
Standard Method of Test for

The Qualitative Detection of Harmful Clays of the Smectite Group in Aggregates Using Methylene Blue

AASHTO Designation: TP 57-06¹



1. SCOPE

- 1.1. The purpose of this standard is to identify the presence of harmful clays of the smectite group (poor quality 75- μ m material) and to provide an indication of the surface activity of the aggregate.
- 1.2. *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.*

2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standard:*
- M 231, Weighing Devices Used in the Testing of Materials

3. SUMMARY OF TEST METHOD

- 3.1. Methylene Blue solution is titrated into distilled water containing sample material passing the 75- μ m (No. 200) sieve in increments. A small amount of water containing the sample material and titrated Methylene Blue is removed via a glass rod and dropped onto filter paper. When the sample aggregate can no longer absorb more Methylene Blue, a blue ring is formed on the filter paper.

4. SIGNIFICANCE AND USE

- 4.1. The Methylene Blue Value determined by this standard can be used to estimate the amount of harmful clays and organic matter present in an aggregate. A large value for Methylene Blue Value indicates a large amount of clay or organic material present in the sample.

Note 1—Research (Aschenbrener, 1992) has developed the following relationship of methylene blue values and anticipated hot-mix asphalt pavement performance as related to moisture susceptibility. (See Table 1.)

Table 1—Expected Performance of Methylene Blue

Methylene Blue (mg/g)	Expected Performance
≤ 6	Excellent
7–12	Marginally acceptable
13–19	Problems/possible failures
≥ 20	Failure

5. APPARATUS

- 5.1. Amber-colored burette of at least 50-mL capacity with 0.1-mL graduations.
- 5.2. Magnetic mixer with stir bar.
- 5.3. Balance complying with M 231, Class C.
- 5.4. Glass rod of approximately 250-mm (10-in.) length and approximately 8-mm (0.3-in.) diameter.
- 5.5. Timer or stopwatch.
- 5.6. Pan and 75-μm (No. 200) sieve.
- 5.7. Volumetric Flask of 1000-mL capacity.
- 5.8. Whatman No. 2 filter paper.
- 5.9. Three 500-mL griffin beakers.
- 5.10. Methylene Blue, reagent grade-dated and stored for no more than four months in a brown bottle wrapped with foil in a dark cabinet at lab temperature.
Note 2—One gram of Methylene Blue is dissolved in enough distilled water to produce 200 mL of solution, with each one mL of solution containing 5 mg of Methylene Blue.
- 5.11. Distilled water at lab temperature.
- 5.12. Oven capable of maintaining $110 \pm 5^{\circ}\text{C}$ ($230 \pm 9^{\circ}\text{F}$).

Note 3—For the purposes of this procedure, lab temperature is defined as $15\text{--}25^{\circ}\text{C}$ ($60\text{--}77^{\circ}\text{F}$).

6. SAMPLE PREPARATION

- 6.1. This test shall be performed on a sample of material passing the 75-μm (No. 200) sieve, taken from the washed portion of a representative sample of individual or combined material (as required). The material shall be washed through the 75-μm (No. 200) sieve and collected in a clean container. This container shall be large enough to hold several gallons of water and material passing the 75-μm (No. 200) sieve. Allow the material to settle and remove the excess water. The portion passing the 75-μm (No. 200) sieve is collected, transferred to a smaller container, and dried for testing. The collected material is mixed thoroughly prior to testing. The minimum oven-