CHRISTOPHER BOWNESS, P.E., P.ENG.
PROFESSIONAL ENGINEERING SERVICES

ENGINEERING EVALUATION REPORT

Date	Revision 1, April 13, 2015
Job Name	0011R1 – Tropical Timberwoods
Client Name	Tropical Timberwoods Inc., Attn: Carlos Orta
Address	15476 NW 77 Court, #217, Miami Lakes, FL 33016
Phone, Email	305-240-6230, Info@tropicaltimber.com

Summary

Tropical Timberwoods Inc. has requested an engineering review of their product's wind uplift test report and for a computation of resulting ultimate design load.

Product Description

The product being evaluated is identified as Turada Wood Shingles, installed as described in the reference test report in section: A. Test Deck Assembly Construction Details.

Evaluation

The test report was reviewed and the test procedures were done in accordance with the UL 1897 standard by QAI, a laboratory accredited by IAS for this standard at the time of this evaluation. The ultimate test value of 156.09 psf was determined at the point where the Turada Wood Shingles separated from the roof sheathing.

Conventional Installation of 2 nails per shingle as was tested:
The ultimate load design value of the tested assembly with a safety factor of 2 applied is: **78 psf.**

Evaluation of Adding a 3rd nail for higher resistance:
To achieve a higher pressure value in testing, adding a 3rd nail in each shingle, installed centered between the two nails and 1" above on the vertical axis, would generate a resulting value of approximately 234psf ultimate load in testing. By applying a safety factor of 2.5, the estimated ultimate load would be 94 psf. The design safety factor is considered in the 2-2.5 range for this installation, with a resulting value of: **94 psf.**

This design value would apply to an installation of spaced or solid sheathing of the same wood species, using the same installation details and fasteners as specified in the test report, and with identical roof covering product as was submitted to the test lab.

Key Assumptions and Limitations

1. The evaluation pertains only to the products and assembly that were tested and reported in the referenced laboratory test.
2. The installation is inspected and there is no splitting of the shingles after fastener penetration.

3. The safety factor applied in calculation is to the discretion of the authority and end user if this is an appropriate factor for use in the application and applicable Codes.

Supplemental Documents

The published versions of the following sources, current on the date of this evaluation, were used as reference material to support the conclusions made:

1. QAI Laboratories Test Report #: RJ1298P-1, dated July 10, 2012 (attached)
2. Test Standard UL 1897, Standard for Uplift Tests for Roof Covering Systems, Fifth Edition

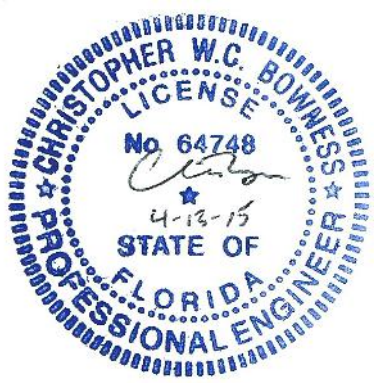
Signed

This report has been prepared and reviewed by:

_____ April 13, 2015_____

Chris Bowness, P.Eng., P.E. Date

Attachment: Page 1 of QAI Test Report



QAI LABORATORIES
CERTIFICATION TESTING INSPECTION

VANCOUVER, BC
LOS ANGELES, CA
TULSA, OK
WASHINGTON, DC
WWW.QAI.ORG

CLIENT: Mr. Calixto Orta
Tropical Timberwoods, Inc.
Linden / Soesdyke Highway
Yerrowkabra, Guyana

Test Report #: RJ1298P-1	Issue Date: June 8, 2011 Revision Date: July 10, 2012

SAMPLE ID: The test samples are identified as Turada Wood Shingles for use as a roof covering.

SAMPLING DETAIL: The products were shipped to QAI Laboratories Rancho Cucamonga direct from Tropical Timberwoods, Inc. manufacturing site in Guyana.

DATE OF RECEIPT: The samples were received at QAI on May 3, 2011

TESTING PERIOD: June 1, 2011

AUTHORIZATION: Signed Work Order by Calixto Orta, dated March 31, 2011 (Reference QAI Virginia Quote No. CS022811-1).

TEST PROCEDURE: Conduct a simulated wind uplift test on the deck assembly using the submitted samples in accordance with the methods and procedures outlined in UP 1897 Uplift Tests for Roof Covering Systems.

FINDINGS: Fastener withdrawal from the 1"x4" Douglas Fir spaced sheathing occurred at 156.09 psf (30.0 in of water). The withdrawal occurred in roughly a 10 square foot area located 6-8 feet above the leading edge of the test deck and centered laterally.

Report Prepared by,

Matt Lansdowne, EIT, M.Sc.
Business Manager – Building Products

Signed for and on behalf of
QAI Laboratories, Inc.

Chris Scoville, M.Sc.
Operations Manager

Attachment: Page 2 of QAI Test Report

REPORT OF TESTS

STORAGE OF COMPLETED TEST DECKS:
All test desk assemblies after construction were stored indoors at temperatures not lower than 60°F (16°C) nor higher than 90°F (32°C) for the period of time necessary to cure the assembly components prior to testing. Test desk were stored such that each was surrounded by free circulating air.

A. Test Desk Assembly Construction Details:
The test deck was constructed by QAI Staff in accordance with UL 1897

Chamber: A 10' x 10' chamber was constructed of Douglas Fir 2x4 framing spaced 16" OC. ¾"AC Exterior grade plywood was screwed to the 2x4 frame to form the base of the chamber. All joints were sealed with Type I silicone, and ventilation holes were drilled into the 2x4 frame to allow free air flow through the chamber.

Deck: 1"x4" Douglas Fir spaced sheathing spaced 5 ½" OC was screwed perpendicular to the 2x4 frame with 2" coarse thread drywall screws, 2 in each end and one in each 2x4 stud. A single layer of 6 mil clear plastic was then layered down over the sheathing and taped alone the edge of the chamber. The plastic was laid down in a manner to allow it to contour the gaps between the 1"x4" sheathing board.

Underlayment: A single layer of Fontana VulcaSeal 30 underlayment was fastened to the desk using T50 flat board staples at 18" intervals and incorporated a 2" overlap.

Roof Covering: The Turada Wood Shingles were fastened to the deck using 1 ¾" Stainless Steel 5D Ring Shank nails per Shingle. The first course consists of two layers of Shingle fastened directly on top of each other. Shingles were overlapped to leave 5 ½" exposures and were fastened at 7" above the leading edge of the shingle.

B. Test Apparatus and Equipment:
1. A controllable blower with an adjustable pressure relief damper was used to apply a constant static positive air pressure differential across the roof system.
2. A calibrated handheld digital manometer was used to monitor the pressure being applied to the roof system.
3. Five calibrated dial gauges were mounted along the horizontal center line of the roof desk in order to measure deflection. The designation and locations are as follows" (Distance is measure from left edge of the sample to right) Gauge #1 (1ft). Gauge #2 (3ft), Gauge #3 (5ft), Gauge #4 (7ft), Gauge #5 (9ft)

C. Test Procedure:
A base line reading of all dial gauges was taken with no pressure being applied to the roof system. The pressure was then increased to 15psf and held for 60 seconds. Another set of readings was then taken from the dial gauges. The pressure was then increased another 15psf. This was repeated over again until failure.

Attachment: Page 3 of QAI Test Report

Pressure		Gauge #1		Gauge #2		Gauge #3	
PSF	Inches of Water	Direct Read	Relative to Zero	Direct Read	Relative to Zero	Direct Read	Relative to Zero
0.0	0.000	0.313	0.000	0.349	0.000	0.310	0.000
15.0	2.883	0.313	0.000	0.349	0.000	0.310	0.000
30.0	5.766	0.314	0.001	0.350	0.001	0.312	0.002
45.0	8.649	0.315	0.002	0.351	0.002	0.313	0.003
60.0	11.532	0.317	0.004	0.352	0.003	0.315	0.005
75.0	14.415	0.318	0.005	0.353	0.004	0.317	0.007
90.0	17.298	0.319	0.006	0.355	0.006	0.320	0.010
105.0	20.181	0.321	0.008	0.356	0.007	0.322	0.012
120.0	23.064	0.322	0.009	0.358	0.009	0.325	0.015
135.0	25.947	0.324	0.011	0.361	0.011	0.330	0.020
150.0	28.830	0.326	0.013	0.364	0.014	0.334	0.024

Pressure		Gauge #4		Gauge#5	
PSF	Inches of Water	Direct Read	Relative to Zero	Direct Read	Relative to Zero
0.0	0.000	0.366	0.000	0.337	0.000
15.0	2.883	0.367	0.001	0.339	0.002
30.0	5.766	0.370	0.004	0.342	0.005
45.0	8.649	0.373	0.007	0.345	0.008
60.0	11.532	0.377	0.011	0.352	0.003
75.0	14.415	0.380	0.014	0.352	0.015
90.0	17.298	0.385	0.019	0.356	0.019
105.0	20.181	0.389	0.023	0.359	0.022
120.0	23.064	0.393	0.027	0.363	0.026
135.0	25.947	0.399	0.033	0.367	0.030
150.0	28.830	0.403	0.037	0.371	0.034

Fastener withdrawal from the 1"x4" Douglas Fir spaced sheathing occurred at 156.09 psf (30.0 in of water). The withdrawal occurred in roughly a 10 square foot area located 6-8 feet above the leading edge of the test deck and centered laterally.

REVISION DATE	REVISION BY	REVIEWED BY	SUMMARY OF REVISION
July 10, 2011	Matt Lansdowne		Updated Company Name to Tropical Timberwoods, Inc. and Revision Date

End of Report
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