



TEST REPORT

REPORT NUMBER: 102488104TOR-001R1
ISSUE DATE: June 8, 2016

EVALUATION CENTER

Intertek Testing Services Ltd.
6225 Kenway Drive
Mississauga, Ontario L5T 2L3

RENDERED TO:
Sagiper North America
13179 156 Street NW
Edmonton, AB
T5V 1V2 Canada

PRODUCT EVALUATED
“Sagiwall Panel”

EVALUATION PROPERTY
Physical Characteristics

**Test Report for Physical Characteristics of Sagiper “Sagiwall Panel”
conducted in general accordance with CAN/CGSB-41.24-95 “Rigid Vinyl
Siding, Soffits and Fascia”.**

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2 Introduction

Intertek has conducted testing for Sagiper North America on their “Sagiwall Panel” product to evaluate for Physical Characteristics. Testing was conducted in accordance with the methods of CAN/CGSB-41.24-95 “Rigid Vinyl Siding, Soffits and Fascia”. This evaluation began on May 3, 2016 and was completed on June 8, 2016.

3 Test Specimen

The sample submitted by Sagiper North America is a ribbed, double wall polyvinyl chloride siding material labeled as Sagiwall Panel. Overall dimensions: 16' x 7" x 5/8" brown in color. The test specimens were shipped to the Intertek Mississauga facility; all sample preparation was completed on site. Sample Selection documents were not submitted with test samples.



Figure 1: Assembled Sagiper “Sagiwall Panel” Material

4 Testing and Evaluation Methods

4.1 Thermal Expansion

As per Section 5.1.2 of the specification standard Thermal Expansion testing was carried out in accordance with ASTM D696. A detailed test report is presented in Appendix B.

4.2 Visual Colour Comparison

As per Section 5.2.1 of the specification standard colour uniformity was evaluated at a 45° angle to the surface in accordance with Section 7.2.1 with comparison to a prescribed standard from Federal Standard 595, “Colours Used in Government Procurement”.

4.3 Specular Gloss

As per Section 5.2.2 of the specification standard gloss evaluation was performed in accordance with Section 7.2.2 at an incident angle of 75° by a Gardner Gloss Guard II equivalent on three widely separated points across the width of the exposed surface.

4.4 Shrinkage

As per Section 5.2.3 of the specification standard shrinkage was evaluated by means of water immersion at 71°C for 30 minutes followed by ambient room temperature conditioning for 24 hours. Shrinkage was measured as a percentage of the original length.

4.5 Warp

As per Section 5.2.4 of the specification standard warp was measured by reference of the material to a straight edge surface for each edge of the siding.

4.6 Weatherability

As per Section 5.2.5 of the specification standard weatherability is evaluated by means of exposure to three climatological areas of North America for a duration of one full year as per ASTM D1435. Samples are evaluated based on effects of peeling, chipping, flaking, and pitting.

4.7 Impact Resistance

As per Section 5.2.6 of the specification standard impact resistance was evaluated in accordance with Section 7.2.6 by means of a variable height impact tester. Samples were conditioned at 23°C and 50%RH for a duration of 1 hour prior to testing. Only brittle failures of the surface were considered. A total of twenty (20) specimens were evaluated.

4.7 Surface Distortion

As per Section 5.2.7 of the specification standard surface distortion was evaluated in accordance with Section 7.2.7 by means of radiant heat apparatus with a watt density of 1900 W/m. A temperature of 55°C was reached as determined by a thermocouple on the midpoint backside of the exposed face. The material was evaluated for observation of bulges, waves and ripples.

4.8 Thickness

As per Section 5.2.9 of the specification standard thickness was evaluated in accordance with Section 7.2.9 by means of a Vernier caliper across the entire width of the exposed face of the siding panel. Thickness of siding at the nailing slots was also measured at the center line and between slots.

5 Testing and Evaluation Results

A summary of test results is presented in Table 1 below.

TEST	SECTION	REQUIREMENT	RESULT	UNIT	Pass/Fail	
Thermal Expansion	5.1.2	$\leq 8.1 \times 10^{-5}$	4.84×10^{-5}	$^{\circ}\text{C}^{-1}$	Pass	
Colour	5.2.1	Uniform	Uniform	-	Pass	
Gloss	5.2.2	8	0.3	points	Pass	
Shrinkage	5.2.3	≤ 3.0	0.2	%	Pass	
Warp, <i>per 3m length</i>	5.2.4	≤ 3	1	mm	Pass	
Weatherability	5.2.5	-	-	-	In Progress	
Impact Resistance ¹	5.2.6	≥ 6.3	8.2	J	Pass	
Surface Distortion	5.2.7	No bulging, waves or ripples	None	-	Pass	
Thickness	Face	5.2.9	≥ 0.7	17	mm	Pass
	Nail Slots		≥ 0.9	1.9	mm	Pass

¹ Sample size was deviated from 2"x2" as per CAN/CGSB-41.24-95 to 4"x4" due to the primary mode of failure occurring within the ribbing of the material when tested at a 2"x2" sample size.

6 Conclusion

The Sagiper "Sagiwall Panel" siding material evaluated in this report has been tested in general accordance with CAN/CGSB-41.24-95 "Rigid Vinyl Siding, Soffits and Fascia" and met all requirements for tests completed to date with deviations as noted in this report.

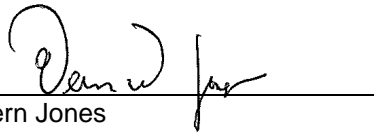
INTERTEK TESTING SERVICES NA LTD.

Reported by:



Igor Radovic,
Technical Analyst, Building Products

Reviewed by:



Vern Jones
Senior Technologist, Building Products

7 Appendix A: Detailed Test Results



Date	19-May-15	Engineer	Igor Radovic	Condition A	
Project No.	G102488104	Reviewer	Vern Jones	Exposure Start	2:35pm
Customer	Sagiper			Exposure End	3:05pm
Test	Shrinkage				
Standard	CAN/CGSB-41-24-95				
Instrument	Number	Cal due			
Calipers	280-01-0754	28-Jan-17			
Scale	280-01-0075	2-Feb-17			

	Initial Measurements			Final Measurements		
	Condition A: 70oC Immersion			Condition A: 70oC Immersion		
Specimen 1	Width (mm)	Height (mm)	Thick (mm)	Width (mm)	Height (mm)	Thick (mm)
1	120.92	28.14	16.94	120.64	28.14	17.25
2	121	28.2	16.94	120.7	28.16	17.38
3	121.1	28.2	16.93	120.73	28.2	17.33
Avg.	121.0	28.2	16.9	120.7	28.2	17.3
Specimen 2	Width (mm)	Height (mm)	Thick (mm)	Width (mm)	Height (mm)	Thick (mm)
1	119.37	27.89	17.17	119.35	27.84	17.31
2	120.4	27.62	17.13	120.25	27.64	17.36
3	120.53	26.95	17.14	120.43	27.04	17.39
Avg.	120.1	27.5	17.1	120.0	27.5	17.4
Specimen 3	Width (mm)	Height (mm)	Thick (mm)	Width (mm)	Height (mm)	Thick (mm)
1	120.34	26.63	16.99	120.03	26.63	17.16
2	120.27	27.19	16.96	120.1	27.23	16.77
3	120.33	27.04	16.95	120.14	27.06	17.33
Avg.	120.3	27.0	17.0	120.1	27.0	17.1
Total Avg.	120.5	27.6	17.0	120.28	27.60	17.27
Std.Dev	0.52	0.60	0.10	0.43	0.58	0.19

	% Change in Dimension		
	Condition A: 70oC Immersion		
	Width (mm)	Height (mm)	Thick (mm)
Specimen 1	-0.26%	-0.05%	2.26%
Specimen 2	-0.07%	0.07%	1.21%
Specimen 3	-0.25%	0.07%	0.71%
Total Avg.	-0.2%	0.0%	1.4%
Visual Observations	None		

Test: Impact-Method B **Reviewer:** V.Jones
Start Date: 5/25/2016 **Eng/Tech:** I.Radovic
Job No: G102488104
Client: Sagiper North America **Sample:** Sagiwall Panel 4x4in
Standards: ASTM D4226-11
Conditioning: 1 hr at 23oC 50%RH
Equipment:

Item	ID	Cal Due Date
Digital Caliper	280-01-0754	28-Jan-17
Gardiner Impact Tester	280-01-0063	n/a
Impact head	H.25	n/a
Environmental Chamber	280-01-1201	21-Sep-16

Thickness Measurement (in.)			
Specimen		Specimen	
1	0.681	16	0.678
2	0.683	17	0.680
3	0.681	18	0.679
4	0.681	19	0.680
5	0.679	20	0.677
6	0.680	21	0.679
7	0.679	22	0.677
8	0.679	23	0.675
9	0.679	24	0.675
10	0.680	25	0.678
11	0.682	26	0.667
12	0.683	27	0.660
13	0.681	28	0.672
14	0.678	29	0.682
15	0.681	30	0.677
Total Avg		0.678	

Outcome of Test, x = failure, O = non failure, D = ductile failure, B = brittle failure

Specimen	Height Measurement (in.)								Failure Height (in)
	6	7	8	9	10	11	12	13	
1	O								-
2		O							-
3			X,B						8
4		O							-
5			X,B						8
6		O							-
7			O						-
8				O					-
9					X,B				10
10				X,B					9
11			O						-
12				X,B					9
13			O						-
14				O					-
15					O				-
16						O			-
17							X,B		12
18						X,B			11
19					X,B				10
20				O					-

Height (in.)	N _x	N _o	i	Ni	iNi	i ² Ni
12	1	0	4	1	4	16
11	1	1	3	1	3	9
10	2	1	2	2	4	8
9	2	3	1	2	2	2
8	2	3	0	2	0	0
7	0	3		0	0	0
6	0	1		0	0	0
Totals	N _x = 8	N _o = 12		N = 8	A = 13	B = 35

$h = h_o + d_h (A/N \pm 0.5)$ $h = 203.2 + 25.4 \{ (13/8) - 0.5 \}$ $= 203.2 + 25.4 * (1.625 - 0.5)$ $= 203.2 + 28.56$ $h = 231.78 \text{ mm (9.125 in)}$	$s = 1.620d \{ [(NB - A^2) / N^2] + 0.029 \}$ $= 1.620(25.4) \{ [(8 * 35 - 13^2) / 8^2] + 0.029 \}$ $= 41.148 \{ [(280 - 169) / 64] + 0.029 \}$ $= 41.148 (1.73 + 0.029)$ $s = 72.56 \text{ mm (2.86 in)}$
---	--


h_o = 203.2
 d_h = 25.4
 N = 8
 A = 13
 B = 35

MBFE = h*w	
h =	9.125 in
w =	7.95 lb
MBFE =	72.54 in·lb

Calculation Check:		
h =	231.78 mm	9.125 in
s =	72.56 mm	2.86 in

For report:

Sample Identification:	Sagiwall Panel
Procedure Used:	Procedure B
Impactor Head Configuration:	H.25
Average Thickness:	0.678 in
Number of Test Specimens:	20 specimens
Mean Failure Energy:	72.54 in·lbf
Estimated Standard Deviation:	2.86 in
Normalized Mean Energies:	107 lb
Deviations from Standard:	None

			
Date:	5/17/2015	Engineer	Igor Radovic
Project No.	G102488104	Reviewer	Vern Jones
Client:	Sagiper		
Sample:	Sagiwall Panel		
Test:	Surface Distortion		
Standard:	CAN/CGSB-41.24-95		
Instrument		Number	Cal due
Radiant Heat Controller		280-01-0152	2/18/2017
Time	Observations		
2:14pm	At 810mm from heat source. 55°C temperature set.		
2:31pm	No bulges, waves or ripples		



Date	17-May-16	Engineer	I.Radovic
Project No.	G102488104	Reviewer	V.Jones
Customer	Saggiper		
Test	Warp & Thickness		
Standard	CAN/CGSB 41.24-95		
Instrument	Number	Cal due	
Feeler Gauge	273-01-0784	n/a	
Calipers	280-01-0754	28-Jan-17	

Thickness Measurements			
Measurement	Siding	Nail Slot	
		Center Line	Between Slots
1	16.77	1.82	1.8
2	16.76	1.84	1.82
3	16.93	1.79	1.77
4	16.87	1.98	1.92
5	16.74	1.99	1.98
Avg,	16.814	1.9	
Req.	> 0.7mm	> 0.9mm	

Warp Measurements	
Location	Measurement, mm
1	1.0
2	0.5
3	0.1
4	0.15
5	0.75
Average	0.5
Minimum	0.1
Maximum	1.0

Note: Measurements taken over a 3m span relative to a straight edge.

8 Appendix B: Supplementary Test Reports



May 25, 2016

Mr. Igor Radovic
Intertek
6225 Kenway Drive
Mississauga, ON L5T 2L3
Canada

PO # CAN20-000020845
Request # G102488104
Intertek PTL # P20161762

Dear Mr. Radovic:

Enclosed you will find the results of the testing you requested.

If you have any questions regarding the data, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Kevin E. Schuman".

Kevin E. Schuman
Quality Manager

KES/jh
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Testing	Coefficient Of Linear Thermal Expansion Of Plastics Between -30°C and +30°C With A Vitreous Silica Dilatometer	
Test Method	ASTM D696-16	
Project Number	P20161762	Purchase Order # : CAN20-0000208045
Customer	Intertek	Customer Request: G102488104
Attention	Igor Radovic	
Analyst	A. Galusha / P. Bacon	
Date	May 24, 2016	



Dilatometer	Tinius Olsen
Sample Preparation	Machined by Intertek PTL
Sample Conditioning	40+ hours at 23° ± 2°C / 50% ± 10% RH
Sample Dimensions	2.5" x 0.5" x 0.01" (Nominal)

$C.T.E. = \alpha = \Delta L / (L_0 \cdot \Delta T)$	$\Delta T = T_2 - T_1$	Temperature	T1 = Start	T2 = Final
	$\Delta L = L_2 - L_1$	Length	L1 = Start	L2 = Final

	Lo (in)	Lo (µm)	T1 (°C)	T2 (°C)	L1 (µm)	L2 (µm)		α (1/°C)	Average α (1/°C)	α (1/°F)	Average α (1/°F)
Sagivall Panel											
Specimen 1	2.567	65202	-31.1	31.0	0	184	Heat	4.54E-05		2.52E-05	
	2.567	65202	31.0	-29.1	184	5	Cool	4.57E-05	4.56E-05	2.54E-05	2.53E-05
Specimen 2	2.562	65075	-28.3	29.0	0	191	Heat	5.12E-05		2.84E-05	
	2.562	65075	29.0	-29.4	191	-3	Cool	5.10E-05	5.11E-05	2.83E-05	2.84E-05
							Average		4.84E-05		2.69E-05

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PERFORMANCE TEST REPORT

Rendered to:

SAGIPER NORTH AMERICA

PRODUCT: Vinyl Siding G102488104

Report No.: F9202.01-106-31

Report Date: 06/02/16

Test Record Retention Date: 05/25/20

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PERFORMANCE TEST REPORT

Rendered to:

SAGIPER NORTH AMERICA
13179 156 Street NW
Edmonton, Alberta T5V 1V2, Canada

Report No.: F9202.01-106-31
Test Start Date: 05/24/16
Test Completion Date: 05/25/16
Report Date: 06/02/16
Test Record Retention Date: 05/25/20

Product: Vinyl Siding G102488104

Project Summary: Architectural Testing, Inc., an Intertek company ("Intertek-ATI"), was contracted by SAGIPER North America to evaluate the color and gloss of a vinyl siding product. The product description, test procedure, and test results are reported herein.

Summary of Test Results: The vinyl siding was compared against a standard control material for color difference and specular gloss. A table with the summary of test results is below.

Summary of Test Results

Specimen ID	Color Difference		Specular Gloss	
	ΔE^*	Outcome	Average	Outcome
1	1.16	Pass	54.9	Pass
2	0.92	Pass	56.0	Pass
3	0.50	Pass	55.8	Pass
4	0.56	Pass	57.0	Pass

Test Methods: The test specimens were evaluated in accordance with CAN/CGSB-41.24-95, *Rigid Vinyl Siding, Soffits and Fascia*, with reference to the following methods.

ASTM D2244-15a, *Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates*

ASTM D2457-13, *Standard Test Method for Specular Gloss of Plastic Films and Solid Plastics*

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Product Description: The wood emboss vinyl siding G102488104 was submitted to Intertek-ATI by SAGIPER North America and consisted of four nominally six-inch square control samples and four nominally three-inch square test specimens. The material was tested as-received. Refer to the product description photos in Appendix A.

Test Procedure and Test Results: The testing procedure and results obtained from testing are reported as follows. All conditioning of test specimens and test conditions were at standard laboratory conditions unless otherwise reported. Refer to the test related photo in Appendix A.

Color Difference

The color readings were determined utilizing a GretagMacBeth Color i5 Spectrophotometer (ICN: 004725) with a diffuse spherical geometry and a xenon lamp, CIELAB color space, illuminant D65, and 10° observer. The specular component was included in the measurements. Each specimen was measured in four equally spaced regions to obtain an indication of uniformity. A standard value was attained with the arithmetic mean of the control specimens. A visual comparison determined that the vinyl siding test specimens did not differ in hue, lightness, and saturation. The test specimens are a reasonable match to the color standard.

CIELAB Value Test Results

Specimen ID	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Standard	29.52	3.97	4.11	NA	NA	NA	NA
T-1	30.35	4.44	4.77	0.83	0.47	0.66	1.16
T-2	30.08	4.40	4.70	0.56	0.44	0.59	0.92
T-3	29.82	4.17	4.45	0.30	0.21	0.34	0.50
T-4	29.88	4.21	4.46	0.36	0.24	0.35	0.56

Munsell Value Test Results

Specimen ID	Hue	Lightness	Chroma
Standard	5.0 YR	2.9	0.9
T-1	5.1 YR	3.0	1.1
T-2	5.1 YR	3.0	1.0
T-3	5.2 YR	2.9	1.0
T-4	5.1 YR	2.9	1.0

Test Procedure and Test Results: (Continued)

Specular Gloss

The gloss was determined utilizing a Gardner Glossmeter (ICN: 004705) with a 75° geometry. The gloss was examined on three equally spaced regions of each specimen and parallel to the direction of embossing. The arithmetic mean of the test specimen gloss varied from the arithmetic mean of the control specimen gloss by 0.5%. The results are displayed in the table below.

Specular Gloss Test Results

Specimen Type	Specimen Number				Average Gloss
	1	2	3	4	
Control	56.3	55.4	55.8	57.1	56.2
Test	54.9	56.0	55.8	57.0	55.9
Point Difference					0.3

Note: The specular gloss of embossed siding shall not vary more than ±15% or 8 points.



Intertek-ATI will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Intertek-ATI for the entire test record retention period.

Results obtained are tested values and were secured using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimens tested. This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI:

Digitally Signed by: Joshua Kennedy

Joshua A Kennedy
Technician III
Components / Materials Testing

Digitally Signed by: Dawn M. Chaney

Dawn M. Chaney
Technician Team Lead
Components / Materials Testing

JAK:dmc/kf

Attachments (pages) This report is complete only when all attachments listed are included.
Appendix A - Photographs (2)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	06/02/16	N/A	Original report issue

This report produced from controlled document template ATI 00231, revised 01/14/16.



F9202.01-106-31

APPENDIX A
Photographs



Photo No. 1
Test Specimens Detail



Photo No. 2
Standard Control Specimens Detail



Photo No. 3
Typical Color Testing Detail

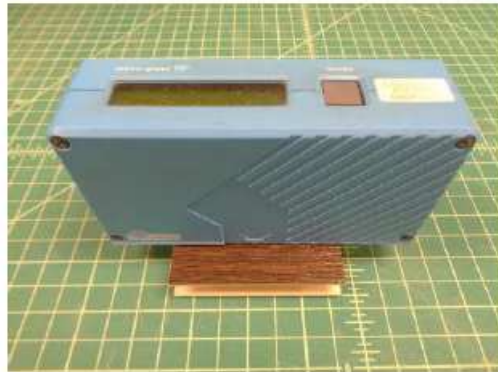


Photo No. 4
Typical Gloss Test Detail

9 Revision Page

Revision No.	Date	Changes	Author	Reviewer
0	May 30, 2016	First issue	Igor Radovic	Vern Jones
1	June 8, 2016	Addition of Color & Gloss report to Appendix B. Updated Results Table.	Igor Radovic	Vern Jones

END OF DOCUMENT