Retest. If no more than two tests in a lot of ten fall to meet the deflection requirements, another lot of ten may be tested for that requirement. If no more than one test fails in this second round of testing, the requirements shall be considered as being satisfied.

**Ultimate load**—For each lot, 100% of tests shall support the specified minimum ultimate load.

Retest. If no more than one test in a lot of ten fails to meet the minimum ultimate load requirement, another lot of ten may be tested for that requirement. If all pass the retest, the requirements shall be considered as satisfied.

**Uniform loads**

A minimum of ten tests (specimens taken from at least five panels) shall be conducted for uniform load capacity according to 4.5.6. The tests shall be conducted for each exposure condition specified in Table 8 or Table 10.

**Deflection**—The average deflection shall not be greater than that specified.

Retest. If the average deflection is greater than specified, but does not exceed the requirement by 20%, another lot of ten may be tested for that requirement. If the average of the first and second lot taken together does not exceed that specified, the requirement shall be considered as being satisfied.

**Ultimate load**—For each lot, 100% of tests shall support the specified minimum ultimate load.

Retest. If no more than one test in a lot of ten fails to meet the ultimate load requirement, another lot of ten may be tested for that requirement. If all specimens pass this retest, the requirements shall be considered as satisfied.

3.8.6.4. Bond durability—Panels shall be classed as “Exposure 1” or “Exterior.”

**Exposure 1**

Panels rated as “Exposure 1” shall be so identified and shall satisfy the bond requirements for Interior panels bonded with exterior glue, as specified in 3.7.3.

**Exterior**

Panels rated as “Exterior” shall be so identified and shall satisfy the bond requirements specified in 3.7.4.

3.8.6.5. Product evaluation

**Mill specification**

Upon conformance with the appropriate requirements of 3.8.6.3 and 3.8.6.4, a manufacturing specification will be written based on product evaluation under Subsection 3.8.6.5. This specification is to be used for quality assurance purposes by the manufacturer and the qualified testing agency, per 6.1.1. Product evaluation will be accomplished on the same lot supplied by the manufacturer for qualification testing. Control values established during product evaluation will be the basis for quality evaluation of future production. The mill specification shall contain the following information:

**Panel construction**

Panels shall be defined as to veneer species and construction.

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**Table 10. Uniform Load Performance Criteria for Panels Tested According to 4.5.6. — Single Floor.**

<table>
<thead>
<tr>
<th>Span Rating</th>
<th>Test Exposure Conditions(a)</th>
<th>Performance Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Average Deflection (in.) Under Load (psf)</td>
</tr>
<tr>
<td>16</td>
<td>Dry or Wet/Redry</td>
<td>0.044 at 100 psf</td>
</tr>
<tr>
<td>20</td>
<td>Dry or Wet/Redry</td>
<td>0.053 at 100 psf</td>
</tr>
<tr>
<td>24</td>
<td>Dry or Wet/Redry</td>
<td>0.067 at 100 psf</td>
</tr>
</tbody>
</table>

(a) Wet/Redry is exposure to three days continuous wetting followed by testing dry.
Thickness

The control value shall be the minimum average panel thickness as sampled under 3.8.6.1.

Mechanical properties

Bending stiffness—Twenty tests (specimens taken from at least ten panels) shall be evaluated for bending stiffness both along and across the major panel axis according to the procedures of 4.5.7. The control value for each panel direction will be the sample mean and the minimum will be the lower value of a 90% confidence interval established on the mean.

Bending strength—Ten tests (specimens from at least ten different panels) shall be tested for maximum bending moment both along and across the major panel axis according to the procedures of 4.5.7. The control value for each panel direction will be the minimum observed value, or the sample mean less 1.9 times the sample standard deviation, whichever is the higher value.

3.8.6.6. Reexamination

Quarterly reexamination

A product qualified by performance testing shall be subjected to quarterly reexamination by the manufacturer's qualified testing agency (6.1.1). Panels shall be tested according to the procedures of 3.8.6.5, Mechanical Properties.

Resampling—Failure to meet established control values shall result in an immediate intensive resampling of current production which will be tested for the failing property. This resampling shall consist of 20 panels.

Requalification—When results of the resampling fail to meet the applicable test requirements, a requalification for structural properties under 3.8.6.3 shall be required.

3.9. Scarf and finger jointed panels—Neither panels with N faces, nor the faces of such panels, unless longer than 10 feet, shall be scarf or finger jointed unless otherwise agreed to by buyer and seller. Panels of other grades may be scarf or finger jointed unless otherwise agreed to by buyer and seller, and panels longer than 12 feet are necessarily scarf or finger jointed. Plain scarf joints and the scarfed portion of finger joints shall not have a slope greater than 1 to 8. All plies with grain perpendicular to the finger joint shall be included in the scarfed portions of the joint, except that such plies may include up to 1/32 inch of vertical shoulder in the scarf (see Figure 5). Joints shall be glued with a waterproof adhesive and shall meet the test requirements set forth in 3.9.1, 3.9.2, 3.9.3, and 3.9.4 as applicable. In addition, the adhesive shall not show creep or flow characteristics greater than unjointed wood when subject to load under any conditions of temperature and moisture.

3.9.1. Strength requirements (Interior and Exterior) scarf and finger jointed panels—if the average ultimate stress of the three test specimens of any one panel is less than 4,000 psi for panels of Group 1 species, or less than 2,800 psi for panels of Group 2 or Group 3 species, or less than 2,400 psi for panels of Group 4 species, or less than 2,000 psi for panels of Group 5 species, when tested in accordance with 4.7.1, then that panel fails. The jointed panels represented by the sampling are acceptable if not more than one of the panels fails.

3.9.2. Scarf and finger joint durability for Interior panels bonded with interior glue—Scarfaced panels shall be tested in accordance with 4.7.2. Finger jointed panels shall be tested in accordance with 4.7.4. Test specimens showing continuous delamination in excess of 1/16 inch deep and 1/2 inch long at the joint glueline shall be considered as failing. More than one failing specimen in a panel shall constitute failure of that panel. The jointed panels represented by the sampling are acceptable if not more than one of the panels fails.

3.9.3. Scarf joint durability for Exterior type plywood and Interior type bonded with exterior glue (Exposure 1) or intermediate glue—Panels shall be tested in accordance with 4.7.3. The material represented by the sampling shall be evaluated in accordance with 3.7.2, 3.7.3, and 3.7.4, as applicable.

3.9.4. Finger joint durability for Exterior type panels and Interior type panels bonded with exterior glue (Exposure 1) or intermediate glue—Panels shall be tested in accordance with 4.7.5. The joints shall meet all of the following minimum conditions:

1. The average wood failure rating of all specimens from each panel when tested in accordance with 4.7.5 shall not be less than 85 percent.

2. No single specimen from a panel (average of face and back gluelines) shall rate less than 60 percent wood failure.

3. No single face or back glueline in any specimen shall rate less than 30 percent wood failure.
Shim — A long, narrow repair of wood or suitable synthetic not more than 3/16 inch wide.

Shop-cutting panel — A shop-cutting panel is one which has been rejected as not conforming to a standard grade because of deficiencies, other than adhesive bond quality, which prevents it from meeting the requirements of this Standard. Blistered panels are not considered as coming within the category of “shop-cutting” panel. Localized delamination may occur as a result of a deficiency. However, shop-cutting panels may be suitable for cut-up use where cutting eliminates the deficiency in the portion of the panel salvaged. Such a panel must be identified with a separate mark as specified in 6.2.1.

Span Rating — A set of numbers used in marking sheathing and combination subfloor-underlayment (single floor) grades of plywood as described in 3.8.5. Formerly called Identification Index.

Split — Lengthwise separation of wood fibers completely through the veneer, caused chiefly by the manufacturing process or handling.

Streaks — See “Pitch streak.”

Sub-face (Sub-back) — The ply adjacent to the exposed face (or back) of a parallel laminated outer layer.

Touch-sanding — A sizing operation consisting of a light surface sanding in a sander. Sander skips to any degree are admissible.

Veneer — Thin sheets of wood of which plywood is made. Also referred to as “plies” in the glued panel.

Wane — Thin to open areas in veneer sheets that result from outer log surface irregularities. Generally, only veneer peeled from the outer log surface will contain wane. Some wane areas may contain bark inclusions. For grading, wane is classed as an open defect.

Waterproof adhesive — For purposes of this Standard, glue capable of bonding plywood in a manner to satisfy the exterior performance requirements given herein.

White pocket — A form of decay (Fomes pini) that attacks most conifers but has never been known to develop in wood in service. In plywood manufacture, routine drying of veneer effectively removes any possibility of decay surviving. (Admissible amounts of white pocket permitted by this Standard were established through a 2-year research project at the U.S. Forest Products Laboratory.)

Light white pocket — Advanced beyond incipient or stain stage to point where pockets are present and plainly visible, mostly small and filled with white cellulose; generally distributed with no heavy concentrations; pockets for the most part separate and distinct; few to no holes through the veneer.

Heavy white pocket — May contain a great number of pockets, in dense concentrations, running together and at times appearing continuous; holes may extend through the veneer but wood between pockets appears firm. At any cross section extending across the width of the affected area, sufficient wood fiber shall be present to develop not less than 40 percent of the strength of clear veneer. Brown cubicule and similar forms of decay which have caused the wood to crumble are prohibited.

Wood failure (percent) — The area of wood fiber remaining at the glueline following completion of the specified shear test. Determination is by means of visual examination and expressed as a percent of the test area.

6. Gрадemarking and Certification

6.1. Certification of shipments — In order to assure that the purchaser is getting plywood of the grade and quality specified, the producer shall include with each shipment a “Certificate of Inspection” which states that the plywood conforms to this Standard. Each panel certified as being in conformance with this Standard shall bear the stamp of a qualified inspection and testing agency which (1) either inspects the manufacture (with adequate sampling, testing of glueline, and examination for quality of all veneers) or which (2) has tested a randomized sampling of the finished panels in the shipment being certified for conformance with this Standard. All plywood that is trademarked or otherwise designated as being in conformity with this Standard shall be accompanied by such Certificates of Inspection and applicable grade-trademarks of such inspection and testing agency as outlined above.
6.1.1. Qualified inspection and testing agency—A qualified inspection and testing agency is defined to be one that:

(a) has the facilities and trained technical personnel to verify that the grading, measuring, species, construction, sanding, bonding, workmanship, and other characteristics of the products as determined by inspection, sampling and testing conform to all of the applicable requirements specified herein;

(b) has developed procedures to be followed by agency personnel in performance of the inspection and testing;

(c) has no financial interest in, or is not financially dependent upon, any single company manufacturing the product being inspected or tested; and

(d) is not owned, operated, or controlled by any such company.

6.2. Panel marking—All panels represented as conforming to this Standard shall be identified with marks giving the following information:

(a) Species group number, Span Rating and Class—Unless otherwise provided, panels which are produced with face and back veneers of the same species group shall be identified as being of that species group. Touch-sanded panels without Span Ratings that are manufactured with face and back plies of different species groups shall be identified by the larger numbered species group (i.e., Group 4 is larger numbered than Group 1). Sanded panels 3/8 inch or less in thickness, and Decorative panels of any thickness, that are manufactured with face and back plies of different species groups shall be identified by the face species group number. Sanded panels greater than 3/8 inch that are manufactured with face and back plies of different species groups shall be identified by the larger numbered species group, except that sanded panels with C or D grade backs may be identified by the face species group number if backs are no more than one species group larger in number than the face and are 1/8 inch or thicker before sanding. A class number as provided in 3.8.4 shall be used in lieu of a species group number to identify concrete form panels and a Span Rating shall be used for unsanded and touch-sanded grades as provided for in 3.8.5.

(b) Either “Interior”, “Exposure 1” or “Exterior”—Panels not fully satisfying exterior veneer requirements shall be identified as “Interior” or “Exposure 1”. When panels are identified as “Interior” the additional notation “exterior glue” or “intermediate (IMG)” shall be used where applicable to supplement the designation of Interior grades bonded with exterior glue or intermediate glue. Any further reference to adhesive bond, including those which imply premium performance or special warranty by the manufacturer, as well as manufacturer’s proprietary designations, shall be separated from the grademarks or trademarks of the testing agency by not less than 6 inches.

(c) The grade name or the grade of face and back veneers or a mark of a qualified inspection and testing agency. If identified by such a mark, the product specification shall be available from the qualified inspection and testing agency whose mark appears on the panel.

(d) The symbol PS 183 signifying conformance with this Standard.

(e) The manufactured thickness of panels if other than standard nominal thickness, except for panels meeting the requirements of Table 6. For standard nominal thickness, see Appendix A1.2.

(f) The designation “ Butt-Jointed Center” for those panels manufactured with butt-joints in center plies in accordance with 3.8.

6.2.1. Voiding marks—Panels originally marked as conforming to this Standard but subsequently rejected as not conforming thereto shall have any reference to the Standard voided or obliterated by the manufacturer as follows:

Such panels shall be plainly marked by means of a 4 inch by 5 inch minimum size rectangular stamp carrying the legend, “Shop-cutting panel — all other marks void”. (See definition of shop-cutting panel.)

No reference shall be made to this Standard in the certification or grade trademarking of panels not conforming to all of the applicable provisions of this Standard.