



Designation: D6880 – 05

Standard Specification for Wood Boxes¹

This standard is issued under the fixed designation D6880; 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 wood boxes. These wood boxes, when constructed, filled and closed, shall be used for the packing of contents not exceeding 1,000 pounds [454 kg].

1.2 If the use of other construction methods or techniques is acceptable and permitted (see 5.1), the resulting boxes shall be of equal or better performance than would result from the use of the specified materials and procedures. An appropriate distribution cycle, specified in Practice [D4169](#), can be used to develop comparative procedures and criteria.

1.3 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.

1.4 *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

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

[D3951](#) Practice for Commercial Packaging

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

[D4675](#) Guide for Selection and Use of Flat Strapping Materials

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

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

[IEEE/ASTM SI 10](#) Standard for Use of the International System of Units (SI): The Modernized Metric System

2.2 *Federal Specification:*

PPP-B-621 Boxes, Wood, Nailed and Lock-Corner³

2.3 *American Softwood Lumber Standard PS-20*⁴

2.4 *American Wood Preservers' Association Standard*⁵

2.5 *National Design Specification for Wood Construction*⁶

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:*

3.2.1 *part*—a section of the box, such as top, bottom, side or end.

3.2.2 *piece*—a single solid piece of wood.

4. Classification

4.1 *Classes*

Class 1 – Light Duty

Class 2 – Heavy Duty

4.2 *Styles*

Style 1 - Uncleated Ends ([Fig. 1](#))

Style 2 - Full Cleated Ends, Butt Joints ([Fig. 2](#))

Style 2-½ Full Cleated Ends, Notched Cleats ([Fig. 3](#))

Style 4 - Exterior End Cleats ([Fig. 4](#))

Style 5 - Interior End Cleats ([Fig. 5](#))

Style 7 - Skidded Base with Separate Hood ([Fig. 6](#))

4.3 Water-Repellent Wood Preservative Treatment

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 National Institute of Standards and Technology, U.S. Department of Commerce, 100 Bureau Dr. Stop 3460, Gaithersburg, MD 20899-3460

⁵ Available from American Wood Preservers' Association (AWPA), P.O. Box 5690, Granbury, TX 76049-0690

⁶ Available from American Forest and Paper Association, American Wood Council, 1111 19th St. NW, Suite 800 Washington, DC 20036

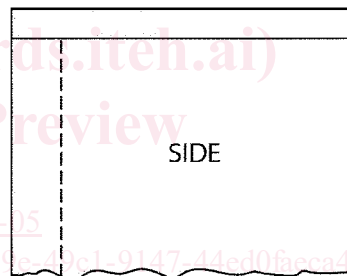
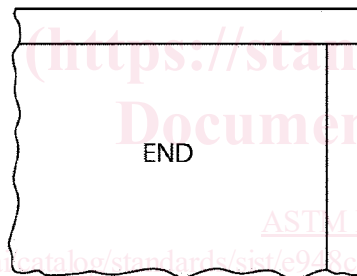
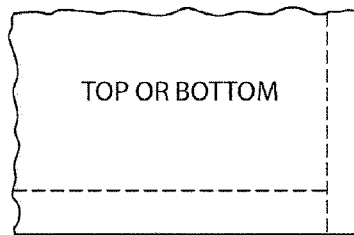
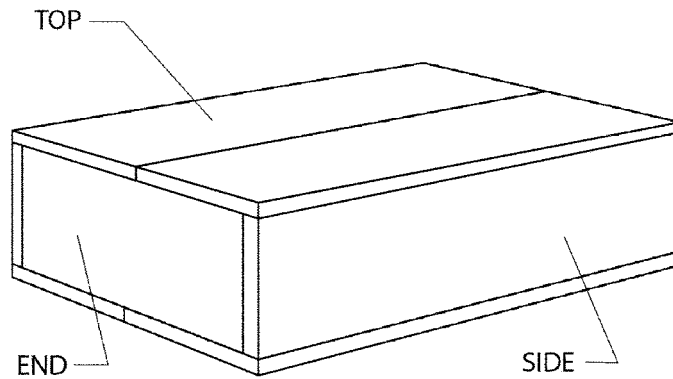


FIG. 1 Style 1 Box (Uncleated Ends)

Treatment A - Without treatment
 Treatment B - With treatment

5. Ordering Information

5.1 Purchasers should include the following information in procurement documents:

- 5.1.1 Specification title, number and date.
- 5.1.2 Box class, style and treatment (see 4.1-4.3).
- 5.1.3 Description of contents and contents weight, if known.
- 5.1.4 When alternate materials and construction methods are acceptable and permitted (see 1.2).
- 5.1.5 Inside box dimensions. (see 7.1).
- 5.1.6 When cleats are cut or notched for water drainage (see 7.3).
- 5.1.7 When skids are required (see 7.4).
- 5.1.8 When 4-way entry skids are required (see 7.4).
- 5.1.9 When rubbing strips are required (see 7.4).
- 5.1.10 When beveled skids are required (see 7.4).
- 5.1.11 When re-closable top panel closure is required (see 7.5.1).

- 5.1.12 When marking of boxes is required (see 7.9).
- 5.1.13 When boxes are shipped assembled or knocked down (see 7.12 and 7.13).

6. Material

6.1 *Materials.* All materials shall meet the requirements of this specification and referenced documents. Materials shall not affect or be affected by the product being packed. The use of recycled material is encouraged.

6.1.1 *Wood.* Wood shall conform to Practice D6199 or the American Softwood Lumber Standard PS-20, as applicable. Tables 1 and 2 cite nominal dimensions for wood pieces (commercial tolerances will apply). Thicker or wider pieces of wood are acceptable. For cleats, battens and diagonals, the wood shall conform to Class 1 or 2 of Practice D6199.

6.1.2 *Fasteners.* Fasteners (bolts, nuts, screws, staples, and so forth) shall meet the stress design criteria of the National Design Specification for Wood Construction.

6.1.2.1 *Nails.* Nails shall conform to Specification F1667.

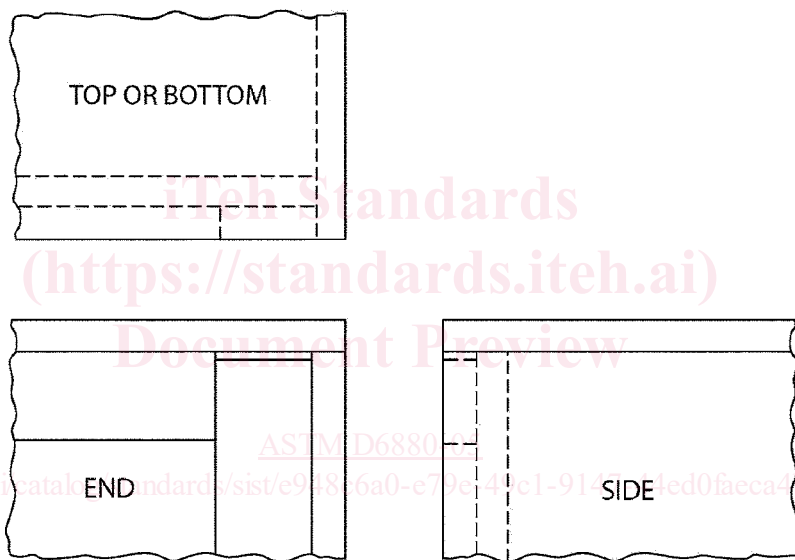
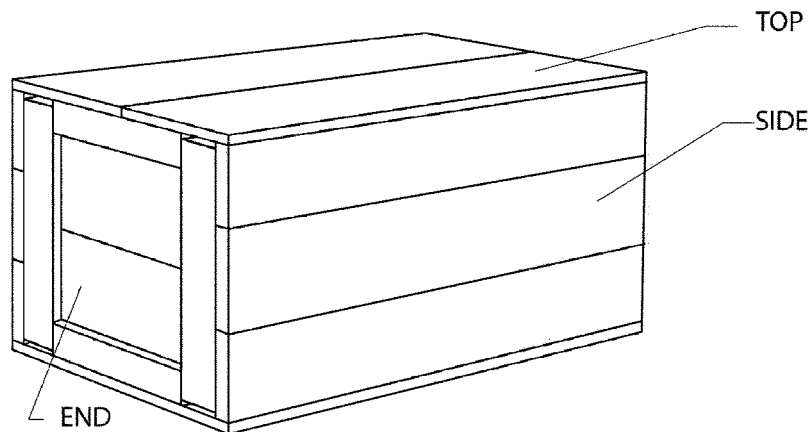


FIG. 2 Style 2 Box (Full Cleated Ends, Butt Joints)

6.1.3 *Preservatives.* Preservatives shall conform to the properties and formulations of either copper naphthenate, zinc naphthenate or oxine copper (copper-8-quinolinolate) as cited in American Wood Preservers' Association (AWPA) Standard P8 and P9.

7. Construction

7.1 *Dimensions.* Boxes shall be designed to the cited inside length, width and depth (see 5.1.4). A tolerance of -0, +1/4 inch [6 mm] shall be permitted.

7.2 *Box sides, tops, bottoms and ends.* Wood thickness shall be as specified in Tables 1 and 2. No piece, shall be less than 3 in. [76 mm] wide. When a side, top, bottom or end is constructed from more than one piece, the pieces shall be joined with fasteners or adhesive.

7.3 *Cleats, battens and diagonals.* Tables 1 and 2 cite the required wood thickness and width. Pieces shall be one piece up to 12 ft. in length. Longer cleats shall be no more than two

pieces, with no piece less than 3 ft. long. Cleats may be cut or notched to provide for water drainage (see 5.1.6).

7.4 *Skids.* When a box is intended for use with loads resulting in a gross weight in excess of 200 pounds [91 kg] or boxes with a gross weight in excess of 100 pounds [45 kg] and a box length and width of 48 inches [1219 mm] by 24 inches [610 mm] or more, the box shall be fitted with skids. Skids shall measure a minimum of 2-1/2 inches [64 mm] high and 3-1/2 inches [89 mm] wide. Skids shall be placed parallel to and extend the full width of the box and shall be positioned not closer than 2-1/2 inches [64 mm] nor more than 1/6 the box length from each end of the box. The distance between inside edges of skids shall not exceed 48 inches [1219 mm]. Additional skids, as required, shall be positioned so as to divide the distance between skids into equal distances. When bolt fastening is provided for the item being packed, skids shall be located to enable the item to be bolted to the skids. Skids shall be fastened to the box. When 4-way fork entry is required, skids

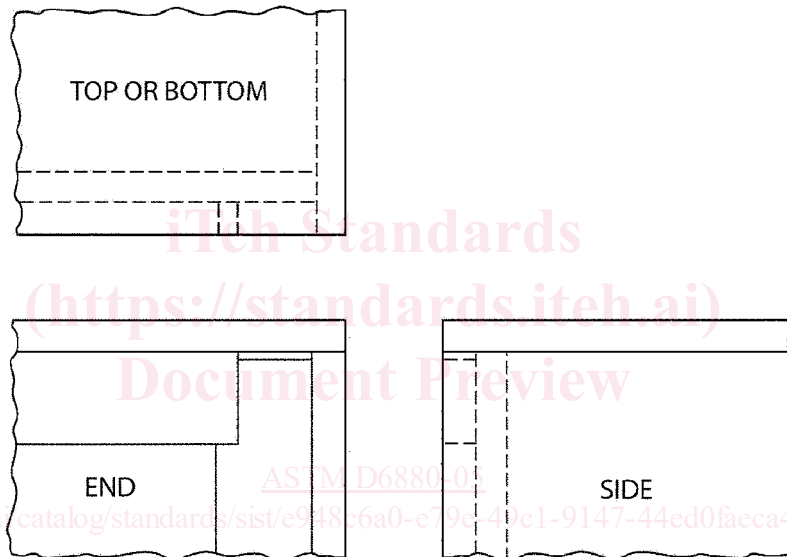
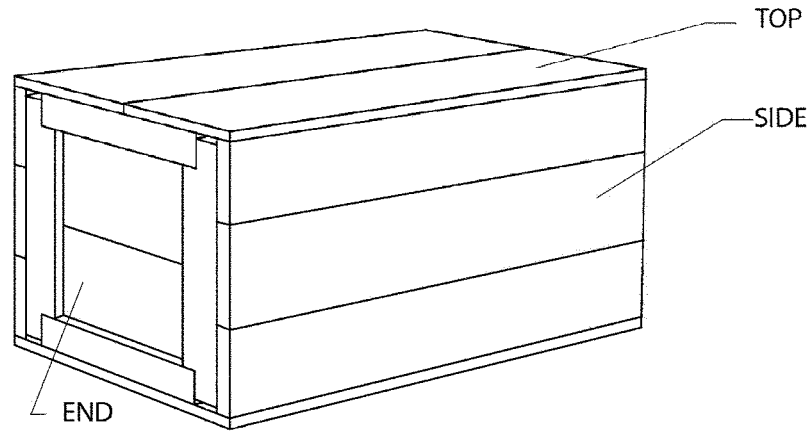


FIG. 3 Style 2-½ Box (Full Cleated Ends; Notched Cleats)

shall be a minimum of 3-½ by 3-½ inches [89 × 89 mm], and cut out a minimum of 2 inches [51 mm] in depth and of such width as to accommodate forks and slings for handling. Note that forks are normally 6 × 2 inches in shape and are set 27 inches apart, outside to outside dimension. Skids may be built with rubbing strips (see 5.1.9). Skids may be beveled to facilitate pushing or dragging of loads (see 5.1.10).

7.5 *Fastening of pieces and parts.* Fastener spacing shall not exceed 4 inches [102 mm]; except tops, where spacing shall not exceed 6 inches. Nails shall be located to minimize splitting of wood. Overdriving of fasteners is discouraged. If fasteners are overdriven, protruding points shall be clinched or covered.

7.5.1 *Re-closable top panel closure.* The top shall be constructed with cleats on the underside that fit snugly inside the box sides and ends. Closure can be completed with strapping (see Guide D4675), screws, bolts or other fasteners to allow easy opening and re-closure.

7.6 *Preservation.* When boxes are treated with preservative, all exterior surfaces of the box shall be treated. All safety and environmental regulations shall be followed.

7.7 *Box styles.*

7.7.1 Style 1, Uncleated Ends (Fig. 1). A recommended maximum box size is the sum of the length, width and height should not exceed 50 inches (1.3 m).

7.7.2 Style 2, Full Cleated Ends, Butt Joints (Fig. 2). The sides, top, and bottom shall be flush with the outside surface of the four cleats at each end.

7.7.3 Style 2-½, Full Cleated Ends, Notched Cleats (Fig. 3). The four cleats at each end shall be notched. The sides, top, and bottom shall be flush with the outside surface of the four cleats at each end.

7.7.4 Style 4, Exterior End Cleats (Fig. 4). Each end shall have two vertical exterior cleats.

7.7.5 Style 4 ½, Horizontal Exterior End Cleats (Fig. 4). Each end shall have two horizontal exterior cleats.