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**Professional Service Industries, Inc.**  
**Pittsburgh Testing Laboratory Division**

February 3, 1993

Flaherty-Wick, Incorporated  
110 Fifth Street  
West Elizabeth, Pennsylvania 15088-0624

Attention: Mr. Jim Flaherty

Re.: Accelerated Carbonization of Concrete Test Methodology  
Used by Pittsburgh Testing Laboratory

Per your request, please find attached the referenced test method which was used in our Carbonation Test for PermaCrete Treated Concrete as set forth in my letter of October 14, 1992, on that subject.

As you know, there is no ASTM test method designed for this test. Therefore, the attached test method was developed by our laboratory and equates to approximately a 10-year carbonation exposure rate that would be found in major metropolitan urban areas within the United States. Following carbonation exposure, the concrete samples are then examined for carbonation penetration in accordance with ASTM C-856.

Very truly yours,

PITTSBURGH TESTING LABORATORY DIVISION

A handwritten signature in black ink that reads 'C.A. Sherman'. The signature is written in a cursive, flowing style.

C. A. Sherman  
Department Manager  
Construction Services

CAS/mb



**TEST METHOD**  
**FOR ACCELERATED CARBONATION OF CONCRETE TEST SAMPLES**

1. Scope
  - 1.1 This method covers the procedure used for rapid carbonation of concrete test samples.
2. Reference Standards
  - 2.1 ASTM C-856 Microscopic Examination, which is used to determine depth of carbonation penetration into concrete.
3. Procedure
  - 3.1 Concrete test samples sized 1211 x 1211 x 311 are mixed and cured naturally at ambient temperature for 28 days or longer. The concrete surface temperature shall not fall below 50 degrees F. Or rise above 85 degrees F. During the cure period.
  - 3.2 Control group samples (non-treated) shall have no external or internal coating applied.
  - 3.3 Treated samples shall be coated with a surface application of PermaCrete. The chemical PermaCrete shall be applied using a paint brush and such application shall take place following the 28 day cure period for the concrete samples to which the PermaCrete is applied.
  - 3.4 PermaCrete treated samples shall be allowed to cure for 28 days in accordance with 3.1.
  - 3.5 Treated and non-treated (control group) samples are exposed to a Kerosene Torpedo heater generating 100,000 BTU for 48 hours and the samples shall be placed at a distance of 18 inches away from the propane heater.
  - 3.6 Treated and untreated samples are allowed to cool for 24 hours following 3.5.
  - 3.7 Treated and untreated samples are then tested for depth of carbonation penetration using microscopic examination procedures per ASTM C-856.

4. Reporting

- 4.1 Report any concrete surface nonconformity before testing starts.
- 4.2 Report any concrete surface nonconformity after testing ends.
- 4.3 Report depth of carbonation of treated and untreated samples in inches, which measurement shall be expressed to the nearest one one-hundredth of an inch