



Product Test Summaries

Nichiha Fiber Cement Products

NichiBoard™, NichiPanel™, NichiShake™, NichiFrontier™, NichiStaggered™, NichiStraight™, NichiSoffit™

Test Summaries

Certifications	1
ASTM C 1185	2
ASTM E 84/CAN/ULC S102-07	5
ASTM E 119/CAN/ULC S101-07 Metal Construction	6
ASTM E 119/CAN/ULC S101-07 Wood Construction	7
ASTM E-136	8

NichiBoard™, NichiPanel™, NichiShake™, NichiFrontier™, NichiStaggered™, NichiStraight™ and NichiSoffit™ Certifications

Nichiha NichiBoard™ NichiPanel™, NichiShake™, NichiFrontier™, NichiStaggered™, NichiStraight™, and NichiSoffit™ boards shall meet or exceed requirements of the following:

1. ICC Evaluation Service, Inc. (ICC-ES) Report No. ESR-2894.

ASTM C 1185 Physical Properties Tests

- Date Of Test:** May 20, 2008
- Test Agency:** Intertek Testing Services NA LTD.
1500 Brigantine Drive, Coquitlam, BC V3K 7C1 Canada
- Test Method:** ASTM C 1185 Durability tests including linear variations with change in moisture content, water tightness, wet flexural strength, freeze/thaw, warm water, and heat/rain.
- Test Specimen:** NichiBoard™, NichiPanel™, NichiShake™, and NichiSoffit™ - i.e. NichiProducts™
- Specimen Specifications:** *Thickness:* 5/16" and 1/4"
Width: Various.
Length: Various.
- Test Procedure:** The test was performed in accordance to ASTM requirements.
- Test Results:** The test results show the Nichiha NichiProducts™ Fiber Cement Boards successfully comply with the requirements specified in the ICC-ES Acceptance Criteria for Fiber Cement for use.

Physical Property Test Results for NichiBoard™		
Property	Test Result	Requirement
Dimensional Tolerances, in		
Length	0.03	± 0.25
Width	0.01	± 0.13
Thickness	0.03	± 0.04
Squareness	0.00	± 0.38
Edge Straightness	0.00	± 0.38
Density, lb/ft ³	77.6	As reported
Heat Rain Resistance	No cracks or structural alteration	No cracks or structural alteration

Physical Property Test Results for NichiPanel™		
Property	Test Result	Requirement
Dimensional Tolerances, in		
Length	0.01	± 0.25
Width	0.03	± 0.25
Thickness	0.00	± 0.04
Squareness	0.06	± 0.25
Edge Straightness	0.00	± 0.25
Water Tightness	No formation of water drops	No formation of water drops
Heat Rain Resistance	No cracks or structural alteration	No cracks or structural alteration

ASTM C 1185 Physical Properties Tests (cont.)

Physical Property Test Results for NichiShake™		
Property	Test Result	Requirement
Dimensional Tolerances, in		
12"wide		
Length	0.06	± 0.13
Width	0.04	± 0.13
Thickness	0.01	± 0.04
Squareness	0.03	± 0.05
Edge Straightness	0.00	± 0.05
8-1/4" wide		
Length	0.07	± 0.13
Width	0.04	± 0.13
Thickness	0.00	± 0.04
Squareness	0.03	± 0.05
Edge Straightness	0.00	± 0.05
6-1/4" wide		
Length	0.03	± 0.13
Width	0.03	± 0.13
Thickness	0.03	± 0.04
Squareness	0.01	± 0.05
Edge Straightness	0.00	± 0.05
Flexural Strength, psi		
Dry	2154	≥ 1450 ¹
Wet	1743	≥ 1015 ¹
Frost Resistance		
Strength Retention %	96	≥ 80
Observation	No deleterious effects	No deleterious effects
Warm Water Resistance		
Strength Retention %	103	As Reported
Observation	No deleterious effects	No deleterious effects
Heat Rain Resistance	No cracks or structural alteration	No cracks or structural alteration

Note ¹ - Grade II requirements taken from Table 1 - "Flexural Strength Requirements" of ASTM C1186-07

ASTM C 1185 Physical Properties Tests (cont.)

Physical Property Test Results for NichiSoffit™		
Property	Test Result	Requirement
Dimensional Tolerances, in		
Length	0.01	± 0.25
Width	0.04	± 0.25
Thickness	0.00	± 0.04
Squareness	0.02	± 0.38
Edge Straightness	0.00	± 0.38
Moisture Movement, %	0.08	As Reported
Water Absorption, %	38.1	As Reported
Moisture Content, %	10.5	As Reported

ASTM E 84/CAN/ULC S102-07 Surface Burning Characteristics

- Date Of Test:** June 25, 2008
- Test Agency:** Intertek Testing Services NA LTD.
1500 Brigantine Drive, Coquitlam, B.C. V3K 7C1 Canada
- Test Method:** ASTM E 84 Standard test method for surface burning characteristics of building materials, sometimes referred to as the Steiner Tunnel test.
- Test Specimen:** 5/16" thick NichiProducts™
- Specimen** *Thickness: 5/16"*
Specifications: *Width: Various.*
Length: Various.
- Test Procedure:** For each trial run, three 8ft. panels were placed on the upper ledge of the flame spread tunnel and butted together to form the required 24ft. sample length. A layer of 6mm reinforced cement board was placed over the top of the samples, the tunnel lid was lowered into place, and the samples were then tested in accordance with ASTM E84-08.
- Test Results:** The test result is shown in the table below. NichiProducts™ meets Class A requirements.

Test Sample	Maximum Flame Spread (ft.)	Smoke Developed
NichiProducts™	0	1

Note: Class A requirements:
Flame Spread \leq 25
Smoke Developed $<$ 450

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

Date Of Test: September, 2008

Test Agency: Intertek Testing Services
1500 Brigantine Drive, Coquitlam, B.C. V3K 7C1

Test Method: ASTM E/CAN/ULC S101-07 Standard practicing for fire tests of building construction and materials.

Test Specimen: NichiBoard™, NichiPanel™

Specimen *Thickness:* 5/16"

Specifications: *Width:* 12" trimmed as needed for tests.

Length: 12' trimmed as needed for tests.

Test Panel Structure 20-gauge steel studs on 3 5/8" deep track, placed at 16 in. on center. R-13 fiberglass un-faced insulation (4-in thickness) was installed within each stud cavity. Both sides of wall assembly were faced with 5/8" Type-X gypsum wallboards oriented horizontally with joints staggered. Drywall tape was applied to all joints. 15-lb felt paper was installed over gypsum board on the exposed surface with 1/4" staples. Nichiboards were installed, per installation instructions, using 1-5/8" self-tapping screws at each stud.

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 steam test, which subjects the specimen to impact, erosion, and cooling effects of the water stream.

Test Result: 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.

1 Hour Steel-Stud Assembly		
Time (min.)	Exposed Side	Unexposed Side
5:00	No change	
20:00	Some flaming observed	
45:00	Gypsum wallboard intact	
61:00	No change, test discontinued	No flaming, no burn-through, no open cracks have occurred.

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

- Date Of Test:** September, 2008
- Test Agency:** Intertek Testing Services
1500 Brigantine Drive, Coquitlam, B.C. V3K 7C1
- Test Method:** ASTM E/CAN/ULC S101-07 Standard practicing for fire tests of building construction and materials.
- Test Specimen:** NichiBoard™, NichiPanel™
- Specimen Specifications:** *Thickness:* 5/16"
Width: 12" trimmed as needed for tests.
Length: 12' trimmed as needed for tests.
- Test Panel Structure:** 2" x 4" Douglas Fir studs placed at 16" on center. R-13 fiberglass un-faced insulation was installed within each stud cavity. Both sides of the wall were faced with 5/8" Type-X gypsum wallboard with staggered joints. Drywall tape was applied to all joints. 15-lb felt paper was installed horizontally, with 6 inch overlap, over the gypsum wallboards on the fire side of the wall assembly using 1/4" staples. Nichi-boards were installed, per installation instructions, using 8D common nails over each stud.
- 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 steam test, which subjects the specimen to impact, erosion, and cooling effects of the water stream.
- Test Result:** 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.

1 Hour Wood-Stud Wall Assembly		
Time (min.)	Exposed Side	Unexposed Side
0:00		2700 psi load applied (17,000 lbs.)
10:00	Siding is starting to crack	
15:00	Tar paper has ignited	
18:00	Siding has fallen off	
25:00	Tar paper no longer burning	
51:00		No change, holding 2700 psi load
60:00	No change, test discontinued	No flaming, no burn-through, no open cracks have occurred, 2700 psi load held.



October 26, 2006
Revised: February 15, 2010

Nichiha-USA, Inc.
5855 Oakbrook Parkway, Ste P
Norcross, GA 30093

Attention: Mr. Ryuji Hotta

Dear Sir:

Re: Report No. 3105885COQ-002 – ASTM E136 Non-Combustibility Test Results

On October 12, 13, and 25, 2006, Intertek Testing Services NA Ltd. conducted a test program on behalf of Nichiha-USA, Inc. The purpose of the testing was to determine whether Nichiha products: Nichiha M Series, NichiBoard, NichiPanel, and NichiSoffit unprimed cementitious cubes would meet the requirements of ASTM E136-99, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C*. A pre-test inspection of the sample material was conducted on September 29, 2006, at Nichiha Corporation, Nagoya, Aichi-Ken, Japan, by Mr. Tetsuo Maeda representing Intertek Testing Services.

After the specimens were conditioned, they were weighed and then tested in accordance with the test standard. The standard states that; the mean of the maximum temperature rise for the four specimens does not exceed 30°C above the stabilized temperature; and there is no flaming of any of the four specimens during the duration of the test; and the maximum loss of mass of any of the four specimens does not exceed 50%. The results of the tests are as follows:

Group 1:

Sample No.	Allowable Temp Rise (°C)	Temp. Rise Above Initial (°C)	Flaming After 30 Secs.	Allowable Weight Loss (%)	Weight Loss (%)
1-1	782	16	No	50	25.6
1-2	782	19	No	50	24.0
1-3	777	26	No	50	24.3
Average			No	50	24.6

/...2

All services undertaken are subject to the following general policy:

1. This report is for the exclusive use of Intertek Testing Services NA Ltd.'s (Intertek's) client and is provided pursuant to the agreement between Intertek and its client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. 2. Only the client is authorized to copy or distribute this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. 3. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product or service is or has ever been under an Intertek certification program.



Group 2:

Sample No.	Allowable Temp Rise (°C)	Temp. Rise Above Initial (°C)	Flaming After 30 Secs.	Allowable Weight Loss (%)	Weight Loss (%)
2-1	777	26	No	50	19.1
2-2	780	23	No	50	19.6
2-3	780	26	No	50	18.9
Average			No	50	19.2

Group 3:

Sample No.	Allowable Temp Rise (°C)	Temp. Rise Above Initial (°C)	Flaming After 30 Secs.	Allowable Weight Loss (%)	Weight Loss (%)
3-1	777	24	No	50	23.0
3-2	778	28	No	50	14.6
3-3	778	20	No	50	15.4
Average			No	50	17.6

The samples of Group 1, 2, and 3, Nichiha products: Nichiha M Series, NichiBoard, NichiPanel, and NichiSoffit unprimed cementitious cubes, submitted by Nichiha-USA, Inc., therefore met the requirements of ASTM E136-99, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C*.

Yours truly,

INTERTEK TESTING SERVICES NA LTD.

Tested and
Reported by: Gregory Philp
Technician
Construction Products Testing

Reviewed by: Mike van Geyn
Mike van Geyn, A.Sc.T.
Manager
Fire Testing & Technical Programs

GP/bjm

C:\Documents and Settings\bmills\My Documents\ITS-DATA\490-WP\RPT2006 - 493 Rpts\nichiha.3105885.oct-06.doc