DMS-4650

Hydraulic Cement Concrete Curing Materials and Evaporation Retardants

Effective Date: October 2020 – November 2025

1. DESCRIPTION

This Specification governs the materials, composition, quality, sampling, and testing of liquid membrane-forming compounds and evaporation retardants for curing concrete.

2. UNITS OF MEASUREMENTS

The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.

3. MATERIAL PRODUCER LIST

The Materials and Tests Division (MTD) maintains the Material Producer Lists (MPLs) of all materials conforming to the requirements of this Specification. Materials appearing on the MPLs, entitled "Concrete Curing Compounds (Liquid Membrane-Forming)" and "Concrete Evaporation Retardants," require no further sampling and testing before use, unless deemed necessary by the Project Engineer or MTD.

4. BIDDERS' AND SUPPLIERS' REQUIREMENTS

The Department will only purchase or allow on projects those products listed by producer and product code or designation shown on the MPL.

Use of pre-qualified product does not relieve the Contractor of the responsibility to provide product that meets this Specification. The Department may inspect or test material at any time and reject any material that does not meet the specifications.

5. PRE-QUALIFICATION PROCEDURE

5.1. **NTPEP Submittal.** The Department will only consider products evaluated by the American Association of State Highway Transportation (AASHTO) National Transportation Product Evaluation Program (NTPEP) for pre-qualification. Provide NTPEP test results with pre-qualification request outlined below. The NTPEP results must meet all applicable requirements listed below. Re-submit a sample to NTPEP for re-testing according to the re-test cycle established by NTPEP. If NTPEP has not established a re-test cycle re-submit to NTPEP for re-test within 3 yr. of previous test completion.

5.2. **Pre-Qualification Request.** Submit a request for evaluation under DMS-4650 to DMS_Prequal@txdot.gov.

Include the following information in the request:

- company name;
- physical and mailing addresses;
- contact person, phone number, and email address;

- type of material; and
- NTPEP test report for each material with test data showing compliance with Articles 4650.6. and 4650.7.

5.3. **Pre-Qualification Sample.** The Department will evaluate, at no cost to the supplier, one sample per type of curing compound or evaporation retardant to establish Specification compliance. Ship a 1-qt. sample or three 1-p samples of each material in the producer's original sealed container to the Texas Department of Transportation, Laboratory Building, 6230 E. Stassney Lane, Austin, TX 78744. Mark each container with the brand name of the material, the type of material, and the batch number.

Tex-718-I describes the sampling procedures.

Include a current safety data sheet (SDS) that complies with OSHA Hazard Communication Standard 29 CFR 1910.1200.

Include certified lab results indicating the % moisture loss, % solids and viscosity for that sample.

Submit all materials for pre-qualification at no cost to the Department.

5.4. **Evaluation.** MTD will base final acceptance on tests performed on finished products as soon as practical after their arrival at the shipping destination and will notify prospective bidders and suppliers after completion of material evaluation.

5.4.1. **Qualification.** If approved for Department use, MTD will add the material to the MPL.

Report changes in the composition or in the manufacturing process of any material to MTD. Significant changes reported by the producer, as determined by the Director of MTD, may require a re-evaluation of performance. The Department reserves the right to conduct whatever tests it deems necessary to identify a pre-qualified material and determine if there is a change in the composition, manufacturing process, or quality that may affect its durability or performance. In case of variance, the Department's tests will govern.

5.4.2. **Failure.** Producers not qualified under this Specification may not furnish materials for use on Department projects.

Producers failing to qualify may submit a request for re-evaluation after 6 mo. have elapsed from the date of the original request. MTD may modify this time limit at its discretion. In the request for re-evaluation, document the cause of the issue and corrective action taken.

The Department normally bears the costs of sampling and testing; however, the producer will bear the costs associated with materials failing to conform to the requirements of this Specification. The Director of MTD will assess this cost at the time of testing, and amounts due will be billed to the producer. Amounts due must be paid before any re-evaluation of the same material type.

5.5. **Periodic Evaluation and Quality Monitoring.** The Department reserves the right to conduct random sampling and testing of pre-qualified materials to verify performance and Specification compliance and to perform random audits of documentation. Department representatives may sample material from the manufacturing plant, the project site, and the warehouse.

Failure of materials taken from original closed containers or from storage tanks located at the production plants to comply with the requirements of this Specification as a result of periodic evaluation may be cause for removal of those materials from the MPL. In case of variance, the Department's tests will govern.

Submit a 1-qt sample or three 1-pint samples to MTD for each batch supplied for use on Department projects. Additionally, submit an annual 1-qt quality monitoring sample or three 1-pint quality monitoring samples from the same batch between January or during a different month if designated by MTD. Include certified lab results indicating the % moisture loss, % solids and viscosity with all samples.

5.6. **Disqualification.** Causes for disqualification and removal from the MPL may include, but are not limited to:

- falsification of documentation,
- producer fails to report any change in formulation or manufacturing process to MTD,
- producer fails to properly submit re-test samples to NTPEP as specified,
- material fails to meet the requirements of this Specification as a result of periodic evaluation, or
- producer has unpaid charges for failing samples.

MTD will remove disqualified producers from the MPL and will not allow submission of material for re-qualification for 6 mo., at the discretion of the Department.

5.7. **Re-Qualification.** Once the disqualification period established by MTD has elapsed, producers disqualified and removed from the MPL may begin the re-qualification process by submitting a request in accordance with Section 5.1., including additional documentation identifying the cause of the problem and corrective action taken. The re-qualification process will then follow all subsequent Sections of Article 4650.5.

The Department normally bears the costs of sampling and testing; however, the disqualified producer will bear the costs associated with re-qualification. The Director of MTD will assess this cost at the time of re-evaluation, and amounts due will be billed to the producer.

6. MATERIAL REQUIREMENTS FOR CONCRETE CURING COMPOUNDS (LIQUID MEMBRANE-FORMING)

Curing compound must meet the requirements of ASTM C 309 Type 1-D or Type 2 Class A, in addition to the following.

6.1. **General.** Apply the material to damp concrete as a fine mist through atomizing nozzles and at a wet film thickness of 8–9 mils (200–230 µm). The liquid membrane-forming compound must not react deleteriously with concrete or its components.

The material must produce a firm, continuous, uniform moisture-impermeable film free of pinholes, cracks, or other film defects and must exhibit satisfactory adhesion.

The material's consistency must allow satisfactory application by conventional or airless spray at atmospheric and material temperatures above 40°F (5°C) without thinning. When applied at the producer's recommended thickness, not less than 8 mils (200 µm) wet, to vertical surfaces of damp concrete, the compound must not run off or appreciably sag.

The material must not disintegrate, check, peel, or crack during the required curing period. It must not peel or pick up under traffic after 24 hr. drying time and must disappear from the surface of the cured concrete by gradual disintegration.

6.2. **Solids.** Test solids in accordance with ASTM D 2369.

The total solids (vehicle and pigment) must not vary more than ± 2.0% from the total solids established on the pre-qualification sample or subsequent annual quality monitoring sample for Type 2 compound.

The total solids must not vary more than ± 2.0% from the total solids established on the pre-qualification sample or subsequent annual quality monitoring sample for Type 1-D compound.

6.3. **Density.** The density (gallon weight) must not vary more than ± 0.10 lb. per gallon (0.012 kg per L) from the gallon weight (density) established on the pre-qualification sample or subsequent annual quality monitoring sample when tested in accordance with ASTM D 1475.

6.4. **Infrared.** The infrared spectra of the vehicle must match that of the pre-qualification sample when tested in accordance with Tex-888-B.

6.5. **X-Ray.** The X-ray diffraction pattern of the Type 2 compound must match that of the pre-qualification sample when tested in accordance with Tex-896-B.

6.6. **Undesirable Particles.** The compound must be free of skins, agglomerates, or other undesirable particles. Determine if the contaminants are present in accordance with Tex-805-B.

6.7. **Settling.** A 4/5 × 6-in. (20 × 150-mm) test tube filled with thoroughly mixed compound to 3/4 full and left undisturbed for 72 hr. must show no clear separation in 4 hr. nor exhibit caking of pigment or hard settling after 72 hr.

6.8. **Viscosity.** The viscosity must not vary more than ±4 Krebs Units from the viscosity established by the pre-qualification sample or subsequent annual quality monitoring sample when tested in accordance with ASTM D 562.

6.9. **Color.** The Type 2 compound must exhibit a minimum reflectance value (Y) of 50 over black when a 9-mil (225-µm) wet film is applied to a sealed Sag and Leveling Test Chart (Lenata Company, Item #7B) and allowed to air dry at room temperature, 77 ± 2°F (25 ± 1°C), for 24 hr.

The resulting film must be a continuous uniform film free of pinholes and holidays and be uniform in color and texture, exhibiting no pigment flocculation, floating, or separation, when evaluated in accordance with Tex-839-B.

6.10. **Shelf Life**. Materials must have a minimum shelf life of 6 mo. and a maximum shelf life of 1 yr.

7. MATERIAL REQUIREMENTS FOR CONCRETE EVAPORATION RETARDANTS

The concrete evaporation retardant must be a commercially available monomolecular film compound. Certify the evaporation retardant has no adverse effect on the cement hydration process or the concrete and that it reduces surface moisture evaporation from the concrete when performing concrete operations in direct sun, wind, high temperatures, or low relative humidity.

Sampling will be in accordance with Tex-318-D. Testing will be in accordance with Tex-888-B.

8. ARCHIVED VERSIONS

Archived versions are available.