Standard Practice for

Quality Assurance, Job Site Quality Control, and Reapplication of Protective Sealers for Portland Cement Concrete

AASHTO Designation: R 94-19[1]

Technical Subcommittee: 4c, Markings and Coatings

Release: Group 2 (June)

AASHTO

American Association of State Highway and Transportation Officials
444 North Capitol Street N.W., Suite 249
Washington, D.C. 20001

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1. SCOPE

1.1. This practice covers procedures and test methods for quality assurance testing and job site quality control for protective sealers for protecting new concrete or prolonging the life of sound, in-service concrete used in highway structures. It is assumed that the sealer has been tested and prequalified through TP 96. This practice provides testing methods for routine and job site product quality assurance and for assessing the field performance of sealers, and includes methods to assess when reapplication should be performed.

1.2. Sealers are divided into two basic types: coatings, which remain on the surface; and penetrants, which penetrate into the concrete to some measurable depth and do not substantially change the appearance of the concrete.

1.3. The values stated in SI units are to be regarded as the standard.

2. REFERENCED DOCUMENTS

2.1. *AASHTO Standards*:

- T 260, Sampling and Testing for Chloride Ion in Concrete and Concrete Raw Materials
- T 278, Surface Frictional Properties Using the British Pendulum Tester
- TP 96, Protective Sealers for Portland Cement Concrete

2.2. *ASTM Standards*:

- C496/C496M, Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
- C1583/C1583M, Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method)
- D891, Standard Test Methods for Specific Gravity, Apparent, of Liquid Industrial Chemicals
- D2369, Standard Test Method for Volatile Content of Coatings
- D4138, Standard Practices for Measurement of Dry Film Thickness of Protective Coating Systems by Destructive, Cross-Sectioning Means
- D4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method

- D4541, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
- D5095, Standard Test Method for Determination of the Nonvolatile Content in Silanes, Siloxanes and Silane-Siloxane Blends Used in Masonry Water Repellent Treatments
- E274/E274M, Standard Test Method for Skid Resistance of Paved Surfaces Using a Full-Scale Tire
- E355, Standard Practice for Gas Chromatography Terms and Relationships
- E573, Standard Practices for Internal Reflection Spectroscopy
- E1252, Standard Practice for General Techniques for Obtaining Infrared Spectra for Qualitative Analysis
- F2170, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

2.3. *Other Reports*:

- Alberta Infrastructure, Technical Standards Branch, Alberta. BT005, Test Procedure for Measuring the Waterproofing Performance of Core Samples Taken from Sealed Concrete Surfaces
- Cady, P. D. and E. J. Gannon. *Condition Evaluation of Concrete Bridges Relative to Reinforcement Corrosion*, Vol. 8: *Procedure Manual*, Report No. SHRP-S/FR-92-110. Strategic Highway Research Program, National Research Council, Washington, DC, 1992.

2.4. *RILEM Recommendation*:

- RILEM Commission 25-PEM. Recommended Tests to Measure the Deterioration of Stone and to Assess the Effectiveness of Treatment Methods. *Materials and Structures,* Vol. 13, No. 3, 1980, pp. 175–253.

3. ROUTINE AND JOB SITE QUALITY ASSURANCE TESTING

3.1. This testing is recommended to establish that the sealer material supplied to a job site or ordered for use by maintenance forces is the same material and has the same performance as the material that was tested in the prequalification testing conducted according to TP 96. This testing includes sealer material characterization tests and selected performance tests.

3.2. *Sealer Sampling*—Sample a minimum of 1 qt of material for each manufacturing lot supplied. It is preferred to sample complete units of material; however, small samples of large units are allowed. Ensure that the sample container is clean, has an airtight seal, and is nonreactive with the sealer. Thoroughly mix each component prior to sampling.

3.3. *Material Characterization Tests for Job Site QA*—Material characterization tests are used to collect data on the basic characteristics of the material, including composition, solids content, and specific gravity. These tests are primarily used for comparison of materials sampled during routine and job site quality assurance with prequalified materials. These tests should be performed on samples of the batch or batches of sealer material that are supplied for project use. The test results should be compared to the data on file from the prequalification testing.

3.3.1. *Spectral Analysis (FTIR-ATR)*—Fourier transform infrared -Attenuated Total Reflection (FTIR - ATR) analysis provides a chemical fingerprint of a material system that can be used to compare one material to another and to compare batches of a particular material. Analysis can be carried out by transmission or by internal reflection. Analyses of the same material may not be comparable when data is collected in different modes (i.e., transmission vs. reflectance) or when different sample preparation techniques are used. When comparing spectra, it is important to ensure that data was collected under the same conditions, including sample preparation and