User Guide for the Concrete Curing Compounds Technical Committee
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Introduction:
Concrete Curing Compounds are materials which are applied to fresh concrete to maintain moisture content in the concrete until the concrete is properly cured. These materials ensure the concrete fully cures to its full strength.

These materials are liquids which dry to form a membrane on concrete. This membrane causes the concrete to retain water within the concrete. There are different types of curing compounds (acrylic resin, wax, alpha-methyl styrene, resin). The compounds are either dry to form a clear membrane, or contain a white pigment to increase reflectance to reduce the heating of the finished concrete.

This technical committee uses laboratory evaluation of various liquid membrane forming curing compounds for the following properties which are part of ASTM C309, “Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.”:

- Water Retention after 24 and 72 hours (AASHTO T 155, “Standard Method of Test for Water Retention by Liquid Membrane-Forming Curing Compounds for Concrete”)
- Dry Time
- Reflectance
- Long term Settling (Minnesota DOT Three-Day Settlement Test)
- Non-Volatile Content
- Flash Point (ASTM D93, “Standard Test Method for Flash Point by Pensky Martin Closed Cup Tester”)
- Fourier Transform Infrared Spectroscopy (FTIR) Scan
Key Aspects of the Program:
This program tests liquid membrane forming curing compounds, according to ASTM C309. The data generated will allow NTPEP member states to select curing compounds for usage in their state, and placement on that state’s APL/QPL. 15-20 products are generally tested per year, and products will need to be re-submitted to the technical committee every three years.

Terminology:

- **Membrane**
  - What forms on top of the concrete after drying of the applied curing compound

- **Water Retention**
  - How much water evaporates from the concrete, tested at 24 and 72 hour intervals. The less water loss, the higher the water retention

- **Reflectance**
  - Using 45/0 geometry color spectrophotometer or colorimeter using CIE Illuminant D65 with 2° Standard Observer shall be used to measure reflectance. Reflectance is Y in the CIE Y,x,y color measurement system.

- **Long Term Settling**
  - Degree of settling is the amount of clear, colorless supernatant liquid in a 100ml graduated cylinder over a 72 hour period

- **Non-Volatile Solids**
  - Solids (pigment and membrane compound) remaining after volatile carrier is evaporated

- **Flash Point**
  - The lowest temperature at which a liquid will form a vapor in the air near its surface that will “flash,” or briefly ignite, on exposure to an open flame. Water-based curing compounds are tested to 100°C.

Review of Evaluations and Significance of Data Generated:

The standard practice provides details’ regarding the standard testing that is used for evaluation of these products. The following discussion and suggested parameters for acceptance of products is intended only as a guide. The descriptions and suggested values are abbreviations (and some modifications) of information found ASTM C 309 and other referenced specifications. Individual agencies may elect to only utilize a portion of these tests and the suggested values may be altered to correspond to the needs of their agency.

1. **Water Loss Properties**: Liquid membrane-forming compounds, when tested in accordance with section 11.1 of ASTM C309, shall restrict the loss of water to not more than 0.55 kg/m2 in 72 h.
2. Reflectance Properties: Type 2 liquid membrane-forming compounds, when tested in accordance with section 11.2 of ASTM C309, shall exhibit a daylight reflectance of not less than 60%.

3. Drying Time Requirement: Liquid membrane-forming compounds, when tested in accordance with section 11.3 of ASTM C309, shall dry to touch in not more than 4 h.