CODE EVALUATION REPORT

CERUS-1012

PUBLISHED: January 2023
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EXPIRATION: January 2027

PRODUCT: **Allura® and TerraPlank™ Fiber Cement Siding**

REPORT HOLDER: Plycem USA LLC

CONTACT DETAILS:
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CSI DIVISION: 07 00 00 - Thermal and Moisture Protection

CSI SECTION: 07 46 46 – Fiber-Cement Siding

APPLICABLE CODES:
2018, 2015 International Building Code (IBC)
2018, 2015 International Residential Code (IRC)
2019 / 2016 California Green Building Standards Code (CALGreen), Title 24 Part 11
2020 / 2015 ICC 700 *National Green Building Standard*™ (ICC 700)

EVALUATED:
Physical Properties
Surface-Burning Characteristics
Wind Resistance
Fire-Resistance Ratings
Non-Combustibility

IAS ACCREDITED Product Certification Agency PCA-118

1.0 APPROVED FOR FOLLOWING:

APPROVED TYPES OF CONSTRUCTION:	Types I-V/AB
APPROVED USE:	Exterior Cladding and Interior Wall and Ceiling Finish (Dry Room).
APPROVED INSTALLATIONS:	• Exterior cladding on bearing and non-load bearing exterior walls. • Interior walls and ceilings.

2.0 DESCRIPTION:

2.1 General:

Allura® and TerraPlank™ products are Grade II Type A fiber-cement products complying with the 2018 / 2015 IBC Sections 1404.10 and 1405.16 and 2018 / 2015 IRC Section R703.10 for use as exterior siding and soffit. Allura® and TerraPlank™ are available in various shapes and sizes as outlined in Table 1 of this report. Allura® and TerraPlank™ fiber-cement are available in a wide variety of color and texture options applied over the fiber-cement product.

When used in exterior cladding applications Allura® and TerraPlank™ fiber-cement are intended for installation over structural sheathing materials listed in Section 2304.6 of the 2018 / 2015 IBC or Section R604 of the 2018 / 2015 IRC or non-structural sheathing as outlined in 2018 / 2015 IRC Section R703.15.1. Installation shall include a water-resistive barrier complying with Section 1403 of the 2018 / 2015 IBC or R703 of the 2018 / 2015 IRC as appropriate.

Allura® and TerraPlank™ fiber-cement products have a flame spread index of 0 and a smoke developed index of ≤ 5 when evaluated in accordance with ASTM E84.

Allura® and TerraPlank™ fiber-cement are classified non-combustible and complies for use in Types I-V construction, including use in fire-resistance rated applications. See sections 4.7 and 4.8 of this report respectively for details.

Allura® and TerraPlank™ fiber-cement products are available in Allura® and TerraPlank™ Lap Siding, Allura® and TerraPlank™ Panel, Allura® and TerraPlank™ Shake, Allura® Select Shake and Allura® Soffit designations in dimensions as outlined in Table 1 of this report.

Table 1. Allura® and TerraPlank™ Fiber-Cement Products

TYPE	MODEL	WIDTH		LENGTH		THICKNESS	
		inches	mm	inches	mm	inches	mm
ALLURA® AND TERRAPLANK™ LAP SIDING	Traditional Cedar	5¼,6¼,7¼,8¼,9¼,12	133, 159, 184, 210, 235, 305	144	3658	5/16	8
	Smooth	5¼,6¼,7¼,8¼,9¼,12	133, 159, 184, 210, 235, 305				
ALLURA® AND TERRAPLANK™ PANEL SIDING	Stucco	48	1219	96 108 120	2438 2743 3048	5/16	8
	Cedar 8'' Groove	48	1219				
	Traditional Cedar	48	1219				
	Smooth	48	1219				
ALLURA® AND TERRAPLANK™ SHAKE SIDING	Straight Edge	16	406	48	1219	¼	6
	Staggered Edge	16	406	48	1219	¼	6
	Half Rounds	16	406	48	1219	¼	6
	Octagon	16	406	48	1219	¼	6
ALLURA® SHAKE SELECT	Random Square Straight Edge	12, 16	305, 406	48	1219	5/16	8
	Random Square Staggered Edge	16	406	48	1219	5/16	8
	Half Rounds	16	406	48	1219	5/16	8
	Octagon	16	406	48	1219	5/16	8
ALLURA® SOFFIT	Traditional Cedar*	12, 16, 24	305, 406, 610	144	3658	¼	6
	Smooth*	12, 16, 24	305, 406, 610	144	3658	¼	6
	Porch Panel	48	1219	96	2438	¼ 5/16	6 8

*Noted products are available in vented and non-vented options.

Allura® and TerraPlank™ fiber-cement products comply with 2019 CALGreen Section A4.405.1.4 as prefinished building materials. Allura® fiber-cement products comply with 2016 CALGreen Section A5.406 as materials with enhanced durability and reduced maintenance.

Allura® and TerraPlank™ products comply with 2020 / 2015 ICC 700 Sections 601.7, and 11.601.7 as site-applied prefinished building materials.

3.0 DESIGN:

Allura® and TerraPlank™ fiber-cement are exterior cladding products for installation over code complying wall framing, and sheathing including an approved water resistive barrier. Use of Allura® or TerraPlank™ does not require professional design but shall be in applications where wind-resistance requirements determined in accordance with the applicable code are within the limits as outlined in Section 8.1 of this report for installations described.

4.0 INSTALLATIONS:

4.1 General:

Installation of Allura® and TerraPlank™ fiber-cement products must comply with the manufacturer's published installation instructions, this report, and the applicable code(s). Where differences are found between documents, this report and the applicable building code shall be followed.

Installation of Allura® and TerraPlank™ fiber-cement products is be over exterior walls including the code prescribed water-resistive barrier and sheathing products in accordance with Sections 1405.1 through 1405.4 and Sections 1405.16 of the 2018 / 2015 IBC and Section R703.1 and R703.3 of the 2018 / 2015 IRC. Allura® and TerraPlank™ fiber-cement Lap Siding and Panel products can be installed over sheathing of structural or non-structural designation, where the wall is constructed in accordance with the applicable code. Allura® fiber-cement Select Shake products require installation over a minimum 7/16-inch (11 mm) thickness oriented strandboard (OSB) or 1/2-inch (13 mm) thickness plywood Exposure 1 classification wood sheathing types. Fasteners for attachment of Allura® and TerraPlank™ fiber-cement products must be corrosion-resistance, hot-dipped galvanized or stainless steel. Clearance between Allura® and TerraPlank™ fiber-cement siding products and earth on the exterior of a building shall be ≥ 6 inches (152 mm). Clearance between Allura® and TerraPlank™ fiber-cement siding products and horizontal concrete slabs or similar surfaces exposed to weather shall be ≥ 2 inches (51 mm).

Where field cuts are required, all field-cut edges are to be painted. No paint is to be applied to the backside of Allura® and TerraPlank™ fiber-cement products.

Installation of Allura® and TerraPlank™ fiber-cement assemblies shall conform to Tables 2-4 and Figures 1-11 of this report for the respecitve product type.

4.1.1 Special Inspection:

Use of Allura® and TerraPlank™ fiber-cement products do not require special inspection.

4.2 Allura® and TerraPlank™ Lap Siding

Allura® and TerraPlank™ Lap Siding can be installed in a face fasten or blind nail system as detailed in Section 9.1 of this report. Installation is restricted to horizontal orientation.

Installation starts at the bottom of wall where the bottom edge of the first course of lap siding is installed ¼-inch (6 mm) below a 1-1/2-inch (38 mm) width starter strip. A fastener in accordance with Table 2 of this report is installed at 1-inch (25 mm) from the top edge for blind fastening or ¾-inch (19 mm) up from the bottom edge for face fastening and at a minimum 3/8-inch (10 mm) from edges in accordance with Figure 1 or Figure 2 of this report as appropriate with fastening at every stud location. Each subsequent row of lap siding has a 1-1/4-inch (32 mm) overlap installed as shown in Figures 1 and 2. Maintain a minimum 1/8-inch clearance when siding meets a vertical termination, such as windows, doors, trim, corners, penetrations, etc. Caulk all vertical terminations or transitions unless siding terminates into a pocket or "J" channel receiver. Maintain a 1/4-inch clearance when Allura® or TerraPlank™ Lap Siding meets horizontal flashing, such as window and door heads, band boards, water tables etc. Caulking is not to be applied between the siding and the horizontal flashing.

See Section 9.1 Figures 1 and 2 for details of Allura® and TerraPlank™ Lap Siding installation.

4.3 Allura® TerraPlank™ Panel Siding

Allura® and TerraPlank™ Panel are installed in an exposed fastener (face fastened) application as detailed in Section 9.2 of this report. Installation can be in vertical or horizontal panel orientation where panels horizontal and vertical joints are treated as outlined below.

All edges of Allura® and TerraPlank™ Panels shall be backed by framing or solid blocking for attachment. Fasteners are to be installed a minimum 2-inches (51 mm) from panel corners in each direction with a minimum 3/8-inch (9 mm) edge distance. Vertical edges shall be lightly butted and centered on framing members and either sealed with caulking, covered with a batten, or protected with an H-section joint cover. Horizontal joints are to include "Z" flashing, between panels leaving a ¼-inch (6 mm) gap. Maintain a minimum 1/8-inch clearance when siding meets a vertical termination, such as windows, doors, trim, corners, penetrations, etc. Caulk all vertical terminations or transitions unless siding terminates into a pocket or "J" channel receiver. Maintain a 1/4-inch clearance when Allura® or TerraPlank™Panel meets horizontal flashing, such as window and door heads, band boards, water tables etc. Caulking is not to be applied between the siding and the horizontal flashing.

See Section 9.2 Figures 3-5 for details of Allura® and TerraPlank™ Panel installation.

4.4 Allura® and TerraPlank™ Shake Siding

Allura® and TerraPlank™ Shake siding are installed in a hidden fastener (blind nailed) application as detailed in Section 9.3 of this report.

For Allura® and TerraPlank™ Shake siding products, a starter strip and starter course are required at the bottom of wall prior to the installation and in accordance with the manufacturer's installation instructions. Installation is to start from the left side of wall progressing right. Allura® and TerraPlank™ Shake products are trimmed to allow the entire panel to butt against the trim and the factory edge is centered over framing. The first fastener is installed 1-inch (25 mm) above the top of the keyways at no closer than 3/8-inches (9.5 mm) from the edge of panel. A fastener is installed at 1-inch (25 mm) above the keyways and every 16-inches into framing. At the final keyway of the panel at the right edge a fastener is required. Subsequent rows are to be cut and then installed so the butt joint lands on a framing member one stud cavity back from the butt joint in the first course and with the proper overlap to meet the recommended Allura® and TerraPlank™ Shake sequence detailed in the manufacturer's installation instructions and Figures 6 and 7 of this report. Maintain a minimum 1/8-inch clearance when siding meets a vertical termination, such as windows, doors, trim, corners, penetrations, etc. Caulk all vertical terminations or transitions unless siding terminates into a pocket or "J" channel receiver. Maintain a 1/4-inch clearance when Allura® or TerraPlank™ Shake meet horizontal flashing, such as window and door heads, band boards, water tables etc. Caulking is not to be applied between the siding and the horizontal flashing.

See Section 9.3 Figures 6-7 for details of Allura® and TerraPlank™ Shake installation.

4.5 Allura® Shake Select Siding

Allura® Shake Select siding is installed in a hidden fastener (blind nailed) application as detailed in 9.4 of this report.

A starter strip and starter course are required at the bottom of wall prior to the installation of the Allura® Shake Select product in accordance with the manufacturer's installation instructions. Installation is to start from the left side of wall progressing right. The Allura® Shake Select products are trimmed to allow the entire panel to butt against the trim. The first fastener is installed 1-inch (25 mm) above the top of the keyways at no closer than 3/8-inches from the edge of panel. A fastener is installed at 1-inch (25 mm) above every second (every other) keyway. At the final keyway of the panel at the right edge a fastener is required. Subsequent rows are to be installed to provide overlap by matching up identifying V-notches to meet the recommended sequence detailed in the manufacturer's installation instructions and Figure 10 of this report. Maintain a minimum 1/8-inch clearance when siding meets a vertical termination, such as windows, doors, trim, corners, penetrations, etc. Caulk all vertical terminations or transitions unless siding terminates into a pocket or "J" channel receiver. Maintain a 1/4-inch clearance when Allura® Shake Select product meets horizontal flashing, such as window and door heads, band boards, water tables etc. Caulking is not to be applied between the siding and the horizontal flashing.

See Section 9.4 Figures 8-10 for details of Allura® Shake Select installation.

4.6 Allura® Soffit

Allura® Soffits are required anchored to framing members at maximum 24-inch (610 mm) on center spacing, with the long direction of the Allura® Soffit panel oriented perpendicular to the framing. Allura® Soffit ventilated applications require ventilation holes to be oriented towards the fascia (away from exterior wall). After installation, ventilated Allura® Soffit provide net free air of 6.9 inches^2 / ft (146 cm^2 / m).

All edges of Allura® Soffits must be backed by framing or solid blocking for attachment. Fasteners are to be installed a minimum 2-inches (51 mm) from corners in each direction, with a minimum edge distance of 3/8-inches (9 mm). Butt joints are to be in contact and located over framing members. No caulking or flashing is applied.

See Section 9.5 Figure 11 for details of Allura® Soffit installation.

4.7 Fire-Resistance Rated Construction

Allura® and TerraPlank™ exterior claddings detailed are approved for use where a limited (restricted) load-bearing fire-resistance rated construction is required for up to 1 hour, with the fire-resistance rating applied for interior or exterior of wall fire exposure. The wall construction shall be as described below:

Interior Finish	**Type:**	1 layer of Type X gypsum board compliant with ASTM C1396, listed by approved agency.	
	Minimum Thickness:	5/8 in. (16 mm).	
	Installation:	Gypsum to be installed with minimum #6 1-5/8 inches (41 mm) length Type S drywall screws spaced at maximum 8 inches (203 mm) around the perimeter and 12 inches (305 mm) in the field. Gypsum joints are to be taped and mudded in accordance with ASTM C474 and ASTM C475, and screw heads are to be covered with joint compound.	
Wall Framing[1]	**Type:**	Dimensional Lumber	
	Minimum Size:	2 x 4 (38 mm x 89 mm).	
	Installation:	16 inches (406 mm) on center spacing. Wall studs are to be loaded to maximum 34% of determined adjusted compression design value parallel to grain determined based on Load and Resistance Factor Design (LRFD) per the National Design Specification (NDS). Wall studs are to be connected to the Top and Sill plates described in accordance with the applicable code.	
Top Plates	Minimum double 2 x 4 (38 mm x 89) dimensional lumber header, with joints of lumber offset. Lumber to be fastened in accordance with the applicable code.		
Sill Plates	Minimum single 2 x 4 (38 mm x 89) dimensional lumber header, with joints of lumber offset. Lumber to be fastened in accordance with the applicable code.		
Insulation	**Type:**	Mineral Wool Batt	Fiberglass Batt
	Type:	16'' (405 mm) width	16'' (405 mm) width R13
	Installation	Friction fit between studs ensuring no through gaps at joint and stud locations.	Friction fit between studs ensuring no through gaps at joint and stud locations.
Exterior Sheathing	**Type:**	1 layer of Type X gypsum board compliant with ASTM C1396 or exterior gypsum compliant to ASTM C1177, listed by approved agency.	
	Minimum Thickness:	5/8 in. (16 mm).	
	Installation:	Gypsum to be installed with minimum #6 1-5/8 inches (41 mm) length Type S drywall screws spaced at maximum 8 inches (203 mm) around the perimeter and 12 inches (305 mm) in the field. Joint treatment is not optional but not required.	
Exterior Cladding	**Type:**	Allura® and TerraPlank™ fiber-cement Lap Siding or Panel Products	
	Minimum Thickness:	5/16 inches (8 mm).	
	Installation:	Lap Siding: 1-1/4 inches (32 mm) overlap installed with minimum 1-3/4-inch (44 mm) roofing nail installed blind or face nail at each stud location. Panel Siding: Panels: 1-3/4-inch (44 mm) roofing nail installed face nail at 8 inches (204 mm) on center around the perimeter, and 12 inches (305 mm) in the field.	

Note 1: Where used in load-bearing fire-resistance rated applications, maximum applied load is restricted to 35% Load and Resistance Factor Design (LRFD) adjusted design load determined in accordance with the NDS.

4.8 Types I-IV Construction

Allura® and TerraPlank™ exterior claddings are classified noncombustible and can be used as exterior cladding in Types I-IV construction when installed in accordance with this report with the following limitations:

4.5.1: Any Combustible Water Resistive Barriers: Allura® and TerraPlank™ fiber-cement exterior cladding is approved for use as exterior cladding in Types I-IV construction when installed with a combustible water-resistive barrier where the building is limited to ≤ 40 ft (12.2 m) measured from grade.

Where Allura® or TerraPlank™ fiber-cement products are used on exterior walls of Types I-IV construction > 40 ft (12.2 m) height above grade with combustible water-resistive barriers, the intended exterior wall assembly shall be listed by an approved agency as complying with the requirements of NFPA 285. The listed assembly is to outline approval for use of non-combustible fiber-cement products complying as Grade II Type A per ASTM C1186 of minimum 5/16-inch (8 mm) thickness. Allura® and TerraPlank™ installation shall be in accordance with the approved agency's listing installation requirements for siding type and Table 2 of this report.

4.5.2: Restricted Combustible Water Resistive Barriers: Allura® and TerraPlank™ fiber-cement exterior cladding is approved for use as exterior cladding in Types I-IV construction when installed with a combustible water resistive barrier in buildings > 40 ft (12.2 m) height where the water resistive barrier is the only combustible component meeting the following criteria:

1. The water-resistive barrier has a flame spread of ≤ 25 and smoke developed index of ≤ 450 when evaluated in accordance with ASTM E84 or UL 723, and
2. The water-resistive barrier meets the following criteria when evaluated to ASTM E1354 at the intended installed thickness tested in the horizontal orientation with an applied heat flux of 50 kW/m2:
    a. Peak heat release rate of ≤ 150 kW/m2
    b. Total heat release of ≤ 20 MJ/m2
    c. Effective heat of combustion of ≤ 17 MJ/kg

5.0 LIMITATIONS

- Allura® and TerraPlank™ fiber-cement products are to be installed in accordance with the manufacturer's installation instructions, the applicable code and this report. Where differences exist between documents, the applicable code and this report shall be followed.
- Where Allura® and TerraPlank™ fiber-cement products are used in fire-resistance rated construction, installation is to be in accordance with Sections 4.7 of this report, with load restricted to 35% of LRFD design load determined per the NDS.
- Where Allura® and TerraPlank™ fiber-cement products are used in Types I-IV construction, installation is to be in accordance with Sections 4.5 of this report.
- Allura® and TerraPlank™ fiber-cement products require installation with corrosion-resistant fasteners described in Table 2 Section 8.2 of this report, except use of electro-galvanized corrosion treatment type is not recommended.
- Allura® and TerraPlank™ fiber-cement products are evaluated for use as exterior cladding and interior finish (dry room) applications. Use of Allura™ fiber-cement products in alternate applications is outside the scope of this report.
- Allura® and TerraPlank™ fiber-cement products are manufactured in White City, OR, Roaring River, NC, Bogota, Colombia, Cali, Colombia, Santa Clara, Mexico and Nuevo Laredo, Mexico with inspections by QAI Laboratories.

6.0 SUPPORTING INFORMATION:

The following data has been submitted for evaluation of Allura® and TerraPlank™ fiber-cement products:

- Data outlining compliance for surface burning characteristics evaluated to ASTM E84.
- Data outlining compliance with ASTM C1186 as Grade II Type A fiber-cement material.
- Data evaluating Allura™ assemblies for transverse load resistance in accordance with ASTM E330.
- Data evaluating wind speed resistance in accordance with ASCE E7.
- Data evaluating fire-resistance in accordance with ASTM E119.
- Data evaluating non-combustibility in accordance with ASTM E136.

7.0 MARKING:

An example of Alllura™ fiber-cement panels finished product label is outlined in Figure 1 below.

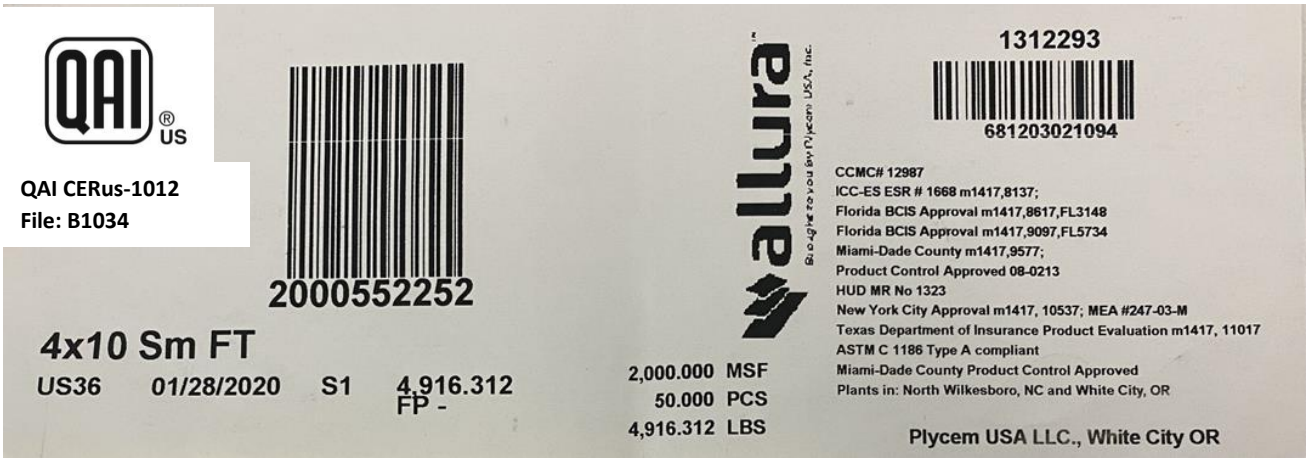

Figure 1. Allura® Finished Product Label Including CER_{US}-1012 and QAI Certification Mark

TerraPlank™ labeling is consistent with labeling for Allura® fiber-cement products shown in Figure 1.

8.0 RESULTS / RATINGS:

8.1 Allowable Load Capacities

Table 2. Allura® and TerraPlank™ Lap Siding Installations Wind Speeds and Design Pressures[1]

								V_{asd}[4,6,7] Wind Exposure Category[6]			V_{ult}[5], V[9] Wind Exposure Category[6]			
	Fastening Method	**Product Width (in.)**	**Fastener Type[2]**	**Fastener Spacing (inches)**	**Frame Type[3]**	**Stud Spacing (in.)**	**Building Height[8] (ft.)**	B	C	D	B	C	D	**Allowable Design Load (psf)**
1	Face	≤ 12 Lap	6D collated siding nail, 2" (51 mm) length	Two nails at 8" (203 mm) into sheathing and studs per Figure 2	Framing of minimum 0.42 specific gravity including 7/16" (11 mm) structural wood sheathing	16	0-15	122	111	101	158	143	130	-36.1
							20	122	108	99	158	139	127	
							40	118	100	93	152	130	120	
							60	111	96	90	143	124	116	
2	Face	≤ 9-1/4 Lap	6D collated siding nail, 2" (51 mm) length	Two nails at 8" (203 mm) into sheathing and studs per Figure 2	Framing of minimum 0.42 specific gravity including 7/16" (11 mm) structural wood sheathing	16	0-15	142	129	117	184	167	151	-48.7
							20	142	125	115	184	162	148	
								137	117	108	176	151	139	
							60	129	112	104	167	145	134	
3	Face	≤ 9-1/4 Lap	6D collated siding nail, 2" (51 mm) length	Two nails at 12" (305 mm) into sheathing and studs per Figure 2	Framing of minimum 0.42 specific gravity including 7/16" (11 mm) structural wood sheathing	24	0-15	101	91	-	130	118	-	-24.4
							20	101	89	-	130	115	-	
							40	97	-	-	125	-	-	
							60	91	-	-	118	-	-	
4	Face	≤ 9-1/4 Lap	6D collated siding nail, 2" (51 mm) length	Two nails at each stud location through any sheathing per Figure 2	Framing of minimum 0.42 specific gravity any sheathing type[10]	16	0-15	101	92	-	130	118	-	-24.5
							20	101	89	-	130	115	-	
							40	97	-	-	125	-	-	
							60	92	-	-	118	-	-	
5	Blind	≤ 9-1/4 Lap	Ring-shank roofing nail of 1-3/4" (45 mm) length	One nail at 8" (203 mm) spacing into sheathing and studs per Figure 1	Framing of minimum 0.42 specific gravity including 7/16" (11 mm) structural wood sheathing	24	0-15	116	105	96	150	136	123	-32.3
							20	116	102	93	150	132	120	
							40	111	95	88	144	123	113	
							60	105	91	-	136	118	-	
6	Blind	≤ 9-1/4 Lap	Roofing nail of 1-1/4" (32 mm) length	One nail at 12" (305 mm) spacing into furring strips per Figure 1	1x4 furring strips at 12" (305 mm) spacing, anchored into structural sheathing	12	0-15	92	-	-	119	-	-	-20.3
							20	92	-	-	119	-	-	
							40	88	-	-	114	-	-	
							60	-	-	-	-	-	-	
7	Blind	≤ 9-1/4 Lap	Roofing nail of 1-1/4" (32 mm) length	One nail at 8" (203 mm) spacing into furring strips per Figure 1	1x4 furring strips at 8" (203 mm) spacing, anchored into structural sheathing	8	0-15	127	116	105	164	149	135	-39.0
							20	127	112	102	164	145	132	
							40	122	104	96	158	135	124	
							60	116	100	93	149	129	120	
8	Face	≤ 8-1/4 Lap	6D collated siding nail, 2" (51 mm) length	Two nails at each stud location through any sheathing per Figure 2	Framing of minimum 0.42 specific gravity any sheathing type[10]	16	0-15	104	94	85	134	121	110	-25.8
							20	104	91	-	134	118	-	
							40	99	-	-	128	-	-	
							60	94	-	-	121	-	-	
9	Blind	≤ 8-1/4 Lap	Roofing nail of 1-1/4" (32 mm) length	One nail at each stud location with any sheathing per Figure 1	Framing of minimum 0.42 specific gravity any sheathing type[10]	16	0-15	98	89	-	127	115	-	-23.3
							20	98	87	-	127	112	-	
							40	94	-	-	122	-	-	
							60	89	-	-	115	-	-	

Table 2 Continued. Allura® and TerraPlank™ Lap Siding Installations Wind Speeds and Design Pressures[1]

								V_{asd}[4,6,7] Wind Exposure Category[6]			V_{ult}[5], V[9] Wind Exposure Category[6]			
	Fastening Method	Product Width (in.)	Fastener Type[2]	Fastener Spacing (inches)	Frame Type[3]	Stud Spacing (in.)	Building Height[8] (ft.)	B	C	D	B	C	D	Allowable Design Load (psf)
10	Blind	≤ 8-1/4 Lap	Roofing nail minimum 1-3/4" (45 mm) length	One nail at 12" (305 mm) into sheathing and studs per Figure 1	Framing of minimum 0.42 specific gravity with 7/16" (11 mm) structural wood sheathing	24	0-15	106	96	87	137	124	113	-27.0
							20	106	93	85	137	121	110	
							40	102	87	-	131	112	-	
							60	96	-	-	124	-	-	
11	Blind	≤ 8-1/4 Lap	Roofing nail minimum 1-3/4" (45 mm) length	One nail at 8" (203 mm) into sheathing and studs per Figure 1	Framing of minimum 0.42 specific gravity with 7/16" (11 mm) structural wood sheathing	24	0-15	129	117	107	167	152	138	-40.3
							20	129	114	104	167	147	134	
							40	124	106	98	160	137	127	
							60	117	102	95	152	131	122	
12	Blind	≤ 8-1/4 Lap	Ring-shank roofing nail minimum 1-3/4" (45 mm) length	One nail at 8" (203 mm) into sheathing and studs per Figure 1	Framing of minimum 0.42 specific gravity with 7/16" (11 mm) structural wood sheathing	24	0-15	129	117	107	167	152	138	-40.3
							20	129	114	104	167	147	134	
							40	124	106	98	160	137	127	
							60	117	102	95	152	131	122	
13	Blind	≤ 8-1/4 Lap	No. 8 self-tapping wafer-head screws of minimum 1'' (25 mm) length	One nail at each stud location through flange per Figure 1.	20-gauge steel with any sheathing[10]	16	0-15	96	87	-	124	113	-	-22.3
							20	96	-	-	124	-	-	
							40	92	-	-	119	-	-	
							60	87	-	-	113	-	-	
14	Face	≤ 7-1/4 Lap	6D collated siding nail, minimum 2" (51 mm) length	Two nails at each stud location through any sheathing per Figure 2	Framing of minimum 0.42 specific gravity any sheathing type[10]	16	0-15	117	107	97	152	138	125	-33.2
							20	117	104	95	152	134	122	
							40	113	96	89	146	124	115	
							60	107	92	86	138	119	111	
15	Blind	≤ 7-1/4 Lap	Roofing nail minimum 1-3/4" (45 mm) length	One nail at each stud location with any sheathing per Figure 1	Framing of minimum 0.42 specific gravity any sheathing type[10]	16	0-15	114	104	94	147	134	122	-31.4
							20	114	101	92	147	130	119	
							40	110	94	87	142	121	112	
							60	104	90	-	134	116	-	
16	Face	≤ 7-1/4 Lap	6D collated siding nail, minimum 2" (51 mm) length	Two nails at 8" (203 mm) into sheathing and studs per Figure 2	Framing of minimum 0.42 specific gravity including 7/16" (11 mm) structural wood sheathing	16	0-15	165	150	136	213	194	176	-65.7
							20	165	146	133	213	188	172	
							40	159	136	125	205	175	162	
							60	150	130	121	194	168	156	
17	Face	≤ 6-1/4 Lap	6D collated siding nail, minimum 2" (51 mm) length	Two nails at each stud location through any sheathing per Figure 2	Framing of minimum 0.42 specific gravity any sheathing type[10]	16	0-15	120	109	99	155	141	128	-34.8
							20	120	106	97	155	137	125	
							40	115	99	91	149	127	118	
							60	109	95	88	141	122	113	
18	Blind	≤ 6-1/4 Lap	Roofing nail minimum 1-3/4" (45 mm) length	One nail at each stud location with any sheathing per Figure 1	Framing of minimum 0.42 specific gravity any sheathing type[10]	16	0-15	123	112	101	159	144	131	-36.4
							20	123	108	99	159	140	128	
							40	118	101	93	152	130	120	
							60	112	97	90	144	125	116	
19	Face	≤ 5-1/4 Lap	6D collated siding nail, minimum 2" (51 mm) length	Two nails at each stud location through any sheathing per Figure 2	Framing of minimum 0.42 specific gravity any sheathing type[10]	16	0-15	135	122	111	174	158	143	-43.7
							20	135	119	108	174	153	140	
							40	129	111	102	167	143	132	
							60	122	106	99	158	137	127	

Table 2 Continued. Allura® and TerraPlank™ Lap Siding Installations Wind Speeds and Design Pressures[1]

	Fastening Method	Product Width (in.)	Fastener Type[2]	Fastener Spacing (inches)	Frame Type[3]	Stud Spacing (in.)	Building Height[8] (ft.)	V_{asd}[4,6,7] Wind Exposure Category[6] B	C	D	V_{ult}[5], V[9] Wind Exposure Category[6] B	C	D	Allowable Design Load (psf)
20	Blind	≤ 5-1/4 Lap	Roofing nail minimum 1-3/4" (45 mm) length	One nail at each stud location with any sheathing per Figure 1	Framing of minimum 0.42 specific gravity any sheathing type[10]	16	0-15	126	114	104	163	148	134	-38.2
							20	126	111	101	163	143	131	
							40	121	103	95	156	133	123	
							60	114	99	92	148	128	119	

Footnotes:

1. Installation must be in accordance with the manufacturer's installation instructions.
2. Nail fasteners are galvanized coated.
3. Unless otherwise noted, wood framing/furring species must have a specific gravity of 0.42 or greater. Furring attachment to wood and steel framing must be determined by the project design engineer to resist the maximum wind speeds.
4. V_{asd} = nominal or allowable stress design wind speed
5. V_{ult} = ultimate design wind speed
6. Wind speed coefficients design assumption per Section 30.4 of ASCE 7-10 and ASCE 7-16: $K_{zt} = 1$, $K_d = 0.85$, $GC_{pi} = 0.18$, $GC_p = -1.4$
7. 2015 IBC Section 1609.3.1, Eq. 16-33, 2018 IBC Section 1609.3.1 Eq. 16-33 $V_{asd} = V_{ult}(0.6)^{0.5}$
8. Building height is the mean roof height (ft) of a building, except that eave height shall be used for roof angle less than or equal to 10° (2-12 roof slope)
9. V = Basic Design Wind Speed per ASCE 7-16 or 2018 IBC Figures 1609.3(1) through 1609.3(8)
10. For non-structural sheathing types (optional) where used, increase the length of fasteners by the sheathing thickness to maintain minimum fastener penetration into framing.

Table 3. Allura® and TerraPlank™ Panel Siding Installations and Design Pressures[1]

	Fastening Method	Product Width (in.)	Fastener Type[2]	Fastener Spacing (inches)	Frame Type[3]	Stud Spacing (in.)	Building Height[8] (ft.)	V_{asd}[4,6,7] Wind Exposure Category[6] B	C	D	V_{ult}[5], V[9] Wind Exposure Category[6] B	C	D	Allowable Design Load (psf)
21	Face	48	6D collated siding nail, minimum 2" (51 mm) length	Nail at 6" (152 mm) around perimeter, 12" (305 mm) in the field into framing	Framing of minimum 0.42 specific gravity any sheathing type[10]	16	0-15	94	-	-	121	-	-	-21.1
							20	94	-	-	121	-	-	
							40	90	-	-	116	-	-	
							60	-	-	-	-	-	-	
22	Face	48	6D collated siding nail, minimum 2" (51 mm) length	Nail at 6" (152 mm) around perimeter, 6" (152 mm) in the field into framing.	Framing of minimum 0.42 specific gravity any sheathing type[10]	16	0-15	132	120	109	171	155	141	-42.2
							20	132	117	107	171	151	138	
							40	127	109	100	164	140	129	
							60	120	104	97	155	135	125	
23	Face	48	6D collated siding nail, minimum 2" (51 mm) length	Nail at 6" (152 mm) around perimeter, 12" (305 mm) in the field into framing.	Framing of minimum 0.42 specific gravity including 7/16" (11 mm) structural wood sheathing	24	0-15	88	-	-	113	-	-	-18.6
							20	88	-	-	113	-	-	
							40	-	-	-	-	-	-	
							60	-	-	-	-	-	-	
24	Face	48	No. 8 self-tapping wafer-head screws of minimum 1'' (25 mm) length	Nail at 6" (152 mm) around perimeter, 12" (305 mm) in the field into framing.	20-gauge steel with any sheathing type[10]	16	0-15	133	120	109	171	156	141	-42.4
							20	133	117	107	171	151	138	
							40	127	109	101	164	141	130	
							60	120	104	97	156	135	125	

Table 3 Continued. Allura® and TerraPlank™ Panel Siding Installations and Design Pressures[1]

	Fastening Method	Product Width (in.)	Fastener Type[2]	Fastener Spacing (inches)	Frame Type[3]	Stud Spacing (in.)	Building Height[8] (ft.)	V_{asd}[4,6,7] Wind Exposure Category[6] B	C	D	V_{ult}[5], V[9] Wind Exposure Category[6] B	C	D	Allowable Design Load (psf)
25	Face	48	No. 8 self-tapping wafer-head screws of minimum 1'' (25 mm) length	Nail at 6" (152 mm) around perimeter, 12" (305 mm) in the field into framing.	20-gauge steel with any sheathing type[10]	24	0-15	100	91	-	129	117	-	-24.1
							20	100	88	-	129	114	-	
							40	96	-	-	124	-	-	
							60	91	-	-	117	-	-	
26	Face	48	SFS Intec TW-S 4.8x38-1-1/2-inch screws	Manufacturer's Commercial Pattern "A" per Figure 4	Framing of minimum 0.42 specific gravity including 7/16" (11 mm) structural wood sheathing	16	0-15	114	103	94	147	133	121	-31.1
							20	114	100	92	147	129	118	
							40	109	93	86	141	120	111	
							60	103	89	-	133	116	-	
27	Face	48	SFS Intec TW-S 4.8x38-1-1/2-inch screws	Manufacturer's Commercial Pattern "B" per Figure 5	Framing of minimum 0.42 specific gravity including 7/16" (11 mm) structural wood sheathing	16	0-15	95	86	-	122	111	-	-21.6
							20	95	-	-	122	-	-	
							40	91	-	-	117	-	-	
							60	86	-	-	111	-	-	

1. Installation must be in accordance with the manufacturer's installation instructions.
2. Nail fasteners are galvanized coated.
3. Unless otherwise noted, wood framing/furring species must have a specific gravity of 0.42 or greater. Furring attachment to wood and steel framing must be determined by the project design engineer to resist the maximum wind speeds.
4. V_{asd} = nominal or allowable stress design wind speed
5. V_{ult} = ultimate design wind speed
6. Wind speed coefficients design assumption per Section 30.4 of ASCE 7-10 and ASCE 7-16: $K_{zt} = 1$, $K_d = 0.85$, $GC_{pi} = 0.18$, $GC_p = -1.4$
7. 2015 IBC Section 1609.3.1, Eq. 16-33, 2018 IBC Section 1609.3.1 Eq. 16-33 $V_{asd} = V_{ult}(0.6)^{0.5}$
8. Building height is the mean roof height (ft) of a building, except that eave height shall be used for roof angle less than or equal to 10° (2-12 roof slope)
9. V = Basic Design Wind Speed per ASCE 7-16 or 2018 IBC Figures 1609.3(1) through 1609.3(8)
10. For non-structural sheathing types (optional) where used, increase the length of fasteners by the sheathing thickness to maintain minimum fastener penetration into framing.

Table 4. Allura® and TerraPlank™ Shake Siding Installations and Design Pressures[1]

	Fastening Method	Product Width (in.)	Fastener Type[2]	Fastener Spacing (inches)	Frame Type[3]	Stud Spacing (in.)	Building Height[8] (ft.)	V_{asd}[4,6,7] Wind Exposure Category[6] B	C	D	V_{ult}[5], V[9] Wind Exposure Category[6] B	C	D	Allowable Design Load (psf)
28	Blind	48	Roofing nail minimum 2" (51 mm) length	Fasteners installed into every stud per Figures 6 and 7.	Framing of minimum 0.42 specific gravity any sheathing type[10]	16	0-15	142	129	117	183	166	151	-48.3
							20	142	125	114	183	161	147	
							40	142	122	112	183	158	145	
							60	142	120	110	183	155	142	

Footnotes:

1. Installation must be in accordance with the manufacturer's installation instructions.
2. Nail fasteners are galvanized coated.
3. Unless otherwise noted, wood framing/furring species must have a specific gravity of 0.42 or greater. Furring attachment to wood and steel framing must be determined by the project design engineer to resist the maximum wind speeds.
4. V_{asd} = nominal or allowable stress design wind speed
5. V_{ult} = ultimate design wind speed
6. Wind speed coefficients design assumption per Section 30.4 of ASCE 7-10 and ASCE 7-16: $K_{zt} = 1$, $K_d = 0.85$, $GC_{pi} = 0.18$, $GC_p = -1.4$
7. 2015 IBC Section 1609.3.1, Eq. 16-33, 2018 IBC Section 1609.3.1 Eq. 16-33 $V_{asd} = V_{ult}(0.6)^{0.5}$
8. Building height is the mean roof height (ft) of a building, except that eave height shall be used for roof angle less than or equal to 10° (2-12 roof slope)
9. V = Basic Design Wind Speed per ASCE 7-16 or 2018 IBC Figures 1609.3(1) through 1609.3(8)
10. For non-structural sheathing types (optional) where used, increase the length of fasteners by the sheathing thickness to maintain minimum fastener penetration into framing.

Table 5. Allura® Shake Select Siding Installations and Design Pressures

	Fastening Method	Product Width (in.)	Fastener Type[2]	Fastener Spacing (inches)	Frame Type[3]	Stud Spacing (in.)	Building Height[8] (ft.)	V_{asd}[4,6,7] Wind Exposure Category[6] B	C	D	V_{ult}[5], V[9] Wind Exposure Category[6] B	C	D	Allowable Design Load (psf)
29	Blind	48	0.092" (2.3 mm) Siding nail of minimum 1-3/4" (45 mm) length	Fastener installed at every other (every second) keyway through sheathing per Figure 8.	Framing of minimum 0.42 specific gravity and minimum 7/16" (11 mm) structural wood sheathing	24	0-15	138	125	114	178	162	147	-46.0
							20	138	122	111	178	157	144	
							40	133	113	105	171	146	135	
							60	125	109	101	162	140	130	
30	Blind	48	Roofing nail of minimum 1-3/4" (45 mm) length.	Fastener installed at every other (every second) keyway through sheathing per Figure 8.	Framing of minimum 0.42 specific gravity and minimum 7/16" (11 mm) structural wood sheathing	24	0-15	118	107	98	153	139	126	-33.7
							20	118	104	95	153	135	123	
							40	114	97	90	147	125	116	
							60	107	93	86	139	120	112	
31	Blind	48	No. 9 Cement Board screw of minimum 1-5/8" (41 mm) length	Fastener installed at every other (every second) keyway through sheathing per Figure 8.	20-gauge steel with 7/16" (11 mm) structural wood sheathing	24	0-15	166	151	137	215	195	177	-66.7
							20	166	147	134	215	189	173	
							40	160	137	126	206	176	163	
							60	151	131	122	195	169	157	

Footnotes:

1. Installation must be in accordance with the manufacturer's installation instructions.
2. Nail fasteners are galvanized coated.
3. Unless otherwise noted, wood framing/furring species must have a specific gravity of 0.42 or greater. Furring attachment to wood and steel framing must be determined by the project design engineer to resist the maximum wind speeds.
4. V_{asd} = nominal or allowable stress design wind speed
5. V_{ult} = ultimate design wind speed
6. Wind speed coefficients design assumption per Section 30.4 of ASCE 7-10 and ASCE 7-16: $K_{zt} = 1$, $K_d = 0.85$, $GC_{pi} = 0.18$, $GC_p = -1.4$
7. 2015 IBC Section 1609.3.1, Eq. 16-33, 2018 IBC Section 1609.3.1 Eq. 16-33 $V_{asd} = V_{ult}(0.6)^{0.5}$
8. Building height is the mean roof height (ft) of a building, except that eave height shall be used for roof angle less than or equal to 10° (2-12 roof slope)
9. V = Basic Design Wind Speed per ASCE 7-16 or 2018 IBC Figures 1609.3(1) through 1609.3(8)

9.0 INSTALLATION DETAILS

9.1 ALLURA® AND TERRAPLANK™ LAP SIDING INSTALLATION

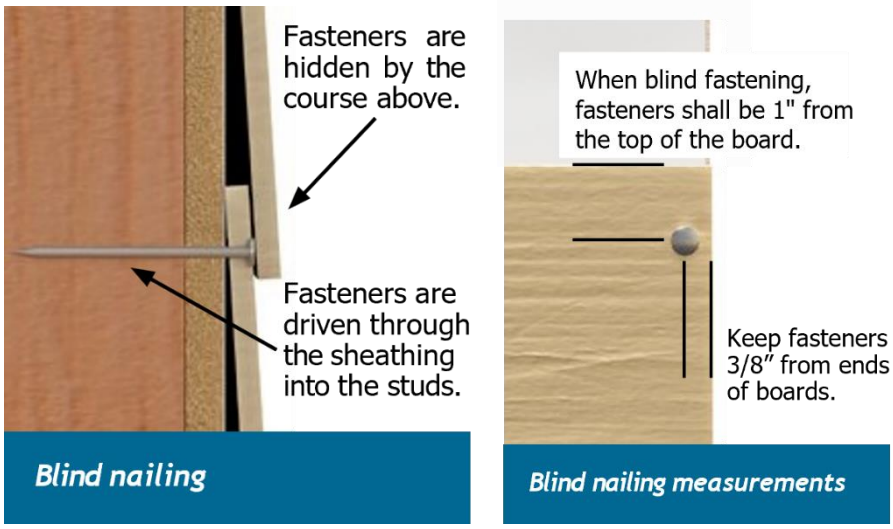

Figure 1. Allura® and TerraPlank™ Lap Siding Blind Nail Fastening Details

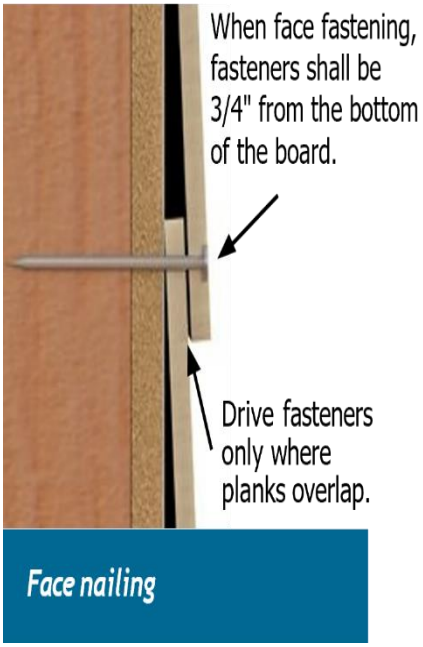

Figure 2. Allura® and TerraPlank™ Lap Siding Face Nail Fastening Details

9.2 ALLURA® AND TERRAPLANK™ PANEL SIDING INSTALLATION

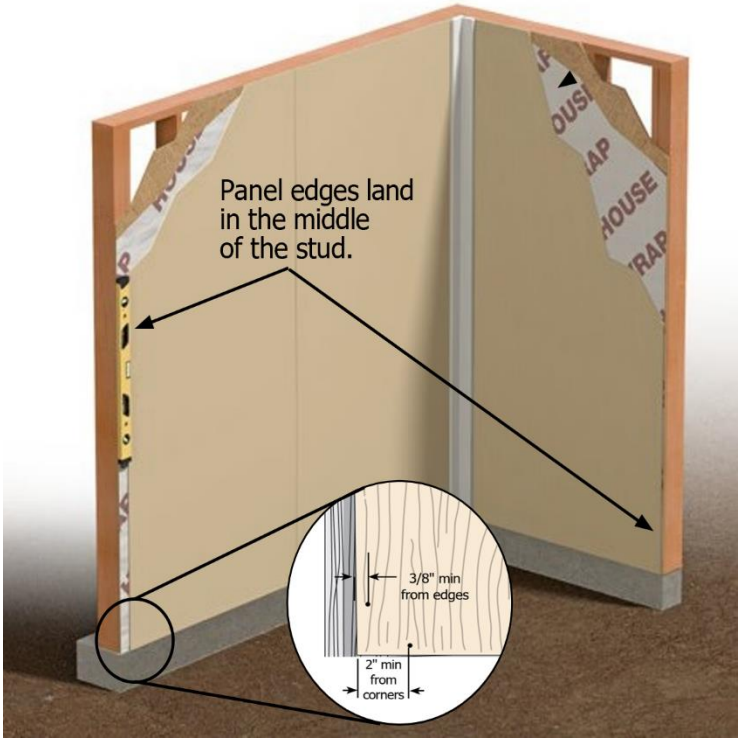

Figure 3. Allura® and TerraPlank™ Panel General Installation

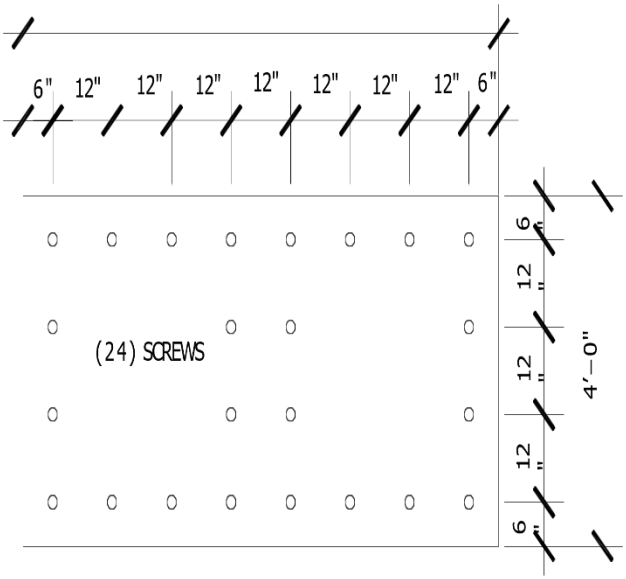

Figure 4. Allura® and TerraPlank™ Panel Commercial Pattern “A”

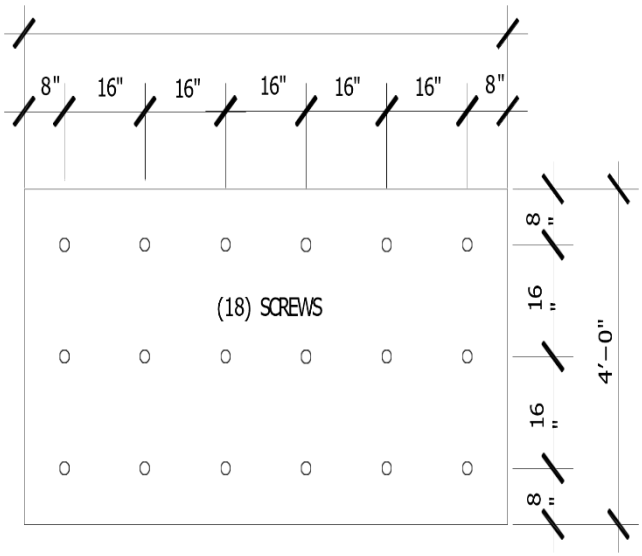

Figure 5. Allura® Panel Commercial Pattern “B

9.3 ALLURA® AND TERRAPLANK™ SHAKE SIDING INSTALLATION

Figure 6. Allura® and TerraPlank™ Shake General Installation

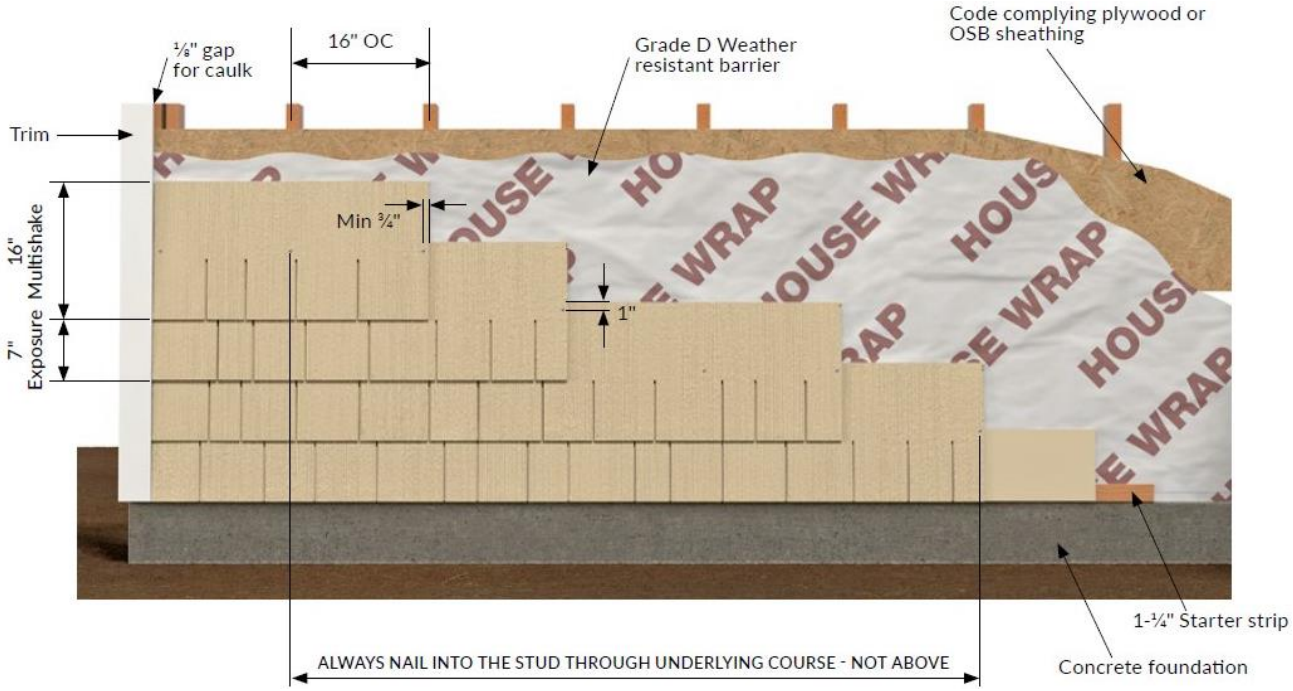

Figure 7. Allura® Select Shake Staggered Installation

9.4 ALLURA® SELECT SHAKE SIDING INSTALLATION

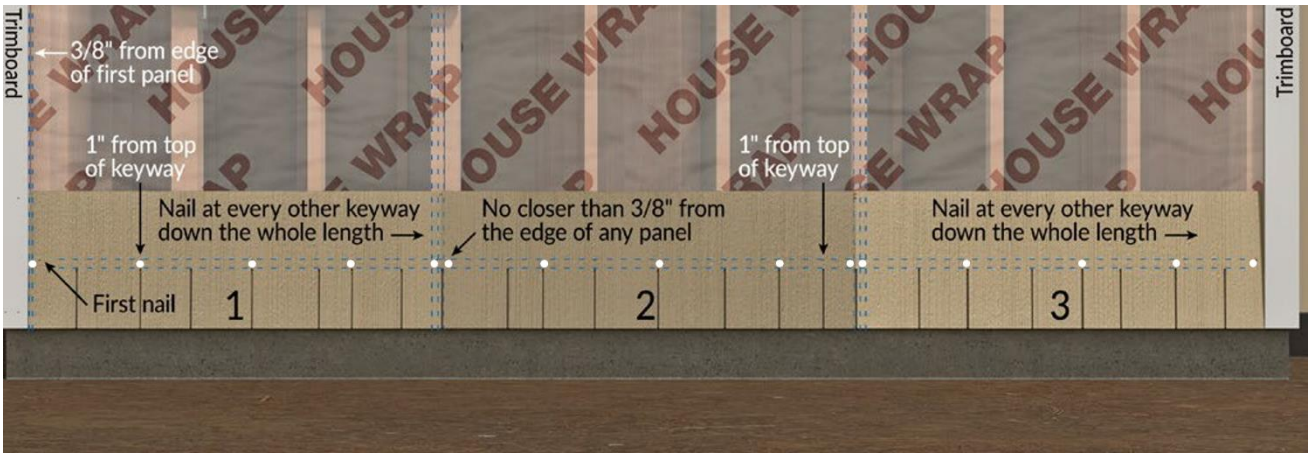

Figure 8. Allura® Select Shake General Installation

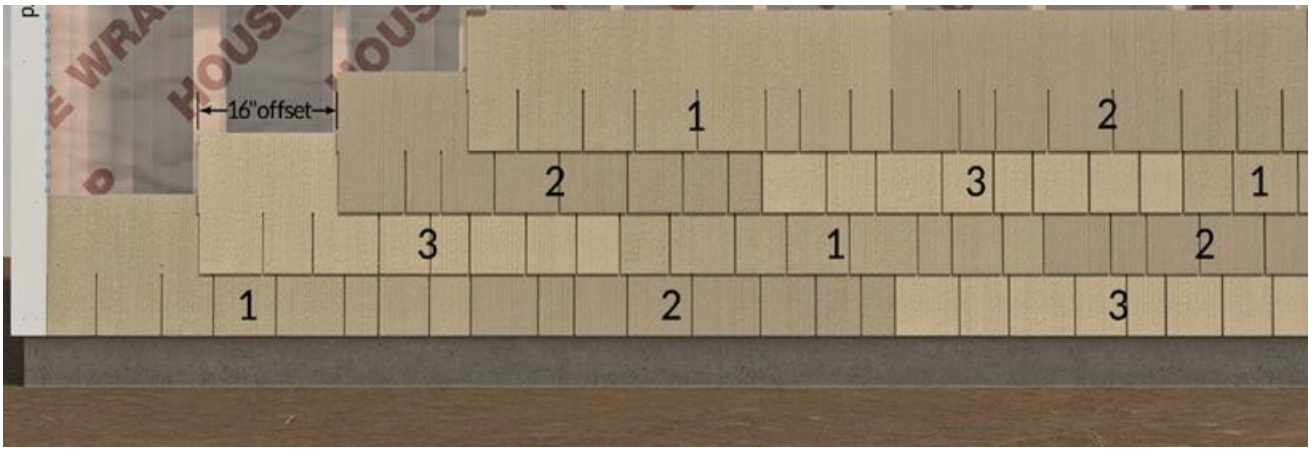

Figure 9. Allura® Select Shake Staggered Installation

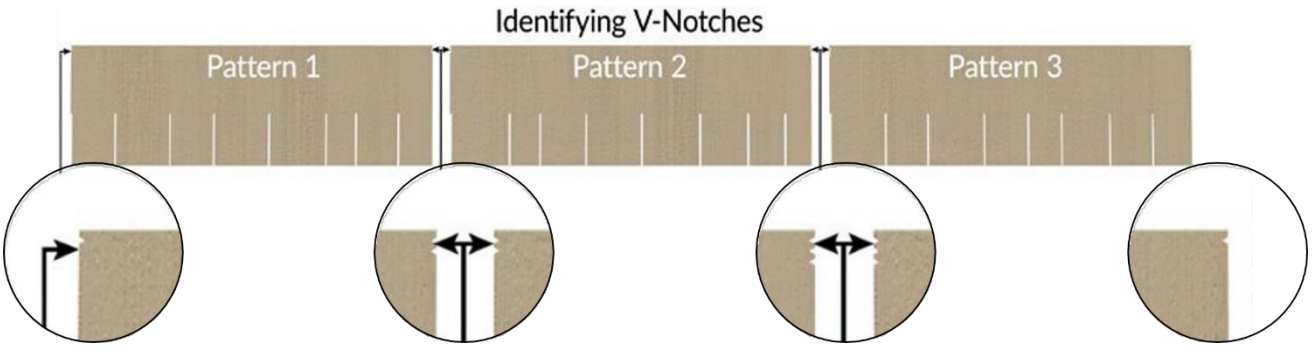

Figure 10. Allura® Select Shake V-Notch Identification of Select Shake Panel Types

9.4 ALLURA® SOFFIT INSTALLATION

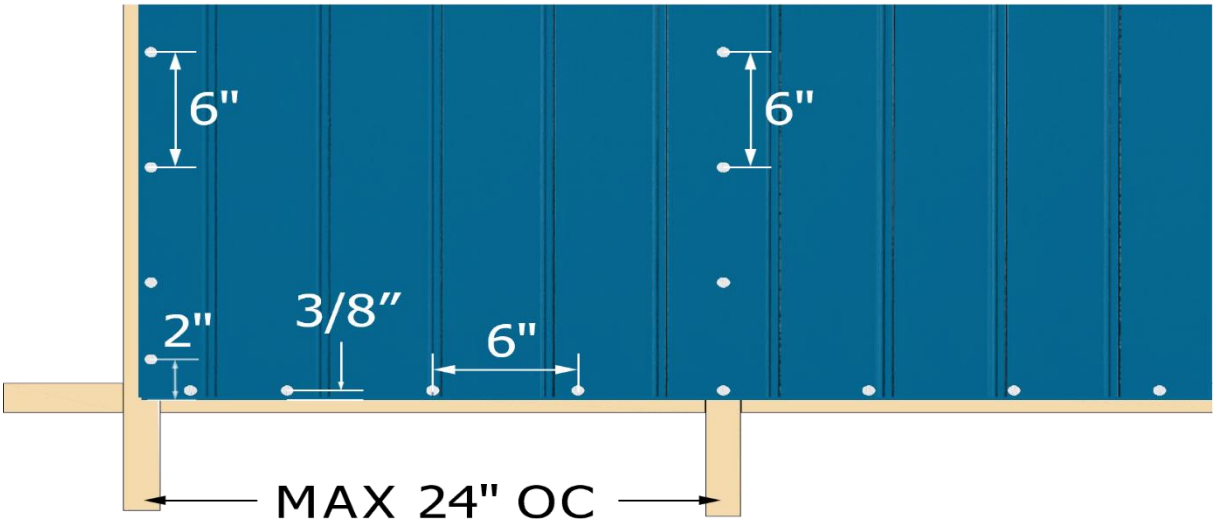

Figure 11. Allura® Soffit General Installation

10.0 ELIGIBILITY OF REPORT

QAI's Code Evaluation Report complies with the 2021 / 2018 / 2015 IBC Section 104.11 *Alternative materials, design and methods of construction and equipment* subsection 104.11.1 *Research Reports*. Supporting data has been evaluated by QAI for compliance of the noted materials and assemblies to the applicable code by QAI, and *approved* source as detailed below.

The attached report has been reviewed by a QAI Registered Professional Engineer approved by the specific state Board of Professional Engineers noted on the specific P.E. seal(s).

Per section 1703 of the IBC, QAI is an independent third-party testing, inspection and certification agency accredited by the International Accreditation Service, Inc. (IAS) for this specific scope (see IAS PCA-118). QAI can confirm that based on its IAS accreditation it meets IBC Section 1703.1 on Independence, Section 1703.1.2 on Equipment and Section 1703.1 on Personnel.

This Evaluation report has been designed to meet the performance requirements of IBC Section 1703.4 and contains the required information to show the product, material or assembly meets the applicable code requirements.

The product is labeled per section IBC 1703 and subject to follow-up inspection per IBC 1703.6 using QAI IAS accredited ISO/IEC 17020 inspection program (see IAS AA-723).

For more information regarding QAI Laboratories, please visit www.qai.org.

The above is an example of the QAI registered Listing mark. The Listing mark may only be used by the Report Holder per the QAI service agreement on products defined in this report. The 'us' indicator in the 8 o'clock position indicates the product complies with the properties evaluated with limitations outlined in this report for use in the US market. A 'c' indicator in the 4 o'clock position indicates the product has been evaluated for use in the Canadian market.

10.0 REFERENCED STANDARDS

ASTM E84 *Standard Test Method for Surface Burning Characteristics of Building Materials*.
ASTM C1186 *Standard Specification for Flat Fiber-Cement Sheets*.
ASTM E330 *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference*.
ASTM E119 *Standard Test Methods for Fire Tests of Building Construction and Materials*.
ASTM E136 *Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C*.