Designation: D6253 – 16

Standard Practice for Treatment and/or Marking of Wood Packaging Materials[1]

This standard is issued under the fixed designation D6253; 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 practice covers the development of recommended treatment, or marking practices, or both, for wood packaging materials (WPM) and aids in identifying WPM as to phytosanitary treatment, intended service cycles, repair, the specific specification used to manufacture or recycle, and other user designated characteristics.

1.2 This practice identifies WPM treated, or marked, or both in accordance with industry, government, or international recognized standards.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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

D6039/D6039M Specification for Open and Covered Wood Crates

D6251/D6251M Specification for Wood-Cleated Panelboard Shipping Boxes

D6254/D6254M Specification for Wirebound Pallet-Type Wood Boxes

D6255/D6255M Specification for Steel or Aluminum Slotted Angle Crates

D6256/D6256M Specification for Wood-Cleated Shipping Boxes with Skidded, Load-Bearing Bases

D6573/D6573M Specification for General Purpose Wirebound Shipping Boxes

2.2 *MHIA Standard:*

MHIA MH1–2005 Pallets, Slip Sheets, and Other Bases for Unit Loads[3]

2.3 *AWPA Standards:*

P8-03, Standard for Oil-Borne Preservatives[4]

P9-03, Standards for Solvents and Formulations for Organic Preservative Systems[4]

2.4 *NFPA Standard:*

NFPA 704, Standard System for Identification of Hazards of Materials for Emergency Response[5]

2.5 *International Standard:*

International Standards for Phytosanitary Measures (ISPM) Publication No. 15, Regulation of Wood Packaging Material in International Trade[6]

3. Terminology

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

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *certifying or inspection agency, n*—a qualified independent agency providing an audit service to verify the manufacturer or recycler has complied with government or industry-recognized programs.

3.2.2 *dielectric heat treatment (DH), n*—heating of WPM using dielectric heating in accordance with a specific time-temperature schedule that achieves a minimum wood core temperature of 60°C for a minimum of 1 continuous minute.

3.2.3 *heat treatment (HT), n*—heating of WPM using a conventional steam or dry kiln heat chamber in accordance with a specific time-temperature schedule that achieves a minimum wood core temperature of 56°C for a minimum of 30 continuous minutes.

[1] This practice 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.

Current edition approved April 1, 2016. Published May 2016. Originally approved in 1998. Last previous edition approved in 2010 as D6253 – 10. DOI: 10.1520/D6253-16.

[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 Material Handling Industry of America (MHIA), 8720 Red Oak Blvd., Suite 201, Charlotte, NC 28217–3992, http://www.mhia.org.

[4] Available from American Wood Protection Association (AWPA), P.O. Box 361784, Birmingham, AL 35236-1784, http://www.awpa.com.

[5] Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02269-9101.

[6] Available from the International Plant Protection Convetion, www.ippc.int.

3.2.4 *intended service cycle, n*—a marking applied to a materials handling pallet to identify a multiple-use or single-use pallet (see 3.2.7 and 3.2.5).

3.2.5 *single-use (S) pallets, n*—intended for use in shipping only one unit load (also known as expendable or single-trip pallets) (see Table 1).

3.2.6 *methyl bromide (MB) fumigation, n*—fumigation of WPM with methyl bromide using an approved fumigation schedule.

3.2.7 *multiple-use (M) pallets, n*—intended for reuse in shipping unit loads (also known as a reusable or multi-trip pallets) (see Table 1).

3.2.8 *quality mark, n*—see *treatment mark*.

3.2.9 *phytosanitary treatment, n*—officially authorized procedure for the killing or removal of pests or rendering pests infertile.

3.2.10 *repaired-pallet (R), n*—describes a pallet with original components replaced or modified (see Table 1).

3.2.11 *treatment mark, n*—an official stamp or brand, internationally recognized, applied to a regulated article to attest its phytosanitary status.

3.2.12 *wood packaging material (WPM), n*—wood or wood products (excluding paper products) used in supporting, protecting or carrying a consignment. It covers wood packaging such as pallets, skids, containers, crates, boxes, packing blocks, drums, cases, load boards, pallet collars, and dunnage.

4. Significance and Use

4.1 This practice establishes the criteria to treat, or mark, or both WPM with permanent identification for the phytosanitary treatment, or intended service cycle, or both, repair, specification used, and other designated characteristics.

4.2 The marking of the WPM shall be performed after ensuring the material complies with the applicable specification.

5. Summary of Practice for Phytosanitary Treatment and Marking of WPM

5.1 Treatment or quality marking of WPM shall conform to the enforcement regulations and policy of the American Lumber Standard Committee (ALSC) WPM Program and ISPM 15.

5.2 Treatment or quality mark must meet the requirements of acceptable marks in ISPM 15 (see Fig. 1 and Fig. 2) and should include the following:

5.2.1 IPPC logo,

5.2.2 Two-letter US abbreviation, which must be separated by a hyphen from the producer/treatment provider code,

TABLE 1 Pallet Intended Service Cycle Identification[A]

Letter Designation	Explanation
S	Single-use pallet
M	Multiple-use pallet
R	Repaired pallet

[A] This information may be found in MHIA MH1–2015.

5.2.3 Unique number assigned by an inspection agency to the facility,

5.2.4 HT or MB abbreviation, and

5.2.5 Inspection agency logo.

5.3 Irrespective of the type of treatment applied, wood packaging material must be made of debarked wood. Any number of visually separate and clearly distinct small pieces of bark may remain if they are:

5.3.1 Less than 3 cm in width (regardless of the length), or

5.3.2 Greater than 3 cm in width, with the total surface area of an individual piece of bark less than 50 cm^2.

6. Summary of Practice for Marking of Wood Pallets

6.1 Marking of pallets shall conform to a published industry, government or international standard, as applicable.

6.1.1 The following divisions under this section, detail the marking (see Fig. 3) information to be applied to the pallet. Each identification will be separated by a space or mark. The location of the marking information is at the discretion of the pallet manufacturer.

6.1.1.1 The manufacturer, recycling or leasing company, or any identification code shall be applied to the pallet, for example, ABC, 123, FP, CHEP, PECO.

6.1.1.2 A marking identifying the industry, government or international specification (when applicable) followed during fabrication shall be applied to the pallet. The marking identifying the specification of conformance shall be coded, for example, GMA75, NNP71C, MH1, SPEQ.

6.1.1.3 The month and year of manufacture and repair shall be marked, for example, 10 94, 05 94, 01 95, 01 201, 02 210.

6.1.1.4 The intended service cycles identification code shall be applied, for example, M, S, R.

6.1.2 The following additional information may be included in the marking of pallets by the direction of the manufacturer, recycling company, or owner of the pallet.

6.1.2.1 The load rating of the pallet, for example, 2000 lb, 0953 kg.

6.1.2.2 The ownership of the pallet, for example, USA, ATT, CHEP.

6.1.2.3 The certifying agency mark, for example, TP, TPS.

6.1.2.4 Identify the materials used in the construction of pallets that exhibit health, flammability, or reactivity risk factors in accordance with the NFPA Hazard rating index, for example 1.B, 1.Y, 2.R (see Table 2).

6.2 *Marking Materials*—Any specification process, or material used in the marking application, or both, shall be durable enough to be readable for the duration of the pallet's expected service life.

7. Requirements for Marking of Government Wood Containers

7.1 *Container Identification*—Unless otherwise specified, each panelboard container shall be marked with the following information and arranged in the following pattern as closely as possible:

7.1.1 Conforms to D6251/D6251M or D6256/D6256M specification,

7.1.2 Box type, class, and style,

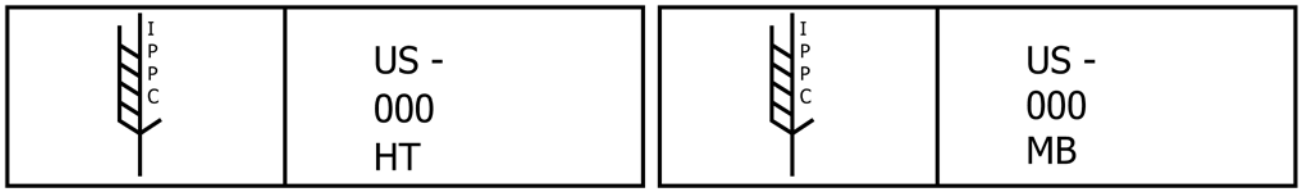

FIG. 1 US Treatment Mark Examples

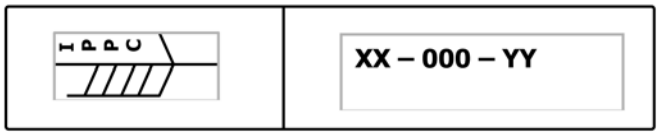

FIG. 2 US Treatment Mark Alternate Example (Typically Used with Pallets)

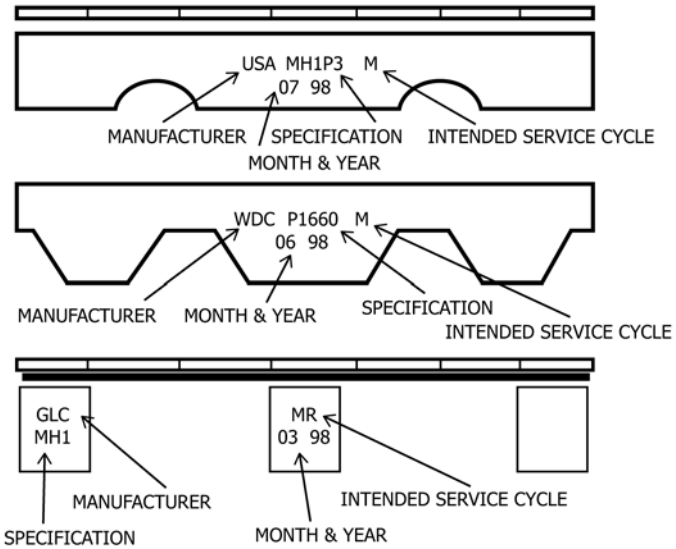

FIG. 3 Marking Requirements (Location of Markings Optional)

TABLE 2 Pallet Material Hazard Rating Index (Location is Optional)

Rating	Health (Blue)	Flammability (Red)	Reactivity (Yellow)
0	No Hazard	Does not burn	Stable
1	Exposure causes slight skin irritation	Must be preheated to burn flash point 200°F or above; non hazardous atmosphere	No violent chemical change; unstable in heat
2	Long term exposure causes temporary incapacity	Flash point above 100°F; produces no hazards to atmosphere	Unstable and violently changes chemically; but no detonation
3	Short exposure, serious temporary injury	Easily ignited at ambient flash point at or below 73°F. Produces hazardous atmosphere	Will detonate with strong initiation
4	Short exposure causes death	Spontaneous ignition resulting in hazardous atmosphere	Detonate at ambient temperature

7.1.3 Box manufacturer's name and address,
7.1.4 Maximum contents weight (lb, kg, or both), and
7.1.5 Load type.
7.1.6 *Modification*—When required, to designate that the box is in accordance with the specification requirements except for modification authorized in a contract or order.
7.1.7 *Preservative Treatment Identification*—All Treatment A and B boxes shall be annotated based on their preservative treatment. The letters PA for oxine copper preservative, PB for zinc naphthenate preservative, and PC for copper naphthenate preservative treatment.
7.1.8 *Export Treatment Requirements*—See Section 5.

7.2 *Container Specification*—Container specification shall be marked with the following information (see Fig. 4):
7.2.1 Type,
7.2.2 Class,
7.2.3 Style,
7.2.4 Wood treatment,
7.2.5 Load,
7.2.6 Assembly,
7.2.7 Length,
7.2.8 Width, and
7.2.9 Depth.

7.2.10 Box sizes shall be in terms of the inside box dimensions and shall be cited in sequence of length, width, and depth. The box inside length and width shall be the assembled box cleats inside dimensions with a ⅛-in. (3-mm) tolerance. The inside depth specified shall be the distance from the top of the pallet deck boards to the underside of the assembled box top cleat with a ¼-in. (6-mm) tolerance. The inside width normally will be greater than the length.

7.3 *Wood Container Marking Examples:*

7.3.1 *English Example*—Type I, Class 1, Style A1, Treated, Load Type 3, 48-in. length, 24-in. width, and 48-in. depth box (D6251 IXX 1 A1 B 3 48XX 24XX 48XX).

TYPE	CLASS	STYLE	TREATED	LOAD TYPE	LENGTH	WIDTH	DEPTH
I	1	A1		3	48	24	48
D6251 IXX 1 A1 B 3 48XX 24XX 48XX							

7.3.2 *Metric Example*—Type III, Class 2, Style J, Untreated, Load Type 1, 1219 mm length, 610 mm width, and 457 mm depth (D6251M III 2 JX A 1 1219 610X 457X).

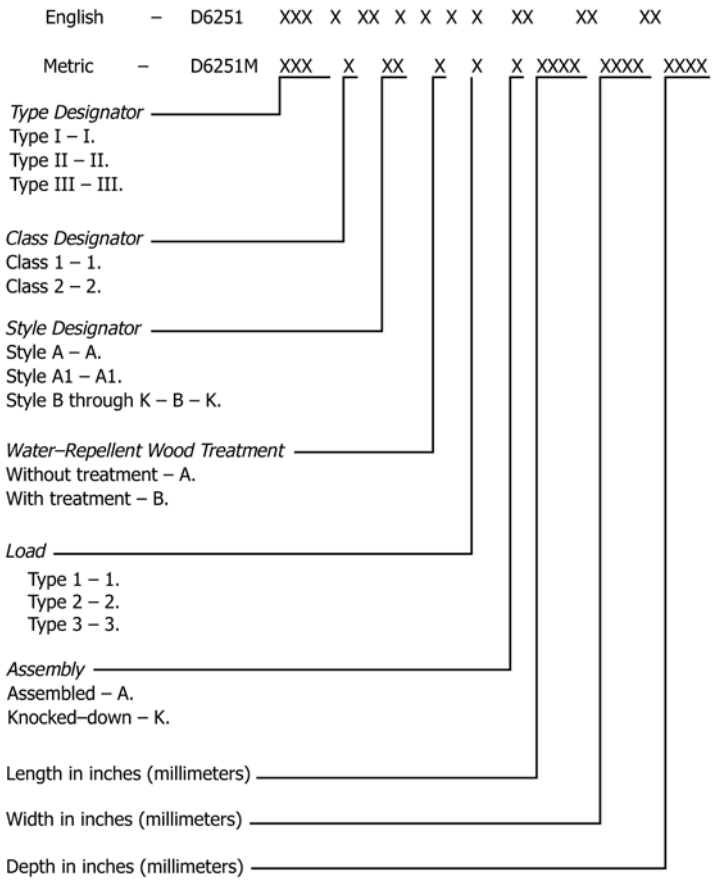

FIG. 4 Container Specification Format

TYPE	CLASS	STYLE	TREATED	LOAD TYPE	LENGTH	WIDTH	DEPTH
III	2	J		1	1219	610	457

D6251M III 2 JX A 1 1219 610X 457X

7.4 *Crate Identification*—Each crate shall be marked with the following information and arranged in the following pattern as closely as possible:

7.4.1 Specification (example: D6039/D6039M),

7.4.2 Number,

7.4.3 Class,

7.4.4 Style of crate,

7.4.5 Crate manufacturer's name and address,

7.4.6 Maximum weight of contents, and

7.4.7 Type of load.

7.4.8 All markings shall be limited to 15 in.^{2} (9677 mm^2) in area and shall be located in a lower corner of one side panel in letters approximately 5⁄16 in. (8 mm) high. The specification number shall be in letters approximately ¾ in. (19 mm) high.

7.4.9 *Crate Marking Requirements :*

7.4.9.1 *Marking Panels*—Marking panels on Type I crates (see Specification D6255/D6255M) shall be ¼-in. (6-mm) thick (minimum) plywood, or 0.047-in. (1.2-mm) thick steel plate. The panel shall be painted with one coat of a low-moisture-sensitivity zinc chromate primer and two coats of a lusterless white, air drying, alkyd enamel paint suitable for use on primed exterior and interior metal and wood surfaces. The panel shall be bolted to the crate members in the appropriate place with bolts (see Specification D6255/D6255M). Type II crates normally do not require marking panels.

7.4.9.2 *Marking Panel Sizes*—The marking panel size will be determined depending on the amount of marking required or as specified in the contract or order.

7.5 *Wirebound Containers Identification*—Each wirebound container shall be marked with the following information and arranged in the following pattern as closely as possible:

7.5.1 Conforms to ASTM D6573/D6573M or D6254/D6254M specification,

7.5.2 Container manufacturer's name,

7.5.3 Plant location,

7.5.4 Maximum weight of contents in lb (kg),

7.5.5 Class of container,

7.5.6 Type of load,

7.5.7 Style of container, and

7.5.8 Type of preservation, if required.

7.6 *Marking Materials*—Any specification process, or material used in the marking application, or both, shall be durable enough to be readable for the duration of the container or crate expected service life.

7.7 *Special Markings:*

7.7.1 Cleated panelboard or plywood container with skidded bases having bolts for easy removal shall have: "**CAUTION: LIFT BY BASE ONLY**" and second line: "**TO OPEN REMOVE BOTTOM LAG BOLTS**".

7.7.2 Minimum 1 in. (25 mm) high letters shall be placed on the container end and side panels with a 1 in. (25 mm) spacing between lines of text.

7.7.3 After closure container shall have the center of balance and a warning against use of hooks in appropriate location.

7.7.4 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 in. [(25 mm) high.

8. Keywords

8.1 containers; crates; marking; pallets; phytosanitary treatment; wood packaging materials

APPENDIX

(Nonmandatory Information)

X1. CHEMICAL PRESERVATIVES USED BY THE MILITARY

X1.1 *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). Treating solutions shall conform to American Wood-Preservers' Association (AWPA) Standard P8-03.

X1.1.1 *Copper Naphthenate Solution*—In general, the copper naphthenate solution should be the preferred wood preservative unless end items to be package in these containers are food items not packaged in sealed metal cans or materials which might be adversely effected by residual solvents from the composition treatment. The purchaser should be consulted if there is a question concerning the appropriate wood preservative. An emulsion of M-GARD W510 (copper naphthenate) reduce down with water to 2 % copper as metal. Copper naphthenate is a widely used, broad-spectrum wood preservative. It has several properties which make it a highly valued commodity, including effective control of decay fungi and excellent control or mitigation of wood destroying insects, including termites, beetles carpenter ants and other host organisms. Extensive references and citations illustrating this fact are found in the literature. In the United States, the Environmental Protection Agency (EPA) also classifies copper naphthenate as a general-use (unrestricted) pesticide, thus making it available for over-the-counter (OTC) sales and distribution without Certified Pesticide Applicators licensing required for purchase or use a solution of Cunapsol 5 (copper naphthenate) reduced down with water to 2 % copper as metal. Alternatively, Grade A containers, individual or palletized or the finished wood parts thereof, shall be completely flooded for a minimum of one minute in PQ56, M-GARD W550, M-GARD W510 or Cunapsol 5 preservative, as applicable. All interior and exterior surfaces (when finished wood parts are dipped) are to be completely inundated with preservative. Care shall be exercised to assure complete coverage of all surfaces of the board. Immediately following the dip treatment, wood products being treated shall be drained for a period of not less than 5 minutes. If wood products are palletized, the pallet load shall be tipped on edge to facilitate thorough drainage. After the dip treatment, the container must be air dried for a period of 24 hours minimum providing thru ventilation thus allowing full air circulation around all surfaces of the wood container. Accelerated drying in an oven or kiln is permitted providing oven or kiln temperature does not exceed 160°F. The boxes must be air dried to a maximum moisture content of 18 % when tested in accordance with prior to shipment. M-GARD W510 (copper naphthenate) or Cunapsol 5 (copper naphthenate) preservative. When treated with M-GARD W510 or Cunapsol 5, the container shall show evidence of discoloration when tested as specified.

X1.1.2 *Zinc Naphthenate Solution :*

X1.1.2.1 *Presence of M-GARD W550 (Zinc Naphthenate Emulsifiable) Preservative*—When treated with M-GARD W550, the container shall show evidence of discoloration when tested as specified.

X1.1.2.2 *Zinc Napthenate Preservative Test*—Prepare daily a solution of 0.1 g of dissolved dithizone (diphenylthiocarbazone) in 100 mL of chloroform and spray evenly over dried wood. A pink color indicates the presence of zinc.

NOTE X1.1—The pink color fades with light. An alternate method is to prepare a mixture of 10 mL each of three stock solutions, and pour them in an atomizer (sprayer). The first stock solution is comprised of 1 g of potassium ferricyanide.

X1.1.3 *Oxine Copper Solution (Copper-8-Quinolinolate):*

X1.1.3.1 *Oxine Copper Solution PQ56 Reduced with Water down to 1.8 % Copper-8-Quinolinolate as Solution*—Permapost K-8 treated wood is pressure impregnated by the closed cylinder vacuum pressure method as described in the latest AWPA standards. The preservative carrier shall conform to AWPA P9-03 and the active ingredient (copper-8-quinolinolate) shall conform to AWPA P8-03. Treatment specifications: Length of treating time and amount of preservative retained shall depend on the species of wood being treated and/or its end use. Treating procedures and quality control practices shall be as specified in the AWPA M2-81 and M3-81 or latest revision.

X1.1.3.2 *Presence of PQ56 (Copper-8-Quinolinolate) Preservative*—When treated with PQ65, the container shall show evidence of discoloration when tested as specified.

X1.1.3.3 *Oxine Copper Preservative Test*—Two drops of a formulation containing 10 parts, by weight, of sodium diethyldithiocarbamate trihydrate and 90 parts, by weight, of distilled

water shall be applied to the wood surface. An immediate dark brown coloration and the drops spreading shall indicate the presence of treatment. An alternate method is to spray, over the dried wood surface, a solution of dissolved 0.5 g chrome azurol S concentrate and 5.0 g of sodium acetate in 80 mL of distilled water, and diluted further to 500 mL total distilled water. A deep blue color reveals the presence of copper (from oxine copper) dissolved in 100 mL of distilled water. The second solution is made of 1 g of potassium iodide dissolved in 100 mL of distilled water with a starch indicator. The starch indicator solution is made from a paste of 1 g of soluble starch in about 5 mL of distilled water which is added to 100 mL of distilled water and boiled for one minute with constant stirring, and then cooled.

NOTE X1.2—This solution is subject to biodegradation and should not be used longer than three days. Spray the mixture evenly over the dried wood surface. The solution will cause the treated wood to turn a deep blue immediately, and the untreated part will retain its original color.

X1.1.4 *Preservative Dryness Test*—Completely assembled and knock-down containers shall be tested for preservative dryness. An assembled container shall be placed on either end with top open. A red oil soluble dye mixture consisting of 5 parts by weight of red oil soluble dye to 95 parts of borax, shall be prepared. The mixture shall be applied along the box interior juncture lines of the sides and bottom with the box end panel. Discoloration of the solution (red or deep pink) on any sample unit within 5 minutes from time of application when tested at 50°F [10°C], or above, shall be cause for rejection.

X1.1.5 *Containers*—Shall be treated such that the plywood absorbs not less than 2.2 lb/100 ft^2 (107 g/m^2). When sanded plywood is specified, the plywood shall be sanded prior to surface treatment. Wood cleats shall be preserved by immersing in wood preservative for a minimum of three minutes. When containers are painted, wood preservation shall be accomplished prior to paint application.