

ICC-ES Evaluation Report

ESR-1844

Issued November 1, 2010

This report is subject to re-examination in one year.

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**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.

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EVALUATION SUBJECT:
**HARDIEPANEL® SIDING, HARDIFLEX® SIDING AND
HARDITEX® BASEBOARD**

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)
- 2006 *International Energy Conservation Code*® (IECC)

Properties evaluated:

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

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 HardiePanel® panel siding, Hardiflex® panel siding and Harditex® Baseboard; and are supplied either unprimed or primed for

subsequent application of a compatible primer and/or exterior-grade top coat(s).

The panels comply with ASTM C 1186, Grade II, Type A. They have a nominal density of 83 lbs/ft³ (133 kg/m³); a flame-spread index of 5 or less and a smoke-developed index of 50 or less when tested in accordance with ASTM E 84; and are classified as noncombustible when tested in accordance with ASTM E 136. Thermal conductance (*K*) and thermal resistance (*R*) values for the panels are as shown in Table 2. When tested in accordance with ASTM E 96, 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.

3.2 Materials:

3.2.1 HardiePanel® (Cempanel®) Siding: HardiePanel® siding (also known as Cempanel®) is available with various surface textures including smooth. Nominal product dimensions are noted in Table 1 of this report.

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

3.2.3 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 IBC Section 1405.15 and IRC Tables R703.4 and R703.10.2, and the manufacturer's installation instructions.

4.2.2 HardiePanel® (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 members and must be protected by polyvinylchloride (PVC) joint treatment, lumber battens, or sealant. Horizontal joints must be flashed with Z-flashing and blocked with solid 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. 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 described in Table 4.

4.2.3 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.

4.2.4 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 C 1396, 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 C 840.

4.3.1.2 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 C 1396, followed by one layer of minimum $\frac{1}{4}$ -inch-thick (6.4 mm) HardiePanel® (Cempanel®), or Hardiflex® siding or Harditex® Baseboard. 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 $1\frac{1}{4}$ -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. HardiePanel® (Cempanel®), or Hardiflex® siding and Harditex® Baseboards, 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 waferhead screws located a maximum of 8 inches (203 mm) on center. HardiePanel® (Cempanel®), Hardiflex® siding and Harditex® Baseboard joints require treatment similar to that described in Sections 4.2.2, 4.2.3 and 3.2.3, respectively.

4.3.2 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 C 1396, followed by one layer of minimum $\frac{1}{4}$ -inch-thick (6.4 mm) HardiePanel® (Cempanel®), or Hardiflex® siding, or Harditex® Baseboard. 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 waferhead 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 HardiePanel® (Cempanel®) 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 panels must be installed over a water-resistive barrier in accordance with the applicable code.
- 5.5** Flashing must be installed at all penetrations and terminations in accordance with the applicable code and the manufacturer’s instructions.

5.6 The products are manufactured at the following locations under a quality control program with inspections by Intertek Testing Services, NA, Ltd. (AA-690):

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

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 2005 (editorially revised January 2008).

7.0 IDENTIFICATION

For field identification, James Hardie Building Products, Inc., HardiePanel® (Cempanel®) and Hardiflex® panel sidings, and Harditex® baseboards, must bear a label with the manufacturer's name and telephone number, the product name, the name of the inspection agency (Intertek Testing Services, NA Ltd.), and the evaluation report number (ESR-1844).

TABLE 1—STANDARD NOMINAL PANEL DIMENSIONS^{1,2}

Product	Width (Inches)	Length (feet)	Thicknesses (Inches)
HardiePanel® siding	48	8, 9 & 10	¹ / ₄ & 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.

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	Fastener Spacing (in.)	Frame Type	Stud Spacing (in.)	Building Height (ft.)	IBC & IRC ¹ 3-Second Gust		
							B	C	D
Hardiflex® HardiePanel®	¼	4d common 1½-in long	8	2 x 4 wood ³	16	20	105		
						40	95		
						60	85		
Hardiflex® HardiePanel®	¼	4d common 1½-in long	8	2 x 4 wood ³	24	20	85		
Hardiflex® HardiePanel®	¼	6d common 2-in long	6	2 x 4 wood ³	16	20	137	116	
						40	137	105	
						60	137	105	
Hardiflex® HardiePanel® Harditex®	¼	No. 11 ga. x 1¼-in. long galvanized roofing nail	6	2 x 4 wood ³	16	20	126	95	
						40	121	95	
Hardiflex® HardiePanel® Harditex®	¼	No. 11 ga. x 1¼-in. long galvanized roofing nail	6	2 x 4 wood ³	24	20	95		
						40	95		
Hardiflex® HardiePanel® 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	
						40	137	105	
						60	126	95	
Hardiflex® HardiePanel®	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
						40	107	92	85
						60	101	88	
Hardiflex® HardiePanel®	5/16	4d common 1½-in long	8	2 x 4 wood ³	16	40	126	95	
Hardiflex® HardiePanel®	5/16	4d common 1½-in long	8	2 x 4 wood ³	24	20	105		
HardiePanel®	5/16	6d common 2 in long	4	2 x 4 wood ³	16	20	178	157	144
						40	171	146	135
						60	162	140	130
						100	134	119	111
HardiePanel®	5/16	6d common 2 in long	4	2 x 4 wood ³	24	20	141	124	113
						40	135	116	107
						60	128	111	103
						100	106	94	88
Hardiflex® HardiePanel®	5/16	6d common 2 in long	6	2 x 4 wood ³	16	20	144	127	116
						40	138	118	109
						60	130	113	105
						100	108	96	90
Hardiflex® HardiePanel®	5/16	6d common 2 in long	6	2 x 4 wood ³	24	20	137	95	
						40	121	95	
						60	110	85	
Hardiflex® HardiePanel®	5/16	6d common 2 in long	6 edge 12 field	2 x 4 wood ³	16	40	137	105	
						60	126	100	
						100	116	95	
Hardiflex® HardiePanel®	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	
						40	110	90	
						60	100	85	
Hardiflex® HardiePanel®	¼	Min. No. 8 x 1- in. long x 0.323-in. HD ribbed buglehead screw	6	Min. No. 20 ga. X 3 ⁵ / ₈ in. x 1 ³ / ₈ in. metal C-stud	16	20	137	105	
						40	126	105	
						60	116	95	

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

Product	Minimum Product Thickness (in.)	Fastener Type	Fastener Spacing (in.)	Frame Type	Stud Spacing (in.)	Building Height (ft.)	IBC & IRC ¹ 3-Second Gust		
							B	C	D
Hardiflex® HardiePanel®	¼	Min. No. 8 x 1-in. long x 0.323-in. HD ribbed buglehead screw	6	Min. No. 20 ga. X 3 ⁵ / ₈ in. x 1 ³ / ₈ in. metal C-stud	24	20	105	85	
						40	95		
Hardiflex® HardiePanel®	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. X 3 ⁵ / ₈ in. x 1 ³ / ₈ in. metal C-stud	16	15	168	137	116
						20	168	126	105
						40	158	116	105
						60	147	116	95
Hardiflex® HardiePanel®	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. X 3 ⁵ / ₈ in. x 1 ³ / ₈ in. metal C-stud	24	15	152	105	90
						20	147	105	85
						40	126	95	85
						60	116	90	85

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

¹IBC/IRC wind speeds are calculated in accordance with IBC Section 1609.1 and are based on the following assumptions:

- a. Importance factor, I, = 1
- b. Product of external pressure and gust effect, GC_p, = -1.4
- c. Product of internal pressure and gust effect, GC_{pi}, = [0.55 (partially enclosed), 0.18 (enclosed)]
- d. Wind directionality factor, K_d, = 0.85

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

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

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

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Issued November 1, 2010

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www.jameshardie.com
chad.diercks@jameshardie.com**EVALUATION SUBJECT:****HARDIEPANEL® SIDING, HARDIFLEX® SIDING AND HARDITEX® BASEBOARD****1.0 EVALUATION SCOPE****Compliance with the following code:**2007 *California Building Code*® (CBC)**Property evaluated:**

Structural

2.0 PURPOSE OF THIS SUPPLEMENT

This supplement is issued to indicate that the HardiePanel® Siding, Hardiflex® Siding and Harditex® Baseboard described in master report ESR-1844 may be used where noncombustible or ignition-resistant exterior walls complying with Section 1403.4 of the CBC are required, provided installation is in accordance with the master report and the additional requirements in Sections 1405.15, 1405.16, and 1405.17 of the CBC.

The exterior wall coverings may be used in the construction of new buildings located in Fire Hazard Severity Zone within State Responsibility Areas or any Wildland–Urban Interface Fire Area, provided installation is also in accordance with the master report and the additional requirements of Sections 701A.3 and 704A.3 of the CBC.

The product(s) recognized in this supplement have not been evaluated for compliance with the *International Wildland–Urban Interface Code*®.

This supplement expires concurrently with the master report issued November 1, 2010.