



EVALUATION SUBJECT

Artisan® Siding Analysis

James Hardie Product Trade Names covered in this report:

Artisan® Lap Siding and Artisan® Siding with Lock Joint System (including five profiles: Artisan® Bevel Channel Siding, Artisan® Cove Siding, Artisan® Square Channel Siding, Artisan® Shiplap Siding, Artisan® V-Groove Siding)

EVALUATION SCOPE:

ASCE 7-22 (referenced in 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 wall assemblies consisting of the Artisan Lap Siding and Artisan Lap Siding with Lock Joint System installed onto ASTM C90 Compliant Concrete Masonry Units (CMU).

REFERENCE REPORTS:

- Intertek Report 3067913 (ASTM C1186) Material properties Artisan sidings.
- Applied Research Laboratories of South Florida, Report 29278-UD1 (ASTM D1761) Pull out testing ET&F Nail (ET & F No. ASM-144-0100, head dia. = 0.30 in., shank dia. = 0.144 in., length = 1.25-in. long).
- Intertek Report 3096000 (ASMT D1761) Pull out testing ET&F Block Nail (ET & F No. ASM-144-125, head dia. = 0.30 in., shank dia. = 0.14 in., length = 1.25-in. long) and Max USA Corp Block Nail (CP-C 832 W7-10C, head dia. = 0.30 in., shank dia. = 0.145 in., length = 1.25 in.)
- Intertek Report 3117855-001 (ASTM E488) Pull out testing on Jaaco Aerosmith® Powerpin Nail (5323HP, head dia. = 0.30 in., shank dia. = 0.144 in., length, 1.25in.), Aerosmith Powerpin nail (5503HP, head dia. = 0.30 in., shank dia. = 0.144 in., length, 2.0in.), and ET&F Block Nail (ET & F No. ASM-144-0125P, head dia. = 0.30 in., shank dia. = 0.14 in., length = 1.25-in. long)
- Intertek Report 101135679 COQ-001A, Fastener withdrawal test on JAACO block nail (NP145S, head dia. = 0.30 in., shank dia. = 0.145 in., length, 1.25 in.) and ET&F Block Nail (ET & F No. ASM-144-0125P, head dia. = 0.30 in., shank dia. = 0.14 in., length = 1.25-in. long)
- Intertek Report 3097158COQ-009 (ASTM E330) Transverse Load Test on 9/16" thick by 5-1/4" and 8-1/4" wide Artisan Lap Siding installed on steel studs space at 16 and 24 inches on center with #8 screws.
- Intertek Report G7085.01-303-44-R1 (ASTM E330) Transverse Load Test on 5/8" thick by 10-1/4" wide Artisan Bevel Channel Siding installed on wood studs space at 16 inches on center with blind nailed 6d siding nails.
- Intertek Report 102477932COQ-001A (ASTM E330) Transverse Load Test on 5/8" thick by 10-1/4" wide Beveled Shiplap Artisan Siding installed on wood studs space at 16 inches on center with face nailed 8d ring shank side nails.

TEST RESULTS:

Table 1 - Artisan Lap Siding and Artisan Siding with Lock Joint Systems Test Results and Analysis of Transverse Load													
Product	Report Number	Test Agency	Thickness (in.)	Width (in.)	Frame Type	Frame Spacing (in.)	Weather Exposure (in.)	Fastening Method	Fastener Type	Ultimate Load (PSF)	Allowable Design Load ¹ (PSF)	Effective Area Tributary (sq.ft.)	Tested Fastener Load (lbs)
Artisan Lap Siding ²	3097158COQ-009 ³	Intertek	0.563	8.25	2x4 20 ga. steel	16	7	blind screw to stud	No. 8 x 1-5/8" long x 0.323" head diameter ribbed bugle head screw	-160	-53.3	0.778	-41.5
Artisan Lap Siding ²	3097158COQ-009 ³	Intertek	0.563	5.25	2x4 20 ga. steel	16	4	blind screw to stud	No. 8 x 1-5/8" long x 0.323" head diameter ribbed bugle head screw	-236	-78.7	0.444	-35.0
Artisan Lap Siding ²	3097158COQ-009 ³	Intertek	0.563	8.25	2x4 20 ga. steel	24	7	blind screw to stud	No. 8 x 1-5/8" long x 0.323" head diameter ribbed bugle head screw	-125	-41.7	1.167	-48.6
Artisan Lap Siding ²	3097158COQ-009 ³	Intertek	0.563	5.25	2x4 20 ga. steel	24	4	blind screw to stud	No. 8 x 1-5/8" long x 0.323" head diameter ribbed bugle head screw	-233	-77.7	0.667	-51.8
Artisan Bevel Channel Siding ²	G7085.01-303-44-R1 ⁴	Intertek	0.625	10.25	2X4 wood SPF	16	9	blind nail to stud	6d siding, 0.092" x 0.225" x 2.0"	-89.3	-29.8	1.000	-29.8
Beveled Shiplap Artisan Siding ²	102477932COQ-001A ^{4,5}	Intertek	0.625	10.25	2X4 wood DFL	16	9.125	face nail to stud	8d ring shank siding nail, 0.092" shank x 0.222" HD x 2.5" L	-269.5	-89.8	1.000	-89.8

Table 1 Footnotes:

- Allowable Design Load is the Ultimate Load divided by a Factor of safety of 3.
- Artisan Lap Siding and Artisan Siding with Lock Joint System complies with ASTM C1186, *Standard Specification for Grade II, Type A Non-asbestos Fiber-Cement Flat Sheets*.
- Tests in Report number 3097158COQ-009 were on product with thickness of 9/16 inch. The loads are applicable to 5/8" thick product as long as fastener withdrawal capacity is verified.
- Tests in reports G7085.01-303-44-R1 and 102477932COQ-001A were performed on Artisan Bevel Channel (original name Beveled Shiplap) sidings. The results are applicable to other four profiles: V-Groove, Cove, Shiplap, Square Channel, since they have very similar design and Bevel Channel has the least amount of material.
- Tests in report 102477932COQ-001A were performed on sidings with 9.125" exposure (1" flange). The result is applicable to sidings with 9" exposure (1.25" flange) since it's more conservative.

Test Block Nail Withdrawal Capacities:

The nail withdrawal capacity of the block nails in Table 2A were reported by Applied Research Laboratories (29278-UD1) and Intertek (3096000, 3117855-001, and 101135679COQ-001A). The minimum average failure load was 725 pounds with embedment into ASTM C90 CMU block between 3/4 to 1 inch. The individual fastener load values as tested in Table 1 are far less than the withdrawal load values into CMU as summarized in Table 2A below. Therefore, withdrawal is not a concern from ASTM C90 CMU blocks.

Table 2A, Tested Withdrawal Results for Block Nail Embedded in CMU Blocks

Manufacturer	Block Nail Specification	Test Report			
		29278-UD1	3096000	3117855-001	101135679 COQ-001A
		Average ultimate withdrawal load (lbf)			
ET&F Fastening Systems	ET & F No. ASM-144-0125P, head dia. = 0.30 in., shank dia. = 0.144 in., length = 1.25 in.	725	963	1113	965
Max Usa Corp	CP-C 832 W7-ICC, head dia. = 0.30 in., shank dia. = 0.145 in., length = 1.25 in.	-	893	-	-
Aerosmith Fastening	5323HP, head dia. = 0.30 in., shank dia. = 0.144 in., length, 1.25 in.	-	-	1165	-
Aerosmith Fastening	5503HP, head dia. = 0.30 in., shank dia. = 0.144 in., length, 2.0 in.	-	-	1169	-
Jaaco Nail Pro	NP145S, head dia. = 0.30 in., shank dia. = 0.145 in., length, 1.25 in.	-	-	-	1067

For the two configurations listed in Table 1 on Artisan Siding with Lock Joint System, since the block nail (0.144" x 0.300") has a larger head bearing area than the tested siding nail (0.092" x 0.225") as shown in Table 2B, the fastener pull-through capacity is not a concern. Thus, we can substitute the block nails listed in Table 2A for the siding nails and retain the same allowable design loads. In order to maintain the minimum embedment depth of 3/4 inch, the block nails shall have a minimum length of 1.5 inches.

For blind screw configurations on Artisan lap siding, the block nail head bearing area is less than the #8 X 0.323 inch head diameter bugle head screw. Therefore in order to use the block nails in Table 2A as a substitute for the #8 screw, the fastener loads are adjusted to accommodate the block nail's smaller head bearing area. Based on report 3097158COQ-009, the system with lowest tested fastener load is the 5.25" wide Artisan Lap siding installed on studs at 16 inch on center where the fastener load was 35 lbs/fastener, which will be used to calculate the allowable design load for the block nail based on the ratio of net bearing areas, as shown in Table 2B.

Table 2B, Fastener Head Bearing Area = (Head Area - Shank Area)

Fastener	Shank Diameter (in.)	Shank Area (in ²)	Head Diameter (in.)	Head Area (in ²)	Net Bearing Area (in ²)
Block nail, head dia. = 0.30 in.,	0.144	0.0163	0.300	0.0707	0.0544
6d or 8d siding nail, 0.092" shank diameter x 0.225"	0.092	0.0066	0.225	0.0398	0.0331
No. 8 x 0.323" head diameter ribbed bugle head	0.164	0.0211	0.323	0.0819	0.0608

From Table 2B, the head net bearing area for the No. 8 X 1-5/8" long X 0.323" ribbed bugle head screw is 0.0608 sq.in. and the head net bearing area for the block nail is 0.0544 sq.in.

From Table 1, the lowest allowable fastener load for the No. 8 X 1-5/8" long X 0.323" head diameter ribbed bugle head screw as tested is 35 lbs/fastener.

By rational analysis, the block nail fastener load is determined by the block nail to No. 8 screw net bearing area ratio times the fastener load of the No. 8 screw as summarized in Table 2C below.

Table 2C, Calculate of Allowable Fastener Load for Artisan Lap Siding

	Net Bearing Area (in ²)	Fastener Load (lb/fastener)
No. 8 x 0.323" head diameter ribbed bugle head screw	0.0608	35.0
Block nail, 0.144" shank diameter x 0.300" head diameter	0.0544	31.3

The block nail allowable fastener load (with safety factor 3 applied) is **31.3 lb/fastener**, this fastener load will be used with Equation 8 below to populate Table 7 for Artisan Lap side blind nailing solutions. To maintain a minimum 3/4" embedment into CMU block, the minimum block fastener length of 1.5" will be used.

For Artisan Siding with Lock Joint System, allowable fastener loads of **29.8 lb/fastener** for blind nailing and **89.8 lb/fastener** for face nailing will be used to populate Table 6. The minimum block nail length of 1.25" for blind nail and 1.5" for face will be used in order to maintain the minimum embedment depth of 3/4".

DESIGN WIND LOAD PROCEDURES:

Fiber-cement siding transverse load capacity (wind load capacity) is determined by transverse load testing in accordance with ASTM E330. The allowable design load is determined based on a factor of safety of 3 applied to the ultimate load from ASTM E330 test results.

Equation 1, $q_z = 0.00256 * K_z * K_{zt} * K_e * V^2$ {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 $K_e = 1.00$ in all cases per Section 26.9 of ASCE 7-22.
 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}
 p , design pressure (psf) for siding (allowable design load)
 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}

To determine design pressure, substitute q_h into Equation 3,

Equation 4, $p = 0.00256 * K_z * K_{zt} * K_e * V_{ult}^2 * (GC_p - GC_{pi})$

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

Equation 6 is used to populate Tables 3, 4, and 5.

Use Equation 7 to determine block nail fastener spacing for the siding attached to ASTM C90 compliant CMU block walls at various wind speeds. Table 6 fastener spacing is based on Equation 7.

Equation 7 $FS_{BN} = FL_{BN} / (P_{asd} * PW)$
 FS_{BN} , block nail fastener spacing to resist wind speed, inches
 FL_{BN} , block nail allowable fastener load, pounds
 PW , plank width exposed to weather, inches

Table 2 - Coefficients and Constants used in Determining V and p.

Height (ft)	K _z				h≤60	K _{zt}	K _d	K _e	Wall Zone 5	
	Exp B 7-22 (ASCE)	Exp B	Exp C	Exp D					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	0.77	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_{sd} 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)	Wind Exposure Category 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_{sd} 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)	Wind Exposure Category 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_{sd} for Component and Cladding (C&C) to be Resisted at Various Wind Speeds for Wind Exposure Category D

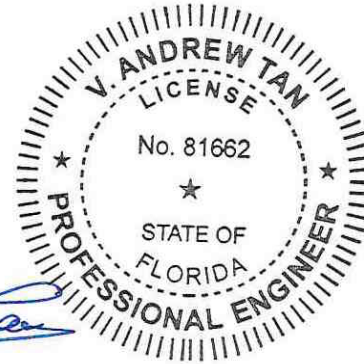
Wind Speed (3-second gust)	100	105	110	115	120	130	140	150	160	170	180	190	200	210
Height (ft)	Wind Exposure Category D													
0-15	-21.2	-23.4	-25.7	-28.1	-30.6	-35.9	-41.6	-47.8	-54.4	-61.4	-68.8	-76.7	-85.0	-93.7
20	-22.3	-24.6	-27.0	-29.5	-32.1	-37.7	-43.7	-50.1	-57.0	-64.4	-72.2	-80.4	-89.1	-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

Table 6 - Maximum Fastener Spacing (inch) Into ASTM C90 Compliant CMU Walls

Allowable Block Nail Fastener Loads Used in the Calculations (lb/fastener)

Artisan Lap Siding blind nailed	-31.3
Artisan Siding with Lock Joint System blind nailed	-29.8
Artisan Siding with Lock Joint System face nailed	-89.8



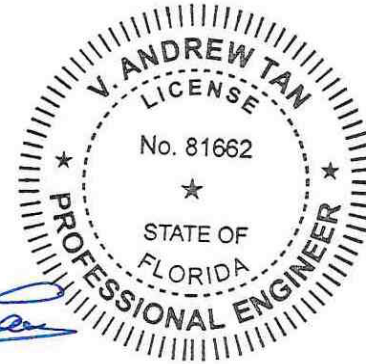
Andrew Tan

2023 FBC (Ultimate Design Wind Speed, Vult ³)	Building Height ^{4,5} (ft.)	2023 FBC															Coefficients used in calculations for Vult (see footnote 6)									
		Blind Nail Artisan Lap Siding Width (in.) ¹									Artisan Siding with Lock Joint System up to 10.25" wide															
		5.25			7.25			8.25			Blind Nail ²			Face Nail ¹												
		Wind Exposure Category																								
		B	C	D	B	C	D	B	C	D	B	C	D	B	C	D	Exp B	Exp C	Exp D		Kzt	Kd	Ke	GCp	GCpi	
105	0-15	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	0.70	0.85	1.03	h≤60	1	0.9	1	-1.4	0.18	
	20	24	24	24	24	24	24	24	24	24	24	24	23	19	24	24	0.70	0.90	1.08		1	0.9	1	-1.4	0.18	
	25	24	24	24	24	24	24	24	24	24	24	24	22	18	24	24	0.70	0.94	1.12		1	0.9	1	-1.4	0.18	
	30	24	24	24	24	24	24	24	24	24	24	24	21	18	24	24	0.70	0.98	1.16		1	0.9	1	-1.4	0.18	
	35	24	24	24	24	24	24	24	24	24	24	23	24	20	17	24	24	0.72	1.01		1.19	1	0.9	1	-1.4	0.18
	40	24	24	24	24	24	24	24	24	24	24	23	24	20	17	24	24	0.74	1.04		1.22	1	0.9	1	-1.4	0.18
	45	24	24	24	24	24	24	24	24	24	22	24	19	16	24	24	0.77	1.07	1.25		1	0.9	1	-1.4	0.18	
	50	24	24	24	24	24	24	24	24	24	22	24	19	16	24	24	0.79	1.09	1.27		1	0.9	1	-1.4	0.18	
	55	24	24	24	24	24	24	24	24	24	21	24	18	16	24	24	0.81	1.11	1.29		1	0.9	1	-1.4	0.18	
	60	24	24	24	24	24	24	24	24	21	24	18	16	24	24	24	0.83	1.13	1.31		1	0.9	1	-1.4	0.18	
100	24	24	24	24	24	20	18	23	17	15	17	13	11	24	24	0.95	1.26	1.43	h>60	1	0.9	1	-1.8	0.18		
110	0-15	24	24	24	24	24	24	24	24	24	24	24	22	18	24	24	0.70	0.85	1.03	h≤60	1	0.9	1	-1.4	0.18	
	20	24	24	24	24	24	24	24	24	23	24	21	17	24	24	24	0.70	0.90	1.08		1	0.9	1	-1.4	0.18	
	25	24	24	24	24	24	24	24	24	23	24	20	17	24	24	24	0.70	0.94	1.12		1	0.9	1	-1.4	0.18	
	30	24	24	24	24	24	24	24	24	22	24	19	16	24	24	24	0.70	0.98	1.16		1	0.9	1	-1.4	0.18	
	35	24	24	24	24	24	24	24	24	21	24	18	16	24	24	24	0.72	1.01	1.19		1	0.9	1	-1.4	0.18	
	40	24	24	24	24	24	24	24	24	21	24	18	15	24	24	24	0.74	1.04	1.22		1	0.9	1	-1.4	0.18	
	45	24	24	24	24	24	24	24	24	20	24	17	15	24	24	24	0.77	1.07	1.25		1	0.9	1	-1.4	0.18	
	50	24	24	24	24	24	23	24	23	20	24	17	15	24	24	24	0.79	1.09	1.27		1	0.9	1	-1.4	0.18	
	55	24	24	24	24	24	23	24	23	19	23	17	14	24	24	24	0.81	1.11	1.29		1	0.9	1	-1.4	0.18	
	60	24	24	24	24	24	22	24	22	19	23	16	14	24	24	24	0.83	1.13	1.31		1	0.9	1	-1.4	0.18	
100	24	24	24	24	19	16	21	16	14	16	12	10	24	24	24	0.95	1.26	1.43	h>60	1	0.9	1	-1.8	0.18		
115	0-15	24	24	24	24	24	24	24	24	22	24	20	16	24	24	24	0.70	0.85	1.03	h≤60	1	0.9	1	-1.4	0.18	
	20	24	24	24	24	24	24	24	24	21	24	19	16	24	24	24	0.70	0.90	1.08		1	0.9	1	-1.4	0.18	
	25	24	24	24	24	24	24	24	24	21	24	18	15	24	24	24	0.70	0.94	1.12		1	0.9	1	-1.4	0.18	
	30	24	24	24	24	24	23	24	24	20	24	17	15	24	24	24	0.70	0.98	1.16		1	0.9	1	-1.4	0.18	
	35	24	24	24	24	24	23	24	23	19	24	17	14	24	24	24	0.72	1.01	1.19		1	0.9	1	-1.4	0.18	
	40	24	24	24	24	24	22	24	22	19	23	16	14	24	24	24	0.74	1.04	1.22		1	0.9	1	-1.4	0.18	
	45	24	24	24	24	24	22	24	22	18	22	16	14	24	24	24	0.77	1.07	1.25		1	0.9	1	-1.4	0.18	
	50	24	24	24	24	24	21	24	21	18	22	16	13	24	24	24	0.79	1.09	1.27		1	0.9	1	-1.4	0.18	
	55	24	24	24	24	24	21	24	21	18	21	15	13	24	24	24	0.81	1.11	1.29		1	0.9	1	-1.4	0.18	
	60	24	24	24	24	24	21	24	20	18	21	15	13	24	24	24	0.83	1.13	1.31		1	0.9	1	-1.4	0.18	
100	24	24	23	23	17	15	19	14	13	14	11	9	24	24	24	0.95	1.26	1.43	h>60	1	0.9	1	-1.8	0.18		
120	0-15	24	24	24	24	24	24	24	24	21	22	18	15	24	24	24	0.70	0.85	1.03	h≤60	1	0.9	1	-1.4	0.18	
	20	24	24	24	24	24	23	24	24	20	22	17	14	24	24	24	0.70	0.90	1.08		1	0.9	1	-1.4	0.18	
	25	24	24	24	24	24	22	24	23	19	22	17	14	24	24	24	0.70	0.94	1.12		1	0.9	1	-1.4	0.18	
	30	24	24	24	24	24	21	24	22	18	22	16	13	24	24	24	0.70	0.98	1.16		1	0.9	1	-1.4	0.18	
	35	24	24	24	24	24	21	24	21	18	22	15	13	24	24	24	0.72	1.01	1.19		1	0.9	1	-1.4	0.18	
	40	24	24	24	24	24	20	24	20	17	21	15	13	24	24	24	0.74	1.04	1.22		1	0.9	1	-1.4	0.18	
	45	24	24	24	24	23	20	24	20	17	20	15	12	24	24	24	0.77	1.07	1.25		1	0.9	1	-1.4	0.18	
	50	24	24	24	24	23	19	24	19	17	20	14	12	24	24	24	0.79	1.09	1.27		1	0.9	1	-1.4	0.18	
	55	24	24	24	24	22	19	24	19	16	19	14	12	24	24	24	0.81	1.11	1.29		1	0.9	1	-1.4	0.18	
	60	24	24	24	24	22	19	24	19	16	19	14	12	24	24	24	0.83	1.13	1.31		1	0.9	1	-1.4	0.18	
100	24	24	21	21	16	14	18	13	12	13	10	8	24	24	24	0.95	1.26	1.43	h>60	1	0.9	1	-1.8	0.18		
130	0-15	24	24	24	24	24	20	24	21	17	19	16	13	24	24	24	0.70	0.85	1.03	h≤60	1	0.9	1	-1.4	0.18	
	20	24	24	24	24	23	19	24	20	17	19	15	12	24	24	24	0.70	0.90	1.08		1	0.9	1	-1.4	0.18	
	25	24	24	24	24	22	19	24	19	16	19	14	12	24	24	24	0.70	0.94	1.12		1	0.9	1	-1.4	0.18	
	30	24	24	24	24	21	18	24	18	15	19	13	11	24	24	24	0.70	0.98	1.16		1	0.9	1	-1.4	0.18	
	35	24	24	24	24	21	18	24	18	15	18	13	11	24	24	24	0.72	1.01	1.19		1	0.9	1	-1.4	0.18	
	40	24	24	24	24	20	17	24	17	15	18	13	11	24	24	24	0.74	1.04	1.22		1	0.9	1	-1.4	0.18	
	45	24	24	24	24	20	17	24	17	14	17	12	10	24	24	24	0.77	1.07	1.25		1	0.9	1	-1.4	0.18	
	50	24	24	24	24	19	16	23	16	14	17	12	10	24	24	24	0.79	1.09	1.27		1	0.9	1	-1.4	0.18	
	55	24	24	24	24	19	16	22	16	14	16	12	10	24	24	24	0.81	1.11	1.29		1	0.9	1	-1.4	0.18	
	60	24	24	24	24	19	16	22	16	14	16	12	10	24	24	24	0.83	1.13	1.31		1	0.9	1	-1.4	0.18	
100	24	20	18	18	13	12	15	11	10	11	8	7	24	24	22	0.95	1.26	1.43	h>60	1	0.9	1	-1.8	0.18		

Table 6 - Maximum Fastener Spacing (inch) Into ASTM C90 Compliant CMU Walls

Allowable Block Nail Fastener Loads Used in the Calculations (lb/fastener)

Artisan Lap Siding blind nailed	-31.3
Artisan Siding with Lock Joint System blind nailed	-29.8
Artisan Siding with Lock Joint System face nailed	-89.8

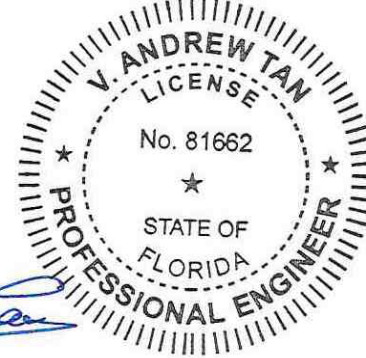


Andrew Tan

2023 FBC (Ultimate Design Wind Speed, Vult ³)	Building Height ^{4,5} (ft.)	2023 FBC															Coefficients used in calculations for Vult (see footnote 6)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
		Blind Nail Artisan Lap Siding Width (in.) ¹									Artisan Siding with Lock Joint System up to 10.25" wide																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
		5.25			7.25			8.25			Blind Nail ²			Face Nail ¹																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
		Wind Exposure Category															Kz																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											

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Artisan Siding with Lock Joint System blind nailed	-29.8
Artisan Siding with Lock Joint System face nailed	-89.8



Andrew Tan

2023 FBC (Ultimate Design Wind Speed, Vult ³)	Building Height ^{4,5} (ft.)	2023 FBC															Coefficients used in calculations for Vult (see footnote 6)									
		Blind Nail Artisan Lap Siding Width (in.) ¹									Artisan Siding with Lock Joint System up to 10.25" wide															
		5.25			7.25			8.25			Blind Nail ²			Face Nail ¹												
		Wind Exposure Category																								
		B	C	D	B	C	D	B	C	D	B	C	D	B	C	D	Exp B	Exp C	Exp D		Kzt	Kd	Ke	GCp	GCpi	
190	0-15	21	17	14	14	11	9	12	10	8	9	7	6	24	22	18	0.70	0.85	1.03	h≤60	1	0.9	1	-1.4	0.18	
	20	21	16	14	14	11	9	12	9	8	9	7	5	24	21	17	0.70	0.90	1.08		1	0.9	1	-1.4	0.18	
	25	21	16	13	14	10	9	12	9	7	9	6	5	24	20	17	0.70	0.94	1.12		1	0.9	1	-1.4	0.18	
	30	21	15	13	14	10	8	12	8	7	9	6	5	24	19	16	0.70	0.98	1.16		1	0.9	1	-1.4	0.18	
	35	21	14	12	14	9	8	12	8	7	8	6	5	24	19	16	0.72	1.01	1.19		1	0.9	1	-1.4	0.18	
	40	20	14	12	13	9	8	11	8	7	8	6	5	24	18	15	0.74	1.04	1.22		1	0.9	1	-1.4	0.18	
	45	19	14	12	13	9	8	11	8	6	8	6	5	24	18	15	0.77	1.07	1.25		1	0.9	1	-1.4	0.18	
	50	19	13	11	12	9	7	10	7	6	8	5	5	24	17	15	0.79	1.09	1.27		1	0.9	1	-1.4	0.18	
	55	18	13	11	12	9	7	10	7	6	7	5	4	23	17	14	0.81	1.11	1.29		1	0.9	1	-1.4	0.18	
	60	18	13	11	12	8	7	10	7	6	7	5	4	23	17	14	0.83	1.13	1.31		1	0.9	1	-1.4	0.18	
100	12	9	8	8	6	5	7	5	4	5	4	-	16	12	10	0.95	1.26	1.43	h>60	1	0.9	1	-1.8	0.18		
200	0-15	19	16	13	13	10	8	11	9	7	8	6	5	24	20	16	0.70	0.85	1.03	h≤60	1	0.9	1	-1.4	0.18	
	20	19	15	12	13	10	8	11	8	7	8	6	5	24	19	16	0.70	0.90	1.08		1	0.9	1	-1.4	0.18	
	25	19	14	12	13	9	8	11	8	6	8	6	5	24	18	15	0.70	0.94	1.12		1	0.9	1	-1.4	0.18	
	30	19	13	11	13	9	7	11	7	6	8	5	4	24	17	15	0.70	0.98	1.16		1	0.9	1	-1.4	0.18	
	35	18	13	11	12	9	7	10	7	6	8	5	4	24	17	14	0.72	1.01	1.19		1	0.9	1	-1.4	0.18	
	40	18	13	11	12	8	7	10	7	6	7	5	4	23	16	14	0.74	1.04	1.22		1	0.9	1	-1.4	0.18	
	45	17	12	10	11	8	7	10	7	6	7	5	4	22	16	13	0.77	1.07	1.25		1	0.9	1	-1.4	0.18	
	50	17	12	10	11	8	7	9	7	6	7	5	4	22	15	13	0.79	1.09	1.27		1	0.9	1	-1.4	0.18	
	55	16	12	10	11	8	7	9	7	6	7	5	4	21	15	13	0.81	1.11	1.29		1	0.9	1	-1.4	0.18	
	60	16	12	10	10	8	6	9	6	5	6	5	4	20	15	13	0.83	1.13	1.31		1	0.9	1	-1.4	0.18	
100	11	8	7	7	5	5	6	4	4	4	-	-	14	11	9	0.95	1.26	1.43	h>60	1	0.9	1	-1.8	0.18		
210	0-15	17	14	12	11	9	8	10	8	6	7	6	5	22	18	15	0.70	0.85	1.03	h≤60	1	0.9	1	-1.4	0.18	
	20	17	13	11	11	9	7	10	7	6	7	5	4	22	17	14	0.70	0.90	1.08		1	0.9	1	-1.4	0.18	
	25	17	13	11	11	8	7	10	7	6	7	5	4	22	16	14	0.70	0.94	1.12		1	0.9	1	-1.4	0.18	
	30	17	12	10	11	8	7	10	7	6	7	5	4	22	16	13	0.70	0.98	1.16		1	0.9	1	-1.4	0.18	
	35	17	12	10	11	8	6	9	7	5	7	5	4	21	15	13	0.72	1.01	1.19		1	0.9	1	-1.4	0.18	
	40	16	11	10	11	7	6	9	6	5	7	5	4	21	15	12	0.74	1.04	1.22		1	0.9	1	-1.4	0.18	
	45	16	11	9	10	7	6	9	6	5	6	4	4	20	14	12	0.77	1.07	1.25		1	0.9	1	-1.4	0.18	
	50	15	11	9	10	7	6	8	6	5	6	4	4	19	14	12	0.79	1.09	1.27		1	0.9	1	-1.4	0.18	
	55	15	11	9	10	7	6	8	6	5	6	4	4	19	14	12	0.81	1.11	1.29		1	0.9	1	-1.4	0.18	
	60	14	10	9	9	7	6	8	6	5	6	4	4	19	13	12	0.83	1.13	1.31		1	0.9	1	-1.4	0.18	
100	10	7	6	6	5	4	5	4	-	4	-	-	13	10	8	0.95	1.26	1.43	h>60	1	0.9	1	-1.8	0.18		

Notes to Table:

- Block nails shall be:
ET&F Fastening Systems [ET & F No. ASM-144-0150, head dia. = 0.30 in., shank dia. = 0.144 in., length = 1.50 in.],
Max Usa Corp [CP-C838 W7-ICC, head dia. = 0.30 in., shank dia. = 0.145 in., length = 1.50 in.], or
Aerosmith Fastening [5383P, head dia. = 0.30 in., shank dia. = 0.144 in., length, 1.50 in.]
Jaaco Nail Pro [NP145S, head dia. = 0.30 in., shank dia. = 0.145 in., length, 1.50 in.]
- Block nails shall be:
ET&F Fastening Systems [ET & F No. ASM-144-0125, head dia. = 0.30 in., shank dia. = 0.144 in., length = 1.25 in.],
Max Usa Corp [CP-C832 W7-ICC, head dia. = 0.30 in., shank dia. = 0.145 in., length = 1.25 in.], or
Aerosmith Fastening [5323P, head dia. = 0.30 in., shank dia. = 0.144 in., length, 1.25 in.]
Jaaco Nail Pro [NP145S, head dia. = 0.30 in., shank dia. = 0.145 in., length, 1.25 in.]
- V_{ult} = ultimate design wind speeds (3-second gust MPH) determined from 2023 FBC Figures 1690.3(1) - 1609.3(4)
- 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).
- Interpolation to address building height (≤ 60 ft) and other Artisan width is permitted.
- Wind speed design coefficient assumptions per Section 30.4 of ASCE 7-22: $K_{zt}=1$, $K_d=0.85$, $K_e=1.00$, $GC_p=-1.4$ ($h\leq 60$), $GC_p=-1.8$ ($h>60$), $GC_{pi}=0.18$.

LIMITATIONS OF USE:

- In High Velocity Hurricane Zones (HVHZ) install per Miami-Dade County Florida, NOA 17-0406.06