Spray-Lock®
CONCRETE PROTECTION

Spray-Lock Concrete Protection Products Tested for Water Vapor Transmission Using ASTM E96 Test Method

ASTM E96-10 *Standard Test Methods for Water Vapor Transmission of Materials* is a standard that allows the user to choose the most appropriate method to test a material for water vapor transmission. ASTM E96 is written to allow for multiple products to be covered by a single standard, and appropriate for materials up to 1 ¼ inches (32mm) in thickness. The thickness limit has been set primarily because the time to reach equilibrium of water permeance increases as a square of the thickness. Therefore, thicker materials would potentially take much longer to test. When testing concrete specimens, a laboratory should select test conditions that most closely approach the conditions of use, as set forth in section 5 of the standard, "Significance and Use."

ASTM E96 details two primary methods of testing. The first is the Desiccant Method. The Desiccant Method utilizes a test specimen sealed to the open mouth of a test dish containing a desiccant with the assembly placed in a controlled atmosphere. Periodic weighing of the sample determines the rate of water movement through the specimen into the desiccant.

The second method of testing involves the use of a dish that contains distilled water that is affixed to the specimen. The specimen and dish are exposed to a controlled environment where the water moves through the specimen in vapor form, allowing calculation of water movement. This method was selected to try and approximate the conditions in the field where water vapor movement from below a concrete slab to the top of the slab is most critical for flooring manufacturers and installers.

A 1-inch concrete slab thickness was chosen to enable calculations within the normal time frame of the testing regime. Although greater thicknesses could be tested, the time for the test to run would have been increased considerably. The specified relative humidity in the test chamber is 50 +/- 2%. The specified temperature is 100 +/- 1° F (38 +/- 1° C). An air velocity of between 0.066 and 1 ft./sec (0.02 and 0.30 m/s) is specified in the test chamber. E96 allows for extreme humidity, if desired, and temperatures between 73.4° F (23° C) and 80° F (26.7° C). The specified, rather than alternate, test values for temperature and humidity were utilized for the testing under consideration.

The test results presented for water vapor transmission values are compared to a control specimen that was tested following the same procedure and at the same time as the experimental samples. The calculations used to determine water vapor transmission are also the same and are detailed in section 13 of the standard.

SCP 327 was applied at time of concrete initial set. SCP 578 was applied after concrete was aged in the laboratory for seven (7) days. Average WVT was obtained from direct measurements. Because permeance (perms) is commonly used in the U.S. construction market to describe water vapor transmission, calculated values for perms are provided. The permeance calculations

utilized the average WVT and projected values for vapor pressure for the measured relative humidity and temperature of the test chamber.

Table 1: Calculated Permeance Values

Test Group	Average WVT ($lbs/1000ft^2/24$ hr)	Calculated Average Permeance (U.S. Perms)
Control	22.80	0.280
SCP 327 (Applied at Time of Placement)	4.56	0.056
SCP 578 (Applied at 7 days of age)	5.54	0.068

The mix design used for testing was purposefully designed to be a high permeability mix in the untreated state to better demonstrate the ability of SCP products to affect water vapor transmission (WVT). Treatment with SCP products can reduce water vapor transmission significantly. Typical reductions in water vapor transmission are between 70% to 80% compared to untreated controls.

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