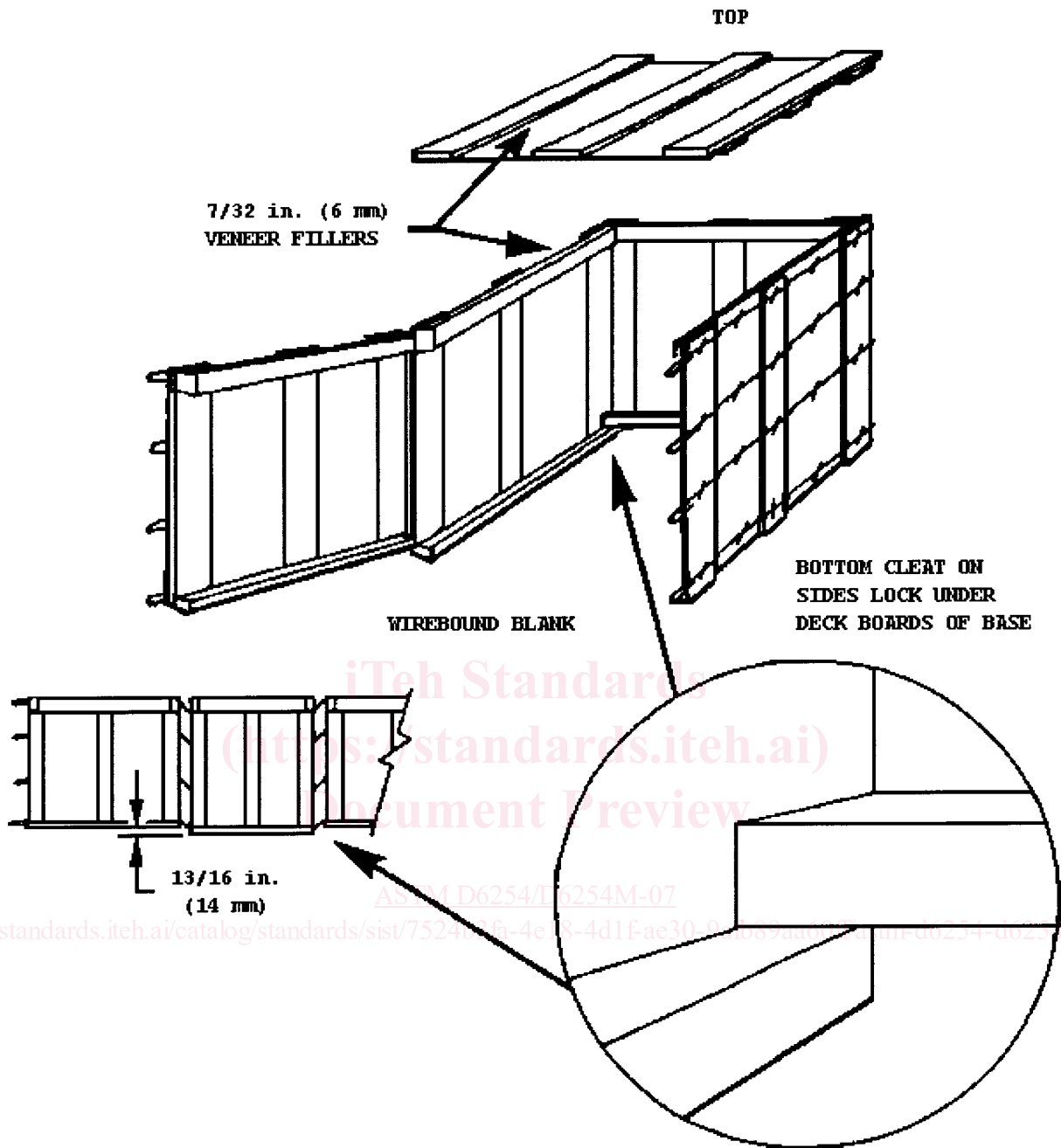
5.1.3 Contents weight.

5.1.4 Modifications to container manufacturer's identification (see 7.6).

5.1.5 Box dimensions specified in order of length by width by depth (see 7.7 and Fig. 7).

5.1.6 When preservative treatment is required (see 4.3 and 6.1.1.9).

5.1.7 Whether boxes are to be shipped assembled or knocked down (see 9.1).



NOTE 1—Top cleat $1\frac{3}{16}$ by $1\frac{5}{8}$ in. nominal [16 by 35 mm].
 Bottom cleat $1\frac{3}{16}$ by $\frac{7}{8}$ in. nominal [16 by 16 mm].
 Top battens $\frac{7}{8}$ by $1\frac{3}{8}$ in. nominal [16 by 29 mm].

FIG. 3 Type III Wirebound Box (Select Class 3 or 4 Base from Fig. 6)

- 5.1.8 Whether additional markings are required (see 9.2).
- 5.1.9 Whether different strapping materials are required (see S3.2.1).
- 5.1.10 Whether additional support is required (see S3.2.3).
- 5.1.11 Whether other construction methods or techniques are acceptable and permitted (see 1.3).
- 5.1.11.1 Whether proof that other constructions methods or techniques are acceptable (see 1.3) is required.

6. Materials and Manufacture

6.1 *Materials*—It is encouraged that recycled material be used when practical. All recovered, recycled, or virgin materials used in box manufacture shall meet the requirements of this specification and referenced documents. In addition, materials shall not affect or be affected by the product being packed.

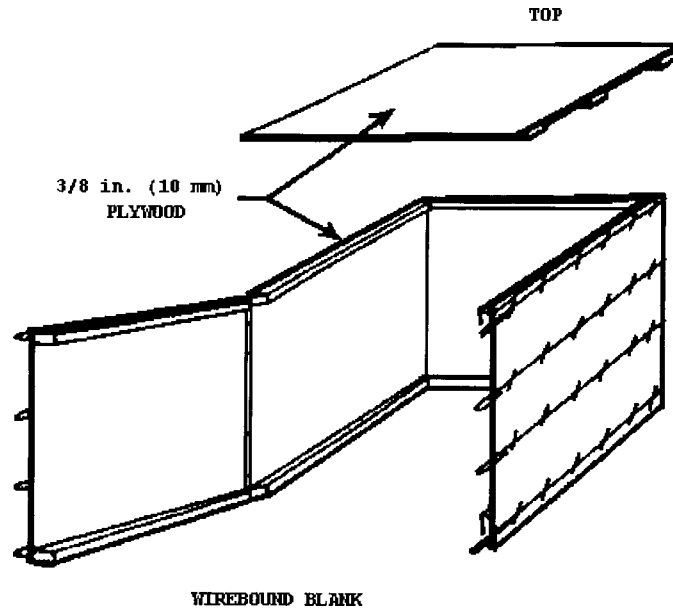


FIG. 4 Type IV Wirebound Box (Select Class 1 or 2 Base from Fig. 5)

NOTE 1—Top battens (see Fig. 1 and Fig. 7) $\frac{7}{8}$ by $1\frac{3}{8}$ in. nominal [16 by 29 mm].
All cleats (see Fig. 5 and Fig. 7) $\frac{1}{16}$ by $\frac{7}{8}$ in. nominal [16 by 16 mm]

6.1.1 *Wood*—Wood used in box fabrication shall conform to Practice D 6199 as applicable and shall conform to commercial standards in accordance with Practice D1990. Group I Woods shall not be permitted for cleats. Nominal dimensions shall be as specified in Practice D6199 as applicable. Group I Woods shall not be permitted for cleats. Nominal dimensions shall be as specified in Practice D 6199.

6.1.1.1 *Wood Quality*—Grain divergence (grain slope), whether on a wooden member face or edge, shall not exceed 1 in. [25 mm] per 10-in. [254-mm] length for pallet base and box frame members and shall not exceed 1 in. [25 mm] per 8-in. [203-mm] length for face boards. Members shall be free from decay and sufficiently smooth on the exterior surface to permit legible markings. Stains and discoloration not associated with decay will be permitted provided they are not so pronounced as to obscure markings. Members shall be free from all defects that will interfere with specified stapling and nailing. Each wood member shall be a single wood piece without any joints.

6.1.1.2 *Cleat and Batten Knots*—Any cleat or batten knot width shall not exceed $\frac{1}{4}$ the member width. Knots shall be sound and tight with no part within $1\frac{1}{4}$ in. [32 mm] of the cleat or batten end. Loose knots and knot holes shall not be permitted in cleats and battens.

6.1.1.3 *Face and Deck Board and Stringer Knots*—Any face and deck board and stringer knot width shall not exceed $1\frac{1}{2}$ in. [38 mm] nor $\frac{1}{3}$ the member width. Knots shall be sound and tight with no part of any knot within 1 in. [25 mm] of the member end. Loose knots or knot holes not more than 1 in. [25 mm] wide shall be permitted, provided they are not within 1 in. [25 mm] of the member end.

6.1.1.4 *Splits Extending Entire Board Length*—Splits extending the entire board length shall be permitted for sides, top, bottom, and ends, provided the width of the narrowest piece of the board measured from the split is $1\frac{1}{2}$ in. [38 mm] or greater, and a staple holds each piece end in place.

6.1.1.5 *Splits Diverging to Board Edge*—Splits diverging to an outer box edge shall not be permitted. Splits extending less than the entire board length and not diverging to a board edge shall be permitted for sides, top, bottom and ends, provided that if the split were extended, the resulting boards would comply with the minimum requirements of 6.1.1.4.

6.1.1.6 *Splits Extending Through Staple or Nail Holes*—Board-end slits, caused by a fastener, which are not longer than 3 in. [76 mm], are acceptable provided the split does not terminate in the board edge.

6.1.1.7 *Wane or Bark*—Wane along any one wood member edge will be permitted for the full length of the member provided it does not exceed $\frac{3}{8}$ in. [10 mm] in either direction from the member edge. Bark shall not be permitted on any wood component.

6.1.1.8 *Moisture Content*—At the time of box fabrication, wood member moisture content shall be in accordance with Practice D 6199 except that there shall be no restriction on pallet base stringer's moisture content.

6.1.1.9 *Preservation Treatment*—When Treatment A or B is specified, pallet finished parts or complete pallet boxes shall be immersed or flooded completely so as to cover all interior and exterior surfaces for the time period specified. Treatment A shall utilize TT-W-572B, Composition C or D preservative, or a commercial equivalent, for a minimum of 3 min. Treatment B shall utilize either a 2% copper naphthenate, a 3% zinc naphthenate, or a 1.8% oxine copper, formerly referred to as copper-8-quinolinolate, solution for a minimum of 1 min. Treating solutions shall conform to AWWA Standards P8-99 or P9-98.

6.1.2 *Plywood*—Type IV boxes shall use plywood conforming to ANSI/HPVA HP-1-1994, Type I, Grade 3-4; APA PS1-95;