

ICC-ES Evaluation Report

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| <p>DIVISION: 06 00 00 — WOOD, PLASTICS AND COMPOSITES</p> <p>Section: 06 16 00 — Sheathing</p> <p>DIVISION: 07 00 00 — THERMAL AND MOISTURE PROTECTION</p> <p>Section: 07 46 46 — Fiber-Cement Siding</p> | <p>REPORT HOLDER: JAMES HARDIE BUILDING PRODUCTS, INC.</p> | <p>EVALUATION SUBJECT: HARDIE® PANEL (PREVAIL®, CEMPANEL®) SIDING, HARDIE® ARCHITECTURAL PANELS, HARDIFLEX® SIDING AND HARDITEX BASEBOARD</p> |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2021, 2018, 2015, 2012, 2009 and 2006 [International Building Code® \(IBC\)](#)
- 2021, 2018, 2015, 2012, 2009 and 2006 [International Residential Code® \(IRC\)](#)
- 2006 [International Energy Conservation Code® \(IECC\)](#)
- 2013 *Abu Dhabi International Building Code (ADIBC)*[†]

[†]The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Property evaluated:

- Weather protection
- Structural
- Noncombustible (Types I, II, III and IV) construction
- Fire-resistance-rated construction
- Thermal resistance

1.2 Evaluation to the following green code(s) and/or standards:

- 2022 California Green Building Standard Code (CALGreen), Title 24, Part 11
- 2020, 2015, 2012 and 2008 ICC 700 *National Green Building Standard*[™] (ICC 700-2020, ICC 700-2015, ICC 700-2012 and ICC 700-2008)
- 2021, 2018 and 2024 *International Green Construction Code*[®] (IgCC)
- 2020 and 2017 ANSI/ASHRAE/USGBC Standard 189.1 – Standard for the Design of High-Performance Green Buildings, Except Low-Rise Residential Buildings

Attributes verified:

See Section 3.0

2.0 USES

The James Hardie fiber-cement panels described in this report are used as exterior wall coverings. The panels may be used in fire-resistance-rated construction as set forth in Section 4.3 and may be used on exterior walls of Types I, II, III, IV and V construction.

3.0 DESCRIPTION**3.1 General:**

The panels are single-faced, cellulose fiber–reinforced cement (fiber-cement) products identified as Hardie[®] Panel (Prevail[®], Cempanel[®]) panel siding, Hardie[®] Architectural Panels, Hardiflex[®] panel siding and Harditex[®] Baseboard; the panels are supplied either coated or uncoated for subsequent application of a compatible exterior-grade top coat. Nominal product dimensions are noted in Table 1.

The panels comply with ASTM C1186, Grade II, Type A. They have a nominal density of 83 lbs/ft³ (1332 kg/m³); a flame-spread index of 0 and a smoke-developed index of 5 or less when tested in accordance with ASTM E84; and are classified as noncombustible when tested in accordance with ASTM E136. Thermal conductance (*K*) and thermal resistance (*R*) values for the panels are as shown in Table 2. When tested in accordance with ASTM E96, products with a thickness of 1/4 inch (6.4 mm) and 5/16 inch (7.5 mm) have permeance values given in Table 3.

The attributes of the fiber-cement sidings have been verified as conforming to the provisions of ICC 700-2020, ICC 700-2015 and ICC-700-2012 Sections 602.1.6 and 11.602.1.6 (termite-resistant materials); (ii) ICC 700-2008 Section 602.8 (termite-resistant materials); (iii) CALGreen Section A4.405. 1.3 (prefinished materials) and A5.406.1.2 (reduced maintenance); (iv) ICC 700-2020 Sections 601.7 and 11.601.7 (prefinished materials); (v) ICC 700-2015 and ICC 700-2012 Sections 601.7, 11.601.7 and 12.1(A).601.7 (prefinished materials); (vi) ICC 700-2008 Section 601.7 (prefinished materials); (vii) ICC 700-2020 Sections 611.1.2 and 11.611.1.2 (Product Specific Declarations); (viii) ICC 700-2015 Sections 611.4.2 and 11.611.4.2 (Product Specific Declarations); (ix) 2021 and 2018 IgCC Section 901.4.1.4.2 (Product Specific Declarations); (x) 2015 IgCC Section 505.4.1 (Product Specific Declarations); (xi) and 2020 and 2017 ASHRAE 189.1 Section 9.4.1.4.2 (Product Specific Declarations). The users are advised of the project-specific provisions that may be contingent upon meeting specific condition, and the verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

Note: The Environmental Product Declaration (EPD) provide to ICC-ES was verified by a Program Operator other than ICC-ES. ICC-ES makes no claims or warranties regarding the contents of the EPD provided. Please contact the report holder to obtain a copy of the PED and confirm its validity; see Section 7.0 for the report holder's contact information.

3.2 Materials:

3.2.1 Hardie[®] Panel (Prevail[®], Cempanel[®]) Siding: Hardie[®] Panel Prevail[®], Cempanel[®] siding is available with various surface textures including smooth. Nominal product dimensions are noted in Table 1 of this report.

3.2.2 Hardie[®] Architectural Panels: Hardie[®] Architectural Panels are available as non-grooved or as grooved panels with various surface textures. Nominal product dimensions are noted in Table 1 of this report (see note 1 in Table 1 regarding nominal dimensions of grooved panels).

3.2.3 Hardiflex[®] Siding: Hardiflex[®] siding is available in various textures including smooth. Nominal product dimensions are noted in Table 1 of this report.

3.2.4 Harditex[®] Baseboard: Harditex[®] Baseboard is used as a starter strip for exterior applications of walls and soffits. Harditex[®] Baseboard has an untextured finish and is available with either tapered or trough edges on the two long sides for joint treatment or all square edges. Harditex[®] Baseboard is supplied either sealed or unsealed for the subsequent application of a primer or sealer by the end user as a component in a direct-applied exterior coating or finish system. Nominal dimensions are noted in Table 1 of this report.

3.3 Fasteners:

Fastener type, size and spacing must be as shown in Table 4.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The maximum basic wind speeds for positive and negative transverse load resistance are presented in [Table 4](#).

4.2 Installation:

4.2.1 General: The manufacturer's published installation instructions and this report must be strictly adhered to and a copy of this report and the instructions must be available on the jobsite during construction. The panels must be installed in accordance with 2021 and 2018 IBC Section 1404.16; 2015, 2012, and 2009 IBC Section 1405.16; and 2006 IBC Section 1405.15; and 2021 and 2018 and 2015 IRC Table R703.3 and Section R703.10; 2012, 2009, and 2006 IRC Table R703.4 and Section R703.10, and the manufacturer's installation instructions.

4.2.2 Hardie[®] Panel (Prevail[®], Cempanel[®]) Siding: The panels are applied with the long dimension either parallel or perpendicular to framing. Vertical joints are fastened at abutting sheet edges. Vertical joints must occur over framing or wood furring members except where the panels are installed and fastened to wood structural panel sheathing in accordance with [Table 4](#). The vertical joints must be sealed with caulking covered with battens, or must be designed to comply with 2021 and 2018 IBC Section 1402.2; and 2015, 2012, 2009, and 2006 IBC Section 1403.2; and IRC Section R703.1. Horizontal joints must be flashed with Z-flashing. Fasteners must be installed with a minimum $\frac{3}{8}$ -inch (9.5 mm) edge distance and a minimum 2-inch (51 mm) clearance from corners. Where a specified level of wind resistance is required, the panel siding is attached to framing members, furring members, or wood structural panel sheathing, appropriately spaced, with fastener types, lengths, and spacing described in [Table 4](#).

4.2.3 Hardie[®] Architectural Panels: The panels are applied with the long dimension parallel or perpendicular to framing. Vertical joints are fastened at abutting sheet edges. Vertical joints must occur over framing except where the panels are installed and fastened directly to wood structural panel sheathing in accordance with [Table 4](#). The vertical joints must be sealed with caulking, covered with battens, or must be designed to comply with 2021 and 2018 IBC Section 1402.2; and 2015, 2012, 2009, and 2006 IBC Section 1403.2; and IRC Section R703.1. Horizontal joints must be flashed with Z-flashing. Fasteners must be installed with a minimum $\frac{3}{8}$ -inch (9.5 mm) edge distance and a minimum 2-inch (51 mm) clearance from corners. Where a specified level of wind resistance is required, the panel siding is attached to framing members, furring members, or wood structural panel sheathing, appropriately spaced, with fastener types, lengths, and spacing described in [Table 4](#).

4.2.4 Hardiflex[®] Siding: The panels are applied with the long dimension either parallel or perpendicular to framing and with all panel edges supported by framing. Fasteners must be installed with a minimum $\frac{3}{8}$ -inch (9.5 mm) edge distance and a minimum 2-inch (51 mm) clearance from corners. Joints must be fastened at abutting sheet edges. Vertical joints must occur over framing members and must be protected by PVC joint treatment, lumber battens, or sealant. Horizontal joints must be flashed with metal Z-flashing and blocked with solid framing. Where a specified level of wind resistance is required, the panel siding is attached to framing members, appropriately spaced, with fastener types, lengths, and spacing as noted in [Table 4](#).

4.2.5 Harditex[®] Baseboard: The panels are applied with the long dimension either parallel or perpendicular to framing and with all panel edges supported by framing. Vertical and horizontal joints must be sealed with a sealant or bedding compound, including any required joint reinforcing mesh or tape, specified by the coating or finish system manufacturer. Fasteners must be installed with a minimum $\frac{3}{8}$ -inch (9.5 mm) edge distance and a minimum 2-inch (51 mm) clearance from corners. Where a specified level of wind resistance is required, the baseboard is attached to framing members, appropriately spaced, with fasteners types, lengths, and spacing as noted in [Table 4](#).

4.3 Fire-resistance-rated Assemblies:

4.3.1 Assembly 1—One-hour Asymmetrical Nonload-bearing:

4.3.1.1 Interior Face: The asymmetrical, nonload-bearing, one-hour fire-resistance-rated wall assembly consists of minimum $3\frac{5}{8}$ -inch-deep (92 mm), No. 20 gage [0.0359-inch (0.91 mm)] steel "C" studs spaced at a maximum of 24 inches (610 mm) on center, with corresponding top and bottom tracks. One layer of $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum board complying with ASTM C1396, 48 inches (1219 mm) wide, is applied vertically to the interior side of the studs and secured with $1\frac{1}{4}$ -inch-long (32 mm), Type S, gypsum board

screws, spaced 8 inches (203 mm) on center at board edges and 12 inches (305 mm) on center at intermediate framing members. All board joints must be backed by framing members. The $\frac{5}{8}$ -inch-thick (15.9 mm) gypsum board joints and screw heads must be finished in accordance with ASTM C840.

4.3.2 Exterior Face: The exterior side of the studs must be covered with one layer of $\frac{1}{2}$ -inch-thick (12.7 mm), Type X, water-resistant gypsum board complying with ASTM C1396, followed by one layer of minimum $\frac{1}{4}$ -inch-thick (6.4 mm) Hardie[®] Panel (Prevail[®], Cempanel[®]), or Hardiflex[®] siding or Harditex[®] Baseboard or Hardie[®] Architectural Panels (non-grooved). The Type X gypsum boards must be applied vertically to framing members with vertical edges staggered 24 inches (610 mm). The $\frac{1}{2}$ -inch-thick (12.7 mm), Type X gypsum board must be fastened to the framing members with $\frac{1}{4}$ -inch-long (32 mm), Type S, gypsum board screws spaced 24 inches (610 mm) on center. All gypsum board joints must be backed by framing members. Hardie[®] Panel (Prevail[®], Cempanel[®]), or Hardiflex[®] siding or Harditex[®] Baseboards, or Hardie[®] Architectural Panels (non-grooved) must be fastened through the gypsum board to the framing members with minimum $1\frac{5}{8}$ -inch-long (41 mm) by minimum 0.323-inch (8.2 mm) HD self-drilling, corrosion-resistant, ribbed buglehead or ribbed wafer head screws located a maximum of 8 inches (203 mm) on center. Hardie[®] Panel (Prevail[®], Cempanel[®]), Hardiflex[®] siding, Harditex[®] Baseboard or Hardie[®] Architectural Panels (non-grooved) joints require treatment similar to that described in Sections 4.2.2, 4.2.3 and 3.2.3, respectively.

4.3.3 Assembly 2—One-hour Nonload-bearing: The nonload-bearing, one-hour, fire-resistance-rated wall assembly consists of minimum $3\frac{5}{8}$ -inch-deep (92 mm), No. 20 gage [0.0359 inch (0.91 mm)], steel “C” studs spaced at a maximum of 24 inches (610 mm) on center, with corresponding top and bottom tracks. Both sides of the wall must be covered with one layer of $\frac{1}{2}$ -inch-thick (12.7 mm), Type X gypsum board (interior side)/gypsum sheathing (exterior side) complying with ASTM C1396, followed by one layer of minimum $\frac{1}{4}$ -inch-thick (6.4 mm) Hardie[®] Panel (Prevail[®], Cempanel[®]), or Hardiflex[®] siding, Harditex[®] Baseboard or Hardie[®] Architectural Panels (non-grooved). The panels must be applied either perpendicular (horizontally) or parallel (vertically) to framing members. All board joints must be backed by framing. Base layer and face layer board joints of both wall sides must be offset by 24 inches (610 mm). The $\frac{1}{2}$ -inch-thick (12.7 mm), Type X gypsum board/sheathing must be fastened to the framing members with minimum 1-inch-long (25.4 mm), Type S, gypsum board screws spaced a maximum of 24 inches (610 mm) on center. The panels must be fastened through the gypsum board to the framing members with minimum $1\frac{5}{8}$ -inch-long (41 mm) by minimum 0.323-inch (8.2 mm) HD self-drilling, corrosion-resistant, ribbed, buglehead or ribbed wafer head screws located a maximum of 8 inches (203 mm) on center. Panel joints and fasteners require treatment similar to that described in Section 4.2.2, 4.2.3 or 4.2.4, of this report.

5.0 CONDITIONS OF USE:

The Hardie[®] Panel (Prevail[®], Cempanel[®]), or Hardie[®] Architectural Panels and Hardiflex[®] panel sidings, and Harditex[®] baseboard products, 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 panels must be installed in accordance with the applicable code, this report and the manufacturer's published installation instructions. In the event of a conflict between this report and the manufacturer's instructions, this report governs.
- 5.2 Design wind loads applied to the siding panels must be determined in accordance with the applicable code and must be equal to, or less than, the allowable loads shown in [Table 4](#).
- 5.3 Use of the products listed in this report as a lateral-force-resisting element of a shear wall that resists wind or seismic forces is beyond the scope of this report. Walls must be braced by other means as required by the applicable code.
- 5.4 The exterior plank and panel products installed on exterior walls must be installed over a weather- resistive barrier in accordance with applicable codes.
- 5.5 Flashing must be installed at all penetrations and terminations in accordance with the applicable code and the manufacturer's instructions.
- 5.6 In jurisdictions adopting the 2021, 2018, 2015, and 2012 IBC, vertical and lateral flame propagation 2021 and 2018 IBC Section 1402.5; and 2015 and 2012 IBC Section 1403.5; exterior walls on buildings of Type I, II, III or IV construction that are greater than 40 feet (12 192 mm) in height above grade plane and that contain a combustible water-resistive barrier must be shown to comply with NFPA 285, except as permitted under Exception 2 of the 2021 and 2018 IBC Section 1402.5 and 2015 IBC Section 1403.5.

5.7 The products are manufactured at the following locations under a quality-control program with inspections by ICC-ES:

- Cleburne, Texas
- Plant City, Florida
- Tacoma, Washington
- Waxahachie, Texas
- Peru, Illinois
- Pulaski, Virginia
- Sparks, Nevada
- Fontana, California
- Prattville, Alabama

6.0 EVIDENCE SUBMITTED

Data in accordance with the [ICC-ES Acceptance Criteria for Fiber Cement Siding Used as Exterior Wall Siding \(AC90\)](#), dated October 2020 (editorially revised December 2020).

7.0 IDENTIFICATION

7.1 For field identification, James Hardie Building Products, Inc., Hardie[®] Panel (Prevail[®], Cempanel[®]), or Hardie[®] Architectural Panels and Hardiflex[®] panel sidings, and Harditex[®] baseboards, must bear a label with the manufacturer's name and telephone number, the product name, and the evaluation report number (ESR-1844).

7.2 The report holder's contact information is the following:

JAMES HARDIE BUILDING PRODUCTS, INC.

10901 ELM AVENUE

FONTANA, CALIFORNIA 92337

(909) 942-7343

info@jameshardie.com

www.jameshardie.com

TABLE 1—STANDARD NOMINAL PANEL DIMENSIONS

| PRODUCT | WIDTH (inches) | LENGTH (feet) | THICKNESSES (inch) |
|-------------------------------------------|----------------|----------------|--------------------|
| Hardie® Panel siding (48") | 48 | 8, 9, 10 & 12 | 1/4 & 5/16 |
| Hardie® Panel siding (16") | 16 | 8, 9, 10 & 12 | 5/16 |
| Cempanel® siding | 48 | 8, 9, 10, & 12 | 5/16 |
| Prevail® siding | 48 | 8, 10, & 12 | 5/16 |
| Hardie® Architectural Panels ¹ | 48 | 8, 10, & 12 | 5/16 |
| Hardiflex® panel | 48 | 8, 9, & 10 | 1/4 & 5/16 |
| Harditex® baseboard | 48 | 8, 9, & 10 | 1/4 & 5/16 |

For SI: 1 inch = 25.4 mm, 1 ft = 305 mm.

¹ The grooved panels are 0.213 inch (5.4 mm) thick at groove locations.

TABLE 2—“K” and “R” VALUES FOR FIBER-CEMENT PRODUCTS

| PRODUCT THICKNESS ³ (inch) | THERMAL CONDUCTANCE ¹ K _{eff} = Btu/hr-ft ² -°F | THERMAL RESISTANCE ¹ R = 1/K _{eff} | ACTUAL THERMAL CONDUCTANCE ² (K _{eff}) | ACTUAL THERMAL RESISTANCE ² (R) |
|---------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------|
| 1/4 | 1.95 | 0.51 | 7.80 | 0.13 |
| 5/16 | 2.07 | 0.48 | 6.62 | 0.15 |

For SI: 1 inch = 25.4 mm, 1 Btu/h-ft²-°F = 5.678 W/m²-K.

¹Based on 1 inch of panel thickness.

²Actual value for panel thickness shown.

TABLE 3—PERMEANCE VALUES FOR FIBER-CEMENT PRODUCTS

| PRODUCT THICKNESS ¹ (inch) | PERMEANCE (perms) |
|---------------------------------------|-------------------|
| 1/4 | 1.75 |
| 5/16 | 1.54 |

For SI: 1 inch = 25.4 mm, 1 perm = 57 mg/(s·m²·Pa).

TABLE 4—MAXIMUM WIND SPEEDS FOR EXPOSURE CATEGORY (mph)²

| Product | Minimum Product Thickness (in.) | Fastener Type ¹² | Fastener Spacing (in.) | Frame Type | Stud Spacing (in.) | Building Height (ft.) | 2012 IRC, 2009 IBC/IRC, 2006 IBC/IRC (Basic Wind Speed, $V_{asd}^{1,5,8}$) | | | 2012 IBC and 2015 IBC/IRC (Ultimate Design Wind Speed, $V_{ult}^{6,7}$), 2018 and 2021 IBC/IRC (Basic Design Wind Speed, $V^{9,10}$) | | |
|------------------------------------------|---------------------------------|------------------------------------------------------------|------------------------|-------------------------|--------------------|-----------------------|-----------------------------------------------------------------------------|-----|-----|----------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| | | | | | | | EXPOSURE CATEGORY | | | EXPOSURE CATEGORY | | |
| | | | | | | | B | C | D | B | C | D |
| Hardiflex® Hardie® Panel (48") | ¼ | 4d common, 1½-in long | 8 | 2 x 4 wood ³ | 16 | 20 | 105 | - | - | 136 | - | - |
| | | | | | | 40 | 95 | - | - | 123 | - | - |
| | | | | | | 60 | 85 | - | - | 110 | - | - |
| Hardiflex® Hardie® Panel (48") | ¼ | 4d common, 1½-in long | 8 | 2 x 4 wood ³ | 24 | 20 | 85 | - | - | 110 | - | - |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| Hardiflex® Hardie® Panel (48") | ¼ | 6d common, 2 in. long | 6 | 2 x 4 wood ³ | 16 | 20 | 137 | 116 | - | 177 | 150 | - |
| | | | | | | 40 | 137 | 105 | - | 177 | 136 | - |
| | | | | | | 60 | 137 | 105 | - | 177 | 136 | - |
| Hardiflex® Hardie® Panel (48") | ¼ | No. 11 ga. x 1¼-in. long galvanized roofing nail | 6 | 2 x 4 wood ³ | 16 | 20 | 126 | 95 | - | 163 | 123 | - |
| | | | | | | 40 | 121 | 95 | - | 156 | 123 | - |
| Hardiflex® Hardie® Panel (48") Harditex® | ¼ | No. 11 ga. x 1¼-in. long galvanized roofing nail | 6 | 2 x 4 wood ³ | 24 | 20 | 95 | - | - | 123 | - | - |
| | | | | | | 40 | 95 | - | - | 123 | - | - |
| Hardiflex® Hardie® Panel (48") Harditex® | ¼ | No. 11 ga. x 1¼-in. long galvanized roofing nail | 4 edge, 12 field | 2 x 4 wood ³ | 16 | 20 | 137 | 105 | - | 177 | 136 | - |
| | | | | | | 40 | 137 | 105 | - | 177 | 136 | - |
| | | | | | | 60 | 126 | 95 | - | 163 | 123 | - |
| Hardiflex® Hardie® Panel (48") | 5/16 | 0.091-in. shank x .225-in HD x 1½-in. long ring shank nail | 4 edge, 8 field | 2 x 4 wood ³ | 16 | 20 | 112 | 98 | 90 | 145 | 127 | 116 |
| | | | | | | 40 | 107 | 92 | 85 | 138 | 119 | 110 |
| | | | | | | 60 | 101 | 88 | - | 130 | 114 | - |
| Hardiflex® Hardie® Panel (48") | 5/16 | 4d common, 1½-in long | 8 | 2 x 4 wood ³ | 16 | 40 | 126 | 95 | - | 163 | 123 | - |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| Hardiflex® Hardie® Panel (48") | 5/16 | 4d common, 1½-in long | 8 | 2 x 4 wood ³ | 24 | 20 | 105 | - | - | 136 | - | - |
| | | | | | | 40 | 95 | - | - | 123 | - | - |
| | | | | | | | | | | | | |
| Hardiflex® Hardie® Panel (48" and 16") | 5/16 | 6d common, 2 in. long | 4 | 2 x 4 wood ³ | 16 | 0-15 | 181 | 164 | 149 | 234 | 212 | 192 |
| | | | | | | 20 | 181 | 159 | 146 | 234 | 205 | 188 |
| | | | | | | 40 | 174 | 148 | 137 | 225 | 191 | 177 |
| | | | | | | 60 | 164 | 142 | 132 | 212 | 183 | 170 |
| Hardiflex® Hardie® Panel (48") | 5/16 | 6d common, 2 in. long | 4 | 2 x 4 wood ³ | 24 | 0-15 | 141 | 128 | 116 | 182 | 165 | 150 |
| | | | | | | 20 | 141 | 124 | 113 | 182 | 160 | 146 |
| | | | | | | 40 | 135 | 116 | 107 | 174 | 150 | 138 |
| | | | | | | 60 | 128 | 111 | 103 | 165 | 143 | 133 |
| Hardiflex® Hardie® Panel (48" and 16") | 5/16 | 6d common, 2 in. long | 6 | 2 x 4 wood ³ | 16 | 0-15 | 144 | 130 | 118 | 186 | 168 | 152 |
| | | | | | | 20 | 144 | 127 | 116 | 186 | 164 | 150 |
| | | | | | | 40 | 138 | 118 | 109 | 178 | 152 | 141 |
| | | | | | | 60 | 130 | 113 | 105 | 168 | 146 | 136 |
| Hardiflex® Hardie® Panel (48") | 5/16 | 6d common, 2 in. long | 6 | 2 x 4 wood ³ | 24 | 0-15 | 114 | 103 | 94 | 147 | 133 | 121 |
| | | | | | | 20 | 114 | 101 | 92 | 147 | 130 | 119 |
| | | | | | | 40 | 109 | 94 | 86 | 141 | 121 | 111 |
| | | | | | | 60 | 103 | 90 | - | 133 | 116 | - |

TABLE 4—MAXIMUM WIND SPEEDS FOR EXPOSURE CATEGORY (mph)² (Continued)

| Product | Minimum Product Thickness (in.) | Fastener Type ¹² | Fastener Spacing (in.) | Frame Type | Stud Spacing (in.) | Building Height (ft.) | 2012 IRC, 2009 IBC/IRC, 2006 IBC/IRC (Basic Wind Speed, V _{asd} ^{1,5,8}) | | | 2012 IBC and 2015 IBC/IRC (Ultimate Design Wind Speed, V _{ult} ^{6,7}), 2018 and 2021 IBC/IRC (Basic Design Wind Speed, V ^{9,10}) | | |
|----------------------------------------|---------------------------------|----------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------------|-----------------------------|-----------------------|---------------------------------------------------------------------------------------------|-----|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| | | | | | | | EXPOSURE CATEGORY | | | EXPOSURE CATEGORY | | |
| | | | | | | | B | C | D | B | C | D |
| Hardie® Panel (48") | 5/16 | 6D siding nails (0.092" shank X 0.222" HD x 2" long) | 6 | 2 x 4 wood ³ | 16 | 0-15 | 148 | 134 | 122 | 191 | 173 | 158 |
| | | | | | | 20 | 148 | 131 | 119 | 191 | 169 | 154 |
| | | | | | | 40 | 142 | 121 | 112 | 183 | 157 | 145 |
| | | | | | | 60 | 134 | 117 | 108 | 173 | 150 | 140 |
| Hardiflex® Hardie® Panel (48") | 5/16 | 6d common, 2 in. long | 6 edge, 12 field | 2 x 4 wood ³ | 16 | 40 | 137 | 105 | - | 177 | 136 | - |
| | | | | | | 60 | 126 | 100 | - | 163 | 129 | - |
| Hardiflex® Hardie® Panel (48") | 5/16 | 0.091-in. shank x .225-in HD x 1½-in. long ring shank nail | 3 edge, 8 field | 2 x 4 wood ⁴ | 16 | 20 | 126 | 95 | - | 163 | 123 | - |
| | | | | | | 40 | 110 | 90 | - | 142 | 116 | - |
| | | | | | | 60 | 100 | 85 | - | 129 | 110 | - |
| Hardie® Panel (48") | 5/16 | No. 8 X 1-5/8 in. long X 0.375 in. HD ribbed waferhead screw | 6" OC vertically / 12" OC horizontally | Attached to 7/16" wood structural panel sheathing only | 7/16" WSP attached per code | 0-15 | 150 | 136 | 123 | 194 | 176 | 159 |
| | | | | | | 20 | 150 | 132 | 120 | 194 | 170 | 155 |
| | | | | | | 40 | 143 | 123 | 113 | 185 | 159 | 146 |
| | | | | | | 60 | 136 | 118 | 109 | 176 | 152 | 141 |
| Hardiflex® Hardie® Panel (48") | ¼ | Min. No. 8 x 1-in. long x 0.323-in. HD ribbed buglehead screw | 6 | Min. No. 20 ga. (33 mil) X 3 5/8 in. x 1 3/8 in. metal C-stud | 16 | 20 | 137 | 105 | - | 177 | 136 | - |
| | | | | | | 40 | 126 | 105 | - | 163 | 136 | - |
| | | | | | | 60 | 116 | 95 | - | 150 | 123 | - |
| Hardiflex® Hardie® Panel (48") | ¼ | Min. No. 8 x 1-in. long x 0.323-in. HD ribbed buglehead screw | 6 | Min. No. 20 ga. (33 mil) X 3 5/8 in. x 1 3/8 in. metal C-stud | 24 | 20 | 105 | 85 | - | 136 | 110 | - |
| | | | | | | 40 | 95 | - | - | 123 | - | - |
| Hardiflex® Hardie® Panel (48" and 16") | 5/16 | ET & F 0.10-in. knurled shank x 1½-in. long x 0.25-in. HD pin fastener (AKN100-0150NA) | 4 edge, 8 field For 48" Panel; | Min. No. 20 ga. (33 mil) X 3 5/8 in. x 1 3/8 in. metal C-stud | 16 | 15 | 153 | 139 | 127 | 198 | 179 | 164 |
| | | | | | | 20 | 153 | 135 | 124 | 198 | 174 | 160 |
| | | | 40 | | | 147 | 126 | 116 | 190 | 163 | 150 | |
| | | | 60 | | | 139 | 121 | 112 | 179 | 156 | 145 | |
| Hardiflex® Hardie® Panel (48") | 5/16 | ET & F 0.10-in. knurled shank x 1½-in. long x 0.25-in. HD pin fastener (AKN100-0150NA) | 4 edge, 8 field | Min. No. 20 ga. (33 mil) X 3 5/8 in. x 1 3/8 in. metal C-stud | 24 | 15 | 118 | 107 | 98 | 152 | 138 | 127 |
| | | | | | | 20 | 118 | 104 | 95 | 152 | 134 | 123 |
| | | | | | | 40 | 114 | 97 | 90 | 147 | 125 | 116 |
| | | | | | | 60 | 107 | 93 | 87 | 138 | 120 | 112 |

TABLE 4—MAXIMUM WIND SPEEDS FOR EXPOSURE CATEGORY (mph)² (Continued)

| Product | Minimum Product Thickness (in.) | Fastener Type ¹² | Fastener Spacing (in.) | Frame Type | Framing Spacing (in.) | Building Height (ft.) | 2012 IRC, 2009 IBC/IRC, 2006 IBC/IRC (Basic Wind Speed, V _{asd} ^{1,5,8,11}) | | | 2012 IBC and 2015 IBC/IRC(Ultimate Design Wind Speed, V _{ult} ^{6,7}), 2018 and 2021 IBC (Basic Design Wind Speed, V ^{9,10}) | | |
|-----------------------------------------|---------------------------------|-------------------------------------------------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------------|------------------------------------------------------------------------------------------------|-----|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| | | | | | | | EXPOSURE CATEGORY | | | EXPOSURE CATEGORY | | |
| | | | | | | | B | C | D | B | C | D |
| Hardie [®] Panel (48" and 16") | 5/16 | No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws | 6" O.C. | Min. No. 20 ga. (33 mil) X 3 ⁵ / ₈ in. x 1 ³ / ₈ in. metal C-stud or 2 X 4 wood studs ³ | 16 | 15 | 149 | 135 | 123 | 193 | 175 | 159 |
| | | | | | | 20 | 149 | 132 | 120 | 193 | 170 | 155 |
| | | | | | | 40 | 143 | 122 | 113 | 185 | 158 | 146 |
| | | | | | | 60 | 135 | 117 | 109 | 175 | 152 | 141 |
| Hardie [®] Panel (48" and 16") | 5/16 | No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws | 8" O.C. | Min. No. 20 ga. (33 mil) X 3 ⁵ / ₈ in. x 1 ³ / ₈ in. metal C-stud or 2 X 4 wood studs ³ | 16 | 0-15 | 135 | 122 | 111 | 174 | 158 | 144 |
| | | | | | | 20 | 135 | 119 | 109 | 174 | 154 | 140 |
| | | | | | | 40 | 129 | 111 | 102 | 167 | 143 | 132 |
| | | | | | | 60 | 122 | 106 | 99 | 158 | 137 | 127 |
| Hardie [®] Panel (48" and 16") | 5/16 | No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws | 10" O.C. | Min. No. 20 ga. (33 mil) X 3 ⁵ / ₈ in. x 1 ³ / ₈ in. metal C-stud or 2 X 4 wood studs ³ | 16 | 0-15 | 127 | 115 | 105 | 164 | 149 | 135 |
| | | | | | | 20 | 127 | 112 | 102 | 164 | 145 | 132 |
| | | | | | | 40 | 122 | 104 | 96 | 157 | 134 | 124 |
| | | | | | | 60 | 115 | 100 | 93 | 149 | 129 | 120 |
| Hardie [®] Panel (48" and 16") | 5/16 | No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws | 12" O.C. | Min. No. 20 ga. (33 mil) X 3 ⁵ / ₈ in. x 1 ³ / ₈ in. metal C-stud or 2 X 4 wood studs ³ | 16 | 0-15 | 121 | 110 | 100 | 157 | 142 | 129 |
| | | | | | | 20 | 121 | 107 | 98 | 157 | 138 | 126 |
| | | | | | | 40 | 116 | 100 | 92 | 150 | 128 | 119 |
| | | | | | | 60 | 110 | 95 | 89 | 142 | 123 | 114 |
| Hardie [®] Panel (48") | 5/16 | No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws | 8" O.C. | Min. No. 20 ga. (33 mil) X 3 ⁵ / ₈ in. x 1 ³ / ₈ in. metal C-stud or 2 X 4 wood studs ³ | 24 | 0-15 | 107 | 97 | 88 | 138 | 125 | 114 |
| | | | | | | 20 | 107 | 94 | 86 | 138 | 122 | 111 |
| | | | | | | 40 | 103 | 88 | 81 | 133 | 113 | 105 |
| | | | | | | 60 | 97 | 84 | 78 | 125 | 109 | 101 |
| Hardie [®] Panel (48") | 5/16 | HardieNail Studless Siding Fastener (TetraGrip), .117" x 1.125" x .3" (PART #650867 or #650964) | 12"x12" O.C. | Attached to 7/16" Wood Structural Panel sheathing only | 7/16" WSP Sheathing attached per code | 0-15 | 108 | 98 | 89 | 139 | 126 | 115 |
| | | | | | | 20 | 108 | 95 | 87 | 139 | 123 | 112 |
| | | | | | | 40 | 104 | 88 | - | 134 | 114 | - |
| | | | | | | 60 | 98 | - | - | 126 | - | - |
| Hardie [®] Panel (48") | 5/16 | HardieNail Studless Siding Fastener (TetraGrip), .117" x 1.125" x .3" (PART #650867 or #650964) | 12"x8" O.C. | Attached to 7/16" Wood Structural Panel sheathing only | 7/16" WSP Sheathing attached per code | 0-15 | 127 | 115 | 105 | 164 | 149 | 135 |
| | | | | | | 20 | 127 | 112 | 102 | 164 | 144 | 132 |
| | | | | | | 40 | 122 | 104 | 96 | 157 | 134 | 124 |
| | | | | | | 60 | 115 | 100 | 93 | 149 | 129 | 120 |

For SI: 1 ft = 305 mm, 1 inch = 25.4 mm, 1 mph = 0.44 m/s.

¹ Wind speed design assumptions per Section 6.5, Method 2, of ASCE 7-05: I = 1.0, Kzt = 1, Kd = 0.85, GCpi = 0.18, GCp = -1.4.

² Installation must be in accordance with Section 4.2 of this report.

³ Values are for species of wood having a specific gravity of 0.42 or greater.

⁴ Values are for species of wood having a specific gravity of 0.36 or greater.

⁵ V_{asd} = nominal design wind speed.

⁶ V_{ult} = ultimate design wind speed

⁷ Wind speed design assumptions per Section 30.4, of ASCE 7-10: Kzt = 1, Kd = 0.85, GCpi = 0.18, GCp = -1.4.

⁸ 2015 and 2012 IBC Section 1609.3.1, Eqn. 16-33, V_{asd} = V_{ult} √0.6

⁹ V = basic design wind speed

¹⁰ Wind speed design assumptions per Section 30.3, of ASCE 7-16: Kzt = 1, Kd = 0.85, GCpi = 0.18, GCp = -1.4.

¹¹ 2021 IBC Section 1609.3.1, Eqn. 16-17 and 2018 IBC Section 1609.3.1, Eqn. 16-33, V_{asd} = V √0.6

¹² Smooth-shank stainless steel nails are outside of the scope of this report unless specifically noted.

TABLE 4—MAXIMUM WIND SPEEDS FOR EXPOSURE CATEGORY (mph)² (Continued)

| Product | Minimum Product Thickness (in.) | Fastener Type ¹⁶ | Fastener Spacing (in.) | Frame Type | Furring Spacing (in.) | Building Height (ft.) | 2012 IRC, 2009 IBC/IRC, 2006 IBC/IRC (Basic Wind Speed, $V_{asd}^{1,5,8,15}$) | | | 2012 IBC and 2015 IBC/IRC (Ultimate Design Wind Speed, $V_{ult}^{6,7}$), 2018 and 2021 IBC/IRC (Basic Design Wind Speed, $V^{13,14}$) | | |
|-----------------------------|---------------------------------|---------------------------------------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|--------------------------------------------------------------------------------|-----|-----|-----------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| | | | | | | | EXPOSURE CATEGORY | | | EXPOSURE CATEGORY | | |
| | | | | | | | B | C | D | B | C | D |
| Hardie® Panel (48" and 16") | 5/16 | No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws | 6" O.C. into furring only | 2X4 wood or 20 ga. (33 mil) steel framing with 3/4" thick by 3.5" wide wood furring or 20 ga. (33 mil.) steel furring ^{9,10,11,12} | 16 | 15 | 149 | 135 | 123 | 193 | 175 | 159 |
| | | | | | | 20 | 149 | 132 | 120 | 193 | 170 | 155 |
| | | | | | | 40 | 143 | 122 | 113 | 185 | 158 | 146 |
| | | | | | | 60 | 135 | 117 | 109 | 175 | 152 | 141 |
| Hardie® Panel (48" and 16") | 5/16 | No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws | 8" O.C. into furring only | 2X4 wood or 20 ga. (33 mil) steel framing with 3/4" thick by 3.5" wide wood furring or 20 ga. (33 mil.) steel furring ^{9,10,11,12} | 16 | 0-15 | 135 | 122 | 111 | 174 | 158 | 144 |
| | | | | | | 20 | 135 | 119 | 109 | 174 | 154 | 140 |
| | | | | | | 40 | 129 | 111 | 102 | 167 | 143 | 132 |
| | | | | | | 60 | 122 | 106 | 99 | 158 | 137 | 127 |
| Hardie® Panel (48" and 16") | 5/16 | No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws | 10" O.C. into furring only | 2X4 wood or 20 ga. (33 mil) steel framing with 3/4" thick by 3.5" wide wood furring or 20 ga. (33 mil.) steel furring ^{9,10,11,12} | 16 | 0-15 | 127 | 115 | 105 | 164 | 149 | 135 |
| | | | | | | 20 | 127 | 112 | 102 | 164 | 145 | 132 |
| | | | | | | 40 | 122 | 104 | 96 | 157 | 134 | 124 |
| | | | | | | 60 | 115 | 100 | 93 | 149 | 129 | 120 |
| Hardie® Panel (48" and 16") | 5/16 | No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws | 12" O.C. into furring only | 2X4 wood or 20 ga. (33 mil) steel framing with 3/4" thick by 3.5" wide wood furring or 20 ga. (33 mil.) steel furring ^{9,10,11,12} | 16 | 0-15 | 121 | 110 | 100 | 157 | 142 | 129 |
| | | | | | | 20 | 121 | 107 | 98 | 157 | 138 | 126 |
| | | | | | | 40 | 116 | 100 | 92 | 150 | 128 | 119 |
| | | | | | | 60 | 110 | 95 | 89 | 142 | 123 | 114 |
| Hardie® Panel (48") | 5/16 | No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws | 8" O.C. into furring only | 2X4 wood or 20 ga. (33 mil) steel framing with 3/4" thick by 3.5" wide wood furring or 20 ga. (33 mil.) steel furring ^{9,10,11,12} | 24 | 0-15 | 107 | 97 | 88 | 138 | 125 | 114 |
| | | | | | | 20 | 107 | 94 | 86 | 138 | 122 | 111 |
| | | | | | | 40 | 103 | 88 | 81 | 133 | 113 | 105 |
| | | | | | | 60 | 97 | 84 | 78 | 125 | 109 | 101 |
| Hardie® Panel (48") | 5/16 | 0.090" shank X 0.215" HD x 1.5" long ring shank nail | 6" O.C. into furring only | 2X4 wood or 20 ga. (33 mil) steel framing with 3/4" thick by 3.5" wide wood furring ^{9,10,11} | 16 | 0-15 | 143 | 130 | 118 | 185 | 168 | 152 |
| | | | | | | 20 | 143 | 126 | 115 | 185 | 163 | 149 |
| | | | | | | 40 | 137 | 117 | 108 | 177 | 151 | 140 |
| | | | | | | 60 | 130 | 113 | 105 | 168 | 145 | 135 |

For SI: 1 ft = 305 mm, 1 inch = 25.4 mm, 1 mph = 0.44 m/s.

¹ Wind speed design assumptions per Section 6.5, Method 2, of ASCE 7-05: $I = 1.0$, $K_{zt} = 1$, $K_d = 0.85$, $GC_{pi} = 0.18$, $GC_p = -1.4$.

² Installation must be in accordance with Section 4.2 of this report.

³ Values are for species of wood having a specific gravity of 0.42 or greater.

⁴ Values are for species of wood having a specific gravity of 0.36 or greater.

⁵ V_{asd} = nominal design wind speed.

⁶ V_{ult} = ultimate design wind speed.

⁷ Wind speed design assumptions per Section 30.4, of ASCE 7-10: $K_{zt} = 1$, $K_d = 0.85$, $GC_{pi} = 0.18$, $GC_p = -1.4$.

⁸ 2015 and 2012 IBC Section 1609.3.1, Eqn. 16-33, $V_{asd} = V_{ult} \sqrt{0.6}$.

⁹ Furring attachment to structural members (framing) or alternative furring width shall be designed by the project engineer.

¹⁰ Wood furring shall be preservative treated per AWPA.

¹¹ Wood furring shall be specific gravity of 0.42 or greater per AFPA/NDS, or wood structural panel, conforming to DOC PS-1 or DOC PS-2 or APA PRP-108.

¹² The design and attachment of steel furring shall be the responsibility of the project engineer.

¹³ V = basic design wind speed

¹⁴ Wind speed design assumptions per Section 30.3, of ASCE 7-16: $K_{zt} = 1$, $K_d = 0.85$, $GC_{pi} = 0.18$, $GC_p = -1.4$.

¹⁵ 2021 IBC Section 1609.3.1, Eqn. 16-17 and 2018 IBC Section 1609.3.1, Eqn. 16-33, $V_{asd} = V \sqrt{0.6}$

¹⁶ Smooth-shank stainless steel nails are outside of the scope of this report unless specifically noted.

TABLE 4—MAXIMUM WIND SPEEDS FOR EXPOSURE CATEGORY (mph)² (Continued)

| Product | Minimum Product Thickness (in.) | Fastener Type ¹² | Fastener Spacing (in.) | Frame Type | Stud Spacing (in.) | Building Height (ft.) | 2012 IRC, 2009 IBC/IRC, 2006 IBC/IRC (Basic Wind Speed, V _{asd} ^{1,5,8,11}) | | | 2012 IBC and 2015 IBC/IRC(Ultimate Design Wind Speed, V _{ult} ^{6,7}), 2018 and 2021 IBC/IRC (Basic Design Wind Speed, V ^{9,10}) | | |
|---------------------|---------------------------------|--------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------|---------------------------------------|-----------------------|------------------------------------------------------------------------------------------------|-----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| | | | | | | | B | C | D | EXPOSURE CATEGORY | | |
| | | | | | | | | | | B | C | D |
| Hardie® Panel (48") | 5/16 | 4d ring shank siding nails (0.09" SD x 0.215 HD x 1.5" long) | 4" O.C. along studs | 2X4 wood ⁴ | 24 | 0-15 | 111 | 100 | 91 | 143 | 129 | 118 |
| | | | | | | 20 | 111 | 97 | 89 | 143 | 126 | 115 |
| | | | | | | 40 | 106 | 91 | - | 137 | 117 | - |
| | | | | | | 60 | 100 | 87 | - | 129 | 112 | - |
| Hardie® Panel (16") | 5/16 | 4d ring shank siding nails (0.09" SD x 0.215 HD x 1.5" long) | 6" O.C. along studs | 2X4 wood ⁴ | 24 | 0-15 | 167 | 152 | 138 | 216 | 196 | 178 |
| | | | | | | 20 | 167 | 147 | 135 | 216 | 190 | 174 |
| | | | | | | 40 | 160 | 137 | 127 | 207 | 177 | 163 |
| | | | | | | 60 | 152 | 132 | 122 | 196 | 170 | 158 |
| Hardie® Panel (16") | 5/16 | 4d ring shank siding nails (0.09" SD x 0.215 HD x 1.5" long) | 8" O.C. along studs | 2X4 wood ⁴ | 24 | 0-15 | 151 | 137 | 125 | 195 | 177 | 161 |
| | | | | | | 20 | 151 | 133 | 122 | 195 | 172 | 157 |
| | | | | | | 40 | 145 | 124 | 115 | 187 | 160 | 148 |
| | | | | | | 60 | 137 | 119 | 111 | 177 | 154 | 143 |
| Hardie® Panel (16") | 5/16 | 4d ring shank siding nails (0.09" SD x 0.215 HD x 1.5" long) | 10" O.C. along studs | 2X4 wood ⁴ | 24 | 0-15 | 134 | 121 | 110 | 172 | 156 | 142 |
| | | | | | | 20 | 134 | 118 | 108 | 172 | 152 | 139 |
| | | | | | | 40 | 128 | 110 | 101 | 165 | 141 | 131 |
| | | | | | | 60 | 121 | 105 | 98 | 156 | 136 | 126 |
| Hardie® Panel (16") | 5/16 | 4d ring shank siding nails (0.09" SD x 0.215 HD x 1.5" long) | 12" O.C. along studs | 2X4 wood ⁴ | 24 | 0-15 | 113 | 103 | 93 | 146 | 132 | 120 |
| | | | | | | 20 | 113 | 100 | 91 | 146 | 129 | 117 |
| | | | | | | 40 | 108 | 93 | 86 | 140 | 120 | 111 |
| | | | | | | 60 | 103 | 89 | - | 132 | 115 | - |
| Hardie® Panel (16") | 5/16 | 4d ring shank siding nails (0.09" SD x 0.215 HD x 1.5" long) | 6" O.C. along panel edges ¹⁴ | Attached to 7/16" Wood Structural Panel sheathing only | 7/16" WSP Sheathing attached per code | 0-15 | 144 | 131 | 119 | 186 | 169 | 154 |
| | | | | | | 20 | 144 | 127 | 116 | 186 | 164 | 150 |
| | | | | | | 40 | 138 | 118 | 109 | 179 | 153 | 141 |
| | | | | | | 60 | 131 | 114 | 105 | 169 | 147 | 136 |
| Hardie® Panel (16") | 5/16 | 4d ring shank siding nails (0.09" SD x 0.215 HD x 1.5" long) | 8" O.C. along panel edges ¹⁴ | Attached to 7/16" Wood Structural Panel sheathing only | 7/16" WSP Sheathing attached per code | 0-15 | 133 | 120 | 109 | 171 | 156 | 141 |
| | | | | | | 20 | 133 | 117 | 107 | 171 | 151 | 138 |
| | | | | | | 40 | 127 | 109 | 101 | 165 | 141 | 130 |
| | | | | | | 60 | 120 | 105 | 97 | 156 | 135 | 125 |

| Product | Minimum Product Thickness (in.) | Fastener Type ¹² | Fastener Spacing (in.) | Frame Type | Stud Spacing (in.) | Building Height (ft.) | 2012 IRC, 2009 IBC/IRC, 2006 IBC/IRC (Basic Wind Speed, V _{asd} ^{1,5,8,11}) | | | 2012 IBC and 2015 IBC/IRC(Ultimate Design Wind Speed, V _{ult} ^{6,7}), 2018 and 2021 IBC/IRC (Basic Design Wind Speed, V ^{9,10}) | | |
|--------------------------------------------|---------------------------------|-----------------------------------------------------------------|------------------------------------------|--------------------------------------------------------|---------------------------------------|-----------------------|------------------------------------------------------------------------------------------------|-----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| | | | | | | | EXPOSURE CATEGORY | | | EXPOSURE CATEGORY | | |
| | | | | | | | B | C | D | B | C | D |
| Hardie® Panel (16") | 5/16 | 4d ring shank siding nails (0.09" SD x 0.215 HD x 1.5" long) | 10" O.C. along panel edges ¹⁴ | Attached to 7/16" Wood Structural Panel sheathing only | 7/16" WSP Sheathing attached per code | 0-15 | 120 | 108 | 99 | 155 | 141 | 128 |
| | | | | | | 20 | 120 | 106 | 97 | 155 | 137 | 125 |
| | | | | | | 40 | 115 | 99 | 91 | 149 | 127 | 118 |
| | | | | | | 60 | 109 | 95 | 88 | 141 | 122 | 113 |
| Hardie® Panel (16") | 5/16 | 4d ring shank siding nails (0.09" SD x 0.215 HD x 1.5" long) | 12" O.C. along panel edges ¹⁴ | Attached to 7/16" Wood Structural Panel sheathing only | 7/16" WSP Sheathing attached per code | 0-15 | 106 | 96 | 88 | 137 | 124 | 113 |
| | | | | | | 20 | 106 | 94 | 86 | 137 | 121 | 110 |
| | | | | | | 40 | 102 | 87 | - | 132 | 113 | - |
| | | | | | | 60 | 96 | - | - | 124 | - | - |
| Hardie® Architectural Panels (non-grooved) | 5/16 | 6d common, 2in. long | 4 | 2x4 wood ³ | 16 | 0-15 | 181 | 164 | 149 | 234 | 212 | 192 |
| | | | | | | 20 | 181 | 159 | 146 | 234 | 205 | 188 |
| | | | | | | 40 | 174 | 148 | 137 | 225 | 191 | 177 |
| | | | | | | 60 | 164 | 142 | 132 | 212 | 183 | 170 |
| Hardie® Architectural Panels (non-grooved) | 5/16 | 6d common, 2in. long | 6 | 2x4 wood ³ | 16 | 0-15 | 144 | 130 | 118 | 186 | 168 | 152 |
| | | | | | | 20 | 144 | 127 | 116 | 186 | 164 | 150 |
| | | | | | | 40 | 138 | 118 | 109 | 178 | 152 | 141 |
| | | | | | | 60 | 130 | 113 | 105 | 168 | 146 | 136 |
| Hardie® Architectural Panels (non-grooved) | 5/16 | 6d common, 2in. long | 4 | 2x4 wood ³ | 24 | 0-15 | 141 | 128 | 116 | 182 | 165 | 150 |
| | | | | | | 20 | 141 | 124 | 113 | 182 | 160 | 146 |
| | | | | | | 40 | 135 | 116 | 107 | 174 | 150 | 138 |
| | | | | | | 60 | 128 | 111 | 103 | 165 | 143 | 133 |
| Hardie® Architectural Panels (non-grooved) | 5/16 | 6d common, 2in. long | 6 | 2x4 wood ³ | 24 | 0-15 | 114 | 103 | 94 | 147 | 133 | 121 |
| | | | | | | 20 | 114 | 101 | 92 | 147 | 130 | 119 |
| | | | | | | 40 | 109 | 94 | 86 | 141 | 121 | 111 |
| | | | | | | 60 | 103 | 90 | - | 133 | 116 | - |
| Hardie® Architectural Panels (non-grooved) | 5/16 | 4d, 0.091 in shank x 0.225in. HD x 1.5 in. long ring shank nail | 4 edge 8 field | 2x4 wood ³ | 16 | 20 | 112 | 98 | 90 | 144 | 127 | 116 |
| | | | | | | 40 | 107 | 92 | 85 | 138 | 119 | 110 |
| | | | | | | 60 | 101 | 88 | - | 130 | 114 | - |

TABLE 4—MAXIMUM WIND SPEEDS FOR EXPOSURE CATEGORY (mph)² (Continued)

| Product | Minimum Product Thickness (in.) | Fastener Type ¹² | Fastener Spacing (in.) | Frame Type | Stud Spacing (in.) | Building Height (ft.) | 2012 IRC, 2009 IBC/IRC, 2006 IBC/IRC (Basic Wind Speed, V _{asd} ^{1,5,8,11}) | | | 2012 IBC and 2015 IBC/IRC(Ultimate Design Wind Speed, V _{ult} ^{6,7}), 2018 and 2021 IBC/IRC (Basic Design Wind Speed, V ^{9,10}) | | |
|--------------------------------------------|---------------------------------|--------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------------------------------|---------------------------------------|-----------------------|------------------------------------------------------------------------------------------------|-----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| | | | | | | | EXPOSURE CATEGORY | | | EXPOSURE CATEGORY | | |
| | | | | | | | B | C | D | B | C | D |
| Hardie® Architectural Panels (non-grooved) | 5/16 | 16-ga. x 1.5" long stainless steel finish nails | 4" O.C. along studs | 2X4 wood ³ | 16 | 0-15 | 119 | 108 | 98 | 153 | 139 | 126 |
| | | | | | | 20 | 119 | 105 | 95 | 153 | 135 | 123 |
| | | | | | | 40 | 114 | 97 | 90 | 147 | 126 | 116 |
| | | | | | | 60 | 108 | 93 | 87 | 139 | 120 | 112 |
| Hardie® Architectural Panels (non-grooved) | 5/16 | 16-ga. x 1.5" long stainless steel finish nails | 4" O.C. along studs | 2X4 wood ⁴ | 16 | 0-15 | 124 | 113 | 102 | 160 | 145 | 132 |
| | | | | | | 20 | 124 | 109 | 100 | 160 | 141 | 129 |
| | | | | | | 40 | 119 | 102 | 94 | 154 | 131 | 121 |
| | | | | | | 60 | 113 | 98 | 91 | 145 | 126 | 117 |
| Hardie® Architectural Panels (non-grooved) | 5/16 | 16-ga. x 1.5" long stainless steel finish nails | 4" O.C. along studs and vertical panel edges ¹³ | 2X4 wood ⁴ with 7/16" Wood Structural Panel sheathing attached per code | 16 | 0-15 | 133 | 121 | 110 | 172 | 156 | 142 |
| | | | | | | 20 | 133 | 117 | 107 | 172 | 152 | 138 |
| | | | | | | 40 | 128 | 109 | 101 | 165 | 141 | 130 |
| | | | | | | 60 | 121 | 105 | 97 | 156 | 135 | 126 |
| Hardie® Architectural Panels (non-grooved) | 5/16 | 16-ga. x 1.5" long stainless steel finish nails | 4" O.C. along studs and vertical panel edges ¹³ | 2X4 wood ⁴ with 7/16" Wood Structural Panel sheathing attached per code | 24 | 0-15 | 114 | 103 | 94 | 147 | 133 | 121 |
| | | | | | | 20 | 114 | 100 | 92 | 147 | 130 | 118 |
| | | | | | | 40 | 109 | 93 | 86 | 141 | 121 | 111 |
| | | | | | | 60 | 103 | 90 | - | 133 | 116 | - |
| Hardie® Architectural Panels (non-grooved) | 5/16 | 16-ga. x 1.5" long stainless steel finish nails | 4" O.C. along studs and vertical panel edges ¹³ | 2X4 wood ³ with 7/16" Wood Structural Panel sheathing attached per code | 24 | 0-15 | 108 | 98 | 89 | 139 | 126 | 115 |
| | | | | | | 20 | 108 | 95 | 87 | 139 | 123 | 112 |
| | | | | | | 40 | 104 | 89 | - | 134 | 114 | - |
| | | | | | | 60 | 98 | - | - | 126 | - | - |
| Hardie® Architectural Panels (non-grooved) | 5/16 | 16-ga. x 1.5" long stainless steel finish nails | 4" O.C. along studs | 2X4 wood ⁴ | 24 | 0-15 | 110 | 100 | 91 | 142 | 129 | 117 |
| | | | | | | 20 | 110 | 97 | 88 | 142 | 125 | 114 |
| | | | | | | 40 | 105 | 90 | - | 136 | 116 | - |
| | | | | | | 60 | 100 | 86 | - | 129 | 112 | - |
| Hardie® Architectural Panels (non-grooved) | 5/16 | 4d ring shank siding nails (0.09" SD x 0.215 HD x 1.5" long) | 4" O.C. along studs | 2X4 wood ⁴ | 24 | 0-15 | 111 | 100 | 91 | 143 | 129 | 118 |
| | | | | | | 20 | 111 | 97 | 89 | 143 | 126 | 115 |
| | | | | | | 40 | 106 | 91 | - | 137 | 117 | - |
| | | | | | | 60 | 100 | 87 | - | 129 | 112 | - |
| Hardie® Architectural Panels (non-grooved) | 5/16 | No. 8, 1- 5/8 in. long x 0.375" HD Ribbed wafer head screw | 6" vert. 12" horiz. | Attached to 7/16" Wood Structural Panel sheathing only | 7/16" WSP Sheathing attached per code | 0-15 | 150 | 136 | 123 | 194 | 176 | 159 |
| | | | | | | 20 | 150 | 132 | 120 | 194 | 170 | 155 |
| | | | | | | 40 | 143 | 123 | 113 | 185 | 159 | 146 |
| | | | | | | 60 | 136 | 118 | 109 | 176 | 152 | 141 |

TABLE 4—MAXIMUM WIND SPEEDS FOR EXPOSURE CATEGORY (mph)² (Continued)

| Product | Minimum Product Thickness (in.) | Fastener Type ¹² | Fastener Spacing (in.) | Frame Type | Stud Spacing (in.) | Building Height (ft.) | 2012 IRC, 2009 IBC/IRC, 2006 IBC/IRC (Basic Wind Speed, V _{asd} ^{1,5,8,11}) | | | 2012 IBC and 2015 IBC/IRC(Ultimate Design Wind Speed, V _{ult} ^{6,7}), 2018 and 2021 IBC/IRC (Basic Design Wind Speed, V ^{9,10}) | | |
|--------------------------------------------|---------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------------|------------------------------------------------------------------------------------------------|-----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| | | | | | | | EXPOSURE CATEGORY | | | EXPOSURE CATEGORY | | |
| | | | | | | | B | C | D | B | C | D |
| Hardie® Architectural Panels (non-grooved) | 5/16 | 4d ring shank siding nails (0.09" SD x 0.215" HD x 1.5" long) | 6" O.C. vertical, 16" O.C. Horizontal | Attached to 7/16" Wood Structural Panel sheathing only | 7/16" WSP Sheathing attached per code | 0-15 | 118 | 107 | 97 | 153 | 138 | 126 |
| | | | | | | 20 | 118 | 104 | 95 | 153 | 135 | 123 |
| | | | | | | 40 | 113 | 97 | 90 | 146 | 125 | 116 |
| | | | | | | 60 | 107 | 93 | 86 | 138 | 120 | 112 |
| Hardie® Architectural Panels (grooved) | 5/16 | Metabo 16-ga.(0.063" SD) x 1.5" long stainless steel finish nails | 4" O.C. along studs | 2X4 wood ⁴ | 24 | 0-15 | 89 | - | - | 115 | - | - |
| | | | | | | 20 | 89 | - | - | 115 | - | - |
| | | | | | | 35 | 87 | - | - | 112 | - | - |
| | | | | | | 40 | - | - | - | - | - | - |
| Hardie® Architectural Panels (grooved) | 5/16 | 4d ring shank siding nails (0.09" SD x 0.215" HD x 1.5" long) | 6" O.C. vertical, 16" O.C. Horizontal | Attached to 7/16" Wood Structural Panel sheathing only | 7/16" WSP Sheathing attached per code | 0-15 | 118 | 107 | 97 | 153 | 138 | 126 |
| | | | | | | 20 | 118 | 104 | 95 | 153 | 135 | 123 |
| | | | | | | 40 | 113 | 97 | 90 | 146 | 125 | 116 |
| | | | | | | 60 | 107 | 93 | 86 | 138 | 120 | 112 |
| Hardie® Architectural Panels (grooved) | 5/16 | 6d siding nails (0.092" SD x 0.222" HD x 2" long) | 6" O.C. along studs, 16" O.C. along top and bottom plates | 2X4 wood ³ | 16 | 0-15 | 148 | 134 | 122 | 191 | 173 | 158 |
| | | | | | | 20 | 148 | 131 | 119 | 191 | 169 | 154 |
| | | | | | | 40 | 142 | 121 | 112 | 183 | 157 | 145 |
| | | | | | | 60 | 134 | 117 | 108 | 173 | 150 | 140 |
| Hardie® Architectural Panels (grooved) | 5/16 | No. 8 X 1.25" long x 0.323" HD ribbed bugle head screws | 8" O.C. | Min. No. 20 ga. (33 mil) X 3 3/8 in. x 1 3/8 in. metal C-stud or 2 X 4 wood studs ³ | 16 | 0-15 | 135 | 122 | 111 | 174 | 158 | 144 |
| | | | | | | 20 | 135 | 119 | 109 | 174 | 154 | 140 |
| | | | | | | 40 | 129 | 111 | 102 | 167 | 143 | 132 |
| | | | | | | 60 | 122 | 106 | 99 | 158 | 137 | 127 |
| Hardie® Architectural Panels (grooved) | 5/16 | No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws | 10" O.C. | Min. No. 20 ga. (33 mil) X 3 3/8 in. x 1 3/8 in. metal C-stud or 2 X 4 wood studs ³ | 16 | 0-15 | 127 | 115 | 105 | 164 | 149 | 135 |
| | | | | | | 20 | 127 | 112 | 102 | 164 | 145 | 132 |
| | | | | | | 40 | 122 | 104 | 96 | 157 | 134 | 124 |
| | | | | | | 60 | 115 | 100 | 93 | 149 | 129 | 120 |
| Hardie® Architectural Panels (grooved) | 5/16 | No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws | 12" O.C. | Min. No. 20 ga. (33 mil) X 3 3/8 in. x 1 3/8 in. metal C-stud or 2 X 4 wood studs ³ | 16 | 0-15 | 121 | 110 | 100 | 157 | 142 | 129 |
| | | | | | | 20 | 121 | 107 | 98 | 157 | 138 | 126 |
| | | | | | | 40 | 116 | 100 | 92 | 150 | 128 | 119 |
| | | | | | | 60 | 110 | 95 | 89 | 142 | 123 | 114 |
| Hardie® Architectural Panels (grooved) | 5/16 | 0.090" shank X 0.215" HD x 1.5" long ring shank nail | 6" O.C. into furring only | 2X4 wood or 20 ga. (33 mil) steel framing with 3/4" thick by 3.5" wide wood furring ^{9,10,11} | 16 | 0-15 | 143 | 130 | 118 | 185 | 168 | 152 |
| | | | | | | 20 | 143 | 126 | 115 | 185 | 163 | 149 |
| | | | | | | 40 | 137 | 117 | 108 | 177 | 151 | 140 |
| | | | | | | 60 | 130 | 113 | 105 | 168 | 145 | 135 |

TABLE 4—MAXIMUM WIND SPEEDS FOR EXPOSURE CATEGORY (mph)² (Continued)

| | | | | | | | 2012 IRC, 2009 IBC/IRC, 2006 IBC/IRC (Basic Wind Speed, $V_{asd}^{1,5,8,11}$) | | | 2012 IBC and 2015 IBC/IRC(Ultimate Design Wind Speed, $V_{ult}^{6,7}$), 2018 and 2021 IBC/IRC (Basic Design Wind Speed, $V^{9,10}$) | | |
|----------------------------------------|------|---------------------------------------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----|------|--------------------------------------------------------------------------------|-----|-----|---------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| | | | | | | | EXPOSURE CATEGORY | | | EXPOSURE CATEGORY | | |
| Hardie® Architectural Panels (grooved) | 5/16 | No. 8 X 1.25"long X 0.323" HD ribbed bugle head screws | 8" O.C. into furring only | 2X4 wood or 20 ga. (33 mil) steel framing with 3/4" thick by 3.5" wide wood furring or 20 ga. (33 mil.) steel furring ^{9,10,11,12} | 16 | 0-15 | 135 | 122 | 111 | 174 | 158 | 144 |
| | | | | | | 20 | 135 | 119 | 109 | 174 | 154 | 140 |
| | | | | | | 40 | 129 | 111 | 102 | 167 | 143 | 132 |
| | | | | | | 60 | 122 | 106 | 99 | 158 | 137 | 127 |
| Hardie® Architectural Panels (grooved) | 5/16 | No. 8 X 1.25"long X 0.323" HD ribbed bugle head screws | 10" O.C. into furring only | 2X4 wood or 20 ga. (33 mil) steel framing with 3/4" thick by 3.5" wide wood furring or 20 ga. (33 mil.) steel furring ^{9,10,11,12} | 16 | 0-15 | 127 | 115 | 105 | 164 | 149 | 135 |
| | | | | | | 20 | 127 | 112 | 102 | 164 | 145 | 132 |
| | | | | | | 40 | 122 | 104 | 96 | 157 | 134 | 124 |
| | | | | | | 60 | 115 | 100 | 93 | 149 | 129 | 120 |
| Hardie® Architectural Panels (grooved) | 5/16 | No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws | 12" O.C. into furring only | 2X4 wood or 20 ga. (33 mil) steel framing with 3/4" thick by 3.5" wide wood furring or 20 ga. (33 mil.) steel furring ^{9,10,11,12} | 16 | 0-15 | 121 | 110 | 100 | 157 | 142 | 129 |
| | | | | | | 20 | 121 | 107 | 98 | 157 | 138 | 126 |
| | | | | | | 40 | 116 | 100 | 92 | 150 | 128 | 119 |
| | | | | | | 60 | 110 | 95 | 89 | 142 | 123 | 114 |

For SI: 1 ft = 305 mm, 1 inch = 25.4 mm, 1 mph = 0.44 m/s.

¹ Wind speed design assumptions per Section 6.5, Method 2, of ASCE 7-05: $I = 1.0$, $K_{zt} = 1$, $K_d = 0.85$, $GC_{pi} = 0.18$, $GC_p = -1.4$.

² Installation must be in accordance with Section 4.2 of this report.

³ Values are for species of wood having a specific gravity of 0.42 or greater.

⁴ Values are for species of wood having a specific gravity of 0.50 or greater.

⁵ V_{asd} = nominal design wind speed.

⁶ V_{ult} = ultimate design wind speed.

⁷ Wind speed design assumptions per Section 30.4, of ASCE 7-10: $K_{zt} = 1$, $K_d = 0.85$, $GC_{pi} = 0.18$, $GC_p = -1.4$.

⁸ 2015 and 2012 IBC Section 1609.3.1, Eqn. 16-33, $V_{asd} = V_{ult} \sqrt{0.6}$.

⁹ V = basic design wind speed

¹⁰ Wind speed design assumptions per Section 30.3, of ASCE 7-16: $K_{zt} = 1$, $K_d = 0.85$, $GC_{pi} = 0.18$, $GC_p = -1.4$.

¹¹ 2021 IBC Section 1609.3.1, Eqn. 16-17 and 2018 IBC Section 1609.3.1, Eqn. 16-33, $V_{asd} = V \sqrt{0.6}$

¹² Smooth-shank stainless steel nails are outside of the scope of this report unless specifically noted.

¹³ Vertical edges of each panel permitted to be fastened to WSP sheathing only (remainder of panel must be fastened to the studs through the sheathing).

¹⁴ Long edges of each panel permitted to be fastened to WSP sheathing only (short edges are not required to be fastened).

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 16 00—Sheathing

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 46 46—Fiber-Cement Siding

REPORT HOLDER:

JAMES HARDIE BUILDING PRODUCTS, INC.

EVALUATION SUBJECT:

HARDIE® PANEL (PREVAIL®, CEMPANEL®) SIDING, HARDIE® ARCHITECTURAL PANELS HARDIFLEX® SIDING AND HARDITEX BASEBOARD

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that Hardie® Panel (Prevail®, Cempanel®) siding, Hardie® Architectural Panels, HardiFlex® siding and Harditex® baseboard, described in ICC-ES evaluation report ESR-1844, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2022 *California Building Code*® (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2022 *California Residential Code*® (CRC)

2.0 CONCLUSIONS

2.1 CBC:

The Hardie® Panel (Prevail®, Cempanel®) siding, Hardie® Architectural Panels, HardiFlex® siding and Harditex® baseboard, described in Sections 2.0 through 7.0 of the evaluation report ESR-1844, comply with CBC Chapter 14, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 14 and 17, as applicable.

2.1.1 OSHPD: The applicable OSHPD Sections and Chapters of the CBC are beyond the scope of this supplement.

2.1.2 DSA: The applicable DSA Sections and Chapters of the CBC are beyond the scope of this supplement.

2.2 CRC:

The Hardie® Panel (Prevail®, Cempanel®) siding, Hardie® Architectural Panels, HardiFlex® siding and Harditex® baseboard, described in Sections 2.0 through 7.0 of the evaluation report ESR-1844, comply with CRC Chapter 7, provided the design and installation are in accordance with the 2021 *International Residential Code*® (IRC) provisions noted in the evaluation report.

This supplement expires concurrently with the evaluation report, reissued November 2023 and revised May 2024.