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ESR-2273

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
SECTION: 06 12 13—CEMENTITIOUS REINFORCED PANELS
DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
SECTION: 07 45 00—FIBER-REINFORCED CEMENTITIOUS PANELS

REPORT HOLDER:

JAMES HARDIE BUILDING PRODUCTS, INC.

**10901 ELM AVENUE
FONTANA, CALIFORNIA 92337**

EVALUATION SUBJECT:

HARDIESOFFIT® AND CEMSOFFIT® EXTERIOR SOFFIT PANEL



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DIVISION 06 00 00—WOOD, PLASTICS AND COMPOSITES

Section 06 12 13—Cementitious Reinforced Panels

DIVISION 07 00 00—THERMAL AND MOISTURE PROTECTION

Section 07 45 00—Fiber-Reinforced Cementitious Panels

REPORT HOLDER:

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EVALUATION SUBJECT:

HARDIESOFFIT® AND CEMSOFFIT® EXTERIOR SOFFIT PANEL

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2015, 2012 and 2009 *International Residential Code*® (IRC)

Properties evaluated:

- Physical Properties
- Structural
- Noncombustible Construction
- Surface-burning characteristics
- Thermal Resistance
- Weather Protection

2.0 USES

Hardiesoffit® and Cemsoffit® panels are used as exterior soffit covering of buildings of non-fire-resistance-rated construction.

3.0 DESCRIPTION

Hardiesoffit® and Cemsoffit® panels are single-faced, cellulose fiber-reinforced cement (fiber-cement) sheets manufactured by the Hatschek process and cured by high-pressure steam autoclaving. The exterior soffit panels are identified as Hardiesoffit® (Cemsoffit®) panels and may be vented or unvented.

The fiber-cement sheets comply with ASTM C1186 as Type A, Grade II, and have a flame-spread index of 0 and a smoke developed index of 5 when tested in accordance with ASTM E84. The sheets are classified as noncombustible when tested in accordance with ASTM E136.

Thermal conductivity (K) and thermal resistance (R) values for the unvented products are shown in Table 2 based on ASTM C177 tests. When tested in accordance with ASTM E96, unvented products with a thickness of ¼ inch (6.4 mm) have demonstrated the permeance value given in Table 3 of this report.

Soffit panels are available with either a woodgrain texture or a smooth unsanded surface. The exterior soffit products may be supplied unprimed or primed for subsequent application of a compatible primer and/or exterior-grade topcoat(s). Nominal soffit dimensions are noted in Table 1.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The maximum wind speeds, building heights and exposure categories applicable for Hardiesoffit® and Cemsoffit® panels are noted in Table 5. Vented soffit panels provide net free ventilation area as presented in Table 4 of this report.

4.2 Installation:

Installation shall comply with this report and the manufacturer's published installation instructions. A copy of the manufacturer's published installation instructions this report must be available at the job site during installation.

All panel edges must be supported by framing members. Panels must be attached with corrosion-resistant fasteners installed with a minimum 3/8 inch (9.5 mm) edge distance and minimum 2-inch (51 mm) clearance from corners. The panels must be installed with the long edge of the panel perpendicular to the joist framing and must be attached with fastener types, lengths, and spacings described in Table 5. Framing must include a subfascia, blocking, and/or ledger board to provide a nailing base along the dimension of the soffit.

5.0 CONDITIONS OF USE

The Hardiesoffit® and Cemsoffit® exterior soffit panels 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 Hardiesoffit® and Cemsoffit® panels must be installed in accordance with this report and the manufacturer’s published installation instructions. In the event of a conflict between this report and the manufacturer’s published installation instructions, this report governs.
- 5.2 The Hardiesoffit® and Cemsoffit® soffit panel are manufactured under a quality control program with inspections by ICC-ES at the following locations:
 - 5.2.1 Pulaski, Virginia
 - 5.2.2 Tacoma, Washington
 - 5.2.3 Waxahachie, Texas

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Fiber Cement Siding Used as Exterior Wall Siding (AC90), dated June 2012 (editorially revised September 2015).

7.0 IDENTIFICATION

Hardiesoffit® and Cemsoffit® panels shall be identified by a stamp or label on the board bearing the name and address of the report holder (James Hardie Building Products), the product name (Hardiesoffit® or Cemsoffit®), and the evaluation report number (ESR-2273).

TABLE 1—STANDARD NOMINAL SOFFIT DIMENSIONS

Product Type	Width (inches)	Length (feet)	Thickness (inches)
Hardiesoffit® Smooth (unvented)	4, 5, 6, 10, 12, 16, 24, 36 & 48	8, 9, 10 & 12	1/4
Hardiesoffit® Woodgrain (unvented)	4, 5 1/4, 5 3/4, 6, 6 1/4, 7 1/4, 8, 8 1/4, 9 1/2, 10, 11 1/4, 11 1/2, 12, 15 1/4, 16, 24, 36 & 48	8, 9, 10 & 12	1/4
Hardiesoffit® Smooth (vented)	4, 6, 9 1/2, 10, 11 1/2, 12, 16 & 24	8 & 12	1/4
Hardiesoffit® Woodgrain (vented)	4, 5 1/4, 5 3/4, 6, 6 1/4, 7 1/4, 8, 8 1/4, 9 1/2, 11 1/2, 12, 16 & 24	8 & 12	1/4
Cemsoffit® Woodgrain (unvented)	4, 5, 6, 10, 12, 16, 24, 36 & 48	8, 9, 10 & 12	1/4
Cemsoffit® Woodgrain (vented)	4, 5 1/2, 5 3/4, 6, 6 1/2, 7 1/4, 8, 8 1/4, 9 1/2, 11 1/2, 12, 16 & 24	8 & 12	1/4

1 inch = 25.4 mm, 1 ft = 304.8 mm

TABLE 2—K and R VALUES FOR UNVENTED SOFFIT PRODUCTS

Product Thickness (inch)	Actual Thermal Conductivity (K _{eff})	Actual Thermal Resistance (Btu/h-ft ² -°F)
1/4	7.80	0.13

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

TABLE 3—WATER VAPOR PERMEANCE VALUES FOR UNVENTED SOFFIT PRODUCTS

Product Thickness (inch)	Permeance (perms)
1/4	1.75

1 inch = 25.4 mm, 1 perm = 57 mg/(s•m²•Pa)

TABLE 4—VENTILATION RATES FOR VENTED SOFFIT PRODUCTS

Width (inch)	NET FREE VENTILATION (in ² / linear ft)
5 3/4 and over	5.0 (64 cm ² /m)
5 1/4	4.0 (64 cm ² /m)
4	3.0 (64 cm ² /m)

1 inch = 25.4 mm

TABLE 5—MAXIMUM WIND SPEEDS FOR EXPOSURE CATEGORY (mph)²

Product	Product Dimensions (in.)		Fastener Type	Fastener Spacing (in.)	Frame Type	Stud Spacing (in.)	Building Height ⁸ (ft.)	2012 IRC, 2009 IBC/IRC, 2006 IBC/IRC (Basic Wind Speed, V _{asd} ^{1,4,7})			2015 IBC/IRC, 2012 IBC (Ultimate Design Wind Speed, V _{ult} ^{5,6})		
	Thick	Max. Width						EXPOSURE CATEGORY			EXPOSURE CATEGORY		
								B	C	D	B	C	D
Hardiesoffit®	1/4	48	4d common, 1½-in long	8	2 x 4 wood ³	16	0-15	111	100	91	143	130	118
							20	111	98	89	143	126	115
							40	106	91	-	137	117	-
							60	100	87	-	130	112	-
Hardiesoffit®	1/4	48	4d common, 1½-in long	8	2 x 4 wood ³	24	0-15	94	86	-	122	110	-
							20	94	-	-	122	-	-
							40	90	-	-	117	-	-
							60	86	-	-	110	-	-
Hardiesoffit®	1/4	48	6d siding nail 0.092-in shank x 2-in long x 0.235-in HD	4	2 x 4 wood ³	24	0-15	139	126	114	179	162	147
							20	139	122	112	179	158	144
							40	133	114	105	172	147	135
							60	126	109	101	162	141	131
Hardiesoffit®	1/4	16	0.083-in shank x 0.187" HD x 1½-in long ring shank nail	8	2 x 4 wood ³	16	0-15	185	168	152	239	217	197
							20	185	163	149	239	211	192
							40	177	152	140	229	196	181
							60	168	146	135	217	188	175
Hardiesoffit®	1/4	16	0.083-in shank x 0.187" HD x 1½-in long ring shank nail	8	2 x 4 wood ³	24	0-15	186	169	153	240	218	198
							20	186	164	150	240	211	193
							40	178	152	141	230	197	182
							60	169	146	136	218	189	175
Hardiesoffit®	1/4	24	0.083 shank x 0.187" HD x 1½-in long ring shank nail	8	2 x 4 wood ³	22.5 max	0-15	106	96	87	137	124	113
							20	106	93	85	137	121	110
							40	102	87	80	131	112	104
							60	96	83	-	124	108	-
Hardiesoffit®	1/4	24	6d siding nail 0.092-in shank x 2-in long x 0.235-in HD	4	2 x 4 wood ³	24	0-15	144	131	119	186	169	153
							20	144	127	116	186	164	150
							40	138	118	109	178	152	141
							60	131	113	105	169	146	136
Hardiesoffit®	1/4	24	6d common nail 0.113-in shank x 2-in long x 0.266-in HD	4	2 x 4 wood ³	24	0-15	150	136	123	193	175	159
							20	150	132	121	193	171	156
							40	144	123	113	186	159	146
							60	136	118	109	175	152	141
Hardiesoffit®	1/4	48	No 8 x 1-in long x 0.323 in HD ribbed bugle head screw	6	20 ga Min 3 ⁵ / ₈ in x 1 ³ / ₈ in metal C-stud	16	0-15	116	106	96	150	136	124
							20	116	103	94	150	133	121
							40	112	95	88	144	123	114
							60	106	92	85	136	118	110

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

¹Wind speed design assumptions per Section 6.5, Method 2, of ASCE 7-05: I = 1.0, K_{z1} = 1, K_d = 0.85, GC_{pi} = 0.18, GC_p = -1.4.

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.

⁴V_{asd} = nominal design wind speed.

⁵V_{ult} = ultimate design wind speed

⁶Wind speed design assumptions per Section 30.4, of ASCE 7-10: K_{z1} = 1, K_d = 0.85, GC_{pi} = 0.18, GC_p = -1.4.

⁷2015 and 2012 IBC Section 1609.3.1, Eq. 16-33, V_{asd} = V_{ult} √0.6

⁸Building height equals the mean roof height (in feet) of a building, except that eave height shall be used for roof angle Θ less than or equal to 10° (2-12 roof slope).