



EVALUATION SUBJECT

HardiePanel® Siding

James Hardie Product Trade Names covered in this evaluation:

HardiePanel® Siding, Cempanel® Siding, Prevail™ Panel Siding

EVALUATION SCOPE:

ASCE 7-22 (ref. in the 2023 FBC)
2023 Florida Building Code (8th Edition)

EVALUATION PURPOSE:

This analysis is to determine the maximum design 3-second gust wind speed to be resisted by an assembly of HardiePanel (Cempanel, Prevail Panel) siding fastened to wood furrings on either wood or metal framing with nails or screws.

REFERENCE REPORTS:

1. Intertek Report 102024363COQ-001A, Transverse load test on HardiePanel.

TEST RESULTS:

Table 1A - Results of Transverse Load Testing										
Report Number	Test Agency	Thickness (in.)	Width (in.)	Frame Type ¹	Frame Spacing (in.)	Fastener Spacing (in.)	Fastener Type and Dimensions	Ultimate Load (PSF)	Allowable Design Load ² (PSF)	Failure Mode
102024363COQ-001A	Intertek	0.3125	48	2X4 wood stud, 3/4" thick by 3.5" wide SPF furring	16	6	No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws	-160.7	-53.6	pull through /fracture
102024363COQ-001A	Intertek	0.3125	48	2X4 wood stud, 3/4" thick by 3.5" wide SPF furring	16	8	No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws	-131.4	-43.8	pull through
102024363COQ-001A	Intertek	0.3125	48	2X4 wood stud, 3/4" thick by 3.5" wide SPF furring	16	12	No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws	-106.1	-35.4	pull through
102024363COQ-001A	Intertek	0.3125	48	2X4 wood stud, 3/4" thick by 3.5" wide SPF furring	16	6	0.090" shank X 0.215" HD x 1.5" long ring shank nail	-147.6	-49.2	pull through /fracture
102024363COQ-001A	Intertek	0.3125	48	2X4 wood stud, 3/4" thick by 3.5" wide SPF furring	24	8	No. 8 X 1.25" long X 0.323" HD ribbed bugle head screws	-82.7	-27.6	pull through /fracture

1. All fasteners were installed on furring without penetration into the framing members.

2. Allowable load is determined from ultimate load divided by a factor of safety of 3.

3. HardiePanel Siding complies with ASTM C1186, *Standard Specification for Grade II, Type A Non-asbestos Fiber-Cement Flat Sheets*.

Table 1B - Analysis of Allowable Load for #8 Screw at 10" O.C.			
	#8 Screw Spacing		
Fastener Spacing (in.)	8	12	10
Frame spacing (in.)	16	16	16
Fastener Tributary area (ft ²)	0.89	1.33	1.11
Allowable load (psf)	43.8	35.4	38.8
Individual fastener load (lb.)	38.9	47.2	43.1

The fastener load for #8 screw at 10" O.C. was calculated as the average of the test results for 8" and 12" O.C.

The allowable load for #8 screw at the spacing of 10" O.C. into furring can be calculated by interpolating the results of same fastener at 8" and 12" O.C., since both tests had same failure mode of fastener pull through from the panels. As shown in the table, the allowable load for #8 screws installed at 10" O.C. to wood furring is **38.8 psf**.

The fastener load as tested based on the allowable design loads in Table 1A above are verified to not exceed the NDS-2018 calculated allowable fastener withdrawal load as summarized in Table 1C below:

Table 1C - Fastener Load Analysis										
Fastener Type and Spacing / Stud Spacing	Shank Dia., D (in.)	Fastener Penetration into Wood Furring ² , P (in.)	Load Duration Factor C _d	Wood Framing Specific Gravity, G ⁴	NDS Adjusted Withdrawal Capacity ¹ W' (lb.)	Tested Design Pressure (from Table 1A above) (psf)	Fastener Tributary Area (ft ²)	Single Fastener Load, as tested ³ (lb.)	Fastener Load @ Design Pressure Exceeds W' (Yes/No)	Adjusted Design Pressure ⁴ (psf)
No.8 Screws @ 6" / 16" oc	0.164	0.750	1.6	0.42	98.9	-53.6	0.67	35.7	No	No Adjustment
No.8 Screws @ 8" / 16" oc	0.164	0.750	1.6	0.42	98.9	-43.8	0.89	38.9	No	No Adjustment
No.8 Screws @ 12" / 16" oc	0.164	0.750	1.6	0.42	98.9	-35.4	1.33	47.2	No	No Adjustment
No.8 Screws @ 8" / 24" oc	0.164	0.750	1.6	0.42	98.9	-27.6	1.33	36.8	No	No Adjustment
Ring Shank Nails @ 6" / 16" oc	0.090	0.750	1.6	0.42	34.3	-49.2	0.67	32.8	No	No Adjustment

(1) The adjusted fastener load (W') is calculated using the following equations in NDS-2018:

Equ. 12.2-5 (deformed shank nails): $W' = 1800 \times G^2 \times D \times P \times C_d$

Equ. 12.2-2 (wood screws): $W' = 2850 \times G^2 \times D \times P \times C_d$

where $C_d = 1.6$ for wind and earthquake

(2) Fastener penetration is into the full depth of the furring strips

(3) Fastener load as tested is determined by multiplying the the design pressure by the fastener tributary area.

(4) If fastener load as tested exceeds W', the allowable design load is adjusted as follows: Adjusted Design Load = W'/Fastener Tributary Area

Justification of Using the Results on Light Gauge Steel Framing

In the subject configurations, all fasteners were attached to furring only, so whether the furring is attached to wood or steel framing does not affect panels' transverse load capacity. It will be the project engineer's responsibility to ensure the furring attachment to the framing members have sufficient load capacities.

DESIGN WIND LOAD PROCEDURES:

Fiber-cement siding transverse load capacity (wind load capacity) is determined from transverse load testing in accordance with ASTM E330 or E72 as noted in Section 4.0 of the ICC ES AC90, Acceptance Criteria for Fiber Cement Siding Used as Exterior Wall Siding (approved October 2018). The allowable/design capacity from the testing is based on a factor of safety of 3 applied to the ultimate test load per AC90. The wind load values are determined from the ASCE 7 equations.

Since the allowable design load is based on factor of safety of 3, allowable design loads on fiber-cement siding correlate directly to required design pressures for Allowable Stress Design, and therefore should be used with combination loading equations for Allowable Stress Design (ASD).

By using the combination loading equations for Allowable Stress Design (ASD), the tested allowable design loads for fiber-cement siding are aligned with the wind speed requirements in ASCE 7-22 (Figures 26.5-1A to -1D), or the figures in the 2023 FBC as applicable.

Equation 1, $q_z = 0.00256 \cdot K_z \cdot K_{zt} \cdot K_e \cdot V^2$ {ref. ASCE 7-22, Eq. 26.10-1}

q_z , velocity pressure at height z
 K_{zt} , velocity pressure exposure coefficient evaluated at height z

K_{zt} , topographic factor
 K_e , ground elevation factor, permitted to take $K_e = 1.0$
 V , basic wind speed (3-second gust MPH) as determined from:

ASCE 7-22 Figures 26.5-1A, B, C, or D
2023 FBC Figures 1609.3(1) - 1609.3(4)

Equation 2, $V = V_{ult}$

V_{ult} , ultimate design wind speeds (3-second gust MPH) determined from 2023 FBC Figures 1609.3(1) - 1609.3(4)

Equation 3, $p = q_h K_d (G C_{pf} - G C_{pi})$ $h \leq 60$ ft {ref. ASCE 7-22 Eq. 30.3-1}

q_h , velocity pressure evaluated at mean roof height h {ref. ASCE 7-22 Section 26.10}

$G C_{pf}$, product of external pressure coefficient and gust-effect factor {ref. ASCE 7-22 Figure 30.3-1 for walls}

$G C_{pi}$, product of internal pressure coefficient and gust-effect factor {ref. ASCE 7-22 Table 26.13-1}

K_d , wind directionality factor {ref. ASCE 7-22 Section 26.6}

p , design pressure (PSF) for siding (allowable design load for siding)

To determine design pressure, substitute q_h into Equation 3,

Equation 4, $p = 0.00256 \cdot K_z \cdot K_{zt} \cdot K_e \cdot V_{ult}^2 \cdot (G C_{pf} - G C_{pi})$

Allowable Stress Design, ASCE 7-22 Section 2.4.1, load combination 7,

Equation 5, $0.6D + 0.6W$ {ref. ASCE 7-22 section 2.4.1, load combination 7}

D , dead load
 W , wind load (load due to wind pressure)

To determine the Allowable Stress Design Pressure, apply the load factor for W (wind) from Equation 5 to p (design pressure) determined from equation 4

Equation 6, $p_{ASD} = 0.6 \cdot [p]$

Equation 7, $p_{ASD} = 0.6 \cdot [0.00256 \cdot K_z \cdot K_{zt} \cdot K_e \cdot V_{ult}^2 \cdot (G C_{pf} - G C_{pi})]$

Equation 7 is used to populate Table 4, 5, and 6.

To determine the allowable ultimate basic wind speed in Table 6, solve Equation 7 for V_{ult} ,

Equation 8, $V_{ult} = (p_{ASD} / 0.6 \cdot 0.00256 \cdot K_z \cdot K_{zt} \cdot K_e \cdot (G C_{pf} - G C_{pi}))^{0.5}$

Applicable to methods specified in Exceptions 1 through 3 of [2023 FBC] Section 1609.1.1., to determine the allowable nominal design wind speed (V_{ASD}) in Table 6, apply the conversion formula below,

Equation 9, $V_{ASD} = V_{ult} \cdot (0.6)^{0.5}$ {ref. 2023 FBC Eq. 16-17}

V_{ASD} , Nominal design wind speed (3-second gust, mph)
 V_{ult} , Ultimate design wind speed (3-second gust, mph) determined from Figure 1609.3(1), 1609.3(2), 1609.3(3) or 1609.3(4)

Table 2 - Coefficients and Constants used in Determining V and p.										
	K _z							Wall Zone 5		
Height (ft)	Exp B (ASCE 7-22)	Exp B	Exp C	Exp D		K _{zt}	K _d	K _e	GC _p	GC _{pi}
0-15	0.57	0.70	0.85	1.03	h≤60	1	0.85	1	-1.4	0.18
20	0.62	0.70	0.90	1.08		1	0.85	1	-1.4	0.18
25	0.66	0.70	0.94	1.12		1	0.85	1	-1.4	0.18
30	0.70	0.70	0.98	1.16		1	0.85	1	-1.4	0.18
35	0.72	0.72	1.01	1.19		1	0.85	1	-1.4	0.18
40	0.74	0.74	1.04	1.22		1	0.85	1	-1.4	0.18
45	0.765	0.765	1.065	1.245		1	0.85	1	-1.4	0.18
50	0.79	0.79	1.09	1.27		1	0.85	1	-1.4	0.18
55	0.81	0.81	1.11	1.29		1	0.85	1	-1.4	0.18
60	0.83	0.83	1.13	1.31		1	0.85	1	-1.4	0.18
100	0.95	0.95	1.26	1.43	h>60	1	0.85	1	-1.8	0.18

The coefficients and constants listed in Table 2 above were consistent for ASCE 7-22 except for K_z at Exposure B under 30 ft, where ASCE 7-22 allows to use lower exposure coefficient that previous codes used a more conservative values (resulted in higher design pressure). For the simplicity of the tables, the tables in the following sheet was populated using the more conservative ASCE 7-10 coefficients.

Table 3 - Allowable Stress Design Pressure P_{asd} for Component and Cladding (C&C) to be Resisted at Various Wind Speeds for Wind Exposure Category B														
Wind Speed (3-second gust)	100	105	110	115	120	130	140	150	160	170	180	190	200	210
Height (ft)	B	B	B	B	B	B	B	B	B	B	B	B	B	B
0-15	-14.4	-15.9	-17.5	-19.1	-20.8	-24.4	-28.3	-32.5	-37.0	-41.7	-46.8	-52.1	-57.8	-63.7
20	-14.4	-15.9	-17.5	-19.1	-20.8	-24.4	-28.3	-32.5	-37.0	-41.7	-46.8	-52.1	-57.8	-63.7
25	-14.4	-15.9	-17.5	-19.1	-20.8	-24.4	-28.3	-32.5	-37.0	-41.7	-46.8	-52.1	-57.8	-63.7
30	-14.4	-15.9	-17.5	-19.1	-20.8	-24.4	-28.3	-32.5	-37.0	-41.7	-46.8	-52.1	-57.8	-63.7
35	-14.9	-16.4	-18.0	-19.6	-21.4	-25.1	-29.1	-33.4	-38.0	-42.9	-48.1	-53.6	-59.4	-65.5
40	-15.3	-16.8	-18.5	-20.2	-22.0	-25.8	-29.9	-34.3	-39.1	-44.1	-49.5	-55.1	-61.1	-67.3
45	-15.8	-17.4	-19.1	-20.9	-22.7	-26.7	-30.9	-35.5	-40.4	-45.6	-51.1	-57.0	-63.1	-69.6
50	-16.3	-18.0	-19.7	-21.6	-23.5	-27.5	-31.9	-36.7	-41.7	-47.1	-52.8	-58.8	-65.2	-71.9
55	-16.7	-18.4	-20.2	-22.1	-24.1	-28.2	-32.7	-37.6	-42.8	-48.3	-54.1	-60.3	-66.8	-73.7
60	-17.1	-18.9	-20.7	-22.6	-24.7	-28.9	-33.6	-38.5	-43.8	-49.5	-55.5	-61.8	-68.5	-75.5
100	-24.6	-27.1	-29.7	-32.5	-35.4	-41.5	-48.1	-55.3	-62.9	-71.0	-79.6	-88.7	-98.2	-108.3

Table 4 - Allowable Stress Design Pressure P_{asd} for Component and Cladding (C&C) to be Resisted at Various Wind Speeds for Wind Exposure Category C														
Wind Speed (3-second gust)	100	105	110	115	120	130	140	150	160	170	180	190	200	210
Height (ft)	C	C	C	C	C	C	C	C	C	C	C	C	C	C
0-15	-17.5	-19.3	-21.2	-23.2	-25.2	-29.6	-34.4	-39.5	-44.9	-50.7	-56.8	-63.3	-70.1	-77.3
20	-18.6	-20.5	-22.5	-24.6	-26.7	-31.4	-36.4	-41.8	-47.5	-53.7	-60.2	-67.0	-74.3	-81.9
25	-19.4	-21.4	-23.5	-25.6	-27.9	-32.8	-38.0	-43.6	-49.6	-56.0	-62.8	-70.0	-77.6	-85.5
30	-20.2	-22.3	-24.5	-26.7	-29.1	-34.2	-39.6	-45.5	-51.8	-58.4	-65.5	-73.0	-80.9	-89.2
35	-20.8	-23.0	-25.2	-27.6	-30.0	-35.2	-40.8	-46.9	-53.3	-60.2	-67.5	-75.2	-83.3	-91.9
40	-21.5	-23.7	-26.0	-28.4	-30.9	-36.3	-42.0	-48.3	-54.9	-62.0	-69.5	-77.4	-85.8	-94.6
45	-22.0	-24.2	-26.6	-29.1	-31.6	-37.1	-43.1	-49.4	-56.2	-63.5	-71.2	-79.3	-87.9	-96.9
50	-22.5	-24.8	-27.2	-29.7	-32.4	-38.0	-44.1	-50.6	-57.6	-65.0	-72.9	-81.2	-89.9	-99.2
55	-22.9	-25.2	-27.7	-30.3	-33.0	-38.7	-44.9	-51.5	-58.6	-66.2	-74.2	-82.7	-91.6	-101.0
60	-23.3	-25.7	-28.2	-30.8	-33.6	-39.4	-45.7	-52.4	-59.7	-67.4	-75.5	-84.1	-93.2	-102.8
100	-32.6	-35.9	-39.4	-43.1	-46.9	-55.0	-63.8	-73.3	-83.4	-94.1	-105.5	-117.6	-130.3	-143.6

Table 5 - Allowable Stress Design Pressure P_{asd} for Component and Cladding (C&C) to be Resisted at Various Wind Speeds for Wind Exposure Category D														
Wind Speed (3-second gust)	100	105	110	115	120	130	140	150	160	170	180	190	200	210
Height (ft)	D	D	D	D	D	D	D	D	D	D	D	D	D	D
0-15	-21.2	-23.4	-25.7	-28.1	-30.6	-35.9	-41.6	-47.8	-54.4	-61.4	-68.8	-76.7	-85.0	-93.7
20	-22.3	-24.6	-27.0	-29.5	-32.1	-37.7	-43.7	-50.1	-57.0	-64.4	-72.2	-80.4	-89.1	-98.2
25	-23.1	-25.5	-28.0	-30.6	-33.3	-39.0	-45.3	-52.0	-59.1	-66.8	-74.9	-83.4	-92.4	-101.9
30	-23.9	-26.4	-29.0	-31.6	-34.5	-40.4	-46.9	-53.8	-61.3	-69.2	-77.5	-86.4	-95.7	-105.5
35	-24.5	-27.1	-29.7	-32.5	-35.3	-41.5	-48.1	-55.2	-62.8	-70.9	-79.5	-88.6	-98.2	-108.3
40	-25.2	-27.7	-30.5	-33.3	-36.2	-42.5	-49.3	-56.6	-64.4	-72.7	-81.5	-90.9	-100.7	-111.0
45	-25.7	-28.3	-31.1	-34.0	-37.0	-43.4	-50.3	-57.8	-65.7	-74.2	-83.2	-92.7	-102.7	-113.3
50	-26.2	-28.9	-31.7	-34.6	-37.7	-44.3	-51.3	-58.9	-67.1	-75.7	-84.9	-94.6	-104.8	-115.5
55	-26.6	-29.3	-32.2	-35.2	-38.3	-45.0	-52.2	-59.9	-68.1	-76.9	-86.2	-96.1	-106.4	-117.4
60	-27.0	-29.8	-32.7	-35.7	-38.9	-45.7	-53.0	-60.8	-69.2	-78.1	-87.6	-97.6	-108.1	-119.2
100	-37.0	-40.8	-44.7	-48.9	-53.2	-62.5	-72.5	-83.2	-94.6	-106.8	-119.8	-133.4	-147.9	-163.0

Tables 3, 4, and 5 are based off of ASCE 7-22, and consistent with the 2023 FBC

Calculation Example:

The following is an example of the wind speed calculation for Table 6:

$$P_{asd} = -53.6 \text{ psf}; K_z = 0.7 \text{ (Exp B)}; K_{zt} = 1; K_d = 0.85; K_e = 1; GC_p = -1.4; GC_{pi} = 0.18$$

Use Equation 8:

$$V_{ult} = \sqrt{\frac{P_{asd}}{0.6 \times 0.00256 \times K_z \times K_{zt} \times K_d \times K_e \times (GC_p - GC_{pi})}} = \sqrt{\frac{-53.6}{0.6 \times 0.00256 \times 0.7 \times 1 \times 0.85 \times 1 \times (-1.4 - 0.18)}} = 193 \text{ mph}$$

TABLE 6 - MAXIMUM WIND SPEEDS (MPH) FOR HARDIEPANEL SIDING ¹

								2023 FBC (Ultimate Design Wind Speed, V_{ult}^5)			2023 FBC (Nominal Design Wind, Speed, $V_{asd}^{4,7}$)													
								Applicable to methods specified in Section 1609.1.1. of 2023 FBC			Applicable to methods specified in Exceptions 1 through 3 of Section 1609.1.1 of 2023 FBC													
								Wind Exposure Category			Wind Exposure Category			Test Results	Coefficients used for calculations ⁶									
								Product	Minimum Thickness (in.)	Width (in.)	Fastener Type	Fastener Spacing (in.)	Frame Type	Stud Spacing (in.)	Building Height ³ (ft.)	B	C	D	B	C	D	Design Load (psf)	K_z	
Exp B	Exp C	Exp D																						
HardiePanel®	5/16	48	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. steel framing, 3/4" thick by 3.5" wide wood furring ^{2,8,9}	16	0-15	193	175	159	149	135	123	-53.6	0.70	0.85	1.03	hs60	1	0.85	1	-1.4	0.18	
							20	193	170	155	149	132	120	-53.6	0.70	0.90	1.08							
							25	193	166	152	149	129	118	-53.6	0.70	0.94	1.12							
							30	193	163	150	149	126	116	-53.6	0.70	0.98	1.16							
							35	190	160	148	147	124	114	-53.6	0.72	1.01	1.19							
							40	187	158	146	145	122	113	-53.6	0.74	1.04	1.22							
							45	184	150	140	143	116	108	-53.6	0.77	1.15	1.33							
							50	181	154	143	140	120	111	-53.6	0.79	1.09	1.27							
							55	179	153	142	139	119	110	-53.6	0.81	1.11	1.29							
							60	177	152	141	137	117	109	-53.6	0.83	1.13	1.31							
							100	148	128	120	114	99	93	-53.6	0.95	1.26	1.43							
							h>60	1	0.85	1	-1.4	0.18												
HardiePanel®	5/16	48	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. steel framing, 3/4" thick by 3.5" wide wood furring ^{2,8,9}	16	0-15	174	158	144	135	122	111	-43.8	0.70	0.85	1.03	hs60	1	0.85	1	-1.4	0.18	
							20	174	154	140	135	119	109	-43.8	0.70	0.90	1.08							
							25	174	150	138	135	116	107	-43.8	0.70	0.94	1.12							
							30	174	147	135	135	114	105	-43.8	0.70	0.98	1.16							
							35	172	145	134	133	112	103	-43.8	0.72	1.01	1.19							
							40	169	143	132	131	111	102	-43.8	0.74	1.04	1.22							
							45	167	141	131	129	109	101	-43.8	0.77	1.07	1.25							
							50	164	140	129	127	108	100	-43.8	0.79	1.09	1.27							
							55	162	138	128	125	107	99	-43.8	0.81	1.11	1.29							
							60	160	137	127	124	106	99	-43.8	0.83	1.13	1.31							
							100	134	116	-	103	90	-	-43.8	0.95	1.26	1.43							
							h>60	1	0.85	1	-1.4	0.18												
HardiePanel®	5/16	48	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. steel framing, 3/4" thick by 3.5" wide wood furring ^{2,8,9}	16	0-15	164	149	135	127	115	105	-38.8	0.70	0.85	1.03	hs60	1	0.85	1	-1.4	0.18	
							20	164	145	132	127	112	102	-38.8	0.70	0.90	1.08							
							25	164	141	130	127	110	100	-38.8	0.70	0.94	1.12							
							30	164	139	127	127	107	99	-38.8	0.70	0.98	1.16							
							35	162	136	126	125	106	97	-38.8	0.72	1.01	1.19							
							40	159	134	124	123	104	96	-38.8	0.74	1.04	1.22							
							45	157	133	123	121	103	95	-38.8	0.77	1.07	1.25							
							50	154	131	122	120	102	94	-38.8	0.79	1.09	1.27							
							55	152	130	121	118	101	94	-38.8	0.81	1.11	1.29							
							60	151	129	120	117	100	93	-38.8	0.83	1.13	1.31							
							100	126	-	-	97	-	-	-38.8	0.95	1.26	1.43							
							h>60	1	0.85	1	-1.4	0.18												
HardiePanel®	5/16	48	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. steel framing, 3/4" thick by 3.5" wide wood furring ^{2,8,9}	16	0-15	157	142	129	121	110	100	-35.4	0.70	0.85	1.03	hs60	1	0.85	1	-1.4	0.18	
							20	157	138	126	121	107	98	-35.4	0.70	0.90	1.08							
							25	157	135	124	121	105	96	-35.4	0.70	0.94	1.12							
							30	157	132	122	121	103	94	-35.4	0.70	0.98	1.16							
							35	154	130	120	120	101	93	-35.4	0.72	1.01	1.19							
							40	152	128	119	118	100	92	-35.4	0.74	1.04	1.22							
							45	150	127	117	116	98	91	-35.4	0.77	1.07	1.25							
							50	147	125	116	114	97	90	-35.4	0.79	1.09	1.27							
							55	146	124	115	113	96	89	-35.4	0.81	1.11	1.29							
							60	144	123	114	111	95	89	-35.4	0.83	1.13	1.31							
							100	120	-	-	93	-	-	-35.4	0.95	1.26	1.43							
							h>60	1	0.85	1	-1.4	0.18												
HardiePanel®	5/16	48	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. steel framing, 3/4" thick by 3.5" wide wood furring ^{2,8,9}	24	0-15	138	125	114	107	97	88	-27.6	0.70	0.85	1.03	hs60	1	0.85	1	-1.4	0.18	
							20	138	122	111	107	94	86	-27.6	0.70	0.90	1.08							
							25	138	119	-	107	92	-	-27.6	0.70	0.94	1.12							
							30	138	117	-	107	91	-	-27.6	0.70	0.98	1.16							
							35	136	115	-	106	89	-	-27.6	0.72	1.01	1.19							
							40	134	113	-	104	88	-	-27.6	0.74	1.04	1.22							
							45	132	112	-	102	87	-	-27.6	0.77	1.07	1.25							
							50	130	111	-	101	86	-	-27.6	0.79	1.09	1.27							
							55	129	-	-	100	-	-	-27.6	0.81	1.11	1.29							
							60	127	-	-	98	-	-	-27.6	0.83	1.13	1.31							
							100	-	-	-	-	-	-	-27.6	0.95	1.26	1.43							
							h>60	1	0.85	1	-1.4	0.18												

TABLE 6 - MAXIMUM WIND SPEEDS (MPH) FOR HARDIEPANEL SIDING ¹

								2023 FBC (Ultimate Design Wind Speed, V_{ult}^5)			2023 FBC (Nominal Design Wind, Speed, $V_{asd}^{4,7}$)												
								Applicable to methods specified in Section 1609.1.1. of 2023 FBC			Applicable to methods specified in Exceptions 1 through 3 of Section 1609.1.1 of 2023 FBC												
								Wind Exposure Category			Wind Exposure Category			Test Results	Coefficients used for calculations ⁶								
Product	Minimum Thickness (in.)	Width (in.)	Fastener Type	Fastener Spacing (in.)	Frame Type	Stud Spacing (in.)	Building Height ³ (ft.)	B	C	D	B	C	D	Design Load (psf)	K_z			K_{dt}	K_{di}	K_e	GC_p	GC_{pi}	
															Exp B	Exp C	Exp D						
HardiePanel®	5/16	48	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. steel framing, 3/4" thick by 3.5" wide wood furring ^{2,8,9}	16	0-15	185	168	152	143	130	118	-49.2	0.70	0.85	1.03	hs≤60	1	0.85	1	-1.4	0.18
							20	185	163	149	143	126	115	-49.2	0.70	0.90	1.08		1	0.85	1	-1.4	0.18
							25	185	159	146	143	123	113	-49.2	0.70	0.94	1.12		1	0.85	1	-1.4	0.18
							30	185	156	143	143	121	111	-49.2	0.70	0.98	1.16		1	0.85	1	-1.4	0.18
							35	182	154	142	141	119	110	-49.2	0.72	1.01	1.19		1	0.85	1	-1.4	0.18
							40	180	151	140	139	117	108	-49.2	0.74	1.04	1.22		1	0.85	1	-1.4	0.18
							45	177	150	138	137	116	107	-49.2	0.77	1.07	1.25		1	0.85	1	-1.4	0.18
							50	174	148	137	135	115	106	-49.2	0.79	1.09	1.27		1	0.85	1	-1.4	0.18
							55	172	147	136	133	114	105	-49.2	0.81	1.11	1.29		1	0.85	1	-1.4	0.18
							60	170	145	135	131	113	105	-49.2	0.83	1.13	1.31		1	0.85	1	-1.4	0.18
							100	142	123	115	110	95	89	-49.2	0.95	1.26	1.43		h>60	1	0.85	1	-1.8

1. Installation must be in accordance with siding manufacturer's instructions. Furring attachment to structural framing members or alternative furring width shall be designed by an engineer to resist the wind loads noted in the table.
2. The penetration of the fasteners shall be the full furring strip depth of minimum 0.75 inch
3. Building height = 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). Linear interpolation of building height (≤ 60 ft) and wind speed is permitted.
4. V_{asd} = nominal design wind speed
5. V_{ult} = ultimate design wind speed
6. Wind speed design coefficient assumptions per Section 30.4 of ASCE 7-22: $K_z=1$, $K_d=0.85$, $K_e = 1$; $GC_p=-1.4$ ($h\leq 60$), $GC_p=-1.8$ ($h>60$), $GC_{pi}=0.18$.
7. 2023 FBC Section 1609.3.1 Eq. 16-17, $V_{asd} = V_{ult}(0.6)^{0.5}$
8. Wood furring shall be preservative treated per AWPA.
9. 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.

LIMITATIONS OF USE:

- 1) In High Velocity Hurricane Zones (HVHZ) install per Miami-Dade County Florida, NOA 22-0315.07

