



EVALUATION SUBJECT

HardieSoffit® Sidings

James Hardie Product Trade Names covered in this evaluation:
HardieSoffit® Sidings

EVALUATION FOR COMPLIANCE WITH THE FOLLOWING:

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

EVALUATION PURPOSE:

This analysis was performed to determine the maximum design 3-second gust wind speed to be resisted by an assembly of the subject product fastened to wood framing with nails and metal framing with screw fasteners.

REFERENCE REPORTS:

1. Ramtech Test Report No. 11436-99/1608 (dated 11/15/99)
2. Ramtech Test Report No. IC-1228-93, dated June 1993
3. Ramtech Test Report No. IC-1054-89, dated September 1989
4. Ramtech Test Report No. IC-1055-89, dated September 1989
5. Applied Research Laboratories Test Report 29278, dated 9/1/94
6. Intertek Test Report No. 100438172COQ-003, revised date March 21, 2012

TEST RESULTS:

TABLE 1 - TRANSVERSE LOAD TEST RESULT SUMMARY									
Referenced Test Report	Siding Thickness (in.)	Siding Width (in.)	Frame Type	Frame Spacing (in.)	Fastener Spacing (in.)		Fastener Type	Ultimate Load (PSF)	Allowable Design Load ¹
					Perimeter Supports	Field Supports			
Ramtech 11436-99/1608	0.25	16	2X4 wood with SG=0.40	24	8	8	1.5 in. long x 0.083 in. shank x 0.187 in. HD, ring shank nails	-249.0	-83.0
Ramtech IC-1228-93	0.25	48	2X4 Hem Fir wood, SG=0.43	16	6	6	6d common nails	-140.0	-46.7
Ramtech IC-1054-89	0.25	48	20 Gauge Steel (min. yield = 33 ksi)	16	6	6	No. 8 x 1 in. long x 0.323 in. HD ribbed bugle head screws	-169.9	-56.6
Ramtech IC-1055-89	0.25	48	20 Gauge Steel (min. yield = 33 ksi)	24	6	6	No. 8 x 1 in. long x 0.323 in. HD ribbed bugle head screws	-91.9	-30.6
Intertek Test Report No. 100438172COQ-003	0.25	24	2x4 SPF (SG = 0.42)	24	4	4	2-in. long x 0.092 in. x 0.235-in. HD siding nails	-149.5	-49.8
Intertek Test Report No. 100438172COQ-003	0.25	24	2x4 SPF (SG = 0.42)	24	4	4	6d common nails	-162.1	-54.0

1. Allowable Load is the Ultimate Load divided by a Factor of safety of 3.

2. The product is currently listed by Intertek Spec ID 39752 for compliance with ASTM C1186-08(12), *Standard Specification for Grade II, Type A Non-asbestos Fiber-Cement Flat Sheets*.

DESIGN WIND LOAD PROCEDURES:

Fiber-cement siding transverse load capacity (wind load capacity) is determined by testing in accordance with published test standards and criteria. From the negative transverse load test results, the allowable design load is determined based on a factor of safety of 3 applied to the ultimate test load. Table 7 summarizes the allowable capacity for each fastener type to ensure that the siding product allowable design load in Table 1 above for each siding product installation does not exceed the fastener allowable capacity.

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_z , velocity pressure exposure coefficient evaluated at height z

K_{zt} , topographic factor

K_e , ground elevation factor. It's permitted to take $K_e = 1$

V , basic wind speed (mph) as determined in ASCE 7-22 Figures 26.5-1A, B, C, or D

Equation 2, $V = V_{ult}$
 V_{ult} , ultimate design wind speeds (3-second gust MPH) determined from 2023 FBC Figures 1690.3(1) - 1609.3(4)

Equation 3, $p = q_h K_d (GC_p - GC_{pi})$ $h \leq 60$ 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}

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

GC_{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, $p = 0.00256 * K_z * K_{zt} * K_d * K_e * V_{ult}^2 * (GC_p - GC_{pi})$

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, $p_{asd} = 0.6 * [p] = 0.6 * [0.00256 * K_z * K_{zt} * K_d * V_{ult}^2 * (GC_p - GC_{pi})]$

Equation 7, $p_{asd} = 0.6 * [0.00256 * K_z * K_{zt} * K_d * K_e * V_{ult}^2 * (GC_p - GC_{pi})]$

Equation 7 is used to populate Table 3, 4, and 5.

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

Equation 8, $V_{ult} = (p_{asd} / 0.6 * 0.00256 * K_z * K_{zt} * K_d * K_e * (GC_p - GC_{pi}))^{0.5}$ {ref. 2017 FBC Equation 16-33}

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

Equation 9, $V_{asd} = V_{ult} * (0.6)^{0.5}$ {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 FBC 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.										
Height (ft)	K_z					Wall Zone 5				
	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)	Exposure 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)	Exposure 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)	Exposure 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:

$$P_{asd} = -83 \text{ psf}; K_z = 0.7 \text{ (Exp B)}; K_{zt} = 1; K_d = 0.85; K_e = 1; GC_p = -1.4; GC_{pi} = 0.18$$

Use Equation 8:

$$V_{ult} = \sqrt{\frac{P_{asd}}{0.6 \times 0.00256 \times K_z \times K_{zt} \times K_d \times K_e \times (GC_p - GC_{pi})}} = \sqrt{\frac{-83}{0.6 \times 0.00256 \times 0.7 \times 1 \times 0.85 \times 1 \times (-1.4 - 0.18)}} = 240 \text{ mph}$$

Use Equation 9:

$$V_{asd} = V_{ult} \sqrt{0.6} = 240 \times \sqrt{0.6} = 186 \text{ mph}$$



TABLE 6 -MAXIMUM WIND SPEEDS (MPH) FOR HARDIESOFFIT SIDING¹

									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														Test Results			Coefficients used in Table 6 calculations for V _{ult} ⁶									
									Product	Product Thickness (inches)	Width (inches)	Fastener Type ²	Fastener Spacing (in.)		Frame Type	Stud Spacing (inches)	Building Height ² (feet)	B	C	D	B	C	D	Design Load (PSF)	Exp B	Exp C	Exp D	K _z			K _{dt}	K _d	K _e	GC _{pf}	GC _{pi}				
				Perimeter	Field																																		
HardieSoffit Siding	0.25	16	1.5 in. long x 0.083 in. shank x 0.187 in. HD, ring shank nails	8	8	2X4 wood with SG=0.40	24	0-15	240	218	198	186	169	153	-83.0	0.70	0.85	1.03	hs60	1	0.9	1	-1.4	0.18	0.18														
								20	240	211	193	186	164	150	-83.0	0.70	0.90	1.08																					
								25	240	207	190	186	160	147	-83.0	0.70	0.94	1.12																					
								30	240	203	186	186	157	144	-83.0	0.70	0.98	1.16																					
								35	236	200	184	183	155	142	-83.0	0.72	1.01	1.19																					
								40	233	197	182	181	152	141	-83.0	0.74	1.04	1.22																					
								45	229	194	180	178	151	139	-83.0	0.77	1.07	1.25																					
								50	226	192	178	175	149	138	-83.0	0.79	1.09	1.27																					
								55	223	190	177	173	147	137	-83.0	0.81	1.11	1.29																					
								60	220	189	175	171	146	136	-83.0	0.83	1.13	1.31																					
HardieSoffit Siding	0.25	16	1.5 in. long x 0.083 in. shank x 0.187 in. HD, ring shank nails	8	8	2X4 wood with SG=0.40	16	0-15	240	218	198	186	169	153	-83.0	0.70	0.85	1.03	hs60	1	0.9	1	-1.4	0.18	0.18														
								20	240	211	193	186	164	150	-83.0	0.70	0.90	1.08																					
								25	240	207	190	186	160	147	-83.0	0.70	0.94	1.12																					
								30	240	203	186	186	157	144	-83.0	0.70	0.98	1.16																					
								35	236	200	184	183	155	142	-83.0	0.72	1.01	1.19																					
								40	233	197	182	181	152	141	-83.0	0.74	1.04	1.22																					
								45	229	194	180	178	151	139	-83.0	0.77	1.07	1.25																					
								50	226	192	178	175	149	138	-83.0	0.79	1.09	1.27																					
								55	223	190	177	173	147	137	-83.0	0.81	1.11	1.29																					
								60	220	189	175	171	146	136	-83.0	0.83	1.13	1.31																					
HardieSoffit Siding	0.25	48	6d common nails	6	6	2X4 Hem Fir wood, SG=0.43	16	0-15	180	163	148	139	126	115	-46.7	0.70	0.85	1.03	hs60	1	0.9	1	-1.4	0.18	0.18														
								20	180	159	145	139	123	112	-46.7	0.70	0.90	1.08																					
								25	180	155	142	139	120	110	-46.7	0.70	0.94	1.12																					
								30	180	152	140	139	118	108	-46.7	0.70	0.98	1.16																					
								35	177	150	138	137	116	107	-46.7	0.72	1.01	1.19																					
								40	175	147	136	135	114	105	-46.7	0.74	1.04	1.22																					
								45	172	146	135	133	113	104	-46.7	0.77	1.07	1.25																					
								50	169	144	133	131	112	103	-46.7	0.79	1.09	1.27																					
								55	167	143	132	129	111	103	-46.7	0.81	1.11	1.29																					
								60	165	141	131	128	110	102	-46.7	0.83	1.13	1.31																					
HardieSoffit Siding	0.25	48	No. 8 x 1 in. long x 0.323 in. HD ribbed bugle head screws	6	6	20 Gauge Steel (min. yield = 33 ksi)	16	0-15	198	180	163	153	139	126	-56.6	0.70	0.85	1.03	hs60	1	0.9	1	-1.4	0.18	0.18														
								20	198	175	159	153	135	123	-56.6	0.70	0.90	1.08																					
								25	198	171	157	153	132	121	-56.6	0.70	0.94	1.12																					
								30	198	167	154	153	130	119	-56.6	0.70	0.98	1.16																					
								35	195	165	152	151	128	118	-56.6	0.72	1.01	1.19																					
								40	193	162	150	149	126	116	-56.6	0.74	1.04	1.22																					
								45	189	161	148	147	124	115	-56.6	0.77	1.07	1.25																					
								50	186	159	147	144	123	114	-56.6	0.79	1.09	1.27																					
								55	184	157	146	143	122	113	-56.6	0.81	1.11	1.29																					
								60	182	156	145	141	121	112	-56.6	0.83	1.13	1.31																					
HardieSoffit Siding	0.25	48	No. 8 x 1 in. long x 0.323 in. HD ribbed bugle head screws	6	6	20 Gauge Steel (min. yield = 33 ksi)	24	0-15	146	132	120	113	102	93	-30.6	0.70	0.85	1.03	hs60	1	0.9	1	-1.4	0.18	0.18														
								20	146	128	117	113	99	91	-30.6	0.70	0.90	1.08																					
								25	146	126	115	113	97	89	-30.6	0.70	0.94	1.12																					
								30	146	123	113	113	95	88	-30.6	0.70	0.98	1.16																					
								35	144	121	112	111	94	87	-30.6	0.72	1.01	1.19																					
								40	142	119	110	110	93	85	-30.6	0.74	1.04	1.22																					
								45	139	118	-	108	91	-	-30.6	0.77	1.07	1.25																					
								50	137	117	-	106	90	-	-30.6	0.79	1.09	1.27																					
								55	135	116	-	105	90	-	-30.6	0.81	1.11	1.29																					
								60	134	115	-	104	89	-	-30.6	0.83	1.13	1.31																					
HardieSoffit Siding	0.25	24	2-in. long x 0.092 in. x 0.235-in. HD siding nails	4	4	2x4 SPF (SG = 0.42)	24	0-15	186	169	153	144	131	119	-49.8	0.70	0.85	1.03	hs60	1	0.9	1	-1.4	0.18	0.18														
								20	186	164	150	144	127	116	-49.8	0.70	0.90	1.08																					
								25	186	160	147	144	124	114	-49.8	0.70	0.94	1.12																					
								30	186	157	144	144	122	112	-49.8	0.70	0.98	1.16																					
								35	183	155	142	142	120	110	-49.8	0.72	1.01	1.19																					
								40	181	152	141	140	118	109	-49.8	0.74	1.04	1.22																					
								45	178	151	139	138	117	108	-49.8	0.77	1.07	1.25																					
								50	175	149	138	135	115	107	-49.8	0.79	1.09	1.27																					
								55	173	148	137	134	114	106	-49.8	0.81	1.11	1.29																					
								60	171	146	136	132	113	105	-49.8	0.83	1.13	1.31																					
HardieSoffit Siding	0.25	24	2-in. long x 0.092 in. x 0.235-in. HD siding nails	4	4	2x4 SPF (SG = 0.42)	24	142	124	116	110	96	90	-49.8	0.95	1.26	1.43	h>60	1	0.9	1	-1.8	0.18	0.18															

TABLE 6 -MAXIMUM WIND SPEEDS (MPH) FOR HARDIESOFFIT SIDING⁷

								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			Test Results	Coefficients used in Table 6 calculations for V_{ult}^6															
															Wind Exposure Category			Wind Exposure Category			K _z									
																					Design Load (PSF)	Exp B	Exp C							
Product	Product Thickness (Inches)	Width (Inches)	Fastener Type ²	Fastener Spacing (in.) Perimeter Field		Frame Type	Stud Spacing (Inches)	Building Height ³ (feet)	B	C	D	B	C	D	Design Load (PSF)	Exp B	Exp C	Exp D		K _{zt}	K _d	K _e	GC _p	GC _{pi}						
HardieSoffit Sidings	0.25	24	6d common nails	4	4	2x4 SPF (SG = 0.42)	24	0-15	193	176	159	150	136	124	-54.0	0.70	0.85	1.03	hs60	1	0.9	1	-1.4	0.18						
								20	193	171	156	150	132	121	-54.0	0.70	0.90	1.08		1	0.9	1	-1.4	0.18						
								25	193	167	153	150	129	118	-54.0	0.70	0.94	1.12		1	0.9	1	-1.4	0.18						
								30	193	163	150	150	127	116	-54.0	0.70	0.98	1.16		1	0.9	1	-1.4	0.18						
								35	191	161	148	148	125	115	-54.0	0.72	1.01	1.19		1	0.9	1	-1.4	0.18						
								40	188	159	147	146	123	113	-54.0	0.74	1.04	1.22		1	0.9	1	-1.4	0.18						
								45	185	157	145	143	121	112	-54.0	0.77	1.07	1.25		1	0.9	1	-1.4	0.18						
								50	182	155	144	141	120	111	-54.0	0.79	1.09	1.27		1	0.9	1	-1.4	0.18						
								55	180	154	142	139	119	110	-54.0	0.81	1.11	1.29		1	0.9	1	-1.4	0.18						
								60	178	152	141	138	118	110	-54.0	0.83	1.13	1.31		1	0.9	1	-1.4	0.18						
								100	148	129	121	115	100	94	-54.0	0.95	1.26	1.43		h>60	1	0.9	1	-1.8	0.18					

Table 6 Footnotes

1. Installation must be in accordance with siding manufacturer's instructions.
2. Screws must penetrate steel framing at minimum 3 full threads.
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: $K_{zt}=1$, $K_d=0.85$, $K_e=1$, $GC_p=-1.4$ ($h \leq 60$), $GC_p=-1.8$ ($h > 60$), $GC_{pi}=0.18$.
7. 2023 FBC Section 1609.3.1 Eq. 16-17, $V_{asd} = V_{ult}(0.6)^{0.5}$

LIMITATIONS OF USE:

- (1) Fastener pullout must be evaluated when installed into species of wood other than as noted in the table above.



TABLE 7 - HARDIESOFFIT SIDING FASTENER CAPACITY

Referenced Test Report	Fastener Type & Dimensions (length x shank dia. x head dia.)	Shank Dia., D (in.)	Fastener Penetration into Wood Framing, P (in.)	Load Duration Factor C_d	Wood Framing SG ⁴	Allowable Withdrawal Capacity ¹ W' (lb.)	Allowable Design Pressure ² (psf)	Wind Pressure Area (ft ²)	Number of Fasteners	Single Fastener Tributary Area (ft ²)	Single Fastener Load @ Design Pressure ³ (lb.)	Fastener Load @ Design Pressure Exceeds W' (Y/N)
Ramtech 11436-99/1608	1.5 in. long x 0.083 in. shank x 0.187 in. HD, ring shank nails	0.083	1.25	1.6	0.40	47.8	-83.0	2.67	7	0.38	-31.6	N
Ramtech IC-1228-93	6d common nails	0.112	1.75	1.6	0.43	52.5	-46.7	5.33	13	0.41	-19.1	N
Ramtech IC-1054-89	No. 8 x 1 in. long x 0.323 in. HD ribbed bugle head screws	0.164	Fastener driven into 20-gage 33-ksi steel with W' value from ARL Test Report 29278			61.9	-56.6	5.33	13	0.41	-23.2	N
Ramtech IC-1055-89	No. 8 x 1 in. long x 0.323 in. HD ribbed bugle head screws	0.164	Fastener driven into 20-gage 33-ksi steel with W' value from ARL Test Report 29278			61.9	-30.6	8.00	15	0.53	-16.3	N
Report No. 100438172CO Q-003	2-in. long x 0.092 in. x 0.235-in. HD siding nails	0.092	1.75	1.6	0.42	40.6	-49.8	4.00	17	0.24	-11.7	N
Report No. 100438172CO Q-003	6d common nails	0.113	1.75	1.6	0.42	49.9	-54.0	4.00	17	0.24	-12.7	N

Table 1B Footnotes:

¹Nails Allowable Withdrawal Capacity (W') is calculated per the following NDS-2018 equations:

Eq. 12.2-3: $W' = C_d \times 1380 \times G^{2.5} \times D \times P$ (for smooth shank nails)

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

²Allowable design load from Table 1 of this analysis (i.e., test values)

³Single fastener load = design pressure x effective fastener tributary area. Example, Single Fastener Load = 83 x 0.38 = 31.6 lb for ring shank nail.

⁴SG are published values from NDS based on wood species. Ramtech Test Report 11436-99/1608 indicated SG of 0.40 with no reported wood species.

Conclusion:

Thus, since the fastener load values as tested did not exceed W', there are no adjustments made to the allowable design pressures.

