Architectural Testing

TEST REPORT

Rendered to:

TREX COMPANY, LLC

For:

***Seclusions*™ Privacy Fence System**
Wood-Plastic Composite Privacy Fence

Report No.: **65313.01-119-16**
Report Date: **04/17/07**

130 Derry Court
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Architectural Testing

TEST REPORT

Rendered to:

TREX COMPANY, LLC
245 Capitol Lane
Winchester, Virginia 22602

Report No.: 65313.01-119-16
Test Date: 06/08/06
Report Date: 04/17/07

Product: *Seclusions*™ Privacy Fence System

Project Summary: Architectural Testing, Inc. (ATI) was contracted by Trex Company, LLC to perform dynamic wind load tests on their *Seclusions*™ wood-plastic composite privacy fence system. Test results are reported herein.

Test Specimens: Three (3) 8 ft high by 8 ft wide test specimens with the following configuration were tested:

Grade to Bottom Rail Height: 2"
Top Rail: 4" wide by 5" high "T" rail with 1.1" hollow space to accept in-fill panels
Bottom Rail: Aluminum reinforcement sleeved by two (2) in-fill panels
Bottom Rail Reinforcement: Extruded 6063-T5 aluminum profile 2.675" wide by 5.135" tall with 0.070" thick web and flanges
Panels: Nineteen (19) 1" deep by 5-3/4" wide interlocking "C" shape pickets (panels) Panels were inserted into rails, and no mechanical fasteners were utilized.
Posts: Two (2) 5-5/8" by 5-5/8" by 1/2" thick wall composite posts (Dwg. No QDS-0051)
Top Rail Attachment: The top rail was seated over plastic brackets and the in-fill panels. One (1) #8 by 1-1/2" self-starting wood screw was toe-nailed through the top of the top rail into each post.
Bottom Rail Attachment: The bottom rail was seated over plastic brackets that were attached to the post with four (4) #8 by 1-1/2" self-starting wood screws through the bracket and into the post.

Test Equipment: The wind generator consists of a Pratt and Whitney R-2800 radial engine with a 13' 6" three-blade fixed propeller. Test specimen deflections were measured with electronic linear transducers accurate to 0.01 inches.

Test Setup: A steel test fixture was utilized to simulate a rigid post embedment. The bottom of the bottom rail was fixed at two inches above the top of the test fixture base. The wind generator was placed in front of the steel test fixture and test specimen. Electronic linear transducers were fixed on the top rail, middle of the in-fill area, and bottom rail for deflection measurements.

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Test Procedure: Wind load testing was performed on each specimen at 80 mph for 45 seconds. The approximate duration of the applied wind speed was determined by t = 3600/V seconds, where V is the wind speed in mph. Maximum deflections were recorded.

Limitations of Test: Test setup and procedure provides information for evaluation of the fence assembly to resist the sustained wind speed indicated in the test results. This evaluation includes the fence panels and rails including the transfer of wind loads to the supports (posts). Single sections of fence were tested in this simulation; a continuous fence system was not evaluated.

Test Results:

Test Sample	Wind Speed	Duration	Maximum Displacement (inch)		
			Top	Mid	Bottom
1	80 mph	45 seconds	5.97	7.23	0.85
2	80 mph	45 seconds	4.51	5.58	0.41
3	80 mph	45 seconds	5.35	6.45	0.53

***Observation**: No visible damage at the completion of any of the three tests.*

Post Evaluation: The post defined by Drawing QDS-0051 was previously evaluated by Static Post Load Testing as reported in ATI Report No. 61298.01-119-16. Those tests resulted in an Average Ultimate Load of 1,907 lb for a 6' high fence. For those tests the load was applied 38" above grade which represented the 2" lower rail clearance above grade plus the distance to the fence horizontal centerline. Extrapolating this Ultimate Load to an 8' high fence:

$$\frac{(6' \div 2 + 2")}{(8' \div 2 + 2")} \times 1{,}907lb = \frac{38"}{50"} \times 1{,}907 = 1{,}449lb$$

The design wind load for an 8' high by 8' wide fence system was calculated using ASCE 7-98 based on a sustained wind speed of 80 mph, which correlates to a 100 mph three-second gust wind. The average ultimate load for the post was then divided by the corresponding design load to obtain a Factor of Safety for the fence system's post. See Appendix A for design wind load calculations.

The results are as follows:

Design Load ("F" from Appendix A)	Average Ultimate Test Load	Calculated Factor of Safety
1,097 lb	1,449 lb	1.32

Detailed drawings, data sheets, representative samples of test specimens, a copy of this test report, and all other supporting evidence will be retained by Architectural Testing, Inc. for a period of four years from the original test date. At the end of this retention period, said materials shall be discarded without notice, and the service life of this report by Architectural Testing, Inc. shall expire. Results obtained are tested values and were secured using the designated test methods. This report neither constitutes certification of this product nor expresses an opinion or endorsement by this laboratory; it is the exclusive property of the client so named herein and relates only to the tested specimens. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC:

Digitally Signed by: Justin M. Mann

Justin M. Mann
Senior Technician

Digitally Signed by: David H. Forney

David H. Forney, P.E.
Senior Project Engineer

JMM:jmm/nlb

Attachments (pages) This report is complete only when all attachments listed are included.
Appendix A - Calculations (1)
Appendix B - Drawings (5)
Appendix C - Photographs (4)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	04/17/07	N/A	Original report issue

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APPENDIX A

Calculations

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WIND DESIGN PRESSURE ANALYSIS

Ref. ASCE 7-98 *Trex Co., Inc. - Seclusions Composite Privacy Fence* *01/09/06*

Project: Trex Company
Job No.: 65313.01-119-19
Component: 8-ft. Privacy Fence
Date: 06/07/06

			ASCE 7-98 Ref.
Basic Wind Speed, V_{3s} =	100	mph (eq. 80 mph fm)	
Structure Classification, Category:	I	Low Hazard	*Tbl. 1-1*
Exposure Category (A, B, C, D):	C		*6.5.6.1*
Exposure Coefficient, Kz =	0.85		*Tbl. 6-5*
Topographic Factor, Kzt =	1.0		
Directionality Factor, Kd =	1.0		*Tbl. 6-6*
Importance Factor, I =	0.77	(Hurricane Prone Region)	*Tbl. 6-1*
Velocity Pressure, $q_z = 0.00256\ K_z K_{zt} K_d V^2 I$ =	16.8	psf	

Note: Values do not account for wind speed-up over hills and escarpments

Gust Effect Factor, G =	0.85		*6.5.8*
Net Force Coeficient, C_f =	1.2		*Tbl. 6-11*

Design Wind Force, $F = q_z G C_f A_f$ (Af = Projected Area, ft^2) *6.5.13*

Design Load:

Hgt.	Length	Af	F (lb)
8.0	8.0	64.0	1097

Test Results:

Ult.	S.F.
1449	1.32

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APPENDIX C

Photographs

Photo No. 1
***Seclusions*™ Privacy Fence as Installed in Rigid Test Fixture**

Photo No. 2
Typical Test Setup (Test Fixture and Wind Generator)

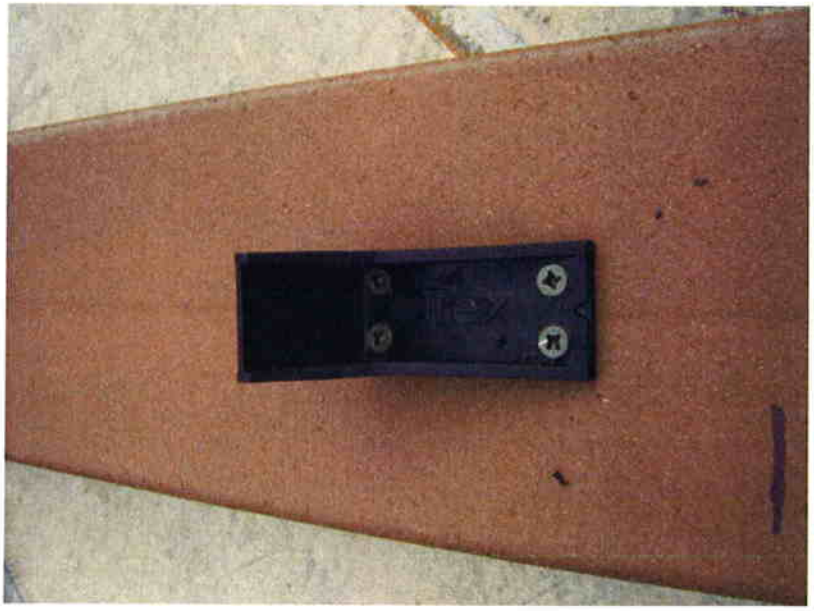

Photo No. 3
Rail Bracket as Installed in Post

Photo No. 4
Bottom Rail and Aluminum Reinforcement

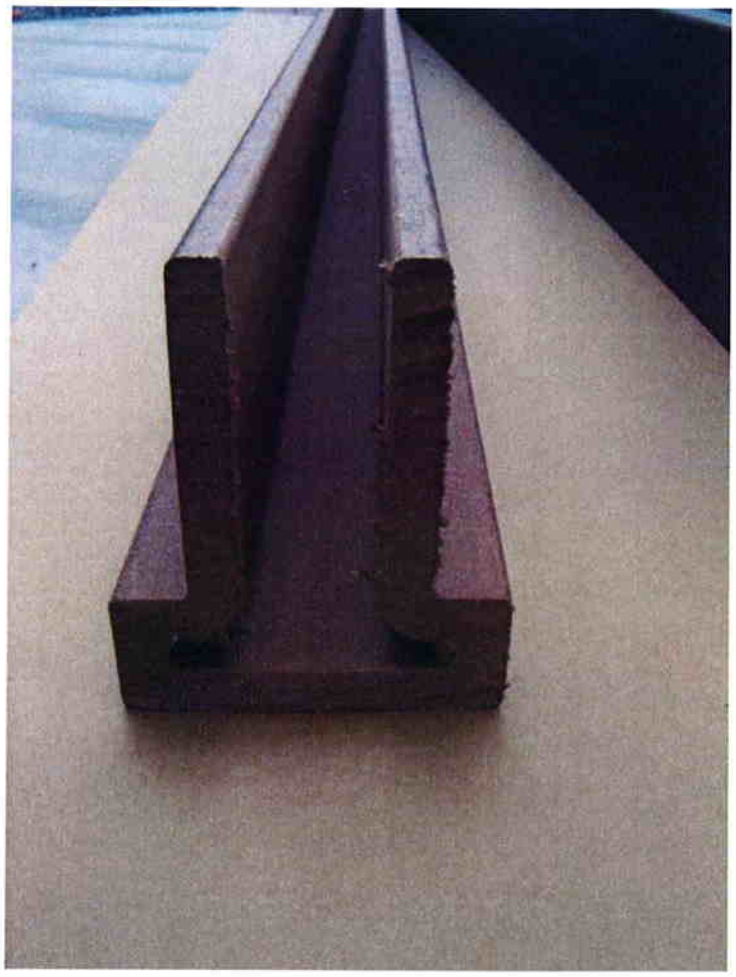

Photo No. 5
Top Rail (Pictured Inverted)