

# Exterior Research & Design, L.L.C.

Building Science and Envelope Consultants

ERD Laboratory



Lab Code: 200563-0

## ERD LABORATORY REPORT #01460.06.03

### Comparative Pull-Over Testing of Fast Felt™ vs. Standard Nail with Tin-Cap

Prepared for:

LFF Systems, Inc.

Attention: David Collins

Date of Issuance: June 26, 2003 - DRAFT

**Client Information:** LFF Systems, Inc  
11302 Memorial Drive  
Houston, TX 77024

**Client Reference:** Comparative Rupture Testing

**ERD Reference:** Project #01460.03LAB

**Samples:** Fast Felt™, manufactured and supplied for testing by LFF Systems, Inc., consists of an ASTM D 226, type II organic felt (30# felt) to which 1-5/8" diameter, 0.009" thick plastic discs are laminated in a predetermined pattern. The integral plates are imprinted on the top side with a target symbol indicating where the nail is to be placed.

'Tin-caps' are 1-5/8" diameter, 32 ga., sheet metal discs, as defined in Section 1517.5.2 of the Florida Building Code.

'Nails' are minimum 12 ga. annular ring shank, hot dip galvanized nails with minimum 3/8" diameter heads, as defined in Section 1517.5.1 of the Florida Building Code.

'30# Felt' is ASTM D 226, type II asphalt impregnated organic roofing felt.

**Sample Delivery:** Fast Felt™ materials were supplied by the named client. 'Tin-caps' were obtained from a roofing distribution house in Miami, FL. Nails were obtained from Home Depot, Seattle, WA.

A stylized signature logo for ERD, consisting of a large, loopy 'E' and 'R' followed by the letters 'ERD' in a bold, sans-serif font.

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**Test Date(s):** June 2003

**ERD Technicians:** Charles Phillips, Nelson Morez

**Miami-Dade  
Notification No.:** TE103002

**Properties:** Base Sheet Rupture (Pull-Over) Performance

**Standards:** Miami-Dade TAS 117(B), *Test Procedure for Dynamic Pull-Through Performance of Roofing Membranes Over Fastener Heads or Fasteners with Metal Bearing Plates*, © Miami-Dade Building Code Compliance Office.

**Specimens:** **Base Sheet Rupture, TAS 117(B)**

Rupture specimens are prepared in accordance with TAS 117(B).

- One set of specimens consists of Fast Felt™ material cut to 18" x 18" squares with an integral disc positioned in the center. A nail is installed through the center of the disc and the specimen is positioned in the test apparatus. See Photo 1, below.
- A second set of specimens consists of a 30# felt cut to 18" x 18" squares. A 'tin-cap' is positioned in the center, a nail is installed through the center of the 'tin-cap' and the specimen is positioned in the test apparatus. See Photo 2, below.





Photo 1: View of Fast Felt™ Specimen



Photo 2: View of Nail & Tin-Cap Specimen



**Test Apparatus: Rupture (Pull-Over) Resistance, TAS I 17(B)**

Tests were conducted on the Com-Ten Model PSB0040 Universal Testing Machine to evaluate the base sheet ability to resist fastener-plate rupture (pull-through). See Photo 3, below.



**Photo 3: View of Test Apparatus**

**Test Procedure: Rupture (Pull-Over) Resistance, TAS I 17 (B)**

The fastener is installed through the center of an 18 x 18 inch specimen of the selected base sheet. For the purposes of this program, no cap sheet is installed ovetop the base sheet. The specimen is inverted and clamped into place at the base of the tensile tester. A load application grip is placed on the fastener shank. The opposite end of the load application grip is connected to the load cell, which is connected to the tensile testing machine. Load is applied to the fastener shank through pulling at a rate of 2 inches per minute until failure, as defined in TAS I 17(B), occurs. The load attained at the failure point is recorded. Fourteen tests are conducted for each base sheet, eliminating the 'high' and 'low' values from the final data set.

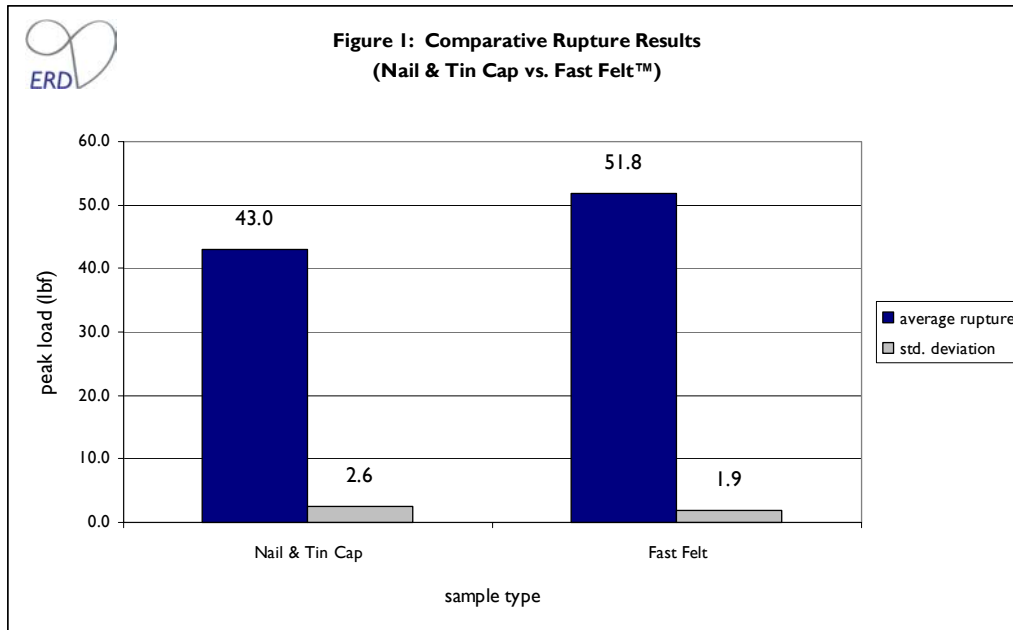


**Results: Rupture (Pull-Through) Resistance, Base Sheets, TAS I17(B)**

- Notes: 1.) The mode of failure observed for all sheets was rupture of the felt around the disc.  
 2.) C of V represents the coefficient of variation for the data set.

**Table I: Base Sheet Pull-Through Resistance Data**

Sample	Peak Force	
	Nail & Tin-Cap	Fast Felt™
1	44.0	50.8
2	41.5	54.1
3	45.2	50.0
4	41.8	50.0
5	41.6	51.5
6	40.2	52.6
7	43.0	54.7
8	40.7	55.2
9	40.2	50.6
10	49.2	51.2
11	44.6	51.3
12	43.5	49.5
<b>Average:</b>	<b>43.0</b>	<b>51.8</b>
Std. Dev.:	2.6	1.9
C of V:	6.0%	3.7%



**Discussion:** Specimens prepared using Fast Felt™ consistently report rupture performance in excess of those prepared using a #30 Felt with a nail & tin cap. Moreover, specimens prepared using Fast Felt™ provide more consistent performance than those prepared using a #30 felt with a nail & tin cap, as indicated by the lesser standard deviation and coefficient of variation.

**Conclusions:** ERD has tested Fast Felt™ by LFF Systems, Inc. and an ASTM D 226, type II felt with FBC defined 'nails & tin-caps' for rupture performance in accordance with Miami-Dade TAS 117(B). Results consistently indicate greater performance of Fast Felt™ when compared to the nail & tin-cap data.

**Laboratory Compliance Statement:**

The Miami-Dade TAS 117(B) testing reported herein has been conducted in full accordance with the requirements of the Florida Building Code, with no deviations.

Please contact our offices with any questions.

Sincerely,  
EXTERIOR RESEARCH & DESIGN, LLC.

Draft June 26, 2003

Charles Phillips  
Laboratory Quality Manager

Draft June 26, 2003

Robert Nieminen, P.E.  
Florida Reg. No. 59166  
Laboratory Technical Manager

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