CLIENT: Polyguard Products
PO Box 755
Ennis, TX 75120-0755
Attention: Chris Rogalski

SAMPLE: One sample of a building membrane was delivered and identified by the client as XT-850, Lot #061364. The thickness of the sample was approximately 1/8 inch. The client also provided several roofing nails. The nails had a shaft diameter of approximately 0.09 inches.

TESTS: The sample was tested for water vapor transmission according to modified ASTM E96-00, "Standard Test Methods for Water Vapor Transmission of Materials." The method was modified only by using cups with a mouth area of 4.29 in^2 – less than the 4.65 in^2 minimum area specified. The smaller cups allowed the specimens to be weighed on an analytical balance to the nearest 0.0001 grams, and thus give faster results. The transmission rate was calculated using a least-squares regression when the rate appeared to be steady.

The desiccant method was used. The ambient relative humidity was 50 ± 2% and the ambient temperature was 74.0 ± 1.8 °F. The test cups were circular, made of aluminum and utilized a wax seal. The sample was tested with the felt side towards the lower humidity atmosphere. As described in the standard, one dummy specimen was also prepared and tested.

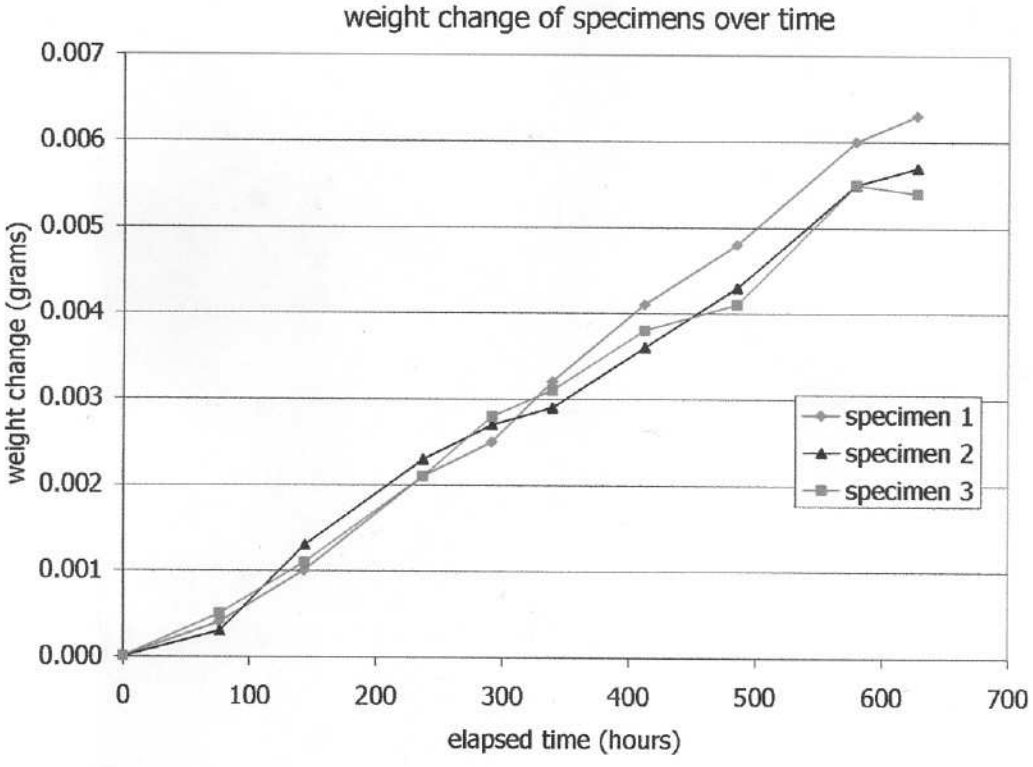
The client also desired to determine if the sample retained its water vapor barrier properties when punctured with a nail. Three additional specimens were prepared using the nails provided by the client. The nails were placed using ASTM D 1970-01, "Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection," as a guideline. One nail was driven through the center of each specimen with the plastic side up. The specimen was backed with a piece of plywood while the nail was driven. The nail was hammered until its head was flush with the surface of the sheet. The nail head was then raised back up approximately ¼ inch by tapping the pointed end of the nail while supporting the specimen. The plywood was removed and the end of the nail was cut off so that it would fit into the water vapor transmission test cup. These specimens were then prepared and tested in the same manner as the un-punctured specimens. The same dummy specimen was used for calculating the weight change of both sets of specimens.

Testing was completed on March 30, 2005.

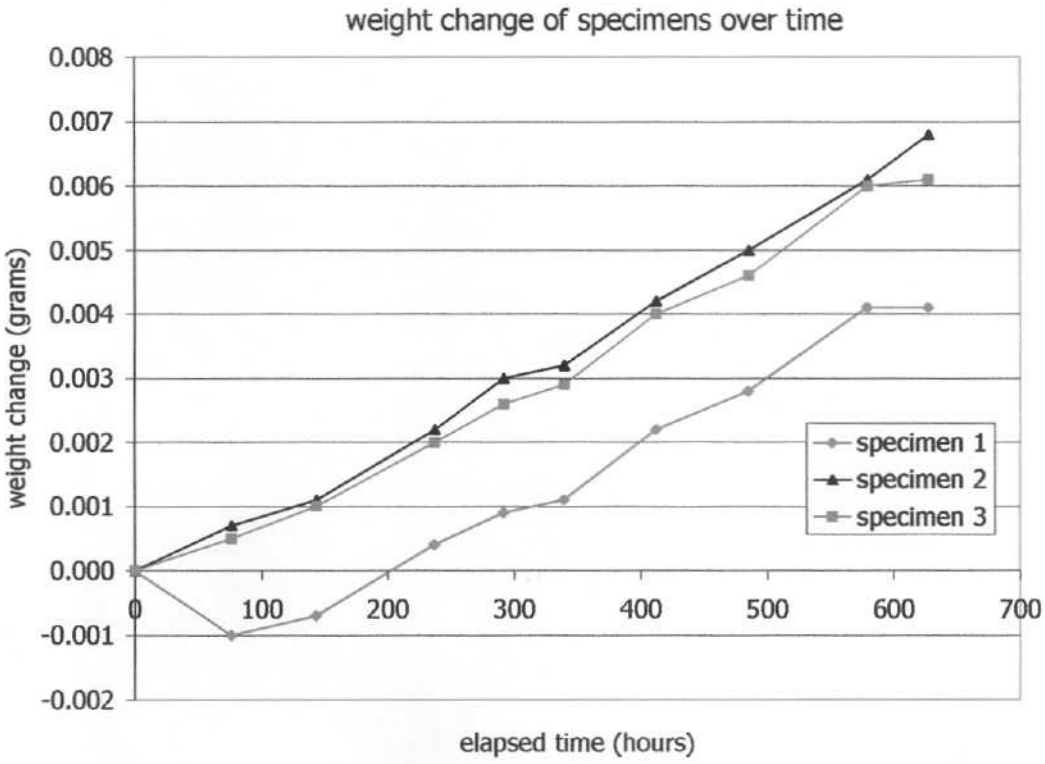
RESULTS: The water vapor transmission rate and the permeance of the two types of specimens are shown in the table below. Graphs 1 and 2 show the weight change of each specimen over time.

Statistical analysis of the data using a single-factor analysis of variance (ANOVA) indicates that there is no significant difference between the two types of specimens at the 95% confidence level.

water vapor transmission and permeance results			
type	specimen	water vapor transmission rate (grains/hr·ft^2)	permeance (US Perms)
no nail	1	0.00572	0.0132
	2	0.00492	0.0114
	3	0.00475	0.0110
	average	0.00513	0.0118
with nail	1	0.00514	0.0119
	2	0.00579	0.0134
	3	0.00553	0.0128
	average	0.00549	0.0127



Graph 1. Weight change data for the specimens without nail puncture. The linear regression calculation to determine the rate of transmission did not include the first data point.



Graph 2. Weight change data for the nail-punctured specimens. The calculation of the rate of transmission did not include the first data point.

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