

# TEST REPORT

**Intertek**

**REPORT NUMBER: 101113787COQ-004**

ORIGINAL ISSUE DATE: July 3, 2013

## EVALUATION CENTER

INTERTEK TESTING SERVICES NA LTD.  
1500 BRIGANTINE DRIVE  
COQUITLAM, BC V3K 7C1

## RENDERED TO

CEMENT BOARD FABRICATORS, INC.  
2148 S. 41<sup>ST</sup> STREET  
LOUISVILLE, KY 40211

PRODUCT EVALUATED: Silbonit™ Fiber-Cement Flat Sheets  
EVALUATION PROPERTY: Transverse Load Testing

**Report of Silbonit™ Fiber-Cement Flat Sheets tested in accordance with  
ASTM E330-02(2010), *Standard Test Method for Structural Performance of  
Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air  
Pressure Difference***

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## 2 Introduction

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Intertek Testing Services NA Ltd. (Intertek) has conducted Transverse Load Testing for Cement Board Fabricators, Inc. on a fiber-cement panel product. The testing was carried out in accordance with ASTM E330-02(2010), *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*. This evaluation was completed during the month of April 2013.

## 3 Test Samples

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### 3.1. SAMPLE SELECTION

The client submitted the fiber-cement panels to the Evaluation Center on April 8, 2013 (Coquitlam ID# VAN1304081354-001). Samples were not independently selected for testing.

### 3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The product was identified as the Silbonit™ Fiber-Cement Flat Sheets, a fiber-reinforced panel product measuring nominal 4 ft. x 8 ft. x 5/16 in. thick and weighing 3 lbs/ft<sup>2</sup>.

## 4 Testing and Evaluation Methods

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### 4.1. CONDITIONING

Unless otherwise stated, the sample materials were maintained in standard laboratory conditions for a minimum of 7 days at a temperature of 73 ± 4°F (23 ± 2°C) and relative humidity of 50 ± 5%.

### 4.2. TRANSVERSE LOAD

Transverse load testing was conducted in accordance with ASTM E330-02(2010). Test frames, measuring 4 ft. x 8 ft., were constructed from SPF #2+BTR, nominal 2 in. x 4 in. lumber, spaced 24 in. on center. Frames were fastened together using 3-1/2 in. deck screws.

A total of four (4) assemblies were constructed for transverse load - three (3) assemblies for the negative wind load direction and one (1) assembly for the positive wind load direction. Plywood furring strips, measuring 1-1/2 in. x 3/4 in., were installed to the vertical stud locations. Client-supplied EPDM rubber strips were then fastened to the furring strips. The Silbonit™ panels were installed vertically over the EPDM rubber strips using the supplied stainless steel 1-1/2 in. long screws spaced every 16 in. o/c along the studs (16 screws total per test assembly). Installation of the test panels were in accordance with the manufacturer's installation instructions.

Testing was conducted using the chamber method for uniformly distributed loading. Each test frame was secured in a horizontal uniformly distributed load testing apparatus. The air within the test chamber was evacuated using a vacuum pump, inducing a uniformly distributed load to the sample. A polyethylene film was used to prevent air leakage through the panel. In order to ensure the maximum load was transferred to the specimen and that the polyethylene film did not prevent movement or failure of the specimen, the polyethylene film was applied loosely with extra folds of material at each corner and at all offsets and recesses. For negative load tests

the polyethylene film was placed on the inner face of the panel during construction of the assembly. The test was carried out without restriction of any relative movement between the panel material and any part of the test assembly or test apparatus.

Deflection readings were recorded for each test to establish deformation and set characteristics. For all test configurations, five (5) gauges were set on the test specimen. Gauge locations can be found on the data sheets in Appendix A. All deflection measurements were made independent of the test specimens.

The load was increased to prescribed load increments where the deformation was recorded after holding for 10 seconds each. The load was then released where the deformation was recorded after a period of not less than 1 minute or more than 5 minutes. This sequence of deformation measurements was repeated a minimum of five times until a final ultimate load was attained. A visual examination of the specimens was made after the tests to determine the failure mode.

## 5 Testing and Evaluation Results

### 5.1. RESULTS AND OBSERVATIONS

The test results are shown in Table 1 below. A full set of test data for the Silbonit™ Fiber-Cement Flat Sheets product is included in Appendix A.

Panel	Framing	Stud Spacing	Direction	Ultimate Load (psf)	Average Ultimate Load (psf)
Silbonit™ Fiber-Cement Flat Sheets	Wood 2" x 4" SPF #2+BTR	24" O/C	Negative Wind Load	156.1	156.1
				156.1	
				156.1	
			Positive Wind Load	150.9	N/A

## 6 Conclusion

The Cement Board Fabricators, Inc. Silbonit™ Fiber-Cement Flat Sheets product identified and evaluated in this report has been tested in accordance with ASTM E330-02(2010), *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*. The product test results are presented in Section 5 of this report.

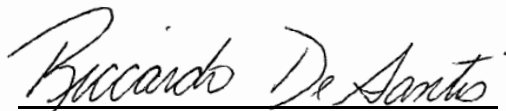
### INTERTEK TESTING SERVICES NA LTD.

Reported by:



Chris Chang, P.Eng.  
Engineer, Building Products

Reviewed by:



Riccardo DeSantis  
Manager, Building Products

## **Appendix A: Transverse Load Test Results (5 pages)**



Company	Cement Board Fabricators, Inc.	Technician(s)	Kevin Penner <i>AP</i>
Project No.	G101113787	Reviewer	Riccardo DeSantis <i>R.D.</i>
Models	Silbonit™ Fiber-Cement Flat Sheets	Start/End Date	April 25, 2013
Product Name	Same as above	Sample ID	VAN1304081354-001
Standard	<b>ASTM E330-02(2010), Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference</b>		

Test Data Package

Table of Contents

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Table of Contents (This Sheet)	1
Transverse Load Test #1 - Negative Wind Load	2
Transverse Load Test #2 - Negative Wind Load	3
Transverse Load Test #3 - Negative Wind Load	4
Transverse Load Test #4 - Positive Wind Load	5



Test: **Transverse Load - Negative Wind Load**

**TEST #1**

Project#: G101113787

Client: Cement Board Fabricators, Inc.

Technician(s): Kevin Penner *K.P.*

Date: 25-Apr-13

Reviewer: Riccardo DeSantis *R.D.*

Product: **Silbonit Fiber-Cement Flat Sheets**

Test Method(s): ASTM E330-02(2010), *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

Installation: Configuration: Wood  
 Framing: Nominal 2x4 SPF #2&BTR lumber studs spaced 24 in. o/c, fastened with 3-1/2 in. deck screws  
 Fastener: 1-1/2 in. long Stainless steel pan head screw (supplied by client)  
 Fastener Spacing: 16 in. o/c along studs (21 screws total)

Equipment:  
 36" Dwyer Manometer (Intertek ID# 2056)  
 1 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# P60021, cal due November 2013)  
 2 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# P60175, cal due November 2013)  
 3 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# 02699, cal due November 2013)  
 4 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# 02768, cal due November 2013)  
 5 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# P60020, cal due November 2013)  
 Vaisala Temperature and Relative Humidity Indicator (Intertek ID# 9-0176, cal due June 2013)

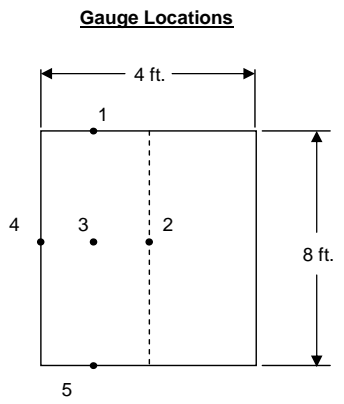
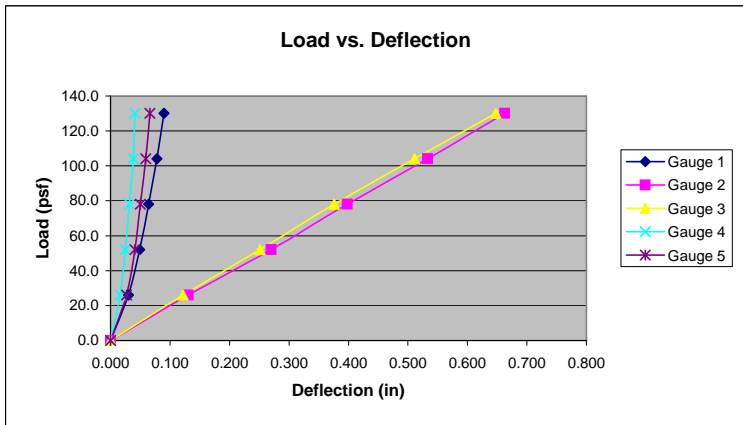
Time/Temp/RH: 1:40PM / 20.9°C / 38.5%

Test Assembly	
Width (ft)	Length (ft)
8.0	4.0

Load (in WC)	Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)
0.0	0.0	immed.	0.000	0.000	0.000	0.000	0.000
15.0	78.0	10 sec.	N/A	N/A	N/A	N/A	N/A
0.0	0.0	1-5mins	Zero Deflection Gauges				
5.0	26.0	10 sec.	0.030	0.131	0.122	0.016	0.027
0.0	0.0	1-5mins	0.000	-0.001	-0.001	0.000	-0.001
10.0	52.0	10 sec.	0.049	0.270	0.251	0.025	0.041
0.0	0.0	1-5mins	0.001	0.001	0.001	0.001	0.000
15.0	78.0	10 sec.	0.064	0.398	0.376	0.032	0.050
0.0	0.0	1-5mins	0.001	0.006	0.005	0.002	0.001
20.0	104.0	10 sec.	0.078	0.533	0.511	0.038	0.059
0.0	0.0	1-5mins	0.002	0.014	0.014	0.003	0.004
25.0	130.1	10 sec.	0.090	0.663	0.648	0.041	0.066
0.0	0.0	1-5mins	0.003	0.023	0.026	0.004	0.008

**Mode of Failure**

Max Load (psf)	156.1	Panel broke along center stud line
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Test: **Transverse Load - Negative Wind Load**

**TEST #2**

Project#: G101113787

Client: Cement Board Fabricators, Inc.

Technician(s): Kevin Penner *K.P.*

Date: 25-Apr-13

Reviewer: Riccardo DeSantis *R.D.*

Product: **Silbonit Fiber-Cement Flat Sheets**

Test Method(s): ASTM E330-02(2010), *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

Installation: Configuration: Wood  
 Framing: Nominal 2x4 SPF #2&BTR lumber studs spaced 24 in. o/c, fastened with 3-1/2 in. deck screws  
 Fastener: 1-1/2 in. long Stainless steel pan head screw (supplied by client)  
 Fastener Spacing: 16 in. o/c along studs (21 screws total)

Equipment:  
 36" Dwyer Manometer (Intertek ID# 2056)  
 1 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# P60021, cal due November 2013)  
 2 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# P60175, cal due November 2013)  
 3 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# 02699, cal due November 2013)  
 4 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# 02768, cal due November 2013)  
 5 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# P60020, cal due November 2013)  
 Vaisala Temperature and Relative Humidity Indicator (Intertek ID# 9-0176, cal due June 2013)

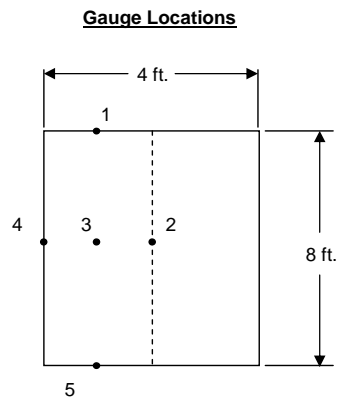
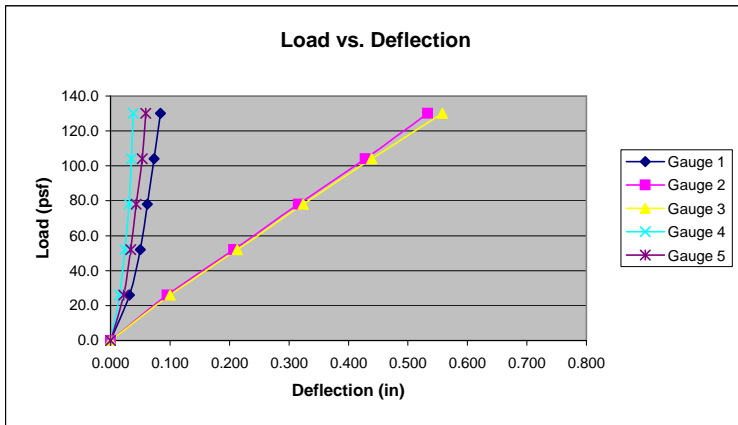
Time/Temp/RH: 1:40PM / 20.9°C / 38.5%

Test Assembly	
Width (ft)	Length (ft)
8.0	4.0

Load (in WC)	Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)
0.0	0.0	immed.	0.000	0.000	0.000	0.000	0.000
15.0	78.0	10 sec.	N/A	N/A	N/A	N/A	N/A
0.0	0.0	1-5mins	Zero Deflection Gauges				
5.0	26.0	10 sec.	0.032	0.095	0.100	0.015	0.022
0.0	0.0	1-5mins	0.001	0.001	0.001	0.001	0.000
10.0	52.0	10 sec.	0.050	0.207	0.213	0.024	0.034
0.0	0.0	1-5mins	0.001	0.002	0.002	0.001	0.000
15.0	78.0	10 sec.	0.062	0.316	0.324	0.031	0.043
0.0	0.0	1-5mins	0.002	0.003	0.004	0.002	0.000
20.0	104.0	10 sec.	0.073	0.428	0.439	0.035	0.053
0.0	0.0	1-5mins	0.004	0.010	0.011	0.003	0.003
25.0	130.1	10 sec.	0.084	0.533	0.558	0.038	0.059
0.0	0.0	1-5mins	0.005	0.013	0.019	0.004	0.004

**Mode of Failure**

Max Load (psf)	156.1	Panel broke along center stud line
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Test: **Transverse Load - Negative Wind Load**

**TEST #3**

Project#: G101113787

Client: Cement Board Fabricators, Inc.

Technician(s): Kevin Penner *K.P.*

Date: 25-Apr-13

Reviewer: Riccardo DeSantis *R.D.*

Product: **Silbonit Fiber-Cement Flat Sheets**

Test Method(s): ASTM E330-02(2010), *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

Installation: Configuration: Wood  
 Framing: Nominal 2x4 SPF #2&BTR lumber studs spaced 24 in. o/c, fastened with 3-1/2 in. deck screws  
 Fastener: 1-1/2 in. long Stainless steel pan head screw (supplied by client)  
 Fastener Spacing: 16 in. o/c along studs (21 screws total)

Equipment:  
 36" Dwyer Manometer (Intertek ID# 2056)  
 1 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# P60021, cal due November 2013)  
 2 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# P60175, cal due November 2013)  
 3 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# 02699, cal due November 2013)  
 4 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# 02768, cal due November 2013)  
 5 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# P60020, cal due November 2013)  
 Vaisala Temperature and Relative Humidity Indicator (Intertek ID# 9-0176, cal due June 2013)

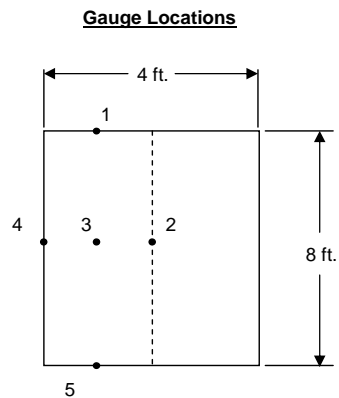
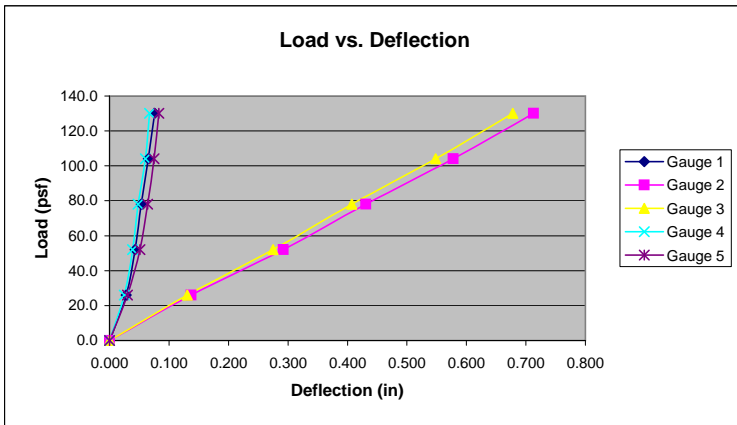
Time/Temp/RH: 1:40PM / 20.9°C / 38.5%

Test Assembly	
Width (ft)	Length (ft)
8.0	4.0

Load (in WC)	Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)
0.0	0.0	immed.	0.000	0.000	0.000	0.000	0.000
15.0	78.0	10 sec.	N/A	N/A	N/A	N/A	N/A
0.0	0.0	1-5mins	Zero Deflection Gauges				
5.0	26.0	10 sec.	0.028	0.137	0.131	0.025	0.030
0.0	0.0	1-5mins	0.001	0.001	0.001	0.001	0.001
10.0	52.0	10 sec.	0.043	0.292	0.275	0.039	0.051
0.0	0.0	1-5mins	0.002	0.003	0.003	0.003	0.002
15.0	78.0	10 sec.	0.053	0.431	0.407	0.048	0.064
0.0	0.0	1-5mins	0.002	0.007	0.008	0.004	0.003
20.0	104.0	10 sec.	0.065	0.578	0.548	0.060	0.075
0.0	0.0	1-5mins	0.006	0.019	0.021	0.008	0.006
25.0	130.1	10 sec.	0.076	0.713	0.678	0.067	0.083
0.0	0.0	1-5mins	0.010	0.028	0.033	0.012	0.008

**Mode of Failure**

Max Load (psf)	156.1	Panel broke along center stud line
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**Test: Transverse Load - Positive Wind Load** **TEST #4**  
**Client:** Cement Board Fabricators, Inc. Project#: G101113787  
**Date:** 25-Apr-13 Technician(s): Kevin Penner *K.P.*  
**Product:** **Silbonit Fiber-Cement Flat Sheets** Reviewer: Riccardo DeSantis *R.D.*  
**Test Method(s):** ASTM E330-02(2010), *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*  
**Installation:** Configuration: Wood  
 Framing: Nominal 2x4 SPF #2&BTR lumber studs spaced 24 in. o/c, fastened with 3-1/2 in. deck screws  
 Fastener: 1-1/2 in. long Stainless steel pan head screw (supplied by client)  
 Fastener Spacing: 16 in. o/c along studs (21 screws total)  
**Equipment:**  
 36" Dwyer Manometer (Intertek ID# 2056)  
 1 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# P60021, cal due November 2013)  
 2 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# P60175, cal due November 2013)  
 3 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# 02699, cal due November 2013)  
 4 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# 02768, cal due November 2013)  
 5 - 2 in. Mitutoyo Digital Deflection Gauge (Intertek ID# P60020, cal due November 2013)  
 Vaisala Temperature and Relative Humidity Indicator (Intertek ID# 9-0176, cal due June 2013)  
**Time/Temp/RH:** 1:40PM / 20.9°C / 38.5%

Test Assembly	
Width (ft)	Length (ft)
8.0	4.0

Load (in WC)	Load (psf)	Time	Gauge 1 (in.)	Gauge 2 (in.)	Gauge 3 (in.)	Gauge 4 (in.)	Gauge 5 (in.)
0.0	0.0	immed.	0.000	0.000	0.000	0.000	0.000
15.0	78.0	10 sec.	N/A	N/A	N/A	N/A	N/A
0.0	0.0	1-5mins	Zero Deflection Gauges				
5.0	26.0	10 sec.	0.089	0.089	0.110	0.039	0.047
0.0	0.0	1-5mins	-0.002	-0.002	-0.001	0.000	0.000
10.0	52.0	10 sec.	0.182	0.192	0.234	0.086	0.095
0.0	0.0	1-5mins	0.001	0.000	0.000	0.000	0.000
15.0	78.0	10 sec.	0.241	0.290	0.350	0.113	0.142
0.0	0.0	1-5mins	0.001	0.002	0.002	0.000	0.002
20.0	104.0	10 sec.	0.330	0.396	0.491	0.131	0.199
0.0	0.0	1-5mins	0.008	0.003	0.043	0.010	0.051
25.0	130.1	10 sec.	0.425	0.475	0.692	0.145	0.452
0.0	0.0	1-5mins	0.012	0.013	0.052	0.013	0.055

**Mode of Failure**

<b>Max Load (psf)</b>	<b>150.9</b>	Panel cracked between center and side studs
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