NATIONAL AND PROVINCIAL CANADIAN CODES
ENGINEERING EVALUATION REPORT

Report Number	0098-18	Issue Date	2025-12-31
Client	Nichiha USA, Inc	Issue Number	2-6070
Address	6465 E. Johns Crossing, Suite 250, Johns Creek, GA, 30097	Expiry Date	2026-12-31

Subject

Nichiha Fiber Cement – AWP Panel and Sierra/Savannah Lap Siding – Exterior Wall Cladding System

Evaluation Scope

This report is provided to assist registered design professionals and building officials in Canada for determining compliance to the performance objectives in the named building codes.

The material(s) and system(s) described herein have been evaluated to:
2020 National Building Code of Canada (NBCC);
2024 British Columbia Building Code (BCBC);
2024 Ontario Building Code (OBC);
2023 National Building Code – Alberta Edition (NBC (AE));
Division A, Sections 1.2.1.1.(1)(a) for compliance with the objectives and fundamental statements attributed to the applicable acceptable solutions in Division B, for buildings classified under Part 3/4/5 and Part 9 construction.

CSI DIVISION: 07 00 00 THERMAL AND MOISTURE PROTECTION
SUBDIVISION: 07 46 46 Fiber-Cement Siding

CODE SECTIONS AND STANDARDS: 2020 NBCC

Div. B Section	Description	Referenced Standard or Div. B Section[1]	Year
Part 3/4/5			
3.1.4.8	Exterior Cladding	3.1.5.5.(1)(b)	-
3.1.5.5[2]	Combustible Cladding on Exterior Walls	CAN/ULC-S134	2013
3.1.7.1	Determination of (Fire-Resistance) Ratings	CAN/ULC-S101	2014
3.1.12.1.(1)	Determination of (Flame-Spread and Smoke Developed)	CAN/ULC-S102	2010
4.1.3.5	Limit States Design, Deflection	4.1.8.13	-
4.1.7.1.(5)	Wind Load, Exterior Cladding Strength Attachment	4.1.7.3	-
4.1.8.1.(11)	Earthquake Load and Effects, Analysis	4.1.8.2	-
4.1.8.13	Deflections on Drift Limits	4.1.8.11, 4.1.8.12	-
4.1.8.18.(10)	Elements of Structures, Non-Structural Components	4.1.8.3.(6)	-
5.1.4.1	Resistance to Structural and Environmental Loads	5.2.1, 5.2.2, 4.1.3.5, 4.1.8	-
5.1.4.2	Resistance to Deterioration	-	-
5.2.1.3.(3)	Environmental (Wind) Load and Transfer Calculations	4.1.7	-
5.2.2.1	Determination of Structural Loads and Effects	Part 4	-
5.6.1.1	Required Protection from Precipitation	-	-

5.6.2.1	Sealing and Drainage	-	-
5.9.1.1.(1)(b)	Compliance with Applicable Standards	A-5.9.1.1.(1)	-
5.9.3.5	Water Penetration	ASTM E331	2000
A-5.9.1.1.(1)	Selection of Materials and Components and Compliance	-	-
A-5.9.3	Testing Standards for other Fenestration Assemblies	AAMA 501.1	2005
A-5.9.3.2.(1)	Structural and Environmental Loads	ASTM E330	2014
Part 9			
9.4.1.1(1)(c)(ii)	General, Structural Design Requirements and Application	Part 4	-
9.10.3.1	Fire-Resistance and Fire-Protection Ratings	Part 3, App. D, Table 9.10.3.1-A	-
9.10.3.2	Flame-Spread Ratings	Part 3, App. D	-
9.10.14.5.(2)[2]	Construction of Exposing Building Face and Walls above	CAN/ULC-S134	2013
9.10.15.5.(2) & (3)[2]	Construction of Exposing Building Face of Houses	CAN/ULC-S134	2013
9.27.1.1(1)	General, Application, Cladding	9.27.2-9.27.12, Part 5	-
9.27.2.2(1)	Minimum Protection from Precipitation Ingress	-	-
9.27.5[3]	Attachment of Cladding	9.27.5.5	-

1. Only the applicable reference standards and code sections sited in the main body text are listed. (-) indicates that the main body text covers the full explanation of the objective.
2. AWP Panel models only. See evaluation for further information.
3. Sierra/Savannah Lap Siding only.

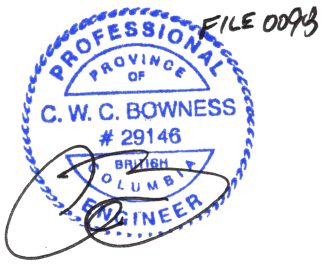
COMPLIANCE STATEMENT

It is the opinion of Boca Engineering Co. that Nichiha Fibre Cement AWP Panel and Sierra/Savannah Lap Siding Cladding System, when installed as described in this report, has demonstrated compliance with the listed sections of the listed sections of the named building codes. Design and performance information can be found in the Product Evaluation section this report.

This report has been prepared and reviewed on behalf of Boca Engineering Co. by:

Christopher Bowness, P.Eng., P.E.

2025-12-31
Date



Province of British Columbia
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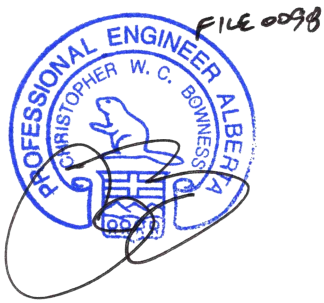
Province of Ontario



Province of Alberta
Permit to Practice Stamp in ATTACHMENT 5

EVALUATION REPORT TERMS

1. This report is a general evaluation of the building code section requirements as identified and applies only to the samples that were evaluated. It does not imply any endorsement or warranty, nor that the signatory Engineer is the Designer of Record of any construction project for which the information is used.
2. This Evaluation Report expires 2026-12-31, open to renewal. Up to the renewal date, the report is valid until such time as the named product(s) changes, the Quality Assurance Agency changes, or provisions of the Code that relate to the product change.

CERTIFICATION OF INDEPENDENCE

1. Boca Engineering Co., it's employees and shareholders, do not have, nor do they intend to or will acquire, a financial interest in any company manufacturing or distributing products that they evaluate.
2. Boca Engineering Co. is not owned, operated, or controlled by any company manufacturing or distributing products that they evaluate.

Contents:

Product Evaluation

1.0 PRODUCT DESCRIPTION

Nichiha exterior wall claddings are fiber cement planks and sheets manufactured from a pressed, stamped, and autoclaved mix of Portland cement, fly ash, silica, recycled rejects, and wood fiber bundles. The surface is pre-finished with a variety of colours and textures. Cladding panels and planks are installed on the exterior of buildings.

AWP PANEL SIDING

The AWP series panels are installed using corrosion-resistant metal clips supplied as part of the system, fastened to framing providing a 10 mm air-space rainscreen between the cladding and wall sheathing.

AWP PANEL SIDING WITH CORROSION-RESISTANT CHANNEL FASTENING CLIPS DIMENSIONS:

	Model Name	
Dimension	**AWP 1818**	**AWP 3030**
Height	17 $^{7}/_{8}$ in. (455 mm)	17 $^{7}/_{8}$ in. (455 mm)
Length	71 $^{9}/_{16}$ in. (1818 mm)	119 $^{5}/_{16}$ in. (3030 mm)
Thickness	5/8, 3/4, 7/8 in. (16, 18, 21 mm)	5/8 in. (16 mm)
Panel Orientation	Horizontal	Horizontal or Vertical

AWP INSTALLATION COMPONENTS SUPPLIED BY NICHIHA

Ultimate Clip System:

1. Starter Track: FA 700 (10mm rainscreen) – 10' (3030mm) (l) galvalume coated steel.

2. Panel Clips: JEL 778 “Ultimate Clip II” (10mm rainscreen for most AWP) – Zinc-Aluminum-Magnesium alloy coated steel.
    a. JEL788 "Ultimate Clip II" (10mm rainscreen for import SandStone and VintageBrick only) - Zinc-Aluminum-Magnesium alloy coated steel.
    b. Joint Tab Attachments (included) – used at all AWP 1818 panel to panel vertical joints.
3. Corner Clips: JE 777C (10mm rainscreen for most AWP Manufactured Corners) -- Zinc-Aluminum-Magnesium alloy coated steel.
    a. Corner Clips: JE 787C (10mm rainscreen for import SandStone and VintageBrick Manufactured Corners only) -- Zinc-Aluminum-Magnesium alloy coated steel.
4. Single Flange Sealant Backer – FHK 1015 R (10mm) – 6.5’ (l) fluorine coated galvalume.
5. Double Flange Sealant Backer – FH 1015 R (10mm) – 10’ (l) fluorine coated galvalume.
6. Corrugated Spacer – FS 1005 (5mm), FS 1010 (10mm) – 4’ (l).

SIERRA & SAVANNAH LAP SIDING

Lap siding are plank boards installed horizontally, overlapping, and fastened against sheathing to the wall framing, which may include vertical wood straps to form a 10 mm airspace rainscreen between the cladding and wall sheathing. Lap siding planks are installed with the long dimension oriented horizontally.

SIERRA & SAVANNAH LAP SIDING DIMENSIONS:

	Model Name	
Dimension	**Sierra Shake**	**Savannah Smooth**
Height	8 $^{7}/_{8}$ in. (225 mm)	6 $^{1}/_{4}$, 7 $^{1}/_{4}$, 8 $^{1}/_{4}$, in. (159, 186, 210 mm)
Length	9 ft. 4 in. (2845 mm)	9 ft. 4 in. (2865 mm)
Thickness	1/2 in. (12 mm)	1/2 in. (12 mm)
Overlap	1 1/4 in. (32 mm)	1 1/4 in. (32 mm)

1.2 MATERIAL PROPERTIES

The material properties of AWP Panel and Sierra/Savannah Lap siding as per ASTM C1186, *Standard Specification for Flat Fiber-Cement Sheets* can be found in *ATTACHMENT 1: MATERIAL PROPERTIES* of this report.

2.0 INSTALLATION

The cladding systems as described in Section 1 shall be installed in accordance with the manufacturer’s installation instructions, and the NBCC, BCBC, OBC, NBC (AE), are subject to the Limitations stated within this report.

Published installation Instructions are available online at:

- https://www.nichiha.com/docs/Nichiha-Install-Guide-AWP-Horizontal-English.pdf
- https://www.nichiha.com/docs/Nichiha-Install-Guide-AWP-Vertical-English.pdf
- https://www.nichiha.com/docs/Nichiha-Install-Guide-Savannah-Sierra.pdf

3.0 CODE SECTIONS REVIEW

NBCC Div. B Section	Description
	Part 3/4/5
3.1.4.8	**Exterior Cladding** Specific AWP Panel horizontal applications conform to article 3.1.4.8.(1)(b). See this report comments to NBCC 3.1.5.5
3.1.5.5[2]	**Combustible Cladding on Exterior Walls** Allows for combustible cladding on buildings required to be of non-combustible construction when tested to CAN/ULC S134 conforming to the conditions of acceptance listed in this clause. AWP Panels with a specific wall framing construction assembly detail have been tested to and comply with this code section. Designers and AHJ's should request and obtain a copy of Boca Engineering report 0098-19 and the ULC S134 test report document cited in section 9 of this report for reference in determining correct detailing for application of testing results in the field. AWP Panel installations where details are not in accordance with the CAN/ULC S134 tested assembly are only suitable for combustible construction applications under Article 3.1.4. Sierra and Savannah Lap siding has not been evaluated for non-combustible construction, and are only suitable for combustible construction applications under Article 3.1.4.
3.1.7.1	**Determination of (Fire-Resistance) Ratings** See section 5 of this report.
3.1.12.1.(1)	**Determination of (Flame-Spread and Smoke Developed) Ratings** See section 5 of this report.
4.1.3.5	**Limit States Design, Deflection** Structural testing and engineering studies of wall assemblies with AWP Panel and Sierra/Savannah Lap Siding has been conducted and reported in Boca Engineering report 0066-5 and 0089-1. It is found that when installed in accordance with the manufacturer's instructions and tested assembly details listed in Tables 2-3 of this report, for storey heights up to 3.28 m (10 ft), with building frames structurally designed to Part 4, that the cladding materials do not become damaged or dislodges under these limitations: i. In-plane story drift under lateral loading (wind or seismic), up to a recommended seismic design lateral inelastic storey drift maximum of 41 mm (1.6 inch), and, ii. out of plane lateral load (wind) wall bending of L/180 [18mm (3/4 inch)], and, iii. vertical frame movements, most prominently recognized in wood framing due to thermal and moisture expansion and contraction of up to 18 mm (3/4 inch). AWP Panels require expansion joints at each storey to accommodate this vertical movement
4.1.7.1.(5)	**Wind Load, Exterior Cladding Strength Attachment** See wind load assembly performance in Attachment 2 of this report, developed following the design methods of NBCC 4.1.7.1.(5).
4.1.8.1.(11)	**Earthquake Load and Effects, Analysis** See this report comments to NBCC 4.1.3.5.

NBCC Div. B Section	Description
	Part 3/4/5
4.1.8.13	**Deflections on Drift Limits** See this report comments to NBCC 4.1.3.5.
4.1.8.18.(10)	**Elements of Structures, Non-Structural Components** It is found that AWP Panel and Sierra/Savannah Lap Siding cladding systems, when installed in accordance with the manufacturer's instructions, do not transfer unaccounted for forces to the primary structure during seismic loading. The design dead weight of the cladding system components may be taken as AWP: 0.5 kN/m^2, Sierra/Savannah: 0.5 kN/m^2, of wall surface area.
5.1.4.1	**Resistance to Structural and Environmental Loads** The contents of this evaluation report cover the intent of demonstrating compliance to this article.
5.1.4.2	**Resistance to Deterioration** The AWP Panel attachment clip with ZAM coating was tested to ASTM B117 for 2000 hours of salt spray exposure and found to have equivalent corrosion protection as to what is required by CSA A370-14 Section 5.2.4, Level 3 Corrosion Protection, which provides for acceptable durability in all climate regions of NBCC Div. B App. C. AWP Panel and Sierra/Savannah Lap Siding have been tested for accelerated exposure to freezing-thawing, heat-rain, and water soaking, in accordance with and complying with material specification ASTM C1186. See material properties information in Attachment 1 of this report.
5.2.1.3.(3)	**Environmental (Wind) Load and Transfer Calculations** The wind load calculations in this report conform to NBCC article 4.1.7
5.2.2.1	**Determination of Structural Loads and Effects** A structural testing and design evaluation was conducted by introducing model design input loads to reach maximum acceptable deflection limits for determining the response of the cladding system when installed on building framing designed to Part 4. Boca Engineering report 0066-5 found that when considering all climatic and loading conditions listed in this article, AWP Panel and Sierra/Savannah Lap Siding do not adversely affect the building framing to where the building framing and cladding will perform as intended to the requirements of the NBCC. Design wind load limitations are provided in Attachment 2 of this report.
5.6.1.1	**Required Protection from Precipitation** The AWP Panel and Sierra/Savannah Lap Siding cladding systems' primary function satisfies this article. See further information in this report comments to NBCC 5.6.2.1.
5.6.2.1	**Sealing and Drainage** The AWP Panel and Sierra/Savannah Lap Siding cladding systems, when installed with joint sealants per manufacturer's instructions, generally satisfy article 5.6.1.(1)(a). Where design conditions require a first and second plane of protection with capillary break of the building exterior (commonly known as a "rainscreen"), with a drainage plane to satisfy 5.6.2.1.(1)(b); i. AWP Panel cladding system is attached with corrosion resistant metal channels that create a

NBCC Div. B Section	Description
	Part 3/4/5
	10mm airspace between the back of the cladding panel and the front of the wall sheathing, which provides for a drainage plane. • AWP Horizontal clips (AWP 3030 and AWP 1818) are spaced 3 to 4 in. apart and the clips have ¼ in. weep holes at the top and bottom of the channel spaces at nominal 2.75 in. along the length. The clip spacing and weep holes provide for vertically directed water drainage paths and water vapor evacuation within the drainage cavity. • AWP Vertical Clips (AWP 3030 only) are oriented in the vertical direction and spaces 18 in. apart. The starter tracks oriented horizontally have a ¼ in. weep holes at the top and bottom of the channel spaced at nominal 2.75 in. along the length. The clip spacing and weep holes provide for vertically directed water drainage paths and water vapor evacuation within the drainage cavity. ii. Sierra/Savannah Lap Siding may be installed over pressure-treated 3/8-in. (10 mm) thick by 1.5-in. (38 mm) wide vertical plywood straps @ 8 in. o/c to create a drainage plane. Guidance of environmental conditions (moisture index) where prescriptive cladding installations require a second plane of protection with capillary break is given in NBCC Div B, article 9.27.2.2.(5).
5.9.1.1.(1)(b)	**Compliance with Applicable Standards** See this report comments to NBCC A-5.9.1.1.(1).
5.9.3.5	**Water Penetration** The AWP panel system and Sierra/Savannah lap siding system has been tested to and found to meet the requirements of the ASTM E331 water penetration test at 0.3 kPa (6.24 psf), 0.577 kPa (12 psf) and 0.958 Kpa (20 psf) that is cited in this article. Tests were completed with each panel or plank configuration as listed in Table 2 of this report. The variation details with the maximum number of fastener penetrations and with all representative horizontal and vertical joint protection methods as referred to in the manufacturer's installation instructions were tested.
A-5.9.1.1.(1)	**Selection of Materials and Components and Compliance with Referenced Standards** This article provides guidance for the applicability of the use of the international standard ASTM C1186 for determining compliance to the performance requirements of Part 5. Article A-5.9.1.1.(1) reads *"It is important to note that Sentence 5.9.1.1.(1) is stated in such a way that the selection of materials and its components is not limited to those traditionally recognized as serving particular functions or those for which a standard is identified in Table 5.9.1.1. This approach permits more flexibility than is provided by similar requirements in Part 9. As long as the selected material meets the performance requirements stated elsewhere in Part 5, the material may be used to serve the required function."*
A-5.9.3	**Testing Standards for other Fenestration Assemblies** This article states that in addition to the ASTM standards cited in article 5.9.3, the additional AAMA standards may be used to evaluate the performance characteristics of the other fenestration assemblies. AAMA 501.1 has been used in this evaluation for AWP which is a test within the AAMA 509 standard. Each AWP assembly tested reached the V1/W1 result in AAMA 509.

NBCC Div. B Section	Description
	Part 3/4/5
A-5.9.3.2.(1)	**Structural and Environmental Loads** This article states that the applicable laboratory test method for demonstrating adequate structural performance of fenestration (cladding) assemblies is ASTM E330, which is the test method that was used to determine the wind pressure performance of the cladding systems.

NBCC Div. B Section	Description
	Part 9
9.4.1.1(1)(c)(ii)	**General, Structural Design Requirements and Application Limitations** The design methodology in this evaluation for determining compliance to Part 9 has been performed in accordance with article 9.4.1.1.(1)(c)(ii) using the loads and deflection limits specified in Part 4.
9.10.3.1(1)(a)	**Fire-Resistance and Fire Protection Ratings** Refers to test methods in Part 3. See section 3.1.7.1 comments of this report.
9.10.3.2(1)	**Flame-Spread Ratings** Refers to test methods in Part 3. See section 3.1.12.1.(1) comments of this report.
9.10.14.5.(2)	**Construction of Exposing Building Face and Walls above Exposing Building Face** AWP Panels installed horizontally with a specific wall framing construction assembly detail have been tested to and comply with the CAN/ULC S-134 test and clause 3.1.5.5.(1)(b) cited in this section. Refer to commentary made to article 3.1.5.5 for more information on this testing.
9.10.15.5.(2) & (3)	**Construction of Exposing Building Face of Houses** AWP Panels installed horizontally with a specific wall framing construction assembly detail have been tested to and comply with the CAN/ULC S-134 test and clauses 9.10.15.5.(2)(c) & 9.10.15.5.(3)(d). Refer to commentary made article 3.1.5.5 for more information on this testing.
9.27.1.1(1)	**General, Application, Cladding** The AWP Panel and Sierra/Savannah siding are “fiber-cement planks and sheets”. The AWP Panel with clip attachment to framing method has been evaluated in accordance with article 9.27.1.1.(1)(b) to Part 5. Nichiha Sierra/Savannah Lap Siding has been evaluated in accordance with article 9.27.1.1.(1)(a) and complies with the applicable Subsections 9.27.2 to 9.27.12.
9.27.2.2(1)	**Minimum Protection from Precipitation Ingress** The clip attachment to framing method used in the installation of the AWP Horizontal and Vertical Panels creates a continuous 10 mm air space between back of the cladding and wall sheathing. AWP clip furring interrupts 13% the clear air space, less than the 20% maximum specified in 9.27.2.2.(2)(b). When installed horizontally, the clip furring pieces are spaced 4-inches and have weep holes to provide for free draining. Sierra/Savannah lap siding, when installed over pressure-treated 3/8-in. (10 mm) thick by 1.5-in. (38 mm) wide vertical plywood straps @ 8 in. o/c to create a drainage plane interrupting less than

NBCC Div. B Section	Description
	Part 9
	20% of the free air space. Guidance of environmental conditions (moisture index) where prescriptive cladding installations require a second plane of protection with capillary break is given in NBCC Div B, article 9.27.2.2.(5)
9.27.5	**Attachment of Cladding** Sierra/Savannah Lap Siding satisfies the requirements when fastened to framing or strapping when installed using corrosion resistant fasteners as per the manufacturer's installation guidelines. AWP Panel siding attachment method has been evaluated in accordance with Part 5 as per 9.27.1.1.(1)(b).

4.0 LIMITATIONS

1. This evaluation is for the base code requirements of the building system as addressed in this report. In some building application, additional performance objective may be required by Code which must be addressed in the building design for those specific cases.
2. Design calculations, drawings, and special inspections are to be furnished for building projects by registered professionals as required by the respective jurisdictional authorities and Codes
3. The conclusions made of cladding performance and code compliance of applications are limited to:
    i. The loading and deflection criterion as stated in this report, and,
    ii. Use with only the substrate materials of framing and wall sheathing that the cladding is attached to as detailed in the wind load tables in this report, and,
    iii. AWP Panel installations on building heights no greater than 30 m (100 ft), and,
    iv. Sierra and Savannah lap siding installation on building heights no greater than 20 m (65 ft).
4. Wall framing and sheathing to which the cladding is attached must be designed and installed for the applicable wind pressure and other climate and occupancy loads as required by Code for the construction project. Where framing and sheathing details are provided in this report, they are representing the minimum tested or calculated materials for the required strength of attachment for the wall cladding. The wall framing structural design and performance is outside the scope of this report.
5. Wall assemblies must be constructed with water-resistive barrier and flashing per NBCC to achieve wall assembly water-resistive performance standards as stated in this report.

5.0 FIRE CLASSIFICATION

Summary of fire performance classifications found by testing to code referenced standards:
AWP panel and Sierra/Savannah Lap Siding meet the definition of *combustible*.
CAN/ULC S134: Meets conditions of NBCC 3.1.5.5. with specific detailing (AWP Horizontal panels only).
CAN/ULC S101: Acceptable as exterior cladding to not adversely affect any bearing on non-bearing 1-hr rates wall qualified by the methods of NBCC Part 3 or Part 9 (All products).
CAN/ULC S102-18: Flame Spread Index (FSI): = 0, Smoke Developed Index (SDI): 0.

More detailed information about the fire testing and code analysis in Boca Engineering Report 0098-19.

6.0 QUALITY ASSURANCE ENTITY

The products evaluated in this report are surveyed at the approved manufacturing locations with third-party quality assurance inspections and product certification labeling by Intertek.

7.0 MANUFACTURING PLANTS

The manufacturing plants of roofing materials covered in this evaluation report are located in: Iwaki, Fukushima, JPN; Handa-shi, Aichiken, JPN; Nagoya, Aichi, JPN; Narashino, Chiba, JPN; Shimonoseki, Yamaguchi, JPN; Macon, GA, USA.

8.0 LABELING

Labeling shall be in accordance with the requirements of and bear the certification mark of the Accredited Quality Assurance Agency.

9.0 REFERENCE TESTING AND EVALUATION DOCUMENTS

Entity	Entity Accreditation[1]	Standards	Report No.	Issue Date
National Research Council	Footnote 2	CAN/ULC-S134	A1-007541.1	2015-Oct-14
Southwest Research Institute	IAS TL-214	ASTM E119	01.23723.01.001	2018-Jul-24
Intertek	SCC Lab No. 54	ASTM E330	103430554COQ-003J	2020-Jan-06
Intertek	IAS TL-274	ASTM C1185/1186	103430554COQ-003J	2020-Jan-06
Progressive Engineering	IAS TL-178	ASTM C1185/1186	2015-475 (A)	2015-Oct-06
Progressive Engineering	IAS TL-178	ASTM C1185/1186	2016-1872 (G)	2017-May-30
Intertek	SCC Lab No. 54	ASTM B117	103430554COQ-008	2019-May-10
Boca Engineering	Footnote 3	Structural Evaluation	0066-5	2019-Aug-29
Boca Engineering	Footnote 3	Fire Test Evaluation	0098-19	2025-Dec-31
Intertek	SCC Lab No. 54	ASTM C1186	104715592COQ-010C	2022-Apr-14
Intertek	SCC Lab No. 54	ASTM C1186	104715592COQ-018	2022-Mar-18
Right Testing Labs	A2LA 6364.01	CAN/ULC-S102	RTL0405	2023-Apr-11
Intertek	SCC Lab No. 54	ASTM E331	105863939COQ-002	2024-Dec-02
Intertek	SCC Lab No. 54	AAMA 509	105863939COQ-003	2024-Dec-02
Intertek	IAS AA-647	Quality Assurance	Spec ID: 45957	2025-Dec-31

1. Testing, certification, evaluation, and inspection agencies referenced have been verified to be accredited by Standards Council of Canada (www.scc.ca), A2LA (www.a2la.org) or International Accreditation Service (www.iasonline.org) for the applicable scope, in good standing on the date of the evaluation, in accordance with ISO 17025 and ISO 17020 international standards for testing and inspection bodies.
2. Federal government laboratory.
3. Professional Engineer sealed report, BC P. Eng. License no. 29146.
4. Professional Engineer sealed report, WA P.E. License No. 50363.

Attachments

ATTACHMENT 1: MATERIAL PROPERTIES

Table 1: AWP Panel Siding and Sierra/Savannah Lap Siding: ASTM C1186 Materials Properties

Property	Requirement	AWP Panel Siding Compliance / Result	Sierra/Savannah Compliance / Result
Dimensions			
Length Tolerance, in.	± 0.25	Pass	Pass
Width Tolerance, in.	± 0.09	Pass	Pass
Thickness Tolerance			
Within a sheet, %	15	Pass	N/A
Between samples, in.	± 0.05	Pass	Pass
Squareness Tolerance, in.	0.19	Pass	Pass
Edge Straightness Tolerance, in.	0.05	Pass	Pass
Density, lb/ft^3	As Reported	Pass / 77.8	Pass / 73.2
Flexural Strength, psi			
Dry	≥ 1450	Pass	Pass
Wet	≥ 1015	Pass	Pass
Moisture Movement, %			
Machine Direction	As Reported	Pass / 0.04	Pass / 0.06
Cross Direction	As Reported	Pass / 0.05	N/A
Water Absorption, %	As Reported	Pass / 17.5	Pass / 18.9
Moisture Content, %	As Reported	Pass / 5.1	Pass / 5.3
Water Tightness	No formation of water drops	Pass	Pass
Surface Burning Characteristics			
Flame Spread Index	0	Pass	Pass
Smoke Developed Index	≤ 5	Pass	Pass
Frost Resistance (Freeze/Thaw)			
Observation	No visible cracks or structural alteration	Pass	Pass
Flexural Strength, % of As Received	80	Pass	Pass
Warm Water Resistance			
Observation	No visible cracks or structural alteration	Pass	Pass
Flexural Strength	As Reported	Pass / 86%	Pass / 70%
Heat/Rain Resistance	No visible cracks or structural alteration	Pass	Pass

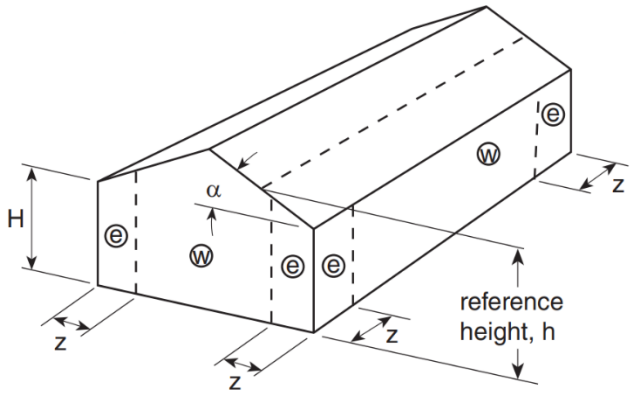
ATTACHMENT 2: WIND PRESSURE AND WIND SPEED TABLES

User's Guide to Exterior Wall Cladding Wind Pressure and Wind Speed Tables:

The Nichiha AWP and Lap Siding wind pressures and wind reference velocity conversion tables have been developed to assist users in determining acceptable installation details for a range of wall construction components, building dimension plans, and site and environmental conditions.

Wind reference velocity conversion tables have been prepared following design methodology of NBCC article 4.1.7, for enclosed buildings with maximum height of 30 m (100 ft) with topographic factor set to unity. These settings are typical of many installations. All design details must agree with the information within the tables and table notes to be considered valid. If the actual site, building dimensions, or climatic conditions (including given variables) differ from those prescribed, the maximum design pressure value may be used to calculate adjusted reference velocity pressure limits.

When the design pressure has been pre-determined by a design professional, the user only needs to check that the installation detail's maximum design pressure is equal or greater to the actual.



(1) End-zone width z is the lesser of 10% of the least horizontal dimension and 40% of height, H, but not less than 4% of the least horizontal dimension or 1 m.
(2) e: End-zone, w: Field.

Figure 1: *Wind Pressure Zone Diagram as represented in 2020 NBCC for use in conjunction with Tables 2-3.*

Table 2: Wind Pressure Assembly Configurations for AWP Panels and Sierra/Savannah Lap Siding - Wall Height Limit of 3m (10 ft), Bending Deflection Limit of L/180[1]

ASSEMBLY NUMBER[2]	MIN. FRAMING[3,4]	MIN. SHEATHING[5,6]	STUD SPACING	FASTENER SPACING & SPECIFICATION[7]	FASTENER SUBSTRATE	MAX. DESIGN PRESSURE (kPa)[8,9,10]
AWP 3030 Horizontal Panel Siding						
1	2x4 SPF, No.2	7/16 in. OSB	16 in.	4 clips / panel, #10 x 1-3/4 in. screw ea stud	Stud	1.6
2	2x6 SPF, No. 2	7/16 in. OSB	16 in.	4 clips / panel, #10 x 1-3/4 in. screw ea stud	Stud	2.3
3	2x4 SPF, No. 2	7/16 in. OSB + 5/8 in. Ext. Gyp	16 in.	4 clips / panel, #10 x 2-1/4 in. screw ea stud	Stud	2.3
4	2x6 SPF, No. 2	7/16 in. OSB + 5/8 in. Ext. Gyp	16 in.	4 clips / panel, #10 x 2-1/4 in. screw ea stud	Stud	2.5
5	2x6 SPF, No. 2	7/16 in. OSB	24 in.	4 clips / panel, #10 x 1-3/4 in. screw 4 / clip	Sheathing only	2.0
6	3-5/8 x 1-5/8 18 ga steel	7/16 in. OSB	16 in.	4 clips / panel, #10 x 1-1/2 in. screw ea stud	Stud	2.1
7	3-5/8 x 1-5/8 18 ga steel	1/2 in. Ext. Gypsum	16 in.	4 clips / panel, #10 x 1-1/2 in. screw ea stud	Stud	1.7
8	3-5/8 x 1-5/8 18 ga steel	1/2 in. Ext. Gypsum	24 in.	4 clips / panel, #10 x 1-1/2 in. screw ea stud	Stud	1.2
9	3-5/8 x 1-5/8 18 ga steel	None	16 in.	4 clips / panel, #10 x 1-1/2 in. screw ea stud	Stud	1.2
10	3-5/8 x 1-5/8 w/ 18 ga z-girt	None	16 in.	4 clips / panel, #10 x 1-1/2 in. screw ea girt	Girt	1.7
AWP 3030 Vertical Panel Siding						
11	3-5/8 x 1-5/8 18 ga steel	7/16 in. OSB	16 in.	4 clips / panel, #10 x 1-3/4 in. screw @ 6 in. o/c	Sheathing only	2.1
12	3-5/8 x 1-5/8 18 ga steel	1/2 in. Ext. Gypsum	18 in.	4 clips / panel, #10 x 1-1/2 in. screw @ 16 in. o/c	Stud	1.4
AWP 1818 Horizontal Panel Siding						
13	3-5/8 x 1-5/8 18 ga steel	7/16 in. OSB	16 in.	2.5 clips per panel, #10 x 1-1/2 in. screw ea stud	Stud	1.8
Sierra and Savannah Lap Siding						
14	2x4 SPF, No. 2	7/16 in. OSB	16 in.	6d 2 in. nail @16 in.	Stud	1.5
15	2x4 SPF, No. 2	7/16 in. OSB	16 in.	#8 x 1-5/8 in. screw @ 16 in.	Stud	2.2
16	2x6 SPF, No. 2	7/16 in. OSB	16 in.	#8 x 1-5/8 in. screw @ 16 in.	Stud	2.5
17	2x4 SPF, No. 2	7/16 in. OSB	16 in.	6d 2 in. nail @ 8 in.	Stud & Sheathing	1.9
18	2x4 SPF, No. 2	7/16 in. OSB w/ vert. strap[4]	16 in.	6d 2 in. nail @ 8 in.	Stud & Sheathing	2.7
19	2x4 SPF, No. 2	7/16 in. OSB + 5/8 in. gypsum	16 in.	6d 2.5 in. nails @ 8 in.	Stud & Sheathing	1.9
20	2x4 SPF, No. 2	7/16 in. OSB	16 in.	#8 x 1-5/8 in. screw@ 8 in.	Sheathing only	1.8
21	2x6 SPF, No. 2	7/16 in. OSB	16 in.	#8 x 1-5/8 in. screw @ 8 in.	Sheathing only	2.5

Table notes begin next page.

Table 3: Maximum Reference Velocity Pressure of Wall Cladding Installed at Various Building Heights and Exposure Categories – NBCC 2020 - Wall Height Limit of 3m (10 ft), Bending Deflection Limit of L/180[1]

Assembly Number[2]	Max. Design Pressure p (kPa)[8,9,10]	Maximum Reference Velocity Pressure $q_{1/50}$ ≤ (kPa)[8,11,12, 13]									
		Maximum Height of Installed Cladding (m)[14]									
		Rough Terrain[15]					Open Terrain[15]				
		6 m	12 m	20 m	24 m	30 m	6 m	12 m	20 m	24 m	30 m
AWP 3030 Horizontal Panel Siding											
1	1.6	0.85	0.85	0.75	0.53	0.48	0.66	0.59	0.52	0.37	0.36
2	2.3	1.00	1.00	1.00	0.77	0.69	0.95	0.85	0.74	0.54	0.51
3	2.3	1.00	1.00	1.00	0.77	0.69	0.95	0.85	0.74	0.54	0.51
4	2.5	1.00	1.00	1.00	0.83	0.75	1.00	0.92	0.81	0.58	0.56
5	2.0	1.00	1.00	0.94	0.67	0.60	0.82	0.74	0.64	0.47	0.45
6	2.1	1.00	1.00	0.98	0.70	0.63	0.86	0.77	0.68	0.49	0.47
7	1.7	0.90	0.90	0.80	0.57	0.51	0.70	0.63	0.55	0.40	0.38
8	1.2	0.63	0.63	0.56	0.40	0.36	0.49	0.44	0.39	0.28	0.27
9	1.2	0.63	0.63	0.56	0.40	0.36	0.49	0.44	0.39	0.28	0.27
10	1.7	0.90	0.90	0.80	0.57	0.51	0.70	0.63	0.55	0.40	0.38
AWP 3030 Vertical Panel Siding											
11	2.1	1.00	1.00	0.98	0.70	0.63	0.86	0.77	0.68	0.49	0.47
12	1.4	0.74	0.74	0.66	0.47	0.42	0.58	0.52	0.45	0.33	0.31
AWP 1818 Horizontal Panel Siding											
13	1.8	0.95	0.95	0.84	0.60	0.54	0.74	0.66	0.58	0.42	0.40
Sierra and Savannah Lap Siding											
14	1.5	0.79	0.79	0.70	NA	NA	0.62	0.55	0.48	NA	NA
15	2.2	1.00	1.00	1.00	NA	NA	0.91	0.81	0.71	NA	NA
16	2.5	1.00	1.00	1.00	NA	NA	1.00	0.92	0.81	NA	NA
17	1.9	1.00	1.00	0.89	NA	NA	0.78	0.70	0.61	NA	NA
18	2.7	1.00	1.00	1.00	NA	NA	1.00	0.99	0.87	NA	NA
19	1.9	1.00	1.00	0.89	NA	NA	0.78	0.70	0.61	NA	NA
20	1.8	0.95	0.95	0.84	NA	NA	0.74	0.66	0.58	NA	NA
21	2.5	1.00	1.00	1.00	NA	NA	1.00	0.92	0.81	NA	NA

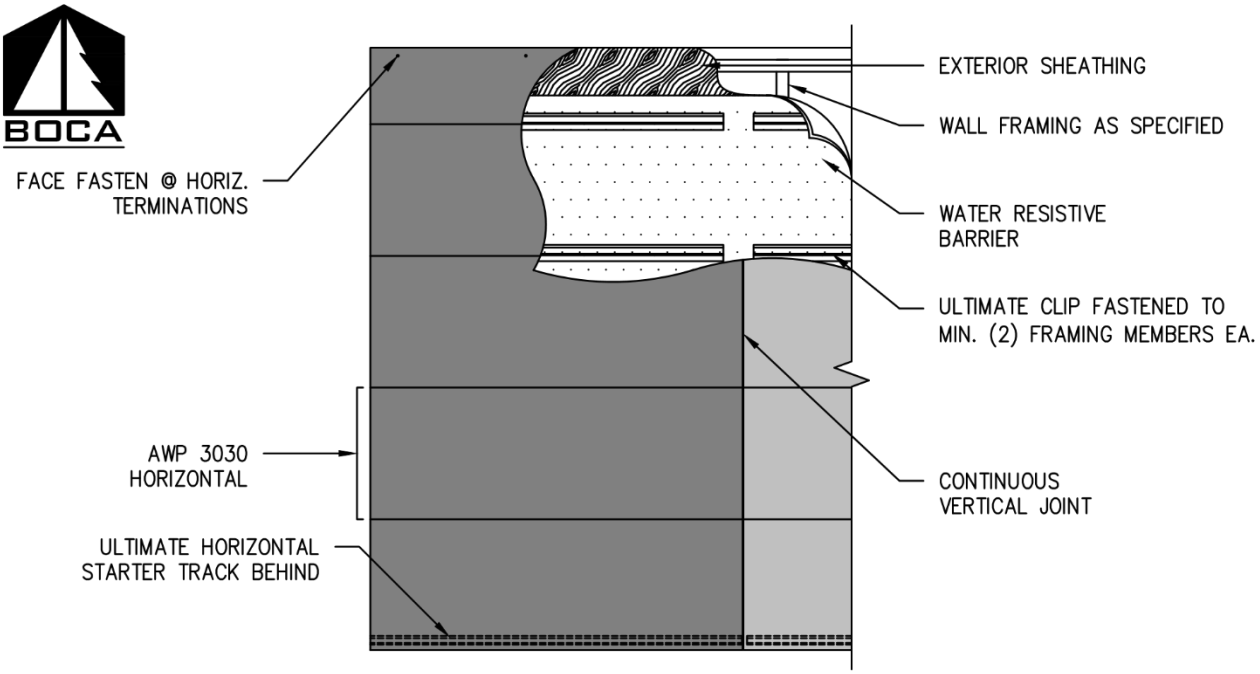
General Notes, Tables 2-3

1) The siding has been tested to the published maximum design pressures at the respective bending limitation of L/180 for wall heights of up to 3 m (10 ft). Where framing and sheathing details are provided in these tables, this represents only the minimum tested or calculated materials for the required strength of attachment of the wall cladding. Primary structural building loads and capacity of the building framing is outside the scope of this table and must be designed and installed for the applicable wind, climate and occupancy loads as required by Code for the construction project. See Attachment 4 of the report for further discussion.
2) Assembly no. per Table 2 and additional details in the assembly diagrams of this report are to be followed.
3) Wood framing min. nominal member size, to comply with NLGA 2017. May be substituted with i) any larger section dimension of the same material, and/or, ii) any species/grade of 0.42 specific gravity or greater.
4) Steel framing min. dimensions 3-5/8 X 1 5/8 in, to comply with CSA S136, min. yield strength of 33 ksi and 18 ga (43 mil) thickness. May be substituted with i) any larger section dimension of the same material, and/or, ii) any greater yield strength and/or gauge thickness.

5) Wood-based Sheathing: Min. 7/16 OSB to comply with CSA O437. May be substituted with min. 15/32 plywood complying with CSA O325 and/or thicker profile of up to nominal 1-inch.
6) Gypsum sheathing must comply with ASTM C1396 and be rated by the manufacturer for exterior use; gypsum thickness may not be increased.
7) Installation must include proper use of Nichiha clips as per relevant Nichiha Installation guide.
8) Wind pressures are only valid under the design conditions stated. For other site and/or building dimensions, designers can use the published maximum design pressure to determine allowable wind speeds following article 4.1.7.
9) The maximum design pressure is determined from tested assemblies as the ultimate negative test pressure divided by 2. In limit states design, the safety factor of 2 applied to the ultimate strength may be regarded as equal to the wind load factor divided by resistance factor.
10) The maximum design pressure must not exceed the unfactored pressure determined by article 4.1.7.3.
11) A maximum $q_{1/50}$ value of 1.0 has been applied.
12) NA indicates that the installation condition is not acceptable within the design limits of the table.
13) The maximum $q_{1/50}$ pre-calculated published values with the inputs of: ULS $I_w = 1$, SLS $I_w = 0.75$, $C_t = 1$, $C_{pi} = -0.45$ to $+0.3$. The values of C_e, C_g, C_p, C_{gi}, C_{pi} were determined using the procedures of article 4.1.7.3.
14) Interpolation not permitted. For heights in between those listed, use next highest height column.
15) Wind exposure categories as defined in article 4.1.7.3(5) as displayed in Figure 1.

ATTACHMENT 3: ASSEMBLY DIAGRAMS

Begins next page.



A/1 TYP. AWP 3030 HORIZONTAL ELEVATION

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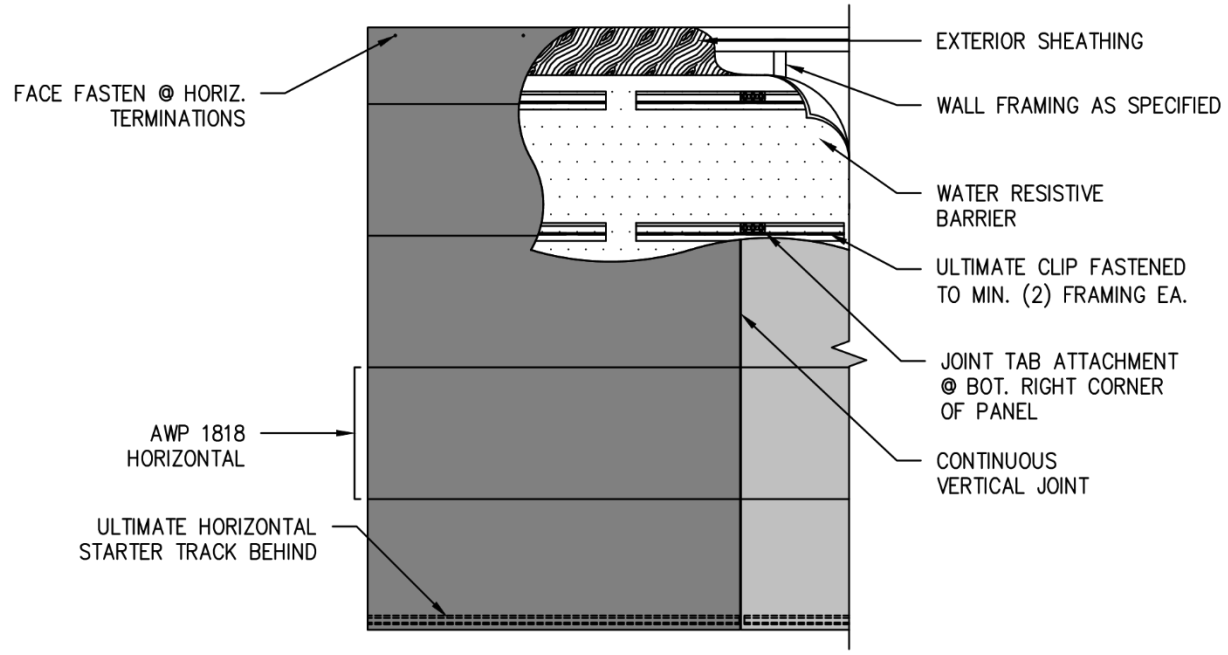

B/1 TYP. AWP 1818 HORIZONTAL ELEVATION

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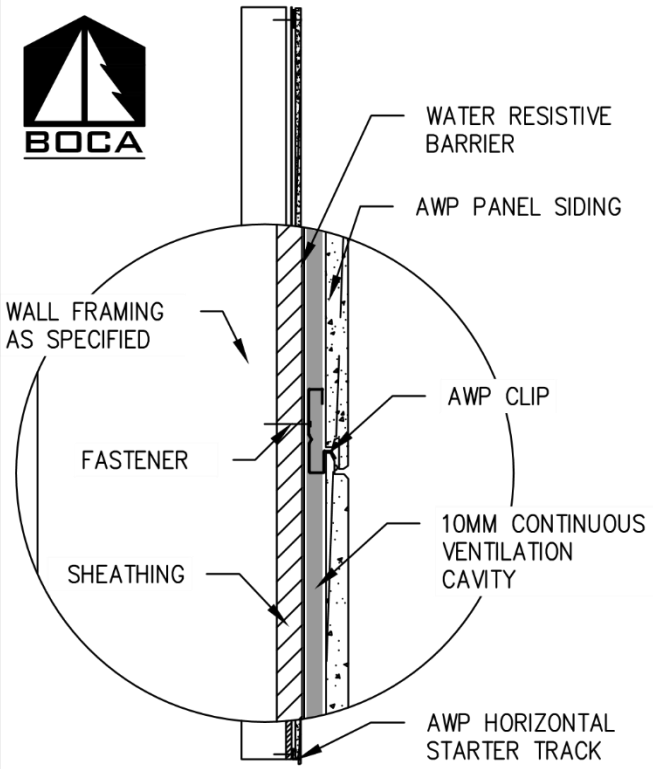

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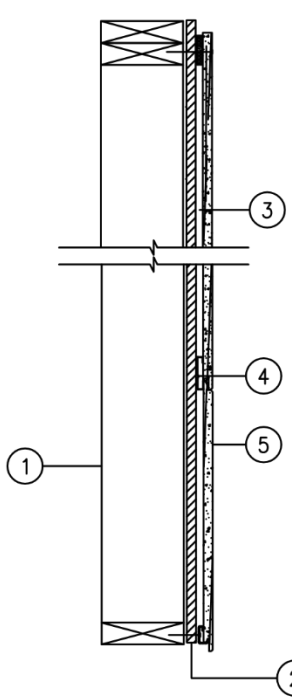

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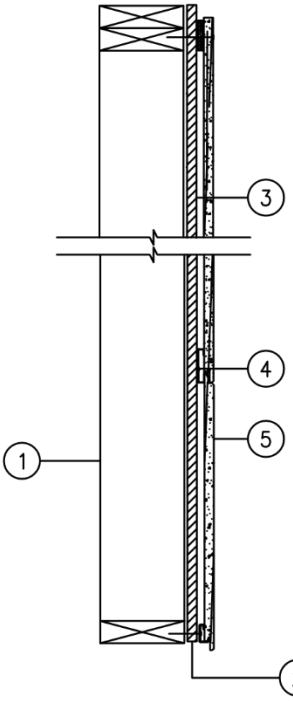

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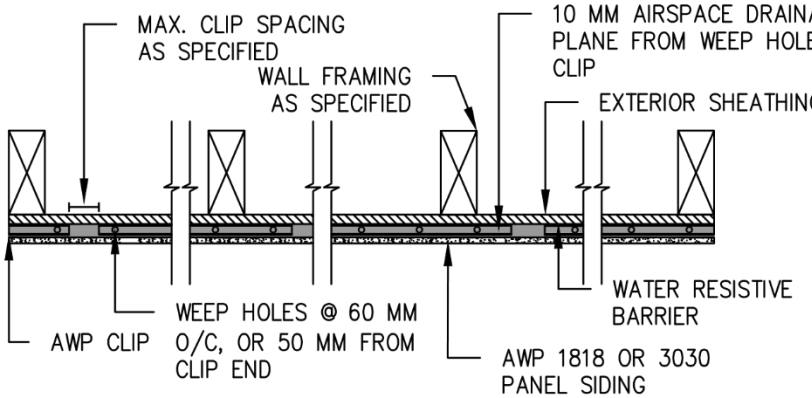

D/2 AWP HORIZONTAL PLAN
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CLIP MAX. SPACING:
AWP 3030 –APPROX. 95 MM TO MEET 4 CLIPS/PANEL
AWP 1818 –APPROX. 84 MM TO MEET 2.5 CLIPS/PANEL

AWP 3030 HORIZONTAL COMPONENTS	
1	STUD FRAMING PER EVALUATION REPORT ASSEMBLIES.
2	SHEATHING ATTACHED TO FRAMING PER CODE, MIN. PER EVALUATION REPORT ASSEMBLIES.
3	WATER-RESISTIVE BARRIER PER CODE.
4	NICHIHA CLIPS: 4 CLIPS/PANEL, FASTENERS PER EVALUATION REPORT ASSEMBLIES.
5	NICHIHA AWP 3030 HORIZONTAL PANELS SLOT FIT TO FASTENER CLIPS.

AWP 1818 HORIZONTAL COMPONENTS	
1	STUD FRAMING PER EVALUATION REPORT ASSEMBLIES.
2	SHEATHING ATTACHED TO FRAMING PER CODE, MIN. PER EVALUATION REPORT ASSEMBLIES.
3	WATER-RESISTIVE BARRIER PER CODE.
4	NICHIHA CLIPS: 2.5 CLIPS/PANEL, FASTENERS PER EVALUATION REPORT ASSEMBLIES.
5	NICHIHA AWP 1818 HORIZONTAL PANELS SLOT FIT TO FASTENER CLIPS.

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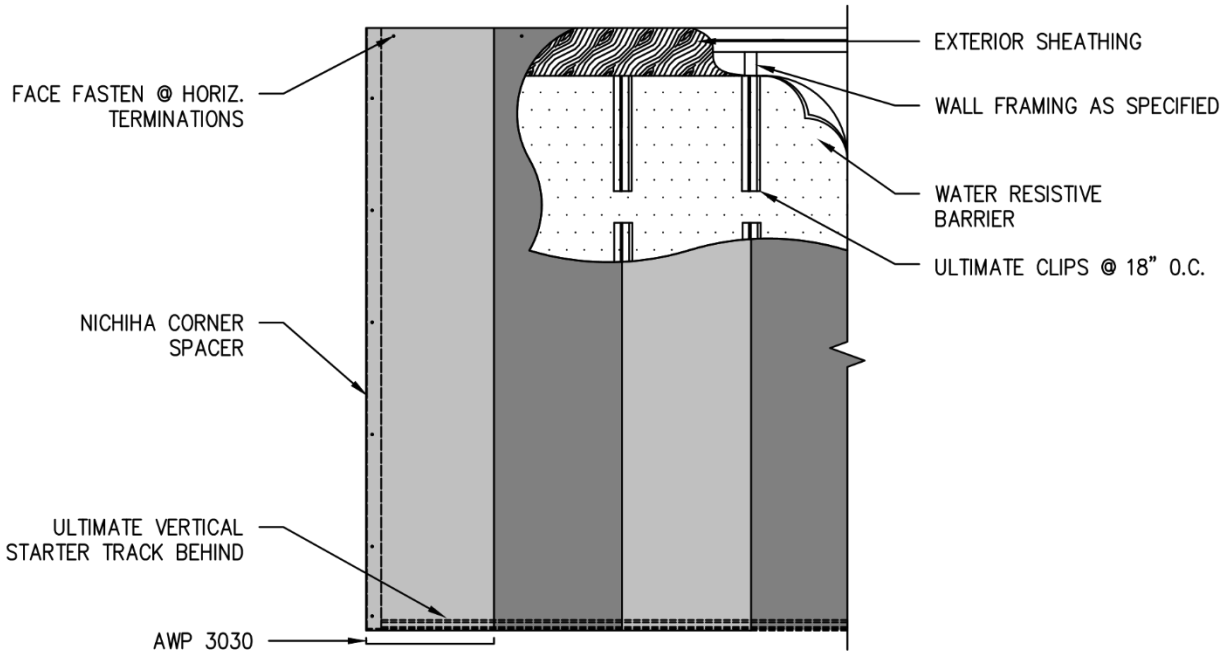

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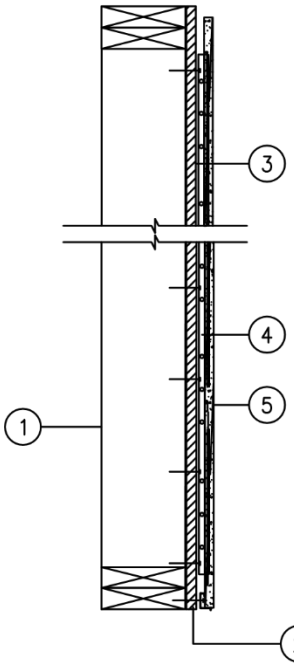

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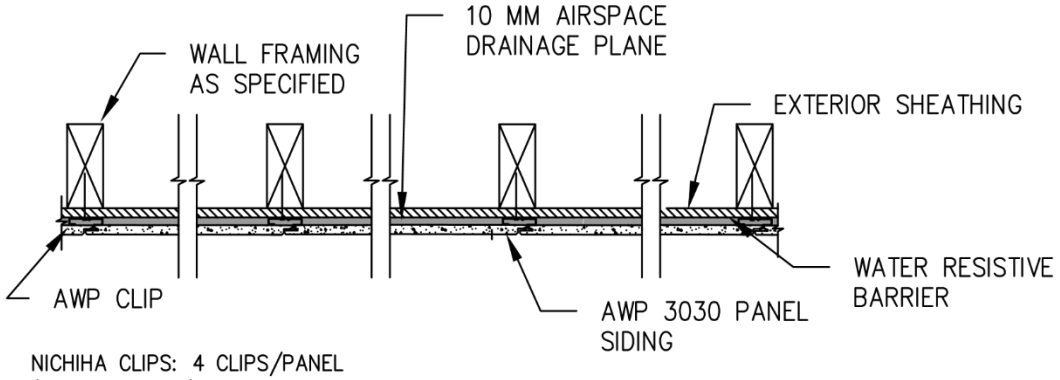

NICHIHA CLIPS: 4 CLIPS/PANEL
(3030 VERTICAL)

C/3 AWP VERTICAL PLAN VIEW
NOT-TO-SCALE

AWP 3030 VERTICAL COMPONENTS	
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2	SHEATHING ATTACHED TO FRAMING PER CODE, MIN. PER EVALUATION REPORT ASSEMBLIES.
3	WATER-RESISTIVE BARRIER PER CODE.
4	NICHIHA CLIPS: 4 CLIPS/PANEL, FASTENERS PER EVALUATION REPORT ASSEMBLIES.
5	NICHIHA AWP 3030 VERTICAL PANELS SLOT FIT TO FASTENER CLIPS.

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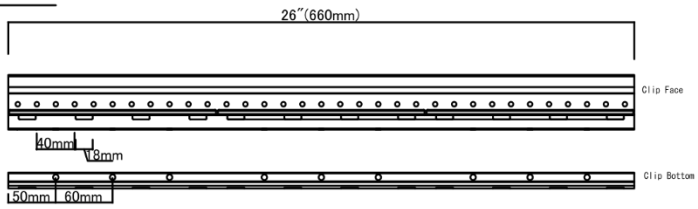
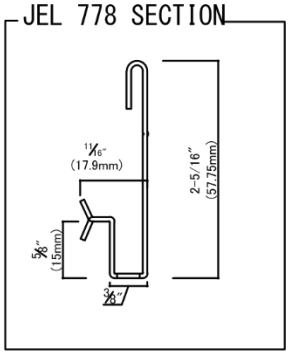
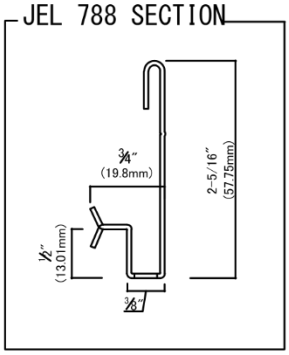
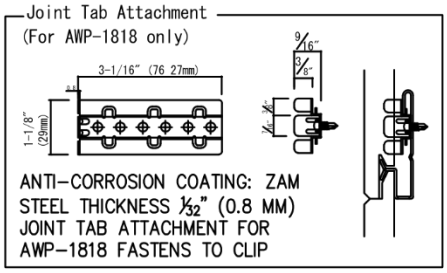


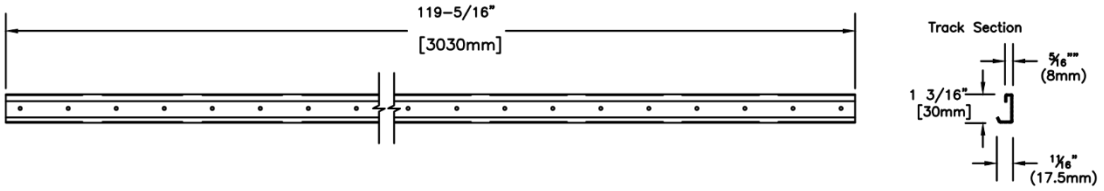




SHEET STEEL THICKNESS 3/64" (1.2 MM)
MIN. YIELD STRENGTH; 27,500 PSI
MIN. TENSILE STRENGTH 50, 000 PSI
STEEL ANTI-CORROSION COATING: ZAM

A/4 AWP CLIPS: JEL778 & JEL788
NOT-TO-SCALE





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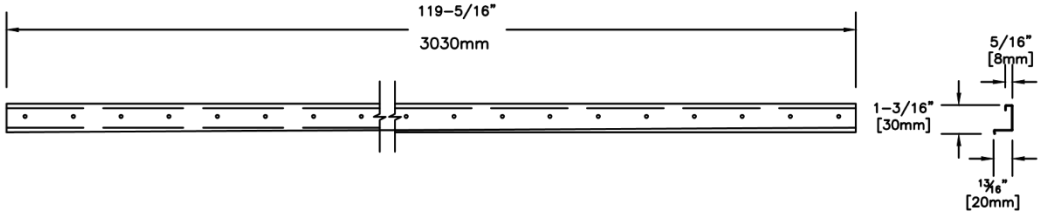

C/4 ULTIMATE VERTICAL STARTER TRACK – FA710T
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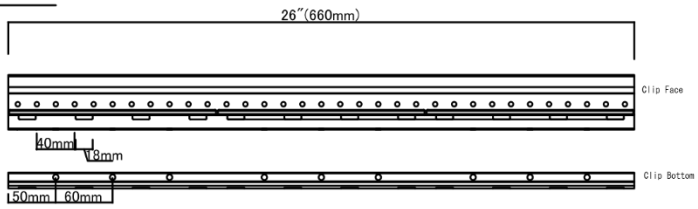
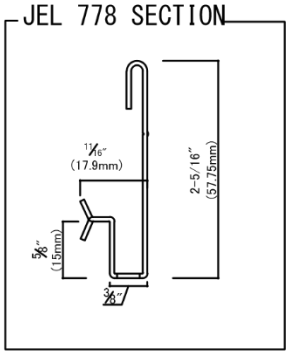
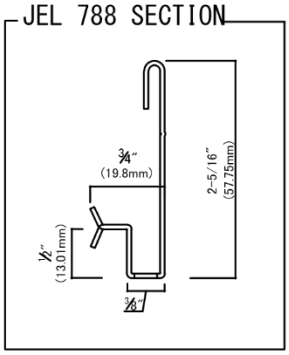
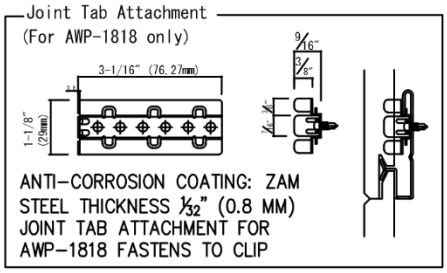


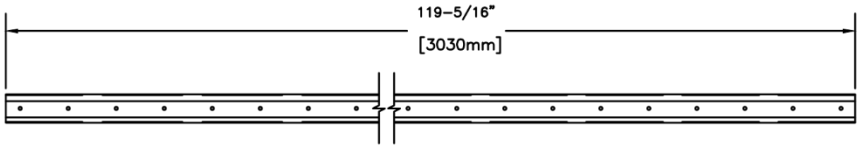


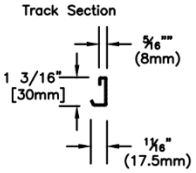


SHEET STEEL THICKNESS 3/64" (1.2 MM)
MIN, YIELD STRENGTH; 27,500 PSI
MIN. TENSILE STRENGTH 50, 000 PSI
STEEL ANTI-CORROSION COATING: ZAM

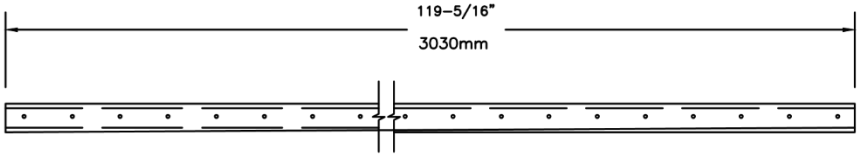
A/4 AWP CLIPS: JEL778 & JEL788
NOT-TO-SCALE

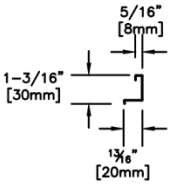






B/4 ULTIMATE HORIZONTAL STARTER TRACK – FA700
NOT-TO-SCALE

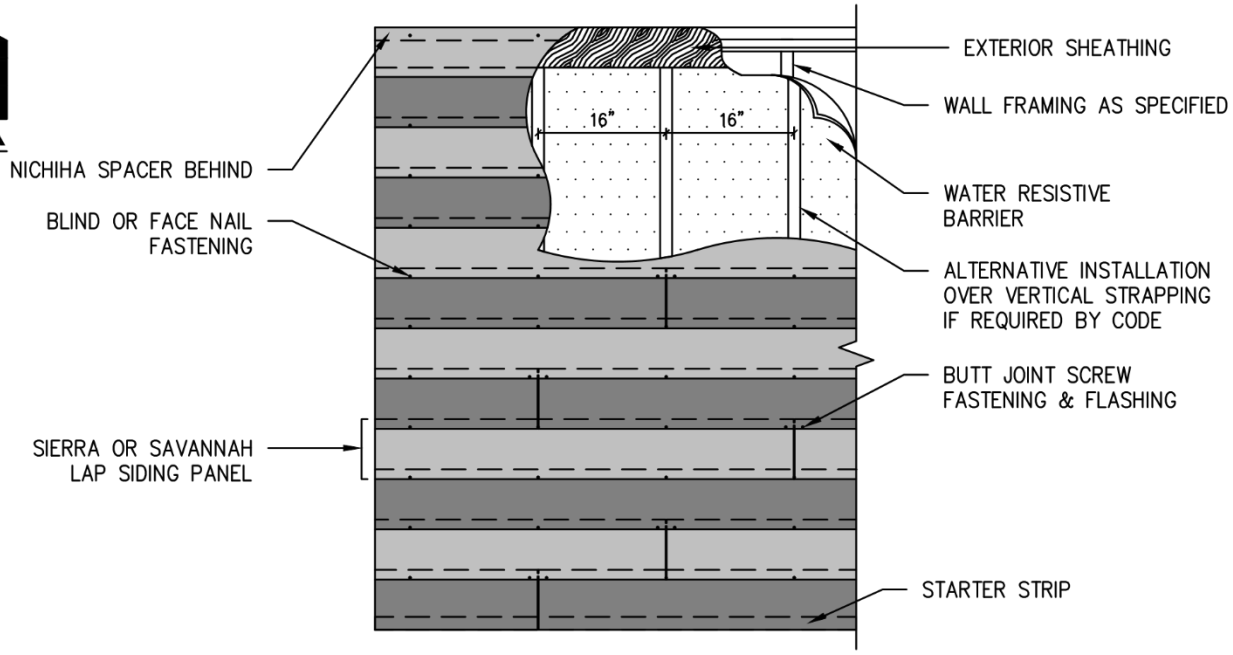




C/4 ULTIMATE VERTICAL STARTER TRACK – FA710T
NOT-TO-SCALE

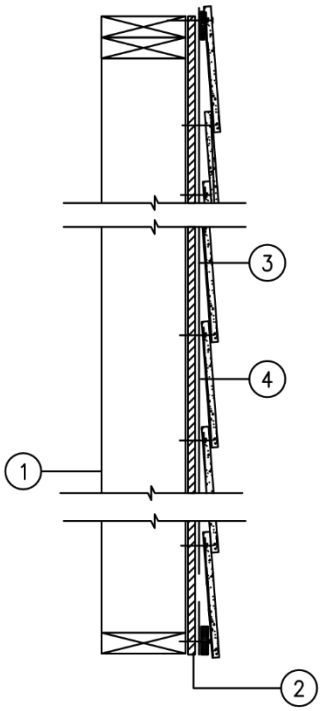
BOCA ENGINEERING CO. | SPAR STRUCTURAL & CIVIL CONSULTANTS	DATE DECEMBER 31, 2025		2 REV.	FOR PUBLICATION ISSUE		CB APP
	DRAWING NO. 6070-SK1	SHEET NO. 4 OF 6	SCALE NOT TO SCALE	DES. CG	DRN. CG	CHK. CB
CLIENT NICHIHA USA, INC.	PROJECT NICHIHA AWP CANADA EER		TITLE AWP TRACK COMPONENTS			

DRAWING FOR ENGINEERING EVALUATION REPORT – NOT FOR USE AS CONSTRUCTION DESIGN DOCUMENTS



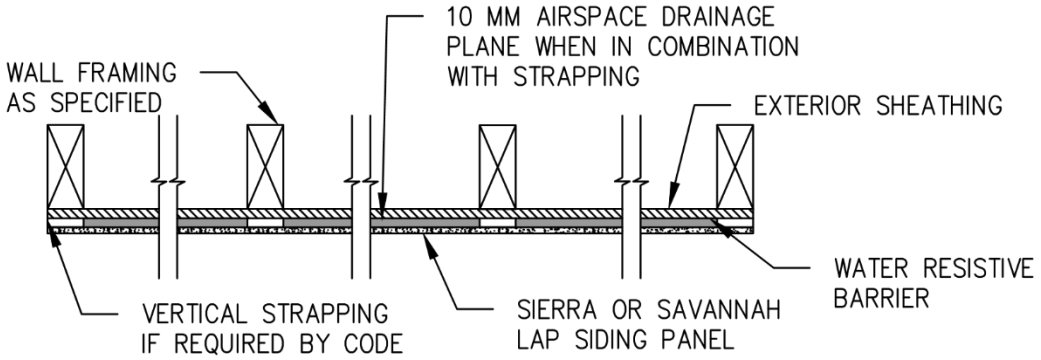
A/5 TYP. SIERRA/SAVANNAH ELEVATION

NOT-TO-SCALE



C/5 SIERRA/SAVANNAH LAP SIDING

NOT-TO-SCALE



B/5 SIERRA/SAVANNAH LAP SIDING WITH STRAPPING PLAN

NOT-TO-SCALE

SIERRA/SAVANNAH LAP SIDING COMPONENTS	
1	STUD FRAMING PER EVALUATION REPORT ASSEMBLIES.
2	SHEATHING ATTACHED TO FRAMING PER CODE, MIN. PER EVALUATION REPORT ASSEMBLIES.
3	WATER-RESISTIVE BARRIER PER CODE.
4	SIERRA OR SAVANNA LAP SIDING FASTENED TO EACH STUD, FASTENERS PER EVALUATION REPORT ASSEMBLIES.

BOCA ENGINEERING CO. | SPAR
STRUCTURAL & CIVIL CONSULTANTS

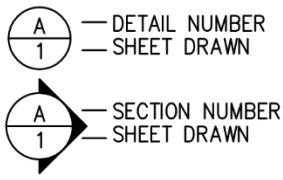
DATE		REV.		
DECEMBER 31, 2025		2	FOR PUBLICATION	CB
			ISSUE	APP
DRAWING NO.	SHEET NO.	SCALE	DES. / DRN. / CHK.	
6070-SK1	5 OF 6	NOT TO SCALE	CG / CG / CB	

DRAWING FOR ENGINEERING EVALUATION REPORT – NOT FOR USE AS CONSTRUCTION DESIGN DOCUMENTS

CLIENT	PROJECT	TITLE
NICHIHA USA, INC.	NICHIHA AWP CANADA EER	TYP. SIERRA/SAVANNAH ASSEMBLY ELEVATION & COMPONENTS

DESIGN LOADS	
LIVE	SEE EVALUATION REPORT
SNOW	
WIND	
SEISMIC	
TEMPERATURE	

LEGEND AND SYMBOLS



ABBREVIATIONS

CONT	CONTINUOUS	O.C.	ON CENTER
EA	EACH	P.T.	PRESSURE TREATED
E/W	EACH WAY	S.G.	SPECIFIC GRAVITY
EXT.	EXTERIOR	SPEC.	SPECIFICATION
INT.	INTERIOR	NO.	TYPICAL
MAX	MAXIMUM	U.N.O.	UNLESS NOTED OTHERWISE
MIN	MINIMUM	W/	WITH
NO.	NUMBER		

DESIGN

1. STRUCTURAL WORK HAS BEEN DESIGNED IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS REFERENCED IN THE EVALUATION REPORT.
2. THE STRUCTURAL FRAMING AND SHEATHING SHALL BE DESIGNED AND ANCHORED TO PROVIDE LATERAL BRACING AND PROPERLY TRANSFER ALL LOADS TO THE STRUCTURE. FRAMING DESIGN AND INSTALLATION IS THE RESPONSIBILITY OF THE ENGINEER OR ARCHITECT OF RECORD FOR THE PROJECT OF INSTALLATION.
3. THESE DRAWINGS APPLY TO THE TESTED ASSEMBLY ONLY AND DO NOT IMPLY THAT THE SIGNATORY ENGINEER IS THE DESIGNER OF RECORD FOR ANY FUTURE CONSTRUCTION ON WHICH THEY ARE USED.
4. SOME NON-STRUCTURAL COMPONENTS NOT SHOWN AND DO NOT IMPACT STRENGTH FOR ATTACHMENT. TO BE INSTALLED PER CODE AND MAY INCLUDE: FLASHING, INSULATION, INTERIOR FINISH.

TESTING AND CODE COMPLIANCE

1. THE PRODUCT ASSEMBLY SHOWN HAS BEEN EVALUATED ACCORDING TO THE TEST STANDARDS AS OUTLINED IN THE EVALUATION REPORT.
2. THE INSTALLATION DETAILS DESCRIBED ARE OF THE LABORATORY TESTED ASSEMBLY AND MAY NOT REFLECT ACTUAL CONDITIONS FOR A SPECIFIC SITE. IF SITE CONDITIONS DEVIATE FROM THE REQUIREMENTS DETAILED HEREIN, THE LICENSED ENGINEER OR ARCHITECT PREPARED SITE-SPECIFIC DOCUMENTS SHALL BE USED.

INSTALLATION

1. FOR COMPLETE INSTALLATION DETAILS SEE TECHNICAL PRODUCT DATA ON PRODUCT MANUFACTURE'S WEBSITE.

MATERIAL STANDARDS

SHEATHING

1. WOOD-BASED STRUCTURAL SHEATHING:
   - 1.1. PLYWOOD – CSA O121-17, CSA O151-17 OR CSA O153-13
   - 1.2. OSB – CSA O437.0-93
   - 1.3. LUMBER – CSA O141-05
2. GYPSUM SHEATHING: ASTM C1396-17, EXTERIOR TYPE

FASTENERS

3. WOOD SCREWS: ASME B18.6.1-81(2016)
4. NAILS: ASTM F1667-18A
5. METAL SCREWS: AISI S240-15, ASTM C1513-13
6. ALL FASTENERS CORROSION-RESISTANT OR STAINLESS STEEL

FRAMING

7. WOOD FRAMING: MIN. 2x4 S.G. 0.42, COMPLIANCE WITH CSA O141-05
8. METAL FRAMING: MIN. 18 GAUGE U.N.O., Fy = 33ksi, COMPLIANCE WITH CSA S136-16

FIBER CEMENT

9. FIBER CEMENT CLADDING TO CONFORM TO ASTM C1186-08(16) GRADE A TYPE 2.

FASTENING CLIPS

10. TYPE A/B SHEET METAL: 3/64" THICK, Fy = 27.5 ksi, COMPLIANCE WITH ASTM A568 SHEET
11. ZINC- ALUMINUM-MAGNESIUM (ZAM) COATING, COMPLIANCE WITH ASTM A1046-23

INSPECTIONS (FIELD REVIEWS)

1. NOTIFICATION FOR INSPECTIONS AND INSTALLATION APPROVAL SHOULD BE COMPLETED AS OUTLINED BY ANY OF THE FOLLOWING APPLICABLE TO THE REFERENCED PROJECT:
   - 1.1. APPLICABLE LOCAL BUILDING CODE.
   - 1.2. LOCAL BUILDING AUTHORITY.
   - 1.3. PROJECT SPECIFICATION DOCUMENTS BY OTHERS.
2. FIELD REVIEWS OF INSTALLATION ARE NOT COMPLETED BY THE EVALUATION REPORT ENGINEER.

BOCA ENGINEERING CO. | SPAR STRUCTURAL & CIVIL CONSULTANTS	DATE: DECEMBER 31, 2025		2	FOR PUBLICATION		CB
			REV.	ISSUE		APP
	DRAWING NO.: 6070-SK1	SHEET NO.: 6 OF 6	SCALE: NOT TO SCALE	DES.: CG	DRN.: CG	CHK.: CB
CLIENT: NICHIHA USA, INC.	PROJECT: NICHIHA AWP CANADA EER		TITLE: NICHIHA SIDING GENERAL NOTES			

DRAWING FOR ENGINEERING EVALUATION REPORT – NOT FOR USE AS CONSTRUCTION DESIGN DOCUMENTS

ATTACHMENT 4: DISCUSSION OF LIMIT STATES DESIGN PROCEDURE

Testing

The application of the ASTM E330 test standard referenced by the NBCC, in addition to the load combinations and factors outlined in the Code form an appropriate solution to determine strength of attachment to the Code requirements covered in this report. The Code clearly defines the loading criteria for exterior cladding systems.

Load Combinations, Load and Resistance Factors, Test Factors

Test Load Factors are computed by:

$$\text{Test Load Factor} = \frac{Combined\ Load\ Factor}{Resistance\ Factor}$$

The resistance factor is taken from the materials standard for the respective failure type.

Wind load on cladding is typically taken as acting as an isolated and independent force on the cladding component and its attachment in to framing. Design load combinations used in this evaluation are:
Ultimate (ULS): 1.4 W
Service (SLS): (0.75) 1.0 W (where 0.75 is the wind importance factor for serviceability)

Where multiple failure modes may occur in testing with a variety of materials that may or may not possess a Canadian national standard with published resistance factors for the stress modes at play, it is convenient to choose a relative system resistance factor based on a test load (safety) factor.

A test load factor of 2 was chosen, that results in an effective system resistance factor of $\phi_f = 0.7$, what would apply for any failure type.

The failure modes observed in the system tests include fastener withdrawal from wood or steel framing, steel framing failure in bending, and shear breakage of fibre-cement. Where fastener or bending failure modes occur, it can be found that the resistance factors published in CSA 086 and CSA S16 are not less than 0.7 for these stress types, and it is confirmed that the test load factor is suitable.

Wall Framing Component Strength of Attachments

The maximum design wind pressures published in the report are exclusive to the tested strength of the cladding materials and the connection strength in to the wall framing. In many cases the actual design wind pressure would be less than the capacity of the cladding system. In any such and all cases in a building design, the actual design pressure imparted by the cladding in to the building framing (and all other forces imparted in to the framing) should be used to design the building framing members.

There are many variables that would be considered in the building frame design. The minimum framing members specified in this report to accept the cladding attachment forces would not necessarily adequately serve the overall building design loads and deflection limits. This is why the design tables and diagrams in the report advise that design capacity of the building framing is outside the scope of this report and must be designed and installed for the applicable wind, climate and occupancy loads of the building project. The variables in the framing design, including but not limited to the height of walls, whether they are vertical load-bearing or non-bearing, and the contribution of other climate loads along with the wind force transferred through the cladding, must all be taken in to account when specifying the structural components that the cladding will attach in to.

Deflection Limits

The bending deflection limits set for this design evaluation are L/180 for the deflection of the wall frame, and L/60 for the differential movement of the cladding member relative to the wall frame. With these deflection limits tested at the maximum wall height of 10 ft and cladding anchorage spans of 16 or 18 inches, the cladding panels were found to not dislodge or distort and return to the set position after releasing the service-level design loads as published. In-plane lateral deflection limits of the system were assessed as summarized in the report's comments to article 4.1.3.5.

ATTACHMENT 5: NATIONAL TO PROVINCIAL CODE CROSS-REFERENCES
BRITISH COLUMBIA: 2024 BCBC

NBCC Div. B Section	BCBC Div. B Section	BCBC Referenced Standard or Div. B Section[1]	Year	BCBC Comparison to NBCC
Part 3/4/5				
3.1.4.8	3.1.4.8	-	-	Article content same as NBCC
3.1.5.5[2]	3.1.5.5	CAN/ULC-S134	2013	Article content same as NBCC
3.1.7.1	3.1.7.1	CAN/ULC-S101	2014	Article content same as NBCC
3.1.12.1.(1)	3.1.12.1.(1)	CAN/ULC-S102	2010	Article content same as NBCC
4.1.3.5	4.1.3.5	4.1.8.13	-	Article content same as NBCC
4.1.7.1.(5)	4.1.7.1.(5)	4.1.7.3	-	Article content same as NBCC
4.1.8.1.(11)	4.1.8.1.(11)	4.1.8.2	-	Article content same as NBCC
4.1.8.13	4.1.8.13	4.1.8.11, 4.1.8.12	-	Article content same as NBCC
4.1.8.18.(10)	4.1.8.18 (10)	4.1.8.3.(6)	-	Article content same as NBCC
5.1.4.1	5.1.4.1	5.2.1, 5.2.2, 4.1.3.5, 4.1.8	-	Article content same as NBCC
5.1.4.2	5.1.4.2	-	-	Article content same as NBCC
5.2.1.3.(3)	5.2.1.3.(3)	4.1.7	-	Article content same as NBCC
5.2.2.1	5.2.2.1	Part 4	-	Article content same as NBCC
5.6.1.1	5.6.1.1	-	-	Article Content same as NBCC
5.6.2.1	5.6.2.1	-	-	Article Content same as NBCC
5.9.1.1.(1)(b)	5.9.1.1.(1)(b)	A-5.9.1.1.(1)	-	Article content same as NBCC
5.9.3.5	5.9.3.5[4]	ASTM E331	2000	Section number same as, content differs
A-5.9.1.1.(1)	A-5.9.1.1.(1)	-	-	Article content same as NBCC
A-5.9.3	A-5.9.3	AAMA 501.1[2], ASTM E331	2005, 2000	Article content same as NBCC with additional testing standards cited.
A-5.9.3.2.(1)	-	ASTM E330	2014	Article content same as NBCC
Part 9				
9.4.1.1(1)(c)(ii)	9.4.1.1.(1)(c)(ii)	Part 4	-	Article content same as NBCC
9.10.3.1(1)(a)	9.10.3.1(a)	Part 3	-	Article content same as NBCC
9.10.3.2(1)	9.10.3.2.(1)	Part 3	-	Article content same as NBCC
9.10.14.5.(2)[2]	9.10.14.5.(2)	CAN/ULC S-134	2013	Article content same as NBCC
9.10.15.5.(2) & (3)[2]	9.10.15.5.(2)&(3)	CAN/ULC S-134	2013	Article content same as NBCC
9.27.1.1(1)	9.27.1.1(1)	9.27.2-9.27.12, Part 5	-	Article content same as NBCC
9.27.2.2(1)	9.27.2.2(1)	-	-	Article content same as NBCC
9.27.5[3]	9.27.5	9.27.5.5	-	Article content same as NBCC

1. Only the applicable reference standards and code sections sited in the main body text are listed. (-) indicates that the main body text covers the full explanation of the objective.
2. AWP Panel models only See Product Evaluation section for further information.
3. Sierra/Savannah Lap Siding only.
4. Section 5.9.3.5 content differs from NBCC, Div B. Section 1.3 Referenced documents and Organizations calls out ASTM E330/ASTM E331 in code references A-5.9.3.2.(1)/5.9.3.5.(2), respectively.

ONTARIO: 2024 OBC

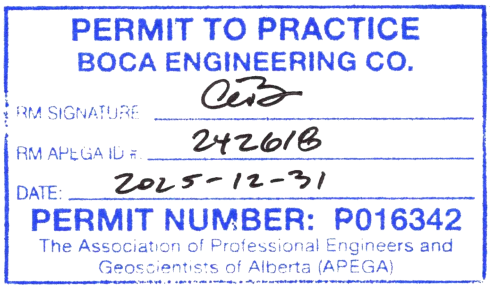
NBCC Div. B Section	OBC Div. B Section	OBC Referenced Standard or Div. B Section[1]	Year	OBC Comparison to NBCC
Part 3/4/5				
3.1.4.8	3.1.4.8.	3.1.5.5.(1)(b)	-	Article content same as NBCC
3.1.5.5[2]	3.1.5.5	CAN/ULC-S134	2013	Section titles differ, content is same
3.1.7.1	3.1.7.1	CAN/ULC-S101	2014	Article content same as NBCC
3.1.12.1.(1)	3.1.12.1.(1)	CAN/ULC-S102	2010	Article content same as NBCC
4.1.3.5	4.1.3.5.	4.1.8.13	-	Article content same as NBCC
4.1.7.1.(5)	4.1.7.1.(5)	4.1.7.3	-	Article content same as NBCC
4.1.8.1.(11)	4.1.8.1.(11)	4.1.8.2	-	Article content same as NBCC
4.1.8.13	4.1.8.13	4.1.8.11, 4.1.8.12	-	Article content same as NBCC
4.1.8.18.(10)	4.1.8.18.(10)	4.1.8.3.(6)	-	Article content same as NBCC
5.1.4.1	5.1.4.1	5.2.1, 5.2.2, 4.1.3.5, 4.1.8	-	Article content same as NBCC
5.1.4.2	5.1.4.2.	-	-	Article content the same with the addition of 5.1.4.2.(3) & (4)
5.2.1.3.(3)	5.1.2.3.(3)	4.1.7	-	Article content same as NBCC
5.2.2.1	5.2.2.1	Part 4	-	Article content same as NBCC
5.6.1.1	5.6.1.1	-	-	Article content same as NBCC
5.6.2.1	5.6.2.1	-	-	Article content same as NBCC
5.9.1.1.(1)(b)	5.10.1.1.(1)	Part 5	-	Section number differs, article content same as NBCC
5.9.3.5	5.9.3.5	ASTM E331	2000	Article content same as NBCC
A-5.9.1.1.(1)	**A-5.9.1.1.(1)**	-	-	Article content same as NBCC
A-5.9.3	**A-5.9.3**	AAMA 501.1[2]	N/A	Article content same as NBCC
A-5.9.3.2.(1)	**A-5.9.3.2.(1)**	ASTM E330	N/A	Article content same as NBCC
Part 9				
9.4.1.1(1)(c)(ii)	9.4.1.1(1)(c)(ii)	Part 4	-	Article content same as NBCC
9.10.3.1(1)(a)	9.10.3.1(1)	Part 3	-	Article content same as NBCC
9.10.3.2(1)	9.10.3.2(1)	Part 3	-	Article content same as NBCC
9.27.1.1(1)	9.27.1.1(1)	9.27.2-9.27.12, Part 5	-	Article content same as NBCC
9.27.2.2(1)	9.27.2.2	-	-	No minimum airspace value provided
9.27.5[3]	9.27.5	9.27.5.5	-	Article content same as NBCC

1. Only the applicable reference standards and code sections sited in the main body text are listed. (-) indicates that the main body text covers the full explanation of the objective.
2. AWP Panel models only See Product Evaluation section for further information.
3. Sierra/Savannah Lap Siding only.

ALBERTA: 2023 NBC (AE)

NBCC Div. B Section	NBC (AE) Div. B Section	NBC (AE) Referenced Standard or Div. B Section[1]	Year	NBC (AE) Comparison to NBCC
Part 3/4/5				
3.1.4.8	3.1.4.8	3.1.5.5.(1)(b)	-	Article content same as NBCC
3.1.5.5[2]	3.1.5.5[2]	CAN/ULC-S134	2013	Article content same as NBCC
3.1.7.1	3.1.7.1	CAN/ULC-S101	2014	Article content same as NBCC
3.1.12.1.(1)	3.1.12.1.(1)	CAN/ULS-S102	2010	Article content same as NBCC
4.1.3.5	4.1.3.5	4.1.8.13	-	Article content same as NBCC
4.1.7.1.(5)	4.1.7.1.(5)	4.1.7.3	-	Article content same as NBCC
4.1.8.1.(11)	4.1.8.1.(11)	4.1.8.2	-	Article content same as NBCC
4.1.8.13	4.1.8.13	4.1.8.11-4.1.8.12	-	Article content same as NBCC
4.1.8.18.(10)	4.1.8.18.(10)	4.1.8.3.(6)	-	Article content same as NBCC
5.1.4.1	5.1.4.1	5.2.1, 5.2.2, 4.1.3.5, 4.1.8	-	Article content same as NBCC
5.1.4.2	5.1.4.2	-	-	Article content same as NBCC
5.2.1.3.(3)	5.3.1.3.(3)	4.1.7	-	Article content same as NBCC
5.2.2.1	5.2.2.1	Part 4	-	Article content same as NBCC
5.6.1.1	5.6.1.1	-	-	Article content same as NBCC
5.6.2.1	5.6.2.1	-	-	Article content same as NBCC
5.9.1.1.(1)(b)	5.9.1.1.(1)(b)	A-5.9.1.1.(1)	-	Article content same as NBCC
5.9.3.5	5.9.3.5[2]	ASTM E331	2000	Article content same as NBCC
A-5.9.1.1.(1)	A-5.9.1.1.(1)	-	-	Article content same as NBCC
A-5.9.3	A-5.9.3	AAMA 501.1[2]	2005	Article content same as NBCC
A-5.9.3.2.(1)	A-5.9.3.2.(1)	ASTM E330	2014	Article content same as NBCC
Part 9				
9.4.1.1(1)(c)(ii)	9.4.1.1(1)(c)(ii)	Part 4	-	Article content same as NBCC
9.10.3.1(1)(a)	9.10.3.1(1)(a)	Part 3	-	Article content same as NBCC
9.10.3.2(1)	9.10.3.2(1)	Part 3	-	Article content same as NBCC
9.10.14.5.(2)[2]	9.10.14.5.2.(2)	CAN/ULC S-134	2013	Article content same as NBCC
9.10.15.5.(2) & (3)[2]	9.10.15.5.(2) & (3)	CAN/ULC S-134	2013	Article content same as NBCC
9.27.1.1(1)	9.27.1.1(1)	9.27.2-9.27.12, Part 5	-	Article content same as NBCC
9.27.2.2(1)	9.27.2.2(1)	-	-	NBC-AE requires min. 10 mm of airspace, NBCC specifies 9.5 mm
9.27.5[3]	9.27.5	9.27.5.5	-	Article content same as NBCC

1. Only the applicable reference standards and code sections sited in the main body text are listed. (-) indicates that the main body text covers the full explanation of the objective.
2. AWP Panel models only See Product Evaluation for further information.
3. Sierra/Savannah Lap Siding only.



Permit to Practice