



Architectural Testing

**MIAMI-DADE COUNTY  
PERFORMANCE TEST REPORT**

**Rendered to:**

**TREX COMPANY, INC.**

**PRODUCT: *Seclusions* Composite  
Privacy Fence System**

**This report contains in its entirety:**

Cover: 1 Page  
Body: 7 Pages  
Drawings: 14 Pages  
Photographs: 3 Pages  
Calculations: 1 Page

**Report No.: 61298.01-119-16**

**Test Date: 12/08/05**

**Report Date: 02/06/06**

**Expiration Date: 12/08/15**

**Miami-Dade County Notification No: ATI05081**

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2/7/06



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## **PERFORMANCE TEST REPORT**

Rendered to:

TREX COMPANY, INC.  
245 Capitol Lane  
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Report No.: 61298.01-119-16  
Test Date: 12/08/05  
Report Date: 02/06/06  
Expiration Date: 12/08/15  
Miami-Dade County Notification No.: ATI05081

**Product:** *Seclusions* Privacy Fence

**Type:** 6 ft. High x 8 ft. Wide Composite Fence System

**Project Summary:** Architectural Testing, Inc. (ATI) was contracted by Trex Company, Inc. to perform Miami-Dade County Performance tests on their composite *Seclusions* privacy fence system. This report includes comprehensive written and photographic documentation of testing performed.

**Summary of Testing Performed:** The following tests were performed:

Dynamic Wind Load Testing and Lateral, Static Load Post Testing.

**Dynamic Wind Load Testing:**

**Test Specimens:** One type of fence section was tested: nominal 6' high x 8' wide wood/plastic composite privacy fence. Detailed specimen descriptions are provided in *Test Results* (see page 3). Three identical specimens were tested.

**Test Equipment:** The wind generator consists of a gasoline engine powered vane axial fan. The fan blades were fixed into a 5-1/2° pitch as marked on the fan. The plenum has an outlet that is 8' wide by 4' high with eight 2' by 2' baffled outlets. The engine-fan speed and pitch are calibrated with respect to plenum outlet velocity. Deflections of the test specimen were measured with linear displacement transducers accurate to 0.01 inches.

**Test Setup:** A steel test fixture was designed and fabricated to simulate a rigid post embedment. The bottom rail was fixed two inches above the top of the test fixture. The wind generator outlet is located 4 ft. from the face of the specimen (see Photo No. 2 in Appendix B). Linear displacement transducers for deflection measurements were fixed on the midspan of the top rail, the middle of the in-fill area and midspan of the bottom rail.

**Test Procedure:** The test specimen was exposed to 75 mph sustained wind load for 50 seconds. After a relaxation period the specimen was exposed to 110 mph sustained wind for 35 seconds followed by a second relaxation period. The duration of the applied wind load at each wind speed was determined by  $t = 3600/V$  seconds, where V is the wind speed in mph. Maximum deflections were recorded at both load levels and permanent sets were recorded after each relaxation period.

**Limitations of Test:** Test setup and procedure provides information for evaluation of the fence assembly to resist sustained wind speeds indicated in the test results. This evaluation included 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. Evaluation of the supporting post members is addressed later in this report.

**Dynamic Wind Load Testing: (Continued)**

**Test Results:**

**Test #1 - Seclusions Privacy Fence**  
**Series/Model: 6' Composite Privacy Fence**  
**Test Date: 12/08/05**

**Grade to Bottom Rail Height: 2"**

**Top Rail:** 4.15" by 5.03" T-shaped profile. The top rail utilized two (2) screws, one (1) at each end that attached the rail to the top rail bracket. (Dwg. No 106018).

**Bottom Rail:** Two (2) 1" x 5.78" C-shaped profiles slipped over the reinforcing member on opposing sides. The bottom rail was fastened at each end with one (1) screw that penetrated the aluminum reinforcement and bracket. (Dwg. No QDS-0050).

**Rail Reinforcement:** (Bottom Rail Only) Aluminum "H"-shape 2-1/2" by 5-1/8" by 0.078" thickness.

**Panels:** Nineteen (19) 1" by 5.78" "C" shaped panels. Each forward facing panel was interlocked to an adjacent rear facing panel. This interlocking of adjacent panels comprised the entire in-fill area. Three (3) screws were used to affix the panels adjacent to the support post, totaling six (6) screws. All panels were engaged in the top and bottom rail.

**Posts:** Two (2) 6" by 6" by 0.530" wall composite posts (Dwg. No QDS-0051).

**Rail Attachment:** Top and bottom rails were attached to the support posts with plastic brackets. The brackets were affixed to the supports with four (4) screws per bracket. One (1) additional screw is used on the top rail bracket(s), which penetrated the top rail and bracket at approx 90°. The bottom rail bracket(s) contain one (1) additional screw at 45° which penetrated the aluminum reinforcing member and bracket (Dwg. No 120006).

**Fasteners:** #8 x 1-5/8" outdoor-use (coated) steel pan-head Phillips and/or square drive screw. Twenty-Six (26) screws used for one 6 ft high by 8 ft wide privacy fence section.

Wind Speed	Duration	Maximum Deflection (inches)		
		Top	Mid	Bottom
75 mph	50 seconds	1.79	2.28	1.66
0 mph	Permanent Set	0.26	0.28	0.07
110 mph	35 seconds	4.10	5.57	1.66
0 mph	Permanent Set	0.55	0.76	0.11

**Observation:** No visible damage at the completion of the test.

**Test Results: (Continued)**

**Test #2 - Seclusions Privacy Fence**  
**Series/Model: 6' Composite Privacy Fence**  
**Test Date: 12/08/05**

Wind Speed	Duration	Maximum Deflection (inches)		
		Top	Mid	Bottom
75 mph	50 seconds	2.16	2.46	0.39
0 mph	Permanent Set	0.51	0.42	0.15
110 mph	35 seconds	4.74	5.89	0.82
0 mph	Permanent Set	0.82	0.86	0.20

*Observation: No visible damage at the completion of the test.*

**Test #3 - Seclusions Privacy Fence**  
**Series/Model: 6' Composite Privacy Fence**  
**Test Date: 12/08/05**

Wind Speed	Duration	Maximum Deflection (inches)		
		Top	Mid	Bottom
75 mph	50 seconds	1.96	2.29	0.50
0 mph	Permanent Set	0.40	0.39	0.19
110 mph	35 seconds	4.38	5.52	1.02
0 mph	Permanent Set	0.72	0.83	0.26

*Observation: No visible damage at the completion of the test.*

**Test Results: (Continued)**

**Static Load Post Testing:**

**Test Specimens:** Three (3) composite posts 6" by 6" (nominal) by 108-1/2" long with a 0.53" thick wall.

**Test Equipment:** The support post was tested in a self-contained structural frame designed to accommodate anchorage of the specimen and application of the test loads. The specimen was loaded using an electric winch mounted to a rigid steel test frame. High strength steel cables and nylon lifting straps were used to impose test loads on the specimen. Applied load was measured using an electronic load cell located in-line within the loading system. Deflections were measured to the nearest 0.01" using electronic linear transducers.

**Test Setup:** One end of the tested post was securely anchored and braced in a rigid test frame to simulate post embedment. The test load was applied to the free end of the post 38" above the test frame. This distance represents the vertical midspan of the assembled 72" tall fence section plus the 2" recommended clearance between the bottom of the fence section and the ground. The post and anchorage were arranged in a horizontal orientation to facilitate testing. See Photo No. 5 in Appendix B for typical test setup.

**Test Procedure:** The support post was preloaded up to a level not exceeding design load. After pre-loading, all load was released and any necessary fixture adjustments were made. The post was then loaded at a uniform rate until failure. Deflection was recorded once every second until failure.

**Test Results:**

Post Type	Load Test No.	Ultimate Test Load (lb)
6" x 6" x 0.530" thick Nominal Dimensions	1	1,944
	2	1,930
	3	1,848
	<b>Average</b>	<b>1,907</b>

**Test Results:** (Continued)

The design wind load for a 6' high by 8' wide fence system was calculated using ASCE 7-98 based on a sustained wind speed of 75 mph, which correlates to a 90 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 C for design wind load calculations.

The results are as follows:

Design Load ("F" from Appendix C)	Average Ultimate Test Load	Calculated Factor of Safety
749 lb	1,907 lb	2.55

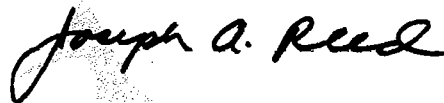
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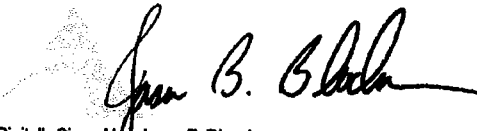
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Attachments (pages):

- Appendix A - Drawings (14)
- Appendix B - Photographs (3)
- Appendix C - Calculations (1)

**Revision Log**

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