

### REFERENCE

RILEM Test No. II.4, water absorption under low pressure (pipe method)

### DISCUSSION

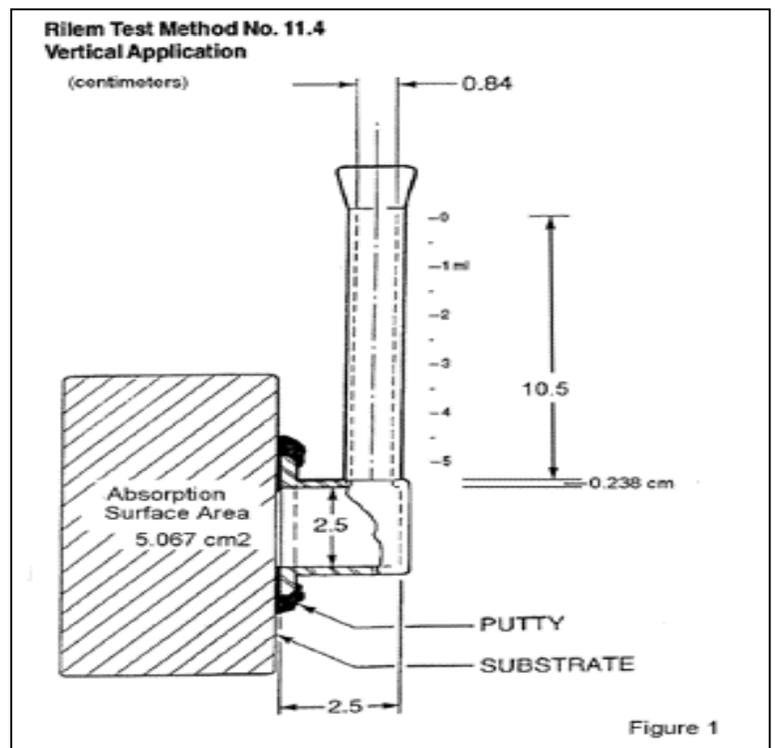
RILEM is an acronym for Reunion Internationale des Laboratoires d'Essais et de Recherches sur les Matériaux et des Constructions (International Union of Testing and Research Laboratories for Materials and Structures) located in Paris, France. Their function and purpose is similar to the American organization ASTM (American Society for Testing and Materials) in that technical committees are formed to develop standard testing methods, RILEM works specifically with measuring properties, performance and durability of various building fabrics.

Technical committee, Commission 25-PEM, developed a method to assess deterioration of natural building stone utilizing what has become known as a RILEM tube (Figure 1). These tubes are now commonly used to evaluate water absorption rates on many types of new, existing, man-made and naturally occurring building materials. This evaluation may be used to determine a substrate's need for a water-repellent, it may be used to compare the water absorption of treated vs. untreated substrates or it may be used to compare the performance of different treatments.

The tube is temporarily affixed to the substrate with water impermeable putty. The tube is then slowly filled with water to the appropriate level (the tube is graduated in milliliters) taking care to avoid trapping air bubbles. Most substrates are evaluated with the tube filled to the "0.0 mL" graduation which is the topmost graduation.

Typically, the volume of water absorbed is recorded after 20-minutes of contact, however, longer time frames may be used. If a 20-minute dwell is not providing data which allows for differentiation between areas (treated vs. untreated, one treatment vs. another), the tube can be left on the substrate for time periods longer than 20 minutes. If this technique is utilized record the time at which performance differentiation could be determined.

In general, acceptable performance is achieved if the level of water drops no more than 20% of the original height during the 20-minute test period. For example, if a clay brick wall is evaluated, the tube would be filled to the "0.0 mL" graduation at the beginning of the test. After 20 minutes, the water level should be no lower than the "1.0 mL" graduation.



The height of the column of water, as measured from the center of the bowl to the meniscus in the tube, determines the hydrostatic pressure applied to the test area. This pressure can subsequently be converted into a velocity or wind-driven rain speed. As an example, if the tube is filled to the "0.0 mL" graduation this exerts a pressure of 1139.36 Pa which correlates to a 98.1-mph wind-driven rain. Filling the tube to the "2.5 mL" graduation correlates to a 78.2-mph wind-driven rain.

