

Laboratory Report P37910.02.12

**Air Leakage Testing
of
Grip-Rite® HouseWrap and
Grip-Rite® Commercial Grade Weather Barrier
in accordance with
ASTM E2357**

**Prepared for:
PrimeSource Building Products
333 Manley Street
West Bridgewater, MA 02379**

**Date of Issuance:
March 20, 2012**



CLIENT INFORMATION: PrimeSource Building Products
333 Manley Street
West Bridgewater, MA 02379
c/o: Pete Barrego

REFERENCE: Project #2011.P37910SC

SAMPLES:

- **Grip-Rite® HouseWrap** is a woven, micro-perforated, polypropylene or polyolefin water-resistive barrier.
- **Grip-Rite® Commercial Grade Weather Barrier** is a woven, high-density polyethylene fabric that is coated on both sides with a low density polyethylene coating used as a water-resistive barrier
- **Resito Grip-Rite® Window and Door Protector** is a self-adhering flashing membrane composed of elastomeric bitumen and a woven polyethylene top surface.

SAMPLE DELIVERY: Trinity | ERD randomly sampled rolls of said water-resistive barrier materials at the warehouse facility in Waterbury, CT on 08/23/2011 following Trinity | ERD's sampling protocol in accordance with ICC-ES AC85 requirements, and shipped the samples to our Columbia, SC Laboratory.

TEST DATE(S): January / February 2012

ERD TECHNICIANS: Charles Phillips, Tim Cook, Freddy Riofrio (Sampler)

PROPERTIES: Air Leakage: ASTM E2357

STANDARDS: ASTM E2357-05 – *Standard Test Method for Determining Air Leakage of Air Barrier Assemblies*, © ASTM.

EQUIPMENT: Air Leakage Calibrated Thermometer, Calibrated Barometer, CME Laminar Flow Elements

I. AIR LEAKAGE – ASTM E2357:

I.1 Specimen Preparation:

I.1.1 Specimen Type 1: Opaque Wall

I.1.1.1 Each wall panel assembly was 8' x 8' framed with nominal 2 x 4-inch wood studs and wood tracks installed at the top and bottom of the wood studs spaced 16-inch o.c. per ASTM E2357 Specimen 1-Opaque Wall (see Fig. A1.1).

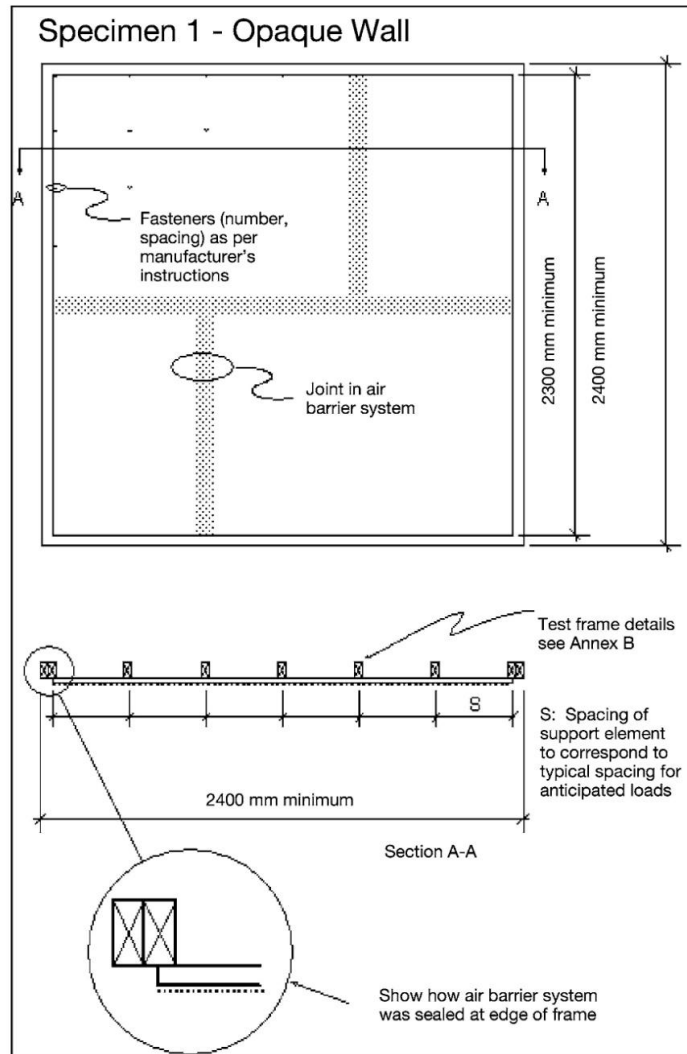


FIG. A1.1 Specimen 1—Opaque Wall

I.1.1.2 The Grip-Rite® HouseWrap or Grip-Rite® Commercial Grade Weather Barrier is installed with the printed side out, applied horizontally at the base of the wall and overlapping each successive course a minimum of 6-inch at the side laps and 8-inch at the end laps. Laps were sealed with Grip-Rite® HouseWrap Tape. 1-inch plastic headed cap nails were placed every 12-inch o.c. on the vertical studs and 8-inch o.c. at the horizontal studs.

1.1.2 Specimen Type 2:

- 1.1.2.1 Each wall panel assembly was 8' x 8' framed with nominal 2 x 4-inch wood studs and wood tracks installed at the top and bottom of the wood studs spaced 16-inch o.c. per ASTM E2357 Specimen 2-Continuity at Penetrations.
- 1.1.2.2 The Grip-Rite® HouseWrap or Grip-Rite® Commercial Grade Weather Barrier is installed in accordance with 1.1.1.2.
- 1.1.2.3 A 1.50-inch dia. PVC pipe is installed through the sheathing along with a 4 x 4 inch galvanized duct, Hexagonal External Metal Junction Box and Rectangular External PVC Junction Box (see Fig. A1.2).
- 1.1.2.4 A 2' x 4' window blank is installed consisting of ½-inch medium density overlay plywood framed with 3-5/8-inch x 1-5/8-inch wood framing with a ½-inch gap around the perimeter between the windows blank and treated rough opening.
- 1.1.2.5 Resisto Grip-Rite® Window & Door Protector was used to seal the perimeter between the window blank framing, galvanized duct, PVC pipe, hexagonal external metal junction box, rectangular external PVC junction box and treated rough openings in accordance with PrimeSource installation details.

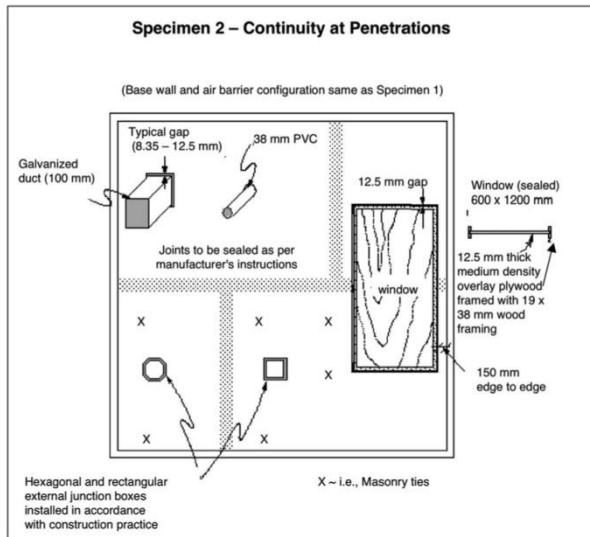


FIG. A1.2 Specimen 2—Continuity at Penetrations





1.2 Procedure:

1.2.1 The specimen is fitted against and sealed to the chamber opening. A pressure differential is created across the specimen. The pressure difference was incrementally increased and, when stabilized at each pressure difference, air flow is documented.

1.2.2 Specimen Types 1 and 2 were tested for both infiltration (negative pressure away from interior surface) and exfiltration (positive pressure towards interior surface).

1.3 Results:

Sample	Pressure Pa (psf)	Measured Flow (L/s-m ²)			
		Type 1: Opaque		Type 2: Penetrations	
		Positive	Negative	Positive	Negative
Grip-Rite HouseWrap	25 (0.10)	0.0202	0.0081	0.0211	0.0110
	50 (0.20)	0.0292	0.0156	0.0332	0.0206
	75 (0.30)	0.0337	0.0212	0.0389	0.0280
	100 (0.40)	0.0510	0.0260	0.0565	0.0329
	150 (0.60)	0.0551	0.0354	0.0627	0.0440
	300 (1.20)	0.0645	0.0547	0.0706	0.0685
Grip-Rite Commercial Grade Weather Barrier	25 (0.10)	0.0146	0.0059	0.0192	0.0090
	50 (0.20)	0.0211	0.0128	0.0226	0.0192
	75 (0.30)	0.0273	0.0186	0.0307	0.0272
	100 (0.40)	0.0342	0.0234	0.0358	0.0334
	150 (0.60)	0.0438	0.0321	0.0442	0.0447
	300 (1.20)	0.0557	0.0531	0.0565	0.0716

2. WIND PRESSURE CONDITIONING – ASTM E2357:

2.1 Procedure:

2.1.1 After initial air leakage testing, the specimens are exposed to pressure loading of 2000 cycles in either four stages of 500 cycles per stage or two stages of 1000 cycles per stage.

2.2 Results:

Sample	Pressure (Pa)	Measured Flow (L/s-m ²)			
		Positive		Negative	
		Before Cycling	After Cycling	Before Cycling	After Cycling
Grip-Rite HouseWrap	25	0.0202	0.0232	0.0081	0.0126
	50	0.0292	0.0322	0.0156	0.0279
	75	0.0337	0.0376	0.0212	0.0339
	100	0.0510	0.0545	0.0260	0.0433
	150	0.0551	0.0588	0.0354	0.0487
	300	0.0645	0.0676	0.0547	0.0749
	Average:	0.0423	0.0457	0.0268	0.0402
Grip-Rite Commercial Grade Weather Barrier	25	0.0146	0.0162	0.0059	0.0074
	50	0.0211	0.0239	0.0128	0.0232
	75	0.0273	0.0312	0.0186	0.0279
	100	0.0342	0.0400	0.0234	0.0338
	150	0.0438	0.0478	0.0321	0.0432
	300	0.0557	0.0614	0.0531	0.0687
	Average:	0.0328	0.0367	0.0243	0.0340

Table 2B: Test Results, Air Leakage, Before vs. After Wind Conditioning Specimen Type 2, Penetrations					
Sample	Pressure (Pa)	Sample Calculated Measured Flow (L/s-m ²)			
		Positive		Negative	
		Before Cycling	After Cycling	Before Cycling	After Cycling
Grip-Rite HouseWrap	25	0.0211	0.0249	0.0110	0.0139
	50	0.0332	0.0362	0.0206	0.0329
	75	0.0389	0.0414	0.0280	0.0428
	100	0.0565	0.0599	0.0329	0.0484
	150	0.0627	0.0672	0.0440	0.0572
	300	0.0706	0.0749	0.0685	0.0848
	Average:	0.0471	0.0507	0.0342	0.0467
Grip-Rite Commercial Grade Weather Barrier	25	0.0192	0.0209	0.0090	0.0128
	50	0.0226	0.0254	0.0192	0.0300
	75	0.0307	0.0360	0.0272	0.0395
	100	0.0358	0.0412	0.0334	0.0482
	150	0.0442	0.0502	0.0447	0.0569
	300	0.0565	0.0617	0.0716	0.0900
	Average:	0.0348	0.0392	0.0342	0.0462

2.3 Observations:

2.3.1 After each loading stage the, the barrier assembly shall be inspected for signs of fracture, delamination, loosening of fasteners, or any change in the structure that would affect the integrity of the assembly. No such observations were noted for any specimen.

3. DEFLECTION – ASTM E2357:

3.1 Scope:

3.1.1 After wind conditioning and air leakage testing, maximum deflections of the air barrier material and the test specimen are recorded at the wind pressures as outlined in Table 2 of E2357 for both positive and negative pressures. For the purposes of this program, deflection measurements were taken at the higher of the two pressure differentials (1440 Pa).

3.2 Procedure:

3.2.1 Maximum deflections of the air barrier material and the test specimen shall be recorded at 1440 Pa, which is held for minimum 10 seconds, for both positive and negative pressures.

3.3 Results:

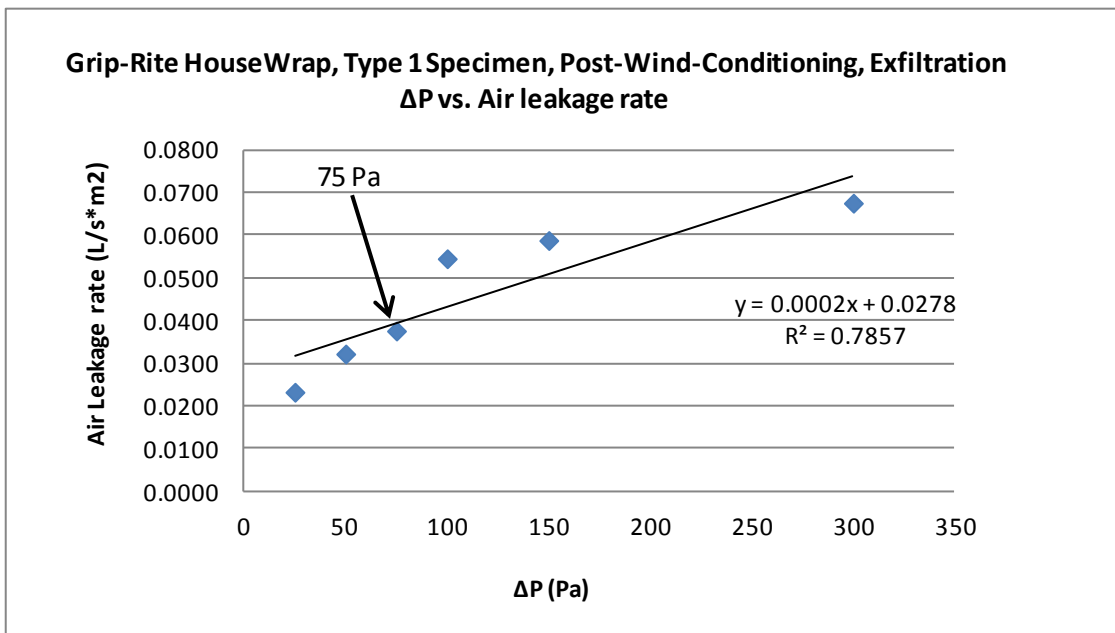
Table 3: Test Results, Deflection @ 1440Pa (inch)			
Sample	Specimen	Positive	Negative
Grip-Rite HouseWrap	Type 1	1.15	0.285
	Type 2	1.25	0.290
Grip-Rite Commercial Grade Weather Barrier	Type 1	1.25	0.295
	Type 2	1.15	0.298

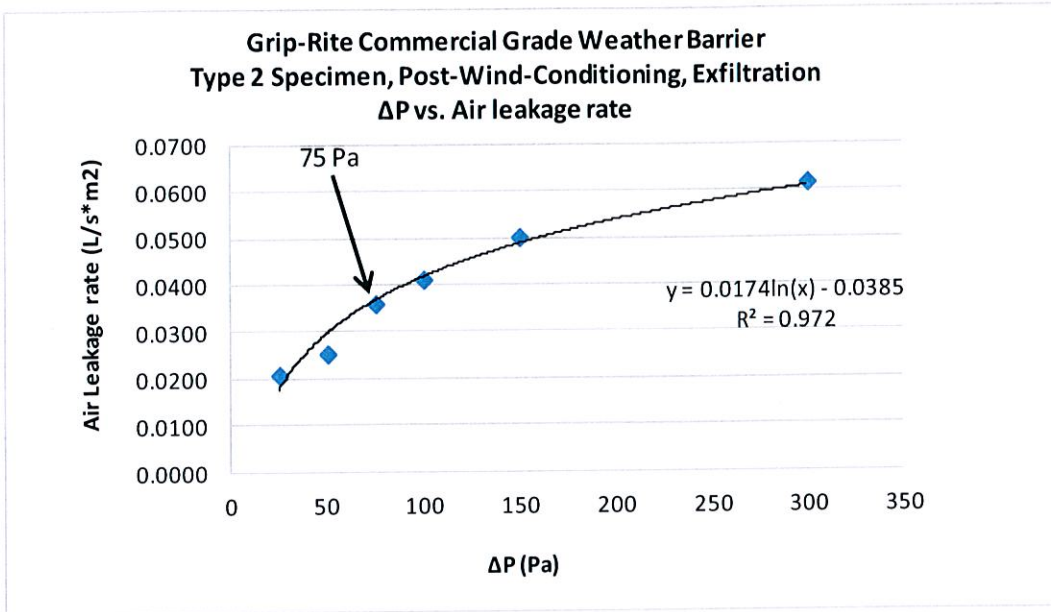
4. ANALYSIS:

- 4.1 The air leakage rate of the specimen to be reported, for both positive and negative cases, shall be the air leakage rate of the specimen after it has been subjected to the wind conditioning.
- 4.2 The referenced air leakage rate for each wall assembly shall be the higher data point value leakage rate at 75 Pa for the exfiltration and infiltration cases. For this program, the higher data point value leakage rate at 75 Pa was exfiltration (positive pressure towards interior surface).
- 4.3 The reference base air leakage rate at 75 Pa determined for Specimen 1, the Opaque Wall, shall be the system air leakage rating assigned to the assembly provided that the air leakage at 75 Pa obtained for Specimen 2 is no more than 10 % greater than the reference base air leakage for Specimen 1.

Sample	Exfiltration		% Difference
	Type 1	Type 2	
Grip-Rite HouseWrap	0.0376	0.0414	9.2% < 10% (Use Type 1 result)
Grip-Rite Commercial Grade Weather Barrier	0.0312	0.0360	13.3% > 10% (Use Type 2 result)

- 4.4 The flow rate equation shall be established through linear fitting of data by method of least squares.





5. CONCLUSIONS:

- 5.1 Trinity| ERD has tested Grip-Rite HouseWrap and Grip-Rite Commercial Grade Weather Barrier assemblies, as described herein, for air leakage in accordance with ASTM E2357.
- 5.1.1 Review of results indicates compliance with the requirements of the American Air Barrier Association of America [$< 0.2 \text{ L/(s m}^2\text{)} @ 75 \text{ Pa}$] as follows:
 - Grip-Rite HouseWrap: $0.0376 \text{ L/(s m}^2\text{)}$ at 75 Pa
 - Grip-Rite Commercial Grade Weather Barrier: $0.0360 \text{ L/(s m}^2\text{)}$ at 75 Pa

Please contact our office with any questions.

Sincerely,
 TRINITY | ERD



Charles Phillips
 Laboratory Manager



Robert Nieminen, P.E.
 Vice President

REPORT HISTORY:

Date	Event	Notes	Authorized By:
02/29/2012	Draft report Issued	For Client Review	RN
03/20/2012	Final Issued	None	RN

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