



TEST SUMMARIES: AWP 1818 & 3030

ASTM C 1185/6 - Physical Properties Tests
ASTM C 518 - Steady-State Heat Flux & Thermal Tests (R-Value)
ASTM E 84 - Surface Burning Characteristics
CAN/ULC - S102 Surface Burning Characteristics
ASTM E 119 - Fire Resistance of a Wall Assembly (Load-Bearing Wood)
NFPA 268 - Ignition Resistance of Exterior Wall Assemblies
NFPA 285 - Fire Test Method - Vertical & Lateral Flame Propagation
CAN/ULC S-134 - Fire Test Method - Vertical & Lateral Flame Propagation
AAMA 509-14 - Drained and Back Ventilated Rain Screen Test
ASTM B-117 - Standard Practice for Operating Salt Spray (Fog) Apparatus
ADA 2018 Visual Contrast Requirements - Light Reflectance Values (LRV)

Code Certifications and Product Approvals

U.S.: Intertek [CCRR-0299](#)
Canada: CCMC approval under development
Florida Product Approval [FL #12875](#)
Los Angeles Research Report [RR 26081](#)
Miami-Dade [NOA 18-0522.05](#)
Texas Department of Insurance (TDI) [EC-58](#)



ASTM C-1185/6 PHYSICAL PROPERTIES

Date of Test: October, 2015
Test Agency: Progressive Engineering, Inc., 58640 State Road 15, Goshen, IN 46528
Test Method: ASTM C 1185-08 Standard Test Methods for Sampling and Testing Fiber Cement Flat Sheets
 ASTM C 1186-08 Standard Specification for Flat Fiber Cement Sheets
Test Specimen: Nichiha Architectural Wall Panels (AWP - EX Series)
Sample Specs: Thickness: 16mm (nominal 5/8"), Width: Various. Length: Various.
Test Procedure: The tests were performed in accordance to ASTM requirements.
Test Results: The test results show Nichiha AWP meet the requirements of ASTM C1186 to be classified as a Type A, Grade II fiber cement sheet.

Property	Test Result	Requirement	Pass / Fail
Linear Variation w/ Change in Moisture Content %	1.177%	Report Value	Report Value
Moisture Content %	7.10%	Report Value	Report Value
Flexural Strength Equilibrium Wet Saturated	1580 psi 1418 psi	1450 psi 1015 psi	Pass Pass
Water Tightness	No drop formation observed	No drop formation	Pass
Freeze/Thaw Resistance Strength Retention, % Observation	80.0% No cracks or delaminations	80.0% No cracks or delaminations	Pass Pass
Warm Water Resistance Strength Retention, % Observation	78.6% No deleterious effects	Report Value No deleterious effects	Report Value Pass
Heat / Rain Resistance	No signs of cracks, damage or structural failure after 25 cycles	No visible cracks or structural alteration	Pass



ASTM C 518 - STEADY-STATE HEAT FLEX & THERMAL TESTS

Date of Test: October 16, 2017

Test Agency: Intertek - ATI, 130 Derry Court, York, PA 17406

Test Method: ASTM C 518 -17, Standard Test Method for Steady-State Thermal Transmission Properties by means of the Heat Flow Meter Apparatus.

Test Specimen: Nichiha AWP

Sample Specs: Thickness: Two 16mm (5/8") samples, stacked.

Test Procedure: The test apparatus consists of a warm plate, a cold plate, a heat flow meter, and the necessary electronic measurement devices. The test specimen is held between the two temperature controlled plates, of which the lower can be raised or lowered to the desired specimen thickness.

Results: The test results show a single, 16mm-thick Nichiha AWP has a thermal resistance or R-Value of 0.47. This data is shown below and is based off the test measurement R-Value for two sample panels stacked together with a total thickness of 1.256".

<u>Element</u>	<u>Measurement</u>
Warm Plate	100°F
Cold Plate	50°F
Mean Specimen Temperature	75°F
Average heat flux (Btu/hr-ft ²)	52.66
Average thermal conductance – C (Btu/hr-ft ² - °F)	1.05
Average thermal resistance – R (hr-ft ² -°F/Btu)	0.95 (0.47 single panel)
Average thermal resistance – Rsi (m ² -K/W)	0.17 (0.08 single panel)



ASTM E 84 - SURFACE BURNING CHARACTERISTICS

Date of Test: September 4, 2015

Test Agency: Commercial Testing Company, 1215 South Hamilton Street, Dalton, GA 30720

Test Method: ASTM E 84-15a Standard test method for Surface Burning Characteristics of building materials, sometimes referred to as the Steiner Tunnel test.

Test Specimen: Nichiha Architectural Wall Panels (AWP - EX Series)

Sample Thickness: 16mm (nominal 5/8")

Test Procedure: The panels were physically self-supporting and required no additional sample preparation. For testing, three 8-foot sections consisting of three pieces, 18" wide by 96" long, and three pieces, 7" wide by 96" long, were placed end-to-end on the ledges of the tunnel furnace to make up the 24 foot test sample. Testing was performed in accordance with ASTM procedure.

Results: *Flame Spread Index: 0*

Smoke Developed Index: 0

Per IBC 2015, Chapter 8, Section 803.1, Nichiha AWP's are a Class A finish material.



CAN/ULC S-102 SURFACE BURNING CHARACTERISTICS

Date of Test:	April 7, 2016
Test Agency:	Intertek Testing Services 1500 Brigantine Drive, Coquitlam, B.C. V3K 7C1
Test Method:	CAN/ULC S102-10 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
Test Specimen:	Nichiha Architectural Wall Panels (AWP - EX Series)
Sample Specs:	Thickness: 16mm (nominal 5/8") Width: 455mm (nominal 17-7/8") Length: 1818mm (nominal 71-9/16")
Test Procedure:	The panels were physically self-supporting and required no additional sample preparation. For testing, panels were cut to 24" widths and were placed end-to-end on the ledges of the tunnel furnace to make up the 24 foot test sample. Testing was performed in accordance with CAN/ULC S102-10.
Results:	<i>Flame Spread Rating: 0</i> <i>Smoke Developed Classification: 5</i>



ASTM E-119 - ONE-HOUR RATED, LOAD-BEARING WOOD ASSEMBLY

Date of Test:	June 27, 2018
Test Agency:	Southwest Research Institute, 6220 Culebra Road, San Antonio, TX 78228
Test Method:	ASTM E 119-18 Standard Test Methods for Fire Tests of Building Construction and Materials
Test Specimen:	Nichiha Architectural Wall Panels (VintageWood) on a wood, load-bearing wall assembly
Sample Specs:	16mm (nominal 5/8"), Width: 3030mm, cut as needed for test. Other: Double Flange Sealant Backer, 10mm Spacer, polyurethane sealant
Test Panel Structure:	Base Wall: Standard gypsum base wall assembly (9'x12'), comprising of 2x4 wood studs at 16" spacing. One layer of 5/8", Type X gypsum was attached to the interior side using #8 by 1-5/8" cement board screws. A single layer of 5/8", Type X gypsum (DensGlass) was attached to the exterior side with 11 GA, 1.75" roofing nails every 7" o.c. perimeter and field. Stud cavities were filled with unfaced R-13 fiberglass insulation. Nichiha panels were installed in a horizontal application using Starter Track and Ultimate Clips.
Test Procedure:	The test panel was secured to the test fixture in accordance with the requirements of ASTM. The test exposed assembly to a standard fire exposure controlled to achieve specified temperatures throughout a 60 minute time period. A superimposed load of 13,200 lbs (1,100 lb/ft) was utilized. The fire exposure was followed by a standard hose stream test, which subjects the specimen to impact, erosion, and cooling effects of the water.
Results:	The wall was evaluated with exterior (Nichiha face) exposure. The wall successfully endured a 60 minute fire exposure without developing excessive unexposed surface temperatures or allowing flaming on the unexposed side of the assembly. The Hose Stream Test did not penetrate the interior sheathing.



NFPA 268 IGNITION RESISTANCE

Date of Test:	October 8, 2014
Test Agency:	Southwest Research Institute 6220 Culebra Road, San Antonio, TX 78238-5166 SwRI Project No. 01.19582.01.220
Test Method:	National Fire Protection Association (NFPA) 268 – 2012 Edition – Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies Using a Radiant Heat Energy Source.
Test Specimen:	Nichiha Architectural Wall Panels (EX Series), JEL777 Panel clips, 10mm Spacer, FA100B Starter Track
Sample Specs:	Nichiha Architectural Wall Panels, 455mm x 1,818mm x 16mm, were cut to width for a 4' x 8' metal stud assembly and installed via Nichiha attachment hardware – Starter Track and Panel Clips. The top course was cut to height and face fastened over Nichiha Spacer.
Test Procedure:	Test conducted in accordance with the NFPA 268 standard, with sample cladding subjected to a minimum radiant heat flux of 12.5 kW/m ² ± 5% in the presence of a pilot ignition source for a 20-minute period.
Results:	The wall assembly met the acceptance criteria given in the NFPA 268 standard. No sustained flaming exhibited.



NFPA 285 FIRE PROPAGATION

- Date of Test:** April 24, 2014
- Test Agency:** Southwest Research Institute, 6220 Culebra Road,
San Antonio, TX 78238-5166
SwRI Project No. 01.19577.01.608
- Test Method:** National Fire Protection Association (NFPA) 285 – 2012 Edition – Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Nonload-Bearing Wall Assemblies containing Combustible Components.
- Test Specimen:** Nichiha Architectural Wall Panels (EX Series), JEL777 Panel Clips, 10mm Spacer, Single Flange Sealant Backer, Starter Track T300, vertical panel Starter Track.
- Sample Specs:** Full size Nichiha Architectural Wall Panels, 455mm x 1,818mm x 16mm, and reduced panels, cut at terminations, were installed via Nichiha attachment hardware - starter track and panel clips fastened to 18 gauge, 3-5/8" C-channel steel studs, spaced 16" on center. Steel framing was sheathed on the interior with 5/8" Type X gypsum and on the exterior side with 1/2" Densglass Gold Sheathing. Stud wall cavities were lined with 4" thick, 4-pct, mineral wool insulation. The exterior sheathing was covered with a layer of Tyvek Commercial Wrap. The two-story assembly included a 78" x 30" window opening. Panels were face fastened over 10mm Spacer at the window head and sill and at the top of the wall. The Vertical Panel Starter Track was used at the window header, installed over 10mm Spacer prior to panel installation.
- Test Procedure:** Test conducted in accordance with NFPA 285 standard, with matrix of temperature measurement devices recording data throughout the assembly, including, but not limited to, the panels' surface, the air cavity between the back of the panels and face of the Densglass sheathing, and burn room ceiling. The test was comprised of three parts with a total duration of 40 minutes, including a 10-minute observation period at the end. The burn room burners acted alone for the first five minutes. Next, a window burner was placed to provide flame exposure directly to the assembly exterior face, and the test continued for 25 minutes until the burners were deactivated and the 10-minute observation period began.
- Results:** *The wall assembly met the acceptance criteria given in the NFPA 285 standard.*
- No vertical flame propagation to 10 feet above the top of the window.
 - No lateral flame propagation to 5 feet from the centerline of the window.
 - Surface temperature readings did not exceed 1000° F at any time.
 - Temperatures in the air cavity did not exceed 1000° F at any time.
 - Flame propagation did not occur in the second floor test room at any time, nor did temperatures exceed 500° F at any time.



CAN/ULC S-134 FIRE PROPAGATION

- Date of Test:** September 17, 2015
- Test Agency:** NRC Fire Safety Laboratory, Mississippi Mills, Ontario
NRC Report No. A1-007541.1
- Test Method:** CAN/ULC S134-13 – Standard Method of Fire Test for Evaluation of Exterior Wall Assemblies.
- Test Specimen:** Nichiha Architectural Wall Panels (EX Series), JEL777 Panel Clips, 10mm Spacer, Double Flange Sealant Backer, and Starter Track FA700.
- Sample Specs:** Full size Nichiha Architectural Wall Panels, 455mm x 3,030mm x 16mm, and reduced panels, cut at the window sill and jambs, were installed via Nichiha attachment hardware - Starter Track and Panel Clips fastened to 2x4 wood studs, spaced 16" on center. Wood framing was sheathed on the interior with 5/8" Type X gypsum and on the exterior side with 5/8" Fire Resistant Plywood Sheathing. Stud wall cavities were lined with 3.5" thick fiber-glass insulation batts. The exterior sheathing was covered with a layer of Tyvek WRB. The 10 meter assembly included a 2.51 x 1.42 m window opening. The sample assembly included a Double Flange Sealant Backer vertical joint above the center of the window, up to a height of 2.73 meters where there was a horizontal/compression joint. FA700 Starter Track was used at the wall base, window header, and above the compression joint. The top edge of the panels just below the horizontal/compression joint and those at top of the wall were face fastened over 10mm Spacer. Otherwise all other panel edges were secured with JEL777 Panel Clips.
- Test Procedure:** Test conducted in accordance with CAN/ULC S134 standard with a matrix of temperature measurement devices recording data throughout the assembly, including, but not limited to, the panels' surface, on the WRB, on the interior gypsum sheathing, and within the burn room. The test lasted 60 minutes with flame ignition/gas flow ramping upwards until the 20 minute mark. At 20 minutes, the gas flow reduction began until cut off at 25 minutes. The assembly was then monitored until the 60 minute mark.
- Results:** *The wall assembly met the acceptance criteria given in the CAN/ULC S134 standard.*
- No vertical flame propagation to 5 meters above the top of the window.
 - Highest flames measured at 2.5 m
 - The maximum one-minute averaged value of the total heat flux density at 3.5 m above the top of the window did not exceed 35 kW/m².
 - Max one-minute averaged value was 25.4 kW/m²



AAMA 509-14 DRAINED/BACK-VENTILATED RAIN SCREEN

Date of Test: February 21-22, 2018
Test Agency: Intertek, 1701 Westfork Drive, Suite 106, Lithia Springs, GA 30122
Test Method: AAMA 509-14 – Voluntary Test and Classification Method of Drained and Back Ventilated Rain Screen Wall Cladding Systems
Test Specimen: Nichiha Architectural Wall Panels
Sample Specs: Thickness: 16 mm (5/8" nominal) AWP 1818 and 3030

Assembly/Installation:

One steel Starter Track (FA700) was installed at the bottom of an 8'x 8' wood support frame, located 3/4" from the bottom edge. Starter Track was installed using one No. 10 by 1-5/8" long flat head wood screw at each vertical stud at 16" o.c. Three 26" long (full-width) panel clips (JEL778) and one cut, 6" clip were installed horizontally on each row of panels using No. 10 by 1-5/8" wood screws at each vertical stud. Cladding was installed at the top of the sample wall by face-fastening panels with No. 8 by 2" long flat head wood screws through 10mm corrugated shim at each vertical stud. The Nichiha AWP installation included representative standard horizontal and vertical panel joints.

Test Procedure: AAMA 509-14 was performed in accordance with AAMA instructions and component tests, including ASTM E283 Rate of Air Leakage, ASTM E331 Water Penetration (Uniform Static Pressure), and AAMA 501.1-17 Water Penetration (Dynamic Pressure).

Results:

Test	Result
Air Leakage (Ventilation Test) via ASTM E283	
Initial Tare (@75 Pa (1.57 psf))	5.77 L/s
Defects in air-water barrier	9.34 L/s
Total with cladding	3.59 L/s
Air flow across cladding elements	
Head (@26 Pa (0.55 psf))	20.15 L/s
Sill	25.11 L/s
Vertical joints	0.55 L/s
Horizontal joints	0.45 L/s
Sum	46.26 L/s (7.78 L/s/m ²)
Ventilation Classification: V1	

Water Penetration (Water collected off AWB behind cladding)

<u>ASTM E331 Static Pressure</u>		water in ml (oz)
300 Pa (6.24 psf)		0.00 (0.00)
575 Pa (12 psf)		16.87 (0.57)
<u>AAMA 501.1 Dynamic Pressure</u>		water in ml (oz)
300 Pa (6.24 psf)		9.12 (0.31)
575 Pa (12 psf)		18.7 (0.63)
Sum		7.52 ml/m ²
Average		1.88 ml/m ²

Water Penetration Classification: W1



ASTM B117 CORROSION RESISTANCE

Date of Test:	November 19, 2018 - February 8, 2019
Test Agency:	Intertek, 1500 Brigantine Drive, Coquitlam, BC, V3K 7C1
Test Method:	ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus
Test Specimens:	Nichiha Ultimate Clips (JEL778) (ZAM®), BT-R100 Brick Tie (305 g/m ²), HTT4 Tension Tie (610 g/m ²), and MSTA18 Stainless Steel Strap
Test Procedure:	Nichiha Ultimate Clips (coated with Zinc, Aluminum, and Magnesium (ZAM®)) along with comparative samples of hot-dipped zinc coated steel, of coating weights 305 and 610 g/m ² , as well as samples of stainless steel were subjected to 2000 hours of salt fog testing per ASTM B117.
Results:	Nichiha Ultimate Clips experienced a mass change of 1.3% with moderate signs of salt deposits but no corrosion or red rust. The 305 g/m ² brick ties experienced a mass change of -0.2% with significant corrosion and salt deposits. The 610 g/m ² tension ties gained 1.6% mass due to significant salt deposits, and lastly, the stainless steel straps had 0% mass change with slight brown staining near cuts but no corrosion or salt deposits.



ADA 2018 - VISUAL CONTRAST - LRV

Date of Test: May 16, 2019

Test Agency: PRI Construction Materials Technologies, 6412 Badger Drive, Tampa, FL

Test Method: Light Reflectance Values (LRV) measured by Hunter UltraScan Pro Spectrophotometer

Test Specimens: Nichiha Wood Series, Modern Series, and Gloss Series

Test Procedure: Nichiha panel samples were scanned with 5 measurements each utilizing a Hunter UltraScan Pro Spectrophotometer using a d/8 sphere at D65/10 degree illumination. Data reported below are average values.

Results:	<u>PRODUCT NAME</u>	<u>COLOR NAME</u>	<u>AVG. LRV (5 SCANS/SAMPLE)</u>
	VintageWood	Ash	25.66
		Bark	8.88
		Cedar	17.33
		Redwood	14.15
	RoughSawn	Espresso	7.31
		Smoke	24.64
		Tobacco	10.45
	ArchitecturalBlock	Gray	31.41
		Mocha	14.25
		Tuscan	27.43
	TuffBlock	Bamboo	23.86
		Pewter	27.15
		Steel	8.24
		Walnut	13.16
	Miraia	Glacier	54.41
		Onyx	3.99
		Snow	72.38