

**CLIENT:** **Jiangsu Canlon Building Materials Co., Ltd**  
NO. 8, Hengtong Rd, Qidu Town, Wujiang Dist,  
Suzhou City, 215234, China

**Report No: RJ4338-2**

**Date: April 11, 2016**

**SAMPLE ID:** MBP Pre-applied Waterproofing Sheet Membrane (Brand: Canlon)

**SAMPLING DETAIL:** Test samples were randomly selected by a QAI representative at the client's manufacturing facility located at \_\_\_\_\_ on October 23, 2015. Photographs of the top and bottom of the sheet membrane are provided in the appendix of this report.

**DATE OF RECEIPT:** The samples were received at QAI Laboratories on October 23, 2015.

**TESTING PERIOD:** November 4, 2015 thru April 1, 2016.

**AUTHORIZATION:** QAI Test Proposal MB-2015-100205R1 dated October 2, 2015 signed by \_\_\_\_\_ on October 14, 2015.

**TEST REQUESTED:** Physical testing in accordance with LA City Test Protocol L021, *Acceptance Criteria for Below-Grade Exterior Damp- Proofing and Waterproofing Materials dated May 2004.*

**TEST RESULTS:** Test results are provided on subsequent pages of this report.

**CONCLUSION:** The sampled MBP Pre-applied Waterproofing Sheet Membrane (Brand: Canlon) met the requirements of LA City Test Protocol L021, *Acceptance Criteria for Below-Grade Exterior Damp- Proofing and Waterproofing Materials dated May 2004.*

**ACCREDITATIONS:** City of Los Angeles Testing Agency License No.TA24788.

**Prepared By**



Larry Burmer  
Project Leader-Physical Testing

**Signed for and on behalf of  
QAI Laboratories Inc.**



Drew Mersereau  
Laboratory Supervisor

**WATER VAPOR TRANSMISSION TEST PER ASTM E96**

**Test Procedure**

Testing was conducted in accordance with Procedure B (Water Method) of ASTM E 96-80, *Standard Test Method for Water Vapor Transmission of Materials*. Four 12" x 12" specimens were cut from the sampled sheet membrane and individually sealed to stainless steel trays containing water. The specimens were tested as sampled with two of the specimens containing seams. Weight measurements were recorded periodically after the test material had reached a steady state condition with relationship to change in weight vs. time. The water vapor permeance was then calculated as outlined in ASTM E 96. Testing was conducted at 73 ± 2°F and 50 ± 2% relative humidity.

**Test Requirements**

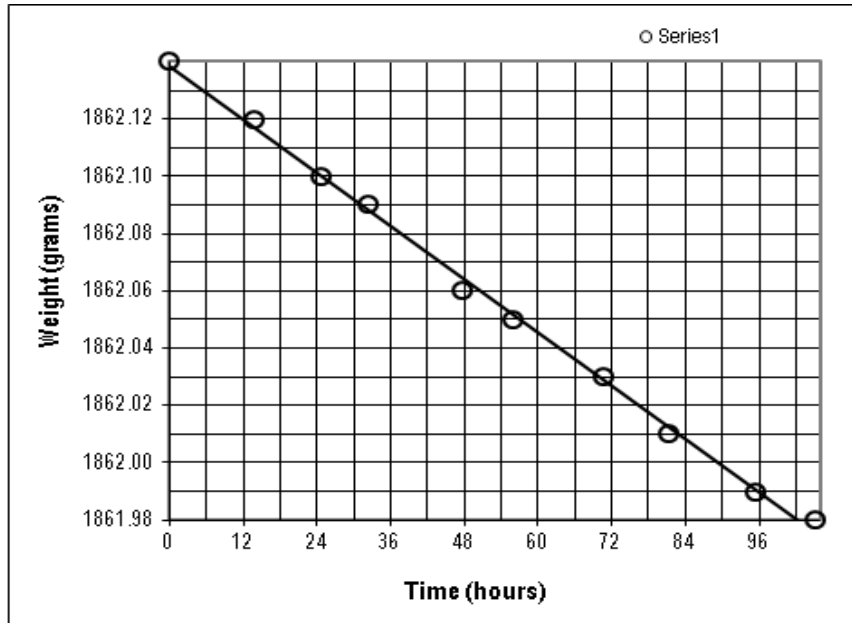
Sheet Membranes - maximum permeance of 0.1 perms

**Test Results**

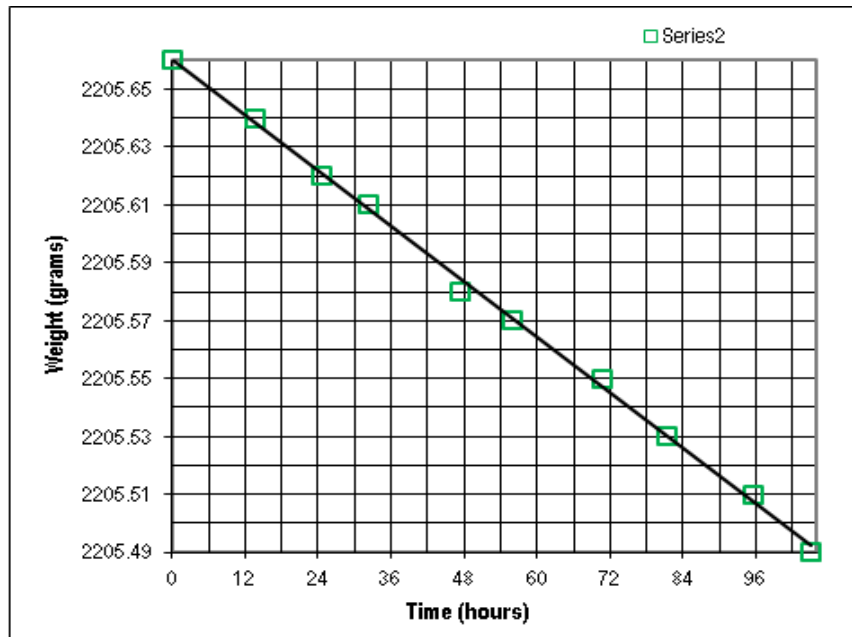
Specimen #	Specimen Thickness (in)	Permeance (Perms)
1 (without seam)	0.075	0.083
2 (without seam)	0.073	0.085
3 (with seam)	0.073	0.102
4 (with seam)	0.075	0.094
<b>Average</b>	<b>0.074</b>	<b>0.091</b>

**WATER VAPOR TRANSMISSION TEST PER ASTM E96 (CONT.)**

**Test Results (Cont.)**



Specimen No.1

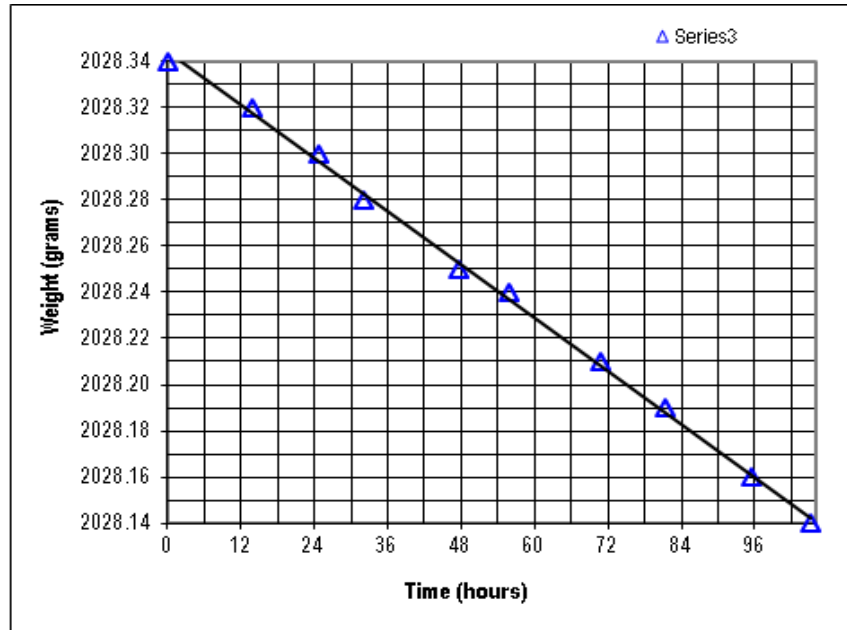


Specimen No.2

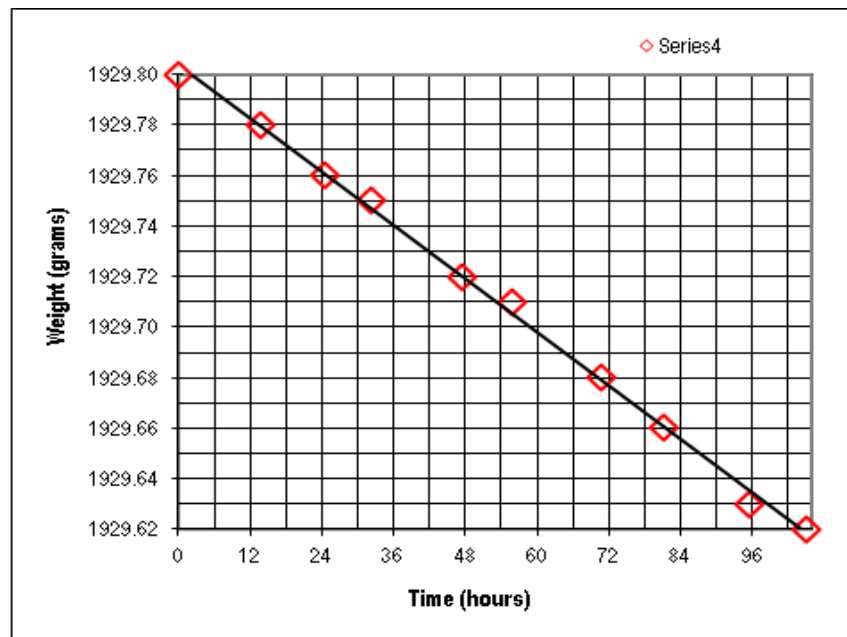
THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

**WATER VAPOR TRANSMISSION TEST PER ASTM E96 (CONT.)**

**Test Results (Cont.)**



Specimen No.3



Specimen No.4

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

**RESISTANCE TO DECAY TEST PER ASTM E154**

**Test Procedure**

Testing was conducted in accordance with Section 13 of ASTM E154-88, *Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover*. Four 12-inch square specimens, two with seams and two without seams, were prepared from the sampled sheet membrane and weighed, along with wood veneer cards. The specimens and veneer cards were placed in containers containing the test soil as specified in Section 13 of ASTM E154. A 1½” thick layer of concrete was then pour over the membrane with the veneer cards buried in the soil. The test specimens, as well as the veneer cards, remained in a darkened chamber, maintained at 27 ± 2°C (80 ± 3°F) and 70 ± 3% relative humidity, for the duration of the test. The specimens remained buried in the soil until the weight loss of the veneer cards reached 35%.

**Test Requirements**

Specimen weights and permeance are limited to 10 percent loss from unconditioned sample values.

**Test Results**

Specimen No.	Unconditioned Weight (grams)	Conditioned Weight (grams)	Percent Weight Loss
1 (without seams)	155.176	153.885	0.832
2 (without seams)	156.887	154.907	1.262
3 (with seams)	180.335	179.816	0.288
4 (with seams)	194.112	192.507	0.827
<b>Average</b>	<b>* * *</b>	<b>* * *</b>	<b>0.800</b>

**RESISTANCE TO DECAY TEST PER ASTM E154 (CONT.)**

**Test Results (Cont.)**

Specimen #	Unconditional Specimen Thickness (in)	Unconditioned Permeance (Perms)	Conditioned Permeance (Perms)	Loss in Permeance (Percent)
1 (without seam)	0.074	0.083	0.088	0
2 (without seam)	0.074	0.085	0.102	0
3 (with seam)	0.075	0.102	0.099	0
4 (with seam)	0.072	0.094	0.106	0
<b>Average</b>	<b>0.074</b>	<b>0.091</b>	<b>0.099</b>	<b>0</b>

**TENSILE AND ELONGATION TEST PER ASTM D412**

**Test Procedure**

Testing was conducted in accordance with ASTM D412-15a, *Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension*. Twelve Type C dogbone specimens were cut from the sampled sheet membrane. Six were cut in the machine direction and six were cut in the cross-machine direction. The specimens were individually placed in a United Tension/Compression Machine and pulled in tension at a constant rate of 20 inches per minute. Testing was conducted at a temperature of 73 ± 2°F and a relative humidity of 50 ± 2%. The test specimens were conditioned for a minimum of 40 hours prior to testing.

**Test Requirements**

Nonreinforced sheet membranes shall have a minimum elongation of 250%.

**Test Results**

Machine Direction		
Specimen No.	Tensile Strength (psi)	Elongation (%)
1	1,311	1,125
2	1,260	1,060
3	1,312	1,253
4	1,323	1,021
5	1,355	1,002
6	1,273	846
<b>Average</b>	<b>1,326</b>	<b>1,032</b>

Cross-Machine Direction		
Specimen No.	Tensile Strength (psi)	Elongation (%)
1	1,466	1,072
2	1,350	1,137
3	1,327	1,058
4	1,357	1,000
5	1,299	1,009
6	1,421	1,025
<b>Average</b>	<b>1,370</b>	<b>1,050</b>

---

**ADHESION TO CONCRETE PER ASTM D903****Test Procedure**

Testing was conducted in accordance with ASTM D 903-98 (Reapproved 2010), *Standard Test Method for Peel or Stripping Strength of Adhesive Bonds*. One 16" x 16" test specimen was prepared for the test by pouring a 1½" thick layer of concrete over the surface of an 8" x 16" section of the sheet membrane. Ten, 1-inch wide peel adhesion specimens were prepared by cutting through to the surface of the cured concrete. The membrane specimens were then peeled back from the concrete and individually peeled at a 180° angle from the concrete substrate at a constant rate of 6 inches per minute for approximately 2 inches.

**Test Requirements**

For sheet membranes the average minimum peel strength shall be 5 pounds.

<b>Specimen No.</b>	<b>Average Peel Strength (lbf/in)</b>
1	30.1
2	30.5
3	30.7
4	29.0
5	28.8
6	30.0
7	31.3
8	31.0
9	31.2
10	31.4
<b>Average</b>	<b>30.4</b>



---

**PUNCTURE RESISTANCE PER ASTM E154****Test Resistance**

Testing was conducted in accordance with Section 10 of ASTM E 154-88, *Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover*. Three, 10-inch square specimens were cut from the sampled sheet membrane and conditioned to a constant weight at 73°F and 50% relative humidity. After conditioning, the specimens were individually placed in the test apparatus centered on the platform of a United Tensile/Compression machine. A 1-inch diameter solid steel cylinder having a flat, slightly rounded surface was lowered onto the surface of the membrane at a rate of 0.25-inch per minute. The load was increased until failure with the deflection of the membrane measured within ¼-inch of the edge of the cylinder.

**Test Requirements**

Minimum puncture load of 40 lbs for unreinforced sheet membranes.

**Test Results**

<b>Specimen #</b>	<b>Maximum Load (lbs)</b>	<b>Deflection at Maximum Load (in)</b>
1	159	1.317
2	159	1.302
3	159	1.329
<b>Average</b>	<b>159</b>	<b>1.329</b>

---

**HYDROSTATIC PRESSURE RESISTANCE TEST PER ASTM D751****Test Procedure**

Testing was performed in accordance with ASTM D 751-06(2011), *Standard Test Methods for Coated Fabrics*. Three, 4-inch diameter specimens were cut from the sampled sheet membrane and individually placed on the test apparatus. Each specimen was then subjected to an increasing hydrostatic pressure at a rate of approximately 5 psi/min until failure.

**Test Requirements**

Recognition of product performance will be limited to the maximum hydrostatic head pressure resisted.

**Test Results**

<b>Specimen No.</b>	<b>Maximum Hydrostatic Head Pressure Resisted (psi)</b>
1	190
2	190
3	195
<b>Average</b>	<b>192</b>

---

**ACCELERATED AGING TEST PER ASTM G153 (ASTM G23)****Test Procedure**

Testing was conducted in accordance with ASTM G 23\*, *Standard Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials*. Four 3" x 12" specimens were cut from the sampled sheet membrane and subjected to 2,000 hours of accelerated weathering using a Type DH, twin enclosed carbon-arc type apparatus and Method 1 as specified in ASTM G 23. Two specimens were cut in the machine direction and two were cut in the cross-machine direction.

At the completion of the 2,000 hour exposure period, twelve Type C dogbone specimens were cut from the sampled material. Six were cut in the machine direction and six were cut in the cross-machine direction. The specimens were individually placed in a United Tension/Compression Machine and pulled in tension at a constant rate of 20 inches per minute to failure with the results compared with those of the unconditioned specimens. Testing was conducted at a temperature of  $73 \pm 2^{\circ}\text{F}$  and a relative humidity of  $50 \pm 2\%$ . The test specimens were conditioned for a minimum of 40 hours prior to testing.

\*Note: ASTM G 23 has been replaced with ASTM G 153, *Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials*. Test apparatus and test procedures outlined in ASTM G 153 are identical to those referenced in ASTM G 23. Therefore, testing would also qualify under ASTM G 153.

**Test Requirements**

There shall be no considerable reduction in Tension and elongation of aged specimens.

**ACCELERATED AGING TEST PER ASTM G153 (ASTM G23) (CONT.)**

**Test Results**

<b>Machine Direction</b>		
<b>Specimen No.</b>	<b>Tensile Strength (psi)</b>	<b>Elongation (%)</b>
1	1,266	1,000
2	1,259	987
3	1,286	976
4	1,329	1,058
5	1,340	1,122
6	1,353	1,135
<b>Average</b>	<b>1,306</b>	<b>1,046</b>

<b>Cross-Machine Direction</b>		
<b>Specimen No.</b>	<b>Tensile Strength (psi)</b>	<b>Elongation (%)</b>
1	1,253	1,004
2	1,270	983
3	1,269	979
4	1,280	1,011
5	1,269	1,022
6	1,258	1,005
<b>Average</b>	<b>1,267</b>	<b>1,001</b>

**Observations**

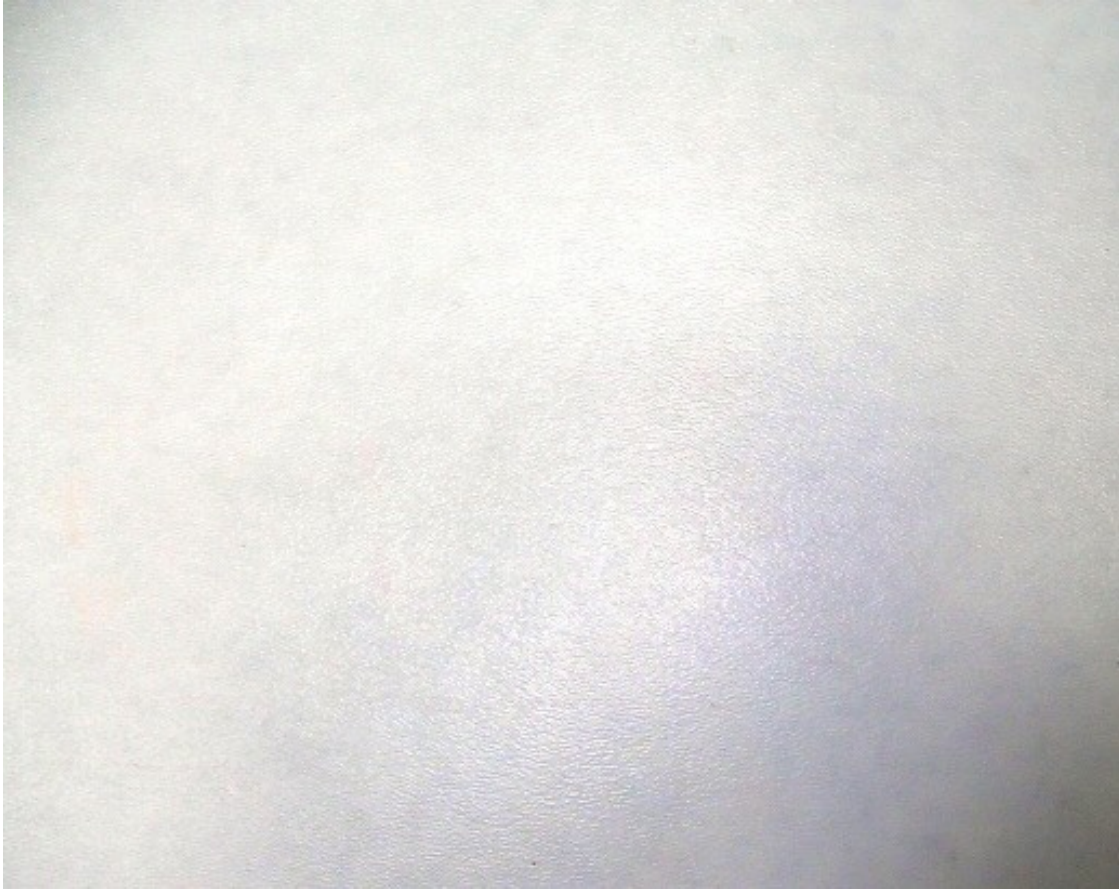
- Reduction in tension of aged machine direction specimens was 1.5%
- Reduction in tension of aged cross-machine direction specimens was 7.5%
- Reduction in elongation of aged machine direction specimens was 0.0%
- Reduction in elongation of aged cross-machine direction specimens was 4.7%

**APPENDIX**



Photograph No.1  
Top surface of sheet membrane

**APPENDIX**



Photograph No.2  
Bottom surface of sheet membrane

**\*\*\*\*End of Report\*\*\*\***