



## Laboratory Report S4610.11.06-R2

**Testing  
of  
DecTec™ and DryDec™ Waterproofing Systems  
for  
Florida Product Approval  
#FL7791-RI**

**Prepared for:**  
**Skyline Building Systems, Inc.**  
**4500 8A Street NE**  
**Calgary, Alberta T2E 4J7**  
**Canada**

**Date of Issuance:**  
**November 10, 2006**

**Revision 2:**  
**February 4, 2008**

TRINITY|ERD

MAIN: 80 YESLER WAY • SUITE 200 • SEATTLE, WA 98104 • P: (206) 467-0054 • F: (206) 467-5840  
EAST: 353 CHRISTIAN STREET, UNIT 13 • OXFORD, CT 06478 • P: (203) 262-9245 • F: (203) 262-9243  
LAB: 10 MAUNEY COURT • COLUMBIA, SC 29201 • P: (803) 988-8133 • F: (803) 908-8111





**APPLICANT:** Skyline Building Systems, Inc.  
4500 8A Street NE  
Calgary, Alberta T2E 4J7  
Canada  
Attention: Cameron Bowie

**PRODUCT CATEGORY:** Roofing

**SUB-CATEGORY:** Single Ply

**COMPLIANCE STATEMENT:** DecTec™ and DryDec™ Waterproofing Systems, as produced by Skyline Building Systems, Inc., have demonstrated compliance with the following sections of the 2004 Florida Building Code (with 2006 Supplements) through testing in accordance with the following Standards. Compliance is subject to the Installation Requirements and Limitations / Conditions of Use set forth herein. Fire resistance does not fall within the scope of F.A.C. Rule 9B-72 and does not form part of this report.

<b>STANDARDS:</b>	<b>Section</b>	<b>Standard</b>	<b>Year</b>
	1504.3.1	FM 4470	1992
	1507.13.2 & TAS 110	ASTM D4434	1996
	1523.6.2	TAS 114	1995
	M-D Checklist #0180	Note: While M-D Checklist #0180 calls for pull-through resistance per TAS 117(B), the subject membrane system does not include mechanically attached systems; only fully adhered. Therefore, TAS 117(B) pull-through testing is not applicable to these systems.	

**PRODUCT / SYSTEM DESCRIPTION:** DecTec™ Membrane is a thermoplastic (PVC) waterproofing membrane.

- DecTec™ Guardian is nominal 60-mil (1.5-mm) thick fiberglass reinforced
- DecTec™ Select and DryDec™ are nominal 60-mil (1.5-mm) thick polyester reinforced
- DecTec™ Ultimate is nominal 72-mil (1.8-mm) thick dual polyester/fiberglass reinforced.

DecTec™ membranes are bonded to approved substrates using DecTec™ SBA 100 or WBA 100 adhesive, as outlined in the Limitations / Conditions of Use herein.  
DryDec™ membranes are bonded to approved substrates using DryDec™ Solvent Based Adhesive or DryDec™ Water Based Adhesive, as outlined in the Limitations / Conditions of Use herein



**I. PHYSICAL PROPERTIES – ASTM D4434**

1.1 Trinity | ERD has tested DecTec™ and DryDec™ Membranes, as sampled in accordance with ICC-ES AC85, for physical properties in accordance with ASTM D4434-96, as required in Section 4 of TAS 110. Testing included Static and Dynamic Puncture in accordance with ASTM D5602 and D5635 (TAS 114, Appendix I). Test results, as outlined in Reports 4745.12.02-1 and 4745.12.02-2 dated 12/13/2002, indicate DecTec™ Guardian meeting Type II, Grade I and DecTec™ Select, DryDec™ and DecTec™ Ultimate meeting Type III requirements.

**2. IMPACT RESISTANCE – FM 4470 / TAS 114, APPENDIX F**

2.1 DecTec / DryDec specimens were prepared over concrete decking as the critical substrate and tested for impact resistance in accordance with FM 4470 / TAS 114, Appendix F.

2.2 Specimen Preparation:

2.2.1 Two identical roof cover samples, 2 by 4 feet are selected. The first sample is prepared with the roof cover applied to the selected substrate(s) or adhered directly to the appropriate roof deck in accordance with the manufacturer's specifications. After preparation, the sample is conditioned for up to 28 days (laboratory cure). For materials supplied as sheets or rolls, the sample shall incorporate a field seam within the assembly, in the center and running parallel to the 4 foot (1.2 m) side. The second sample is loose laid over the matching substrate or roof deck.

2.2.2 A piece of loose laid sample 12 by 24 inch is cut from the original sample, and then further conditioned (weathered) for 1000 hours in a fluorescent ultraviolet condensation-type weathering apparatus (ASTM G154).

2.3 Procedure – Moderate Hail Impact:

2.3.1 Both samples are subjected to initial testing. The 2 inch (51 mm) diameter ball is dropped onto the sample from a height of 5 feet (1.5 m) for a Class 'MH' rating. A minimum of ten drops of the impactor is required, five of which shall be on the field-fabricated seam, if appropriate. The samples are then removed and inspected for damage.

2.3.2 After weathering, the impact test procedure is repeated. The sample is then removed and inspected for damage.

2.3.3 The roof cover shall not show any signs of cracking or splitting.

2.4 Results: The specimens displayed no signs of cracking or splitting and the field seam displayed no signs of cracking, splitting, separation or rupture when examined closely under a 10x magnification. **PASS MODERATE.**

### 3. COMPARATIVE PEEL ADHESION

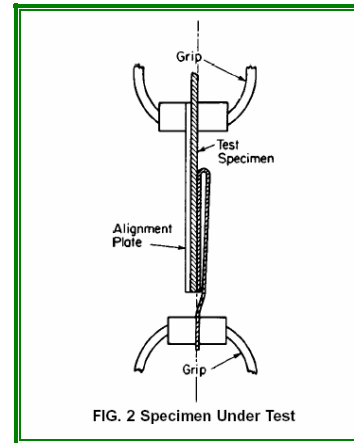
3.1 Membrane samples were bonded to plywood and concrete substrates using the solvent and water-based adhesives to determine the critical adhesive for each substrate.

3.2 Specimen Preparation:

3.2.1 One 6 x 12 in. specimen of each substrate was selected, to which the roof membrane was adhered for a total bond area of 4 x 12 in. Specimens were allowed to cure 15-days at 75°F and 50% RH. Prior to testing the membrane was cut to produce five 1 x 5 in specimens.

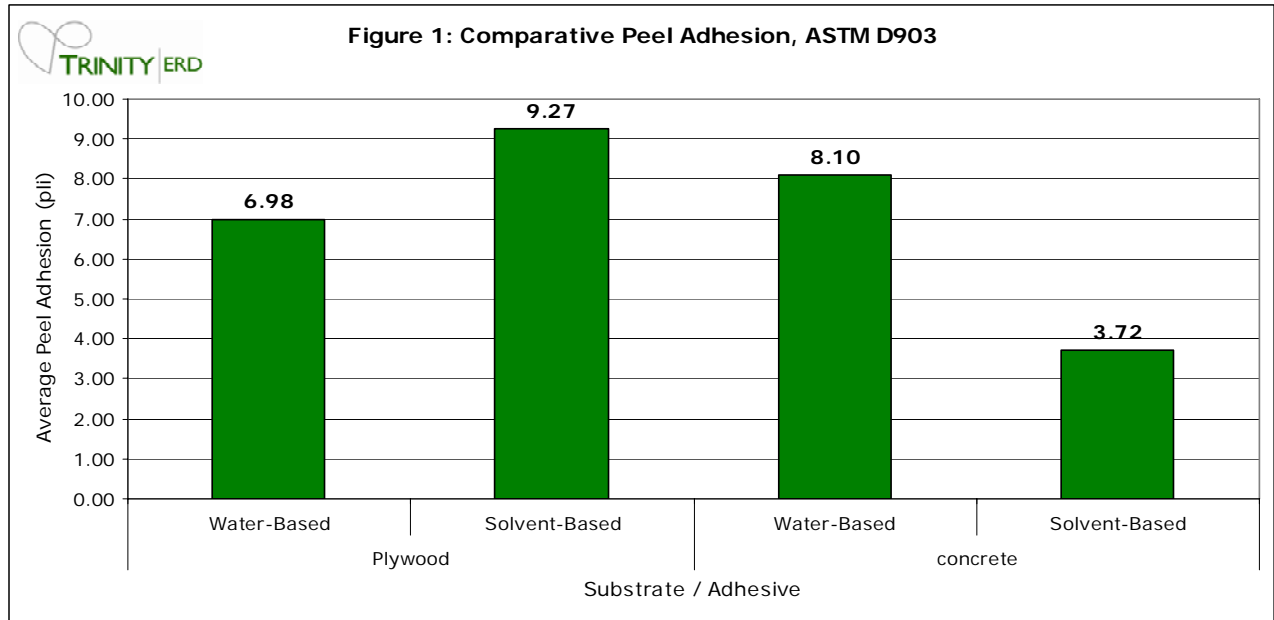
3.3 Procedure:

3.3.1 The specimen is then clamped into the test apparatus, with the free end of the membrane secured in the upper grip which is connected to the load cell. A 180° peel load is applied to the membrane bond with the substrate through a constant rate of separation of 6 inches per minute (See Figure 2 from the D903 standard). The average peel resistance load is determined through an average load line from the graphic printout.



3.4 Results:

Table 1: Results, Peel Adhesion Resistance (pli)				
Test	Plywood Substrate		Concrete Substrate	
	Water-Based	Solvent-Based	Water-Based	Solvent-Based
1	6.61	9.37	8.39	3.88
2	6.70	7.45	7.17	4.01
3	6.77	11.57	7.69	3.68
4	7.68	9.77	8.38	3.25
5	7.14	8.20	8.89	3.79
<b>Avg.:</b>	<b>6.98</b>	<b>9.27</b>	<b>8.10</b>	<b>3.72</b>
Std. Dev.:	0.44	1.58	0.67	0.29



**3.5 Observations:**

3.5.1 The critical adhesive for plywood substrate is water-based and that for concrete substrate is solvent-based.

**4. SIMULATED WIND UPLIFT RESISTANCE – FM 4470, APPENDIX K / TAS I 14, APPENDIX J**

**4.1 Specimen Preparation:**

4.1.1 One specimen measuring 13 x 27 ft was constructed per the following sample descriptions. The simulated wind uplift pressure tests utilize a 24 ft (7.3 m) long by 12 ft (3.7 m) wide steel vacuum pressure vessel arranged to apply vacuum air pressure at pre-established standard rates to the topside of the test panel, which forms the bottom of the pressure vessel.

4.1.2 Decking consists of nominal 5/8-inch thick tongue-and-groove (T&G), CDX plywood glued with LePage Bulldog Grip PL 400 Heavy-Duty Sub-Floor Adhesive and attached 6-inch o.c. to structural supports spaced 24-inch o.c. using #8 wood screws. Deck joints are sealed with DecPatch compound.


4.1.3 Water-based adhesive was selected as critical based on the adhesion data in Section 3.

Table 2: Summary of 12 x 24 ft Specimen Construction			
Sample ID	Deck	Membrane	Application
1	See 4.1.2	DecTec (DryDec) with 1.5-inch heat welded laps	Water-based adhesive applied to the substrate only at 0.7 gallons/square.

**4.2 Procedure:**

4.2.1 A net pressure of 30 psf (1.4 kPa) is applied to the test sample and maintained for 1 minute. The pressure is increased to 45 psf (2.2 kPa), then to 60 psf (2.9 kPa) and held for 1 min. after each increment. The pressure is increased in increments of 15 psf (0.7 kPa) every min. until failure occurs.

4.3 Results:

Table 3: Test Results, Sample ID #1 5/8-inch T&G, CDX Plywood / DecTec (DryDec) Membrane in water-based adhesive		
Sample ID:	1	
Failure Pressure (psf):	285	
Failure Time (sec):	At attainment	
Failure Mode:	Failure of structural members to which plywood was bonded and attached	
Passing Pressure (psf):	270	

5. SIMULATED WIND UPLIFT RESISTANCE – FM 4470, APPENDIX K / TAS I 14, APPENDIX D

5.1 Specimen Preparation:

5.1.1 Three specimens measuring 2 x 2 ft were constructed for each of the following sample descriptions. Each specimen is built atop a structural concrete deck and allowed to cure. The simulated wind uplift pressure tests utilize a 0.75 in thick piece of plywood adhered to the top of the specimen as a load transfer device to which a 2 ft (0.6 m) long by 2 ft (0.6 m) wide steel plate is mechanically attached. A load cell is connected to the steel plate and the test frame. A hydraulic pump is used to incur pressure at pre-established standard rates to the load cell and test panel.

5.1.2 Solvent-based adhesive was selected as the critical adhesive based on the adhesion data in Section 3.

Table 4: Summary of 2 x 2 ft Bonded Pull Specimen Construction			
Sample ID	Deck	Membrane	Application
2	Structural Concrete	DecTec (DryDec)	Solvent-based adhesive applied to the substrate at 1.25 gal/square and to the membrane back-side at 0.5 gal/square for a combined rate of 1.75 gal/square.

5.2 Procedure:

5.2.1 A net pressure of 30 psf (1.4 kPa) is applied to the test sample and maintained for 1 minute. The pressure is increased to 45 psf (2.2 kPa), then to 60 psf (2.9 kPa) and held for 1 min. after each increment. The pressure is increased in increments of 15 psf (0.7 kPa) every min. until failure occurs.



5.3 Results:

Table 5: Test Results, Sample ID #2 Concrete Deck / DecTec (DryDec) Membrane in solvent-based adhesive				
Specimen ID	Failing Pressure (psf)	Failure Time (sec)	Mode of Failure	Passing Pressure (psf)
2-A	None	N/A	Exceed equipment capacity	1,260
2-B	None	N/A		1,260
2-C	None	N/A		1,260
<b>Avg.:</b>				<b>1,260</b>
Std. Dev.:				0
Coefficient of Variation:				0%

**6. QUALITY ASSURANCE DOCUMENTATION:**

6.1 Listing through Underwriters Laboratories, Inc. (QUA 1743). Continued QA documentation comes in the form of the UL Mark on all product containers.

**7. INSTALLATION REQUIREMENTS:**

7.1 DecTec™ and DryDec Waterproofing Systems shall be installed in accordance with published installation instructions by a contractor approved by Skyline Building Systems, subject to the Limitations / Conditions of Use noted below. For installations within the HVHZ, the HVHZ Limitations supercede published installation instructions.

7.2 A summary of the wind uplift ratings is set forth in Appendix I.

**8. LIMITATIONS / CONDITIONS OF USE:**

**8.1 GENERAL:**

8.1.1 The evaluation report is limited to installations over nominal 5/8-inch, T&G, CDX plywood and structural concrete decking.

8.1.2 Refer to a current Approved Roofing Materials Directory for fire rating of this product.

8.1.3 Unless otherwise noted in Appendix I, decking and its attachment shall meet the project design criteria to the satisfaction of the AHJ.

8.1.4 The maximum design pressure for the selected assembly shall meet or exceed critical design pressure determined in accordance with FBC Chapter I6. No rational analysis is permitted for these systems.

8.1.5 For existing substrates in a re-roof (tear off), the existing deck shall be examined for compatibility with the membrane adhesive to be installed. If any surface conditions exist that bring system performance into question, field uplift testing in accordance with ASTM E907 or FM LPDS I-52 shall be conducted on mock-ups of the proposed new waterproofing assembly.



**8.2 HVHZ JURISDICTIONS:**

- 8.2.1 Direct-bonding to wood decks is not permitted in HVHZ jurisdictions. Only the concrete deck assembly tested herein is permissible for use in HVHZ.
- 8.2.2 Required flood integrity testing in accordance with ASTM D5957 shall be provided to the Building Official for review at the time of final inspection.
- 8.2.3 Contractor shall submit to the Building Official all system specifications and details. Submission of these documents, as well as proper application of all materials, is the sole responsibility of the contractor.
- 8.2.4 All attachment and sizing of perimeter nailers, metal profile and/or flashing termination designs shall conform with RAS III and the wind load requirements of FBC Chapter 16.

**9. CERTIFICATION OF INDEPENDENCE & LAB COMPLIANCE STATEMENT:**

- 9.1 Trinity | ERD does not have, nor does it intend to acquire or will it acquire, a financial interest in any company manufacturing or distributing products it tests.
- 9.2 Trinity | ERD is not owned, operated or controlled by any company manufacturing or distributing products it tests.
- 9.3 The testing reported herein has been performed in full accordance with the requirements of the Florida Building Code, with no deviations.

**10. CONTINUED COMPLIANCE:**

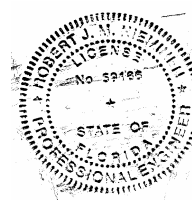
- 10.1 Compliance is valid until such time as the named product(s) changes, the referenced Quality Assurance documentation changes, or provisions of the Code that relate to the product change. Acceptance of this Report by the named client constitutes agreement to notify Trinity | ERD if the product changes or the referenced Quality Assurance documentation changes.

Please contact our offices with any questions.

Sincerely,  
EXTERIOR RESEACH & DESIGN, LLC.  
TRINITY | ERD

Charles Phillips  
Laboratory Systems Manager

Robert Nieminen, P.E.  
Vice President  
Florida Reg. No. 59166



The facsimile seal appearing on this document was authorized by Robert Nieminen, P.E. 59166 on 02/04/2008. This does not serve as an electronically signed document. Original, signed & sealed hardcopies forthcoming via courier.

**THE ONE (1) PAGE ATTACHED FORMS PART OF THIS LABORATORY REPORT**

This report and the data contained therein is the sole property of Trinity|ERD and the named client. This report shall not be reproduced outside Trinity|ERD except by the named client without written permission by the named client, in which case the report shall be reproduced in its entirety



**TABLE 1: WIND UPLIFT PERFORMANCE – WOOD DECKS**  
**NOT FOR USE IN HVHZ**

System No.	Deck	DECK WATERPROOFING		Max. Design Pressure
		Membrane	Application	
W-1	Nominal 5/8-inch, tongue-and-groove (T&G), CDX plywood glued with LePage Bulldog Grip PL 400 Heavy-Duty Sub-Floor Adhesive and attached 6-inch o.c. to structural supports spaced 24-inch o.c. using #8 wood screws. Deck joints are sealed with DecPatch compound.	DecTec™ Guardian, Select or Ultimate Membrane	DecTec™ SBA 100 in a two-sided application at 1.0 gal/square on the substrate and 0.5 gal/square on the membrane for a combined rate of 1.5 gal/square. Or DecTec™ WBA 100 at 0.7 gal/square to the substrate only.	-135 psf
W-2	See W-1	DryDec™ Membrane	DryDec™ Solvent Based Adhesive in a two-sided application at 1.0 gal/square on the substrate and 0.5 gal/square on the membrane for a combined rate of 1.5 gal/square. Or DryDec™ Water Based Adhesive 100 at 0.7 gal/square to the substrate only.	-135 psf

**TABLE 2: WIND UPLIFT PERFORMANCE – CONCRETE DECKS**

System No.	Deck	DECK WATERPROOFING		Max. Design Pressure
		Membrane	Application	
C-1	Min. 2,500 psi structural concrete	DecTec™ Guardian, Select or Ultimate Membrane	DecTec™ SBA 100 in a two-sided application at 1.25 gal/square on the substrate and 0.50 gal/square on the membrane for a combined rate of 1.75 gal/square. Or DecTec™ WBA 100 at 0.8 gal/square to the substrate only.	-630 psf
C-2	Min. 2,500 psi structural concrete	DryDec™ Membrane	DryDec™ Solvent Based Adhesive in a two-sided application at 1.0 gal/square on the substrate and 0.5 gal/square on the membrane for a combined rate of 1.5 gal/square. Or DryDec™ Water Based Adhesive 100 at 0.7 gal/square to the substrate only.	-630 psf