

Nichiha Architectural Wall Panels

Applicable to all Nichiha AWP 1818 and 3030 panels (EX Series).

Product Test Summaries

- ASTM C 518 Steady-State Heat Flex & Thermal Tests
- ASTM C 1185/6 Physical Properties Tests
- ASTM E 84, CAN/ULC S102-10 Surface Burning Characteristics
- ASTM E 119/CAN/ULC S101-07 Fire Resistance of Wall Assembly (2 Summaries)
- ASTM E 228 Physical Properties Test
- ASTM E 331 Water Penetration Test - 1/2" R3 Foam Insulation Board Sheathing
- ASTM E 331 Water Penetration Test - Open Stud 16" o.c.
- ASTM G 23 Weather Resistance Test
- AAMA 509-9 Drained and Back Ventilated Rain Screen Test
- NFPA 268 Ignition Resistance of Exterior Wall Assemblies
- NFPA 285 Fire Test Method for Exterior Wall Assemblies Containing Combustible Material
- CAN/ULC S-134 Standard Method of Fire Test for Evaluation of Exterior Wall Assemblies
- TAS 201, 202, 203 Florida Building Code - Impact Resistance Tests

Refer to PEI-PER 14088 for product Code Evaluation information and wind load data.

For a copy of complete testing and certification documentation, please call Nichiha Technical Department toll free at 1.866.424.4421.





ASTM C 518 Steady-State Heat Flex & Thermal Transmission

- Date of Test:** February, 1998
- Test Agency:** Commercial Testing Company
1215 South Hamilton Street, Dalton, GA 30722
- Test Method:** ASTM C 518 Steady-state heat flux measurements and thermal transmission properties by means of the heat flow metal apparatus.
- Test Specimen:** Nichiha Brick, Stone & Block™ Fiber Cement Panels
- Specimen Specifications:** *Thickness: 25mm (nominal 1").*
- Test Procedure:** The test apparatus consists of a hot 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.
- Test Results:** The test results show the Nichiha Brick, Stone & Block Fiber Cement Panels to have a thermal resistance or R Value of 1.23. This data is shown below. The hot plate temperature record was 99.88°F and the cold plate temperature record as 51.18°F. The mean temperature recorded during the test was 75.53°F.
 $K=SE: (\Delta X/t_1-t_2)$
S: Calibrated constant derived from the SRM.
E: Heat flow output in millivolts.
 ΔX : Specimen thickness.
t1: Hot plate temperature.
t2: Cold plate temperature.
Thermal resistance, R is the reciprocal of k.

Element	Measurement
Hot Plate	99.88°F
Cold Plate	51.18°F
Mean Temperature	75.53°F
E	15.555
ΔX	0.626
k	0.816
R	1.23



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)

Specimen Specifications: *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
Dimensional Tolerances:			
Length, in.	0.0	+/- 1/4	Pass
Width, in.	3/32	+/- 1/8	Pass
Squareness, in.	1/16	<10/32	Pass
Squareness-Edge Straight, in.	<1/32	<10/32	Pass
Thickness, in.	-0.002	+/- 0.05	Pass
Water Absorption, % by mass	13.9	Report value	Report value
Moisture Content, %	7.1	Report value	Report value
Density, lbs./ft ³	74.4	Report value	Report value
Moisture Movement, %			
Parallel	-0.90	Report value	Report value
Perpendicular	1.177		
Flexural Strength			
Equilibrium, psi	1580	≥1450	Pass
Wet saturated, psi	1568	≥1015	Pass
Freeze/Thaw, % Retention	80	80	Pass
Warm Water, psi – Parallel	1565	No cracks or structural alteration	Pass
Perpendicular	1232	No cracks or structural alteration	Pass
Water Tightness	No drop formation	No drop formation	Pass
Heat/Rain Resistance	No apparent changes	No visible cracks or structural alteration	Pass



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)
- Specimen** *Thickness:* 16mm (nominal 5/8").
- Specifications:** *Width:* 455mm (nominal 17-7/8").
Length: 3030mm (nominal 119-5/16").
- 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.
- Test Results:** *Flame Spread Index*
- The maximum distance the flame spreads along the length of the sample from the end of the igniting flame is determined by observation.
 - The Flame Spread Index (FSI) of the material is determined by rounding by Calculated Flame Spread (CFS) as described in UL 723. The CFS is derived by calculating the area under the flame spread distance (ft.) versus time (min.) curve, ignoring any flame front recession, and using one of the calculation methods as described below.
 - If the total area (At) is less than or equal than 97.5 min.-ft., the CFS shall be 0.515 times the total area. (FSI=0.515 AT).
 - If the total area (At) is greater than 97.5 min.-ft., the CFS is to be 4900 divided by 195 minutes the total area. (FSI=4900/(195-At)).

Test Sample	Maximum Flame Spread (ft.)	Time of Maximum Flame Spread (min.)	CFS	FSI
Nichiha AWP (EX-Series)	0.0	-	0.0	0

- Test Results:** *Smoke Developed Index*
- The Smoke Developed Index is determined by rounding the Calculated Smoke Developed (CSD) as described in UL 723. The CSD is determined by the output of a photoelectric circuit operating across the furnace flue pipe. A curve is developed by plotting values of light absorption (decreased in cell output) against time. The CSD is derived by expressing the net area under the curve for this material as a percentage of the net area under the curve for untreated red oak.
 - The CSD is expressed as: $CSD = (A_m/A_{ros}) \times 100$.
 - A_m : The area under the curve for the test material.
 - A_{ros} : The area under the curve for untreated red oak.

Test Sample	CSD	SDI
Nichiha AWP (EX Series)	0.9	0



CAN/ULC S-102 Surface Burning Characteristics

- Date of Test:** April 7, 2016
- Test Agency:** Intertek Testing Services NA
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)
- Specimen** *Thickness:* 16mm (nominal 5/8").
- Specifications:** *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.

Test Results: (A) **Flame Spread**

The resultant flame spread ratings are as follows:
(Rating rounded to nearest 5)

Architectural Block™ Mocha	Flame Spread	Flame Spread Rating
Run 1	1	0
Run 2	1	
Run 3	0	

(B) **Smoke Developed**

The areas beneath the smoke developed curve and the related classifications are as follows:
(Classification rounded to nearest 5)

Architectural Block™ Mocha	Smoke Developed	Smoke Developed Classification
Run 1	6	5
Run 2	7	
Run 3	7	



ASTM E 119/CAN/ULC S101-07 Fire Resistance of Wall Assembly

- Date of Test:** June, 2001
- Test Agency:** Southwest Research Institute
6220 Culebra Road, San Antonio, TX 78228
- Test Method:** ASTM E 119 Standard practicing for fire tests of building construction and materials.
- Test Specimen:** Nichiha Brick, Stone & Block Fiber Cement Panels
- Specimen** *Thickness:* 18mm (nominal 3/4").
- Specifications:** *Width:* 72" trimmed as needed for tests.
Length: 185" trimmed as needed for tests.
Other: 1/4" inch bead of hot melt caulk (identified as Type H-67564BB) provided as sealant between panels.
- Test Panel Structure:** *Base Wall:* Standard gypsum base wall assembly, comprising of 2x4 stud at 16" spacing. One layer of 5/8", Type X gypsum was attached to the interior side using 1-3/4" gypsum wallboard nails at 7" o.c. A single layer of 5/8", Type X gypsum, 15 lb. felt paper was attached to the exterior side.
Nichiha Panel: The panels were assembled to the base wall with fasteners and clips provided by Nichiha.
- Test Procedure:** The test panel was secured to the test fixture in accordance with the requirements of ASTM. The test exposes a wall assembly to a standard fire exposure controlled to achieve specified temperatures throughout a specified time period. The fire exposure may be followed by a standard hose stream test, which subjects the specimen to impact, erosion, and cooling effects of the water stream.
- Test Results:** The wall was evaluated with the exterior (Nichiha face) exposure. The walls successfully endured a 60 minute fire exposure without developing excessive unexposed surface temperatures or allowing flaming on the unexposed side of the assembly. The data is shown below. At the conclusion of the 60 minute fire exposure, the maximum unexposed surface temperature was 163°F, and the maximum average surface temperature was 156°F. The wall met the requirements for a 1 hour fire resistance rating under load bearing conditions of 300 lb./ft.

Time (min:sec)	Observations
00:00	Sample wall loaded to 900 lb./ft., instrumentation verified, test started.
04:00	Light ignition of exposed side.
07:00	Uniform burning of exposed side.
26:00	Continued burning on exposed side, material separating at seams.
41:00	Exfoliation of material on top left corner of the exposed side.
45:00	Gypsum visible on more than 40% of exposed side.
60:00	Test concluded. No passage of flames or hot gases to the unexposed side.
60:00+	Hose stream test conducted for 65 sec. No passage of water to unexposed side.



ASTM E 119/CAN/ULC S101-07 Fire Resistance of Wall Assembly

- Date of Test:** June, 2001
- Test Agency:** Southwest Research Institute
6220 Culebra Road, San Antonio, TX 78228
- Test Method:** ASTM E 119 Standard practicing for fire tests of building construction and materials.
- Test Specimen:** Nichiha Brick, Stone & Block Fiber Cement Panels
- Specimen** *Thickness:* 18mm (nominal 3/4").
- Specifications:** *Width:* 72" trimmed as needed for tests.
Length: 185" trimmed as needed for tests.
Other: 1/4" inch bead of hot melt caulk (identified as Type H-67564BB) provided as sealant between panels.
- Test Panel Structure:** *Base Wall:* Standard gypsum base wall assembly, comprising of 3-5/8", 18GA metal C-stud at 16" spacing. One layer of 5/8", Type X gypsum was attached to the interior side using 1-1/4" screws at 8" perimeter and 12" field centers. A single layer of 1/2", Type X gypsum, 15 lb. felt paper was attached to the exterior side.
Nichiha Panel: The panels were assembled to the base wall with fasteners and clips provided by Nichiha.
- Test Procedure:** The test panel was secured to the test fixture in accordance with the requirements of ASTM. The test exposes a wall assembly to a standard fire exposure controlled to achieve specified temperatures throughout a specified time period. The fire exposure may be followed by a standard hose stream test, which subjects the specimen to impact, erosion, and cooling effects of the water stream.
- Test Results:** The wall was evaluated with the exterior (Nichiha face) exposure. The walls successfully endured a 60 minute fire exposure without developing excessive surface temperatures or allowing flaming on the unexposed side of the assembly. The data is shown below. At the conclusion of the 60 minute fire exposure, the maximum unexposed surface temperature was 219°F, and the maximum average surface temperature was 213°F. A second wall was evaluated for hose stream requirements. The exterior (Nichiha face) exposed assembly met the performance requirements for a 60 minute rating.

Time (min:sec)	Observations
01:45	Flash fire along interior of wall, light flames over exposed surface.
02:30	Exposed surface fire is reduced.
15:00	Flaming along edges and seams of wall panels only.
23:00	Edges along center line of sample are curling away from the base wall.
36:00	Exposed face curling away from base wall and falling from the surface. Felt paper is exposed and burning.
48:00	Exposed face is completely exfoliated, continued light burning.
60:00	Test concluded. No apparent deflections.



ASTM E 228 Physical Properties

- Date of Test:** January, 2002
- Test Agency:** RADCO, Inc., Listing & Testing Division (Resources, Applications, Designs and Controls, Inc.)
3220 East 59th Street, Long Beach, CA 90805
- Test Method:** ASTM E 228 this test measures mean coefficient of linear thermal expansion.
- Test Specimen:** Nichiha Brick, Stone & Block Fiber Cement Panels
- Specimen** *Thickness:* 18mm (nominal 3/4").
- Specifications:** *Width:* Various.
Length: Various.
- Test Procedure:** The test was performed in accordance to requirements of ASTM.
- Test Results:** The Nichiha Brick, Stone and Block Fiber Cement Panels successfully comply with the requirements specified in ICC-ES.

ASTM	Test Performed	AC 90 Req.	Test Result
E 228	Mean coefficient of linear thermal expansion.	Maximum 1.0×10^{-5} in./in./F	Maximum $1.0 \times 3.18 \times 10^{-6}$ in./in./F



ASTM E 331 Water Penetration Test - Open Stud 16" o.c.

- Date of Test:** May, 2001
- Test Agency:** UL (Underwriters Laboratories, Inc.)
333 Pfingsten Road, Northbrook, IL 60062
- Test Method:** ASTM E 331 Standard test method for water penetration of exterior windows, curtain walls, and doors by uniform static air pressure difference.
- Test Specimen:** Nichiha Brick, Stone & Block Fiber Cement Panels
- Specimen** *Thickness:* 18mm (nominal 3/4").
- Specifications:** *Width:* 455mm (nominal 18").
Length: 610mm (nominal 2').
- Test Structure:** *Support Frame:* 8 feet (2,438mm) in width x 8 feet (2,438mm) in height frames were constructed from 2x4 nominal (38mm x76mm) Spruce-Pine-Fir (SPF) studs placed on 16" o.c.
Frame Cover (Sheathing): Open stud (no sheathing).
Nichiha Panel: Each panel was fastened using Nichiha short clips (JE 402) at each frame member, and was fastened using Nichiha long clips (JE403) at the panel vertical joint locations. *Nichiha aluminum clips are no longer available, Nichiha now offers stainless steel clips.*
- Test Procedure:**
- Each test specimen was sealed against the test chamber with the fiber cement sheathed facing the test chamber. The stud cavities of the back side of the sample was visible to inspection for water penetration.
 - A positive pressure of 6.3 psf was applied to the samples and the water spray system was turned on to deliver a minimum water spray of 5 gal./sq. ft. h uniformly against the 8' (2,438mm) x 8' (2,438mm) exposed surface of the test specimen. The test duration was 15 minutes.
- Test Results:** The test result is shown in the table below.

Specimen	Observed Water Leakage Into Wall Cavity
1	No
2	No
3	No



ASTM G 23 Weather Resistance

- Date of Test:** November, 2000
- Test Agency:** UL (Underwriters Laboratories, Inc.)
333 Pfingsten Road, Northbrook, IL 60062
- Test Method:** ASTM G 23 Standard practice for operating light-exposure apparatus (Carbon-Arc Type) with and without water for exposure of nonmetallic materials.
- Test Specimen:** Nichiha Brick, Stone & Block Fiber Cement Panels
- Specimen** *Thickness:* 18mm (nominal 3/4").
- Specifications:** *Width:* 455mm (nominal 18").
Length: 229mm (nominal 9").
- Test Procedure:**
- The test procedure followed the "Method 1" operating schedule as referenced in ASTM G 23 which requires continuous exposure to light and intermittent exposure to water spray.
 - The specimens were mounted in the drum of the test apparatus to receive the greatest uniformity of radiant exposure.
 - The tests were conducted for 2000 with cycles of 102 minutes of light followed by 18 minutes of light and water spray.
 - Black panel temperature was $145 \pm 5^{\circ}$ (62.8° C).
- Test Results:**
- Each test sample was viewed under 5x magnification upon completion of the testing. There was no cracking, checking, crazing, erosion or other detrimental effects observed.
 - Observation of the test samples after the accelerating weathering test showed no characteristics that would adversely affect the performance of the panels as exterior covering materials.



AAMA 509-09 Rain Screen

Date of Test: October 15, 2012
Test Agency: Fenestration Testing Laboratory
 8148 N.W. 74th Avenue, Medley, FL 33166
Test Method: AAMA 509-09 – Voluntary Test and Classification Method of Drained and Back Ventilated Rain Screen Wall Cladding Systems
Test Specimen: Nichiha Architectural Wall Panels

Specimen

Specifications: *Thickness:* 16 mm (5/8" nominal) *Length:* various *Width:* various

One full-length steel starter track (FA100B) was installed at the bottom of an 8'x 8' support frame, located 3/4" from bottom edge, with one 5mm corrugated shim (FS 1005) behind it. Starter track was installed using one No. 8 by 1-1/2" long flat head wood screw at each end and at each vertical stud. Three 26" long aluminum panel clips (JES301) were installed horizontally on each row of panels over 5mm corrugated shim using No. 8 by 1-1/2" wood screws at each vertical stud. Cladding was installed at the top of the sample wall by face-fastening panels with No. 10 by 2" long flat head wood screws through two 5mm corrugated shims at each vertical stud.

Test Procedure: The test was performed in accordance with AAMA instructions, including ASTM E283 Air Infiltration Tests, 1/2 Design Load Tests – Positive and Negative, Design Load Tests – Positive and Negative, 1/2 Structural Load Tests – Positive and Negative, and Uniform Structural Tests – Positive and Negative.

Test Results:

Test	Results
Air Infiltration – Initial tare of test chamber and Air Water Barrier (AWB)	Passed
Air Infiltration – Results after purposely designed defects are drilled in the AWB	Passed
Air Infiltration – Results through the AWB, inclusive of defects and installation of cladding	Passed
Air Infiltration – Initial tare with gate valve open	Passed
1/2 Design Load Test – Positive Load	Passed
Design Load Test – Positive Load	Passed
1/2 Design Load Test – Negative Load	Passed
Design Load Test – Negative Load	Passed
Air Infiltration Test	Passed
1/2 Structural Load Test - Positive	Passed
Uniform Structural Test - Positive	Passed
1/2 Structural Load Test - Negative	Passed
Uniform Structural Test - Negative	Passed



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 Ignitability 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
- Specimen Specifications:** Nichiha Architectural Wall Panels, 18" x 6' x 5/8" (455mm x 1,818mm x 16mm), were cut to width for 4' x 8' metal stud assembly and installed via Nichiha attachment hardware – Starter Track and Panel Clips. Top course cut to height and face fastened over Nichiha Spacer.
- Test Procedure:** Test conducted in accordance with NFPA 268 standard, with sample cladding subjected to a minimum radiant heat flux of 12.5 kW/m² ± 5% in the presence of a pilot ignition source for a 20-minute period.
- Test 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.

Specimen

Specifications: Full size Nichiha Architectural Wall Panels, 18" x 6' x 5/8" (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 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.

Test 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.

Specimen

Specifications: Full size Nichiha Architectural Wall Panels, 18" x 10' x 5/8" (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 fiberglass 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.

Test 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.
 - o 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.
 - o Max one-minute averaged value was 25.4 kW/m²



TAS 201, 202, 203 Florida Building Code - Impact Resistance

Report Date: October 4, 2013
Test Agency: Fenestration Testing Laboratory
8148 N.W. 74th Avenue, Medley, FL 33166
Test Method: Florida Building Code TAS 201, TAS 202, TAS 203
Test Specimen: Nichiha Architectural Wall Panels
Specimen Specifications:

One full-length steel starter track (FA100B) was installed at the bottom of an 8'x 8' support frame (with 12" o.c. 2" by 4" studs and 5/8" plywood sheathing), located 3/4" from bottom edge, with one 5mm corrugated shim (FS 1005) behind it. Starter track was installed using one No. 8 by 1-1/2" long flat head wood screw at each end and at each vertical stud. Three 26" long aluminum panel clips (JES301) were installed horizontally on each row of panels over 5mm corrugated shim using No. 8 by 1-1/2" wood screws at each vertical stud. Cladding was installed at the top of the sample wall by face-fastening panels with No. 10 by 2" long flat head wood screws through two 5mm corrugated shims at each vertical stud. Three such sample assemblies were tested.

Test Procedure: The test was performed in accordance with Florida Building Code Test Protocol for High Velocity Hurricane Zone – Testing Application Standard (TAS) instructions, including ASTM E283 Air Infiltration, 1/2 Structural Load – Positive and Negative, Design Load – Positive and Negative, Water Resistance (ASTM E547, E331), Uniform Structural – Positive and Negative, Large Missile Impact, and Cyclic Wind Loads – Positive and Negative.

Test Results:

Test	Result
1. Air Infiltration (ASTM E283)	Passed
2. 1/2 Structural Load – Positive	Passed
3. 1/2 Structural Load – Negative	Passed
4. Design Load – Positive Load	Passed
5. Design Load – Negative Load	Passed
6. Water Resistance (ASTM E547)	Passed
7. Water Resistance (ASTM E331)	Passed
8. Uniform Structural – Positive	Passed
9. Uniform Structural – Negative	Passed
10. Large Missile Impact	Passed
11. Cyclic Wind Load – Positive	Passed
12. Cyclic Wind Load – Negative	Passed