

# ICC-ES Evaluation Report

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**DIVISION: 06 00 00—WOOD, PLASTICS AND  
COMPOSITES**
**Section: 06 02 00—Design Information**
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**EVALUATION SUBJECT:**
**PERFORMANCE STANDARDS AND QUALIFICATION  
POLICY FOR STRUCTURAL-USE PANELS, AND  
PERFORMANCE STANDARD FOR 303 SIDING**
**1.0 EVALUATION SCOPE**
**Compliance with the following codes:**

- 2009 *International Building Code*® (2009 IBC)
- 2009 *International Residential Code*® (2009 IRC)
- 2006 *International Building Code*® (2006 IBC)
- 2006 *International Residential Code*® (2006 IRC)

**Properties evaluated:**

- Structural
- Fire-resistive construction

**2.0 USES**

The Sturd-I-Floor Standard covers structural-use panels intended for use as combination subfloor and underlayment. The Sheathing Standard covers structural-use panels intended for use as sheathing for roofs, subflooring and walls. The Siding Standard covers structural-use panels intended for use as exterior siding. And the 303 Siding Standard covers prescriptive requirements for panels intended for use as exterior siding.

**3.0 DESCRIPTION**
**3.1 Structural-use Panels:**

**3.1.1 General:** Performance Standards and Qualification Policy for Structural-Use Panels is promulgated by APA—The Engineered Wood Association. The document includes:

- Sturd-I-Floor Standard
- Sheathing Standard
- Siding Standard

**3.1.1.1 Sturd-I-Floor Standard:** Covers sheathing thicknesses from  $19/32$  inch through  $1\frac{1}{8}$  inches (15.08 through 28.58 mm). The standard includes single-floor span ratings of 16, 20, 24, 32 and 48 inches (406, 508, 610, 813 and 1219 mm). Face ply (if veneer) and the ply adjacent to the face (if veneer) must meet the applicable requirements of DOC PS-1 underlayment grade. Veneer faces are touch-sanded and the backs are unsanded, touch-sanded, or textured.

**3.1.1.2 Sheathing Standard:** Identifies subfloor span ratings of 16, 20, 24, 32 and 48 inches (406, 508, 610, 813 and 1219 mm); roof span ratings of 16, 20, 24, 32, 40, 48, 54 and 60 inches (406, 508, 610, 813, 1016, 1219, 1372, and 1524 mm); and wall span ratings of 16 or 24 inches (406 or 610 mm). The span rating is determined on the basis of the results of performance tests as noted in Section 3.1.2 of this report. Sheathing/ceiling deck has one face textured.

**3.1.1.3 Siding Standard:** Identifies span ratings (maximum stud spacings) of 16 and 24 inches (406 and 610 mm). Panels are composed entirely of veneer, of combinations of veneer and reconstituted wood or entirely of reconstituted wood, except that hardboard siding is not included. The span rating is determined on the basis of results of performance tests as noted in Section 3.1.2 of this report.

**3.1.2 Performance Requirements:**

**3.1.2.1 Structural Performance:** Structural-use panels meet performance requirements for concentrated, impact, and uniform loads for the end use span on the grade mark. Panels are tested dry, wetted and redried; and, for certain loading conditions, tested wet. Load test requirements are given in Performance Standards and Qualification Policy for Structural-Use Panels. Roof spans and live loads must not exceed those given in the applicable code and dead loads must not exceed 10 psf (480 Pa). The live load for floor panels must not exceed 100 psf (4800 Pa) with dead loads not to exceed 10 psf (480 Pa), except that the Sturd-I-Floor panel, with a span rating of 48 inches (1219.2 mm) on center, is limited to a total floor load of 65 psf (3120 Pa).

**3.1.2.2 Panel Bond Classification:** The performance standard requires evaluation of the resin bonding system. Exterior-type plywood in U.S. Department of Commerce Voluntary Product Standard PS-1 is designed to be exposed in outdoor applications for its entire service life. Siding panels are identified as Exterior. Other panels are identified as Exposure 1 and are not intended for permanent exposure to weather. Exposure 1 panels are designed to be used for roof sheathing, subflooring, combination subfloor-underlayment, or wall sheathing and

must be covered with an approved roof covering or exterior wall covering. Panels identified as Exposure 1 are designed to be used for roof sheathing where exposed on the underside such as on eaves.

### 3.1.2.3 Composition:

**3.1.2.3.1 Veneer:** Veneer used in structural-use panels meets the applicable requirements of DOC PS-1. Veneer not meeting the requirements of DOC PS-1 is designed to be used, provided the panels meet the applicable performance requirements. Veneer is used throughout the all-veneer panels and for face and back plies or inner layers in composite panels.

**3.1.2.3.2 Reconstituted Wood:** Panels composed entirely of reconstituted wood are oriented strand board (OSB) or other wood-based panels. The panels are manufactured to meet the performance requirements given in Performance Standards and Qualification Policy for Structural-Use Panels.

**3.1.2.3.3 Veneer and Reconstituted Wood:** Panels composed of veneer and reconstituted wood are composite panels. The panels are manufactured to meet the performance requirements given in Performance Standards and Qualification Policy for Structural-Use Panels.

### 3.1.3 Panels:

**3.1.3.1 Size:** Panels are produced in nominal sizes of 4 feet by 8, 9 or 10 feet (1.2 m by 2.4, 2.7 or 3 m). Length and width tolerances are +0, - $\frac{1}{8}$  inch (+0, -3.18 mm).

**3.1.3.2 Tongue-and-Groove Joints:** When panels have tongue-and-groove joints, the joints are on the 8-foot (2.4 m) sides, 4-foot (1.2 m) ends, or both.

**3.1.3.3 Shiplap Edges:** When siding panels have shiplap edges, the edges occur on the 8-, 9-, or 10-foot (2.4, 2.7, or 3 m) sides. The joint is cut approximately one-half way through the thickness and, when installed (after expansion occurs), provides a  $\frac{3}{8}$ -inch (9.53 mm) lap.

### 3.2 303 Siding:

303 Siding is manufactured from exterior plywood meeting the gluebond performance requirements of DOC PS-1 for construction and industrial plywood, and must be one of the following:

1. Grade C-C or better, conforming to PS-1.
2. Openings in face veneers used for three- and four-ply panels limited to open splits up to  $\frac{1}{16}$  inch (1.6 mm) wide and other openings up to  $\frac{1}{4}$  by  $\frac{1}{2}$  inch (6.4 by 12.7 mm).
3. Overlaid panels, conforming to PS-1.
4. Panels meeting grade requirements of Items 1, 2 and 3, above, but nonconforming with respect to PS-1 by reason of species. Species not provided for in PS-1 may be used in 303 Siding panels, subject to the following conditions:
  - a. Species group assignment shall be established for PS-1 species grouping; the group assignments will govern use of the species for inner plies and backs as covered by this specification.
  - b. Panels manufactured with unlisted species for faces must be identified by the common name for that species.
  - c. There must be no reference to PS-1 in the panel trademark.

## 4.0 INSTALLATION

### 4.1 General:

The Structural-Use Panels and 303 Siding must be installed in accordance with this report and the applicable code for wood structural panels and siding. The following installation provisions are limited to those not found in the applicable code.

### 4.2 Sturd-I-Floor:

Sturd-I-Floor must be installed in accordance with the applicable code provisions for wood structural panels of single-floor grade meeting PS-2.

If panels are field-glued with an adhesive meeting ASTM D 3498 applied to joists and tongue-and-groove edges, nails may be spaced a maximum of 12 inches (304.8 mm) along all bearings for panels  $\frac{3}{4}$  inch (19.05 mm) thick or less, and 6 inches (152.4 mm) for thicker panels. Framing must be free of surface moisture, dirt, cement, and other foreign materials prior to application of the adhesive. Where diaphragm action is required, the nail size and spacing must be as set forth in the applicable code.

### 4.3 Sheathing:

Sheathing must be installed in accordance with the applicable code provisions for wood structural panels of Sheathing Grade meeting PS-2.

### 4.4 Siding:

**4.4.1 General:** Siding must be installed over a water-resistive barrier complying with IRC Section R703.2 or IBC Section 1404.2, as applicable, applied either directly to framing or over sheathing. When siding is applied directly to studs, the studs must be spaced no farther apart than the span rating included in the grade mark on the panel. All veneer-faced siding panels with a span rating of 16 or 24 (406 or 610 mm) on center may be applied over studs spaced 24 inches (610 mm) on center when application is with face grain horizontal or over nailable sheathing. Other siding panels with a span rating of 16 or 24 inches (406 or 610 mm) on center may be applied over studs spaced 24 inches (610 mm) on center when application is over nailable sheathing. Nailable sheathing must be nominally 1-inch (25 mm) boards or structural-use panels of thickness permitted in the applicable code for wood structural panel sheathing to which the siding is directly attached.

Fasteners for attaching siding must be nonstaining box, siding or casing nails. For panels  $\frac{1}{2}$  inch (12.7 mm) thick or less, 6d nails are used, and 8d for thicker panels. For  $\frac{3}{8}$ -inch (9.53 mm) and thinner lap siding, 6d nails are used, and 8d for thicker lap siding.

**4.4.2 Panel Siding:** Panel siding must be fastened directly to framing in accordance with wood structural panel provisions of the code. When siding  $\frac{1}{2}$  inch (12.7 mm) or less in thickness is installed over foam plastic insulation up to 1 inch (25.4 mm) in thickness, the siding must be fastened with 8d galvanized box nails. Siding greater than  $\frac{1}{2}$  inch (12.7 mm) in thickness applied over foam plastic insulation must be fastened with 10d galvanized box nails.

Panel siding applied directly to studs, spaced in accordance with the span rating and fastened with 6d galvanized box nails or equivalent, spaced 6 inches (152 mm) on center at panel edges and 12 inches (305 mm) on center at intermediate studs, is an alternative to the wood structural panel sheathing construction specified in the code for wall bracing (IRC Table R602.10.2, Method WSP).

Shear values for all-veneer panel siding must be as given in the applicable code for siding applied directly to studs or over  $1/2$ - or  $5/8$ -inch (12.7 mm or 15.88 mm) gypsum sheathing. Thickness at point of nailing at panel edges determines applicable values.

**4.4.3 Lap Siding:** Lap siding must be applied either directly to framing or over nailable sheathing as defined above. Vertical end joints must be either caulked or otherwise installed in accordance with the recommendations of the manufacturer. Siding joints, if staggered, may occur away from studs when nailable sheathing is used. When lap siding is installed over nailable sheathing, nails must be spaced 8 inches (203 mm) on center along the bottom edge. If siding is wider than 12 inches (305 mm), siding is also nailed to intermediate studs with nails spaced 8 inches (203 mm) on center.

#### 4.5 Diaphragms and Shear Walls:

**4.5.1 Diaphragm Construction:** When used in diaphragm construction, structural-use panels are assigned the values in the applicable code. The unblocked values shown also apply to panels having tongue-and-groove joints along the longitudinal edges, except as noted below.

One-and-one-eighth-inch (28.58 mm) structural-use panels fastened with 8d ring or screw-shank nails or 10d common nails are assigned the values for 10d common nails and  $19/32$ -inch (15.08 mm) minimum panel thickness. Where blocked values are required for  $1^{3/32}$ - or  $1^{1/8}$ -inch (27.78 or 28.58 mm) tongue-and-grooved panels, 1-inch-by- $3/8$ -inch-crown (25.4 by 9.53 mm) by No. 16 gage staples must be driven through the tongue-and-groove edges  $3/8$  inch (9.53 mm) from the joint and driven so as to penetrate the tongue as illustrated in Figure 1. Staples must be spaced at one-half of the boundary nail spacing in the applicable code for Cases 1 and 2, and at one-third the boundary nail spacing for Cases 3 through 6.

**4.5.2 Shear Walls:** When used in shear walls, sheathing is assigned the values in the applicable code except that the allowable shear for wall bracing panels applied directly to studs in accordance with the above nail schedule must be 180 plf (2626.2 N/m) regardless of panel thickness.

#### 4.6 303 Siding:

Installation of 303 Siding must comply with the following:

1. 303 Siding panels intended for direct application to studs spaced 16 inches (406 mm) on center, and 303 panels meeting the requirements of Item 2.e. of Section 4.6, intended for direct application to studs spaced 24 inches (610 mm) on center, must conform to the following requirements:
  - a. Panels must have a minimum average thickness of  $5/16$  inch (7.9 mm) in any 16-inch (406 mm) width.
  - b. When two crossband layers remain intact, the minimum thickness of crossbanding must not be less than  $1/16$  inch (1.6 mm) for Group 1, 2 or 3 species (PS-1).
  - c. When only one crossband layer remains intact, the requirements shown in Table 1 apply.
2. 303 Siding panels intended for direct application to studs located 24 inches (610 mm) on center must conform to the minimum requirements specified in Items a through d of this section, or the special conditions specified in Item e of this section.
  - a. Panels must be minimum four-ply construction. Four-ply panels must not exceed  $5/8$  inch (16 mm) in nominal thickness, and texturing must not extend into the inner layer. Panels of five or more plies must have at least two crossband layers remaining intact.
  - b. Minimum net panel thickness at any point must be  $13/32$  inch (10.3 mm), with no minus tolerance.
  - c. Panels must have a minimum average thickness of  $7/16$  inch (11.1 mm) in any 24-inch (610 mm) width.
  - d. Thickness of crossbanding must be at least  $1/10$  inch (2.5 mm).
  - e. Panels must have a minimum of five plies and a nominal thickness of  $19/32$  inch (15 mm) or more (measured in ungrooved areas), with grooves no wider than  $1^{1/2}$  inches (38 mm) and spaced no closer than 12 inches (305 mm) on center. Panels must meet the requirements of Item 3, 4, 7 or 8 of Table 1.
3. As an alternate to the requirements of Section 4.6, paragraph 1 or 2, 303 Siding panels or lap siding intended for direct application to studs spaced 16 or 24 inches (406 or 610 mm) on center must conform to performance testing provisions for siding given in Performance Standards and Qualification Policy for Structural-Use Panels.
4. 303 Siding panels must be identified with an APA grade-trademark bearing the notation "303 Siding" or "Rated Siding 303." Grade-trademarks for panels fulfilling the requirements of Section 4.6, paragraph 1 or 3, must include the additional notation "16 inches on center." Grade-trademarks for panels fulfilling the requirements of Section 4.6, paragraph 2 or 3, must include the additional notation "24 inches on center."
5. 303 Siding panels with a minimum thickness set forth in Section 4.6, paragraph 1, must be applied in accordance with the stud spacing indicated on the grade-trademark, except that the siding may be applied over studs spaced 24 inches (610 mm) on center if application is with face grain horizontal or if over one of the following:
  - a. One-inch-thick (25.4 mm) board sheathing.
  - b. Three-eighths-inch-thick (9.5 mm) or  $15/32$ -inch-thick (11.9 mm), three-ply plywood sheathing, with face grain of sheathing perpendicular to studs.
  - c. Fifteen-thirty-seconds-inch-thick (11.9 mm), four- or five-ply plywood sheathing, with face grain of sheathing parallel or perpendicular to studs.
  - d. Other rated sheathing panels identified with PS-2 or Performance Standards and Qualification Policy for Structural-Use Panels having a roof span rating of 24 inches (610 mm) or more, with the long panel dimension parallel or perpendicular to studs.
6. 303 Siding panels may be applied either directly to framing or over sheathing, provided all siding joints occur over framing and are protected with a continuous wood batt, approved caulking, flashing, and vertical or horizontal shiplaps, or are otherwise made waterproof to the satisfaction of the code official. Where grooved siding is applied horizontally directly to framing, siding must be backed with a water-resistive barrier complying with IBC Section 1404.2 or IRC Section R703.2. 303 Siding must be fastened directly to framing in accordance with IBC Table 2304.9.1 or IRC Table R602.3(1).

7. 303 Siding panels  $\frac{1}{2}$  inch (12.7 mm) or less in thickness may be installed over foam plastic sheathing up to 1 inch (25.4 mm) in thickness, using 8d galvanized box nails. 303 Siding greater than  $\frac{1}{2}$  inch (12.7 mm) in thickness applied over foam sheathing must be fastened using 10d galvanized box nails. Other corrosion-resistant box nails may be used if racking shear values are not required.
8. 303 lap siding may be applied over nailable sheathing (see Section 4.6, paragraph 5) or, when span rated, may be applied directly to studs or over nonstructural sheathing. When lap siding is applied directly to studs or over nonstructural sheathing, diagonal bracing or other code-specified wall-bracing methods must be used. A code-specified water-resistive barrier must be used beneath the lap siding. Lap siding  $\frac{1}{2}$  inch (12.7 mm) thick or less is permitted to be installed directly to studs using 6d galvanized box, siding or casing nails, with 8d nails used for lap siding thicker than  $\frac{1}{2}$  inch (12.7 mm). If lap siding is installed over rigid foam plastic insulation sheathing up to 1 inch (25 mm) thick, 10d nails [for  $\frac{3}{8}$ -inch- (9.5 mm) or  $\frac{7}{16}$ -inch-thick (11.1 mm) siding], 12d nails [for  $\frac{15}{32}$ -inch- (11.9 mm) or  $\frac{1}{2}$ -inch-thick (12.7 mm) siding], or 16-penny nails [for  $\frac{19}{32}$ -inch-thick (15.1 mm), or thicker, siding] must be used. Nails must be installed at every stud along the bottom edge of the lap siding. Nails for lap siding over nailable sheathing must be spaced 8 inches (203 mm) on center along the bottom edge. Minimum head lap is 1 inch (25.4 mm).
9. The shear values for 303 siding panels installed directly to the studs or over gypsum sheathing are the same as those specified in IBC Table 2306.3 for plywood panel siding. Thickness at point of nailing at panel edges determines allowable shear wall values.
10. 303 Siding applied over foam plastic insulation on studs spaced either 16 or 24 inches (406 or 610 mm) on center with gypsum wallboard installed on the interior is an alternate to the construction specified in Item 3 of IBC Section 2308.9.3; or in Method WSP of IRC Section R602.10.2.
11. 303 Siding used as roof sheathing, with the underside exposed, is permitted the allowable spans specified in Table 2. 303 Siding is assigned the shear values given in IBC Table 2306.3 for grades other than Structural I. Thickness at point of nailing at panel edges determines applicable values.
12. 303 Siding with a maximum thickness of  $\frac{5}{8}$  inch (15.9 mm) and a minimum thickness of  $\frac{1}{4}$  inch (6.4 mm) may be used as a finish material where Class C materials are required.
13. 303 Siding applied directly to studs is adequate to resist inward-acting forces and outward-acting forces caused by wind pressures determined in accordance with IBC Section 1609, except where wind velocities exceed 105 mph (170 km/h), under which circumstances the 303 Siding must be attached to intermediate studs at wall corners (as defined in the applicable code), with nails spaced a maximum of 6 inches (152 mm) on center.

#### 4.7 Fire-resistive Construction:

As an alternate to plywood of the same thickness, structural-use panels may be used in one-hour fire-resistive floor-ceiling or roof-ceiling assemblies permitted by the applicable code. In lieu of  $\frac{15}{32}$ -inch-thick (11.9 mm) or  $\frac{1}{2}$ -inch-thick (12.7 mm) plywood, two-layer assemblies are permitted to be constructed with  $\frac{7}{16}$ -inch-thick (11.1 mm), nonveneer rated sheathing (span-rated 24/16).

The  $\frac{13}{32}$ -inch- or  $\frac{1}{8}$ -inch-thick (27.8 mm or 28.6 mm) Sturd-I-Floor (rated 48 oc) panels may be substituted for the double-wood floor for one-hour wood-floor construction.

Structural-use panels may be installed between the fire protection and the wood studs on either the interior or exterior side of fire-resistance-rated wood frame wall and partition assemblies described in the applicable code, provided the length of fasteners is adjusted for the added thickness of the panel.

Tongue-and-groove structural-use panels that are either  $\frac{13}{32}$  inch or  $\frac{1}{8}$  inch (27.8 mm or 28.6 mm) thick, with exterior glue, may be substituted for the plywood permitted in the code for heavy timber roof decks in Type IV construction.

#### 4.8 Interior Finish:

Structural-use panels with a minimum nominal thickness of  $\frac{1}{4}$  inch have a Class C finish classification when tested in accordance with ASTM E 84.

#### 5.0 CONDITIONS OF USE

The Performance Standards and Qualification Policy for Structural-Use Panels, and the Performance Standard for 303 Siding, described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The scope of this evaluation report is limited to the evaluation of the document Performance Standards and Qualification Policy for Structural-Use Panels promulgated by the APA—The Engineered Wood Association and the installation requirements noted in Section 4.0 of this report. Evaluation of manufactured products is outside the scope of this report.
- 5.2 Span ratings and load capacities are based on untreated panels or plywood panels treated only with preservatives in accordance with AWPA U1 Section 6.F. Structural performance characteristics of FRTW panels are outside the scope of this report.

#### 6.0 EVIDENCE SUBMITTED

Test data, material specifications, and descriptive brochures.

#### 7.0 IDENTIFICATION

Identification of structural-use panels and 303 siding shall meet the requirements of Performance Standards and Qualification Policy for structural-Use Panels promulgated by APA—The Engineered Wood association.

TABLE 1—REQUIREMENTS THAT APPLY WHEN ONLY ONE CROSSBAND LAYER REMAINS INTACT

ITEM NUMBER	MINIMUM NET PANEL THICKNESS AT ANY POINT AFTER FACE TREATMENT (with no minus tolerance) (inch)	MINIMUM NUMBER OF PLYS IN PANEL	SPECIES GROUP OF CROSSBAND REMAINING INTACT	MINIMUM THICKNESS OF CROSSBAND REMAINING INTACT (inch)
1	9/32	3	1	1/6
2	9/32	3	2 or 3	3/16
3	9/32	5	1 or 2	1/9
4	9/32	5	3 or 4	1/8
5	11/32	3	1-2 or 3	1/8
6	11/32	3	4	1/7
7	11/32	5	1-2 or 3	1/10
8	11/32	5	4	1/9

For SI: 1 inch = 25.4 mm.

TABLE 2—ALLOWABLE SPANS FOR APA RATED 303 PLYWOOD SIDING USED AS ROOF SHEATHING<sup>1</sup>

MINIMUM NOMINAL THICKNESS (inches)	SPECIES GROUP NO.	MAXIMUM SPAN (inches)
15/32	1	24
15/32	2, 3, 4	16
19/32	1	32
19/32	2, 3, 4	24
23/32	1, 2, 3, 4	32
1 1/8	1, 2, 3, 4	48

For SI: 1 inch = 25.4 mm, 1 psf = 48 Pa.

<sup>1</sup>Plywood continuous over two or more spans, long dimension across supports. Uniform load deflection limit is 1/240 of the span under live load. Live load capacity at maximum span for all listed construction is 30 psf.

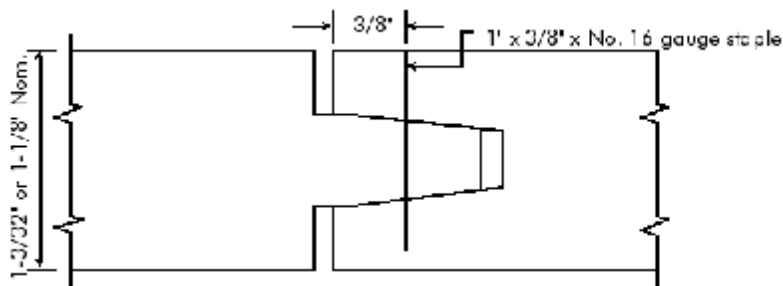


FIGURE 1—DETAIL OF STAPLE IN TONGUE-AND-GROOVE JOINT OF STURD-I-FLOOR 48 oc (1 in = 25.4 mm)