State of Nevada
Department of Transportation
Materials Division

METHOD OF TEST FOR METHYLENE BLUE VALUE OF MINERAL AGGREGATE FILLERS AND FINES

SCOPE

This method provides a procedure to define the surface activity of a given aggregate by estimating the amount of potentially harmful fine material. This fine material can include clays and organic matter.

A. APPARATUS

1. Buret, 50-mL
2. Balance, accurate to 0.01g.
3. Glass Beaker, 600-mL
4. Medicine Dropper or Glass Stirring Rod
5. Laboratory Timer or Stop Watch.
6. Magnetic Mixer with Stir Bar.
7. 75 μm (No. 200) Sieve and Pan.
8. Volumetric Flask, 1 000-mL capacity.
9. Filter Paper, Whatman No. 2 filter paper or comparable grade.

B. REAGENTS

1. Methylene Blue: Reagent Grade
2. Water: Unless otherwise indicated, references to water shall be understood to mean distilled water or water of equal purity.
3. Methylene Blue Solution: One gram of Methylene Blue is dissolved in enough water to produce 200 mL of solution, with each 1 mL of solution containing 5 mg of Methylene Blue. The prepared solution shall be dated and stored in a brown bottle, wrapped with aluminum foil, stored away from strong light in a dark cabinet, at ambient temperature. The Methylene Blue solution has a four-month shelf life. Therefore, unused Methylene Blue solution shall be discarded according to Federal, State and Local regulations after four months.

C. SAMPLE PREPARATION

1. A representative test sample shall be prepared as per Nevada Test Method Nev. T203, Section D, "Initial Preparation of Test Samples for Liquid Limit and/or Plastic Limit".

2. The test sample obtained as per Nev. T203, Section D shall be screened through the 75 μm (No. 200) sieve. Use the portion of material passing through the 75 μm (No. 200) sieve for testing. A minimum of 10 grams of minus 75 μm (No. 200) material is required. If an insufficient sample is obtained, then the test will not be run. Report the test results as **"Insufficient".**

D. TEST PROCEDURE

1. Weigh out 10.0 grams (±0.05g) of the minus 75 μm (No. 200) material into a 600-mL beaker.

2. Add 30 mL of distilled water to the beaker and stir with the mixer until the sample is uniformly dispersed.

3. Fill the burette with the Methylene Blue solution prepared as described in Section B. - Reagents.

4. Continue stirring and titrate the aggregate solution in 0.5 mL additions with the Methylene Blue solution.

   NOTE: If the Plascity Index is large or more than 50 mL of Methylene Blue solution has been used in titrating the sample, the Methylene Blue solution additions may be increased to 1.0 to 2.0 mL.

5. Continue to stir for one minute after each addition of the Methylene Blue solution.

6. Remove a drop of the slurry, using the dropper or glass stirring rod, and place on the filter paper.

7. Observe the appearance of the drop on the filter paper. The end point is indicated by the formation of a light blue halo around the drop. Record the volume of Methylene Blue solution in mL used to reach the end point. With experience, the person performing the test can reach the end point more quickly by skipping early increments

8. Continue to stir for five minutes and determine if a permanent end point has been reached by adding more Methylene Blue solution. Record this value if different from the value observed in "Step 7".

9. Repeat "Steps 7 & 8" until a permanent end point has been reached.

10. Record the end point value.

E. CALCULATION

Calculate the Methylene Blue Value (MBV) to the nearest 0.1 using the following formula:

$$MBV = \frac{CV}{W}$$

where:

MBV = Milligrams of Methylene Blue solution per gram of the minus 75 μm (No. 200) material.

C = Milligrams of Methylene Blue per milliliters of solution.

V = Milliliters of Methylene Blue solution required for titration.

W = Grams of dry material.

F. PRECISION AND BIAS

No precision and bias have been established for this test.

G. Reference Documents

1. Nevada Test Method Nev. T203F - "Method of Test for Soil and Aggregate Sample Preparation" (Effective Date: September 2, 1996).
2. ASTM Designation: C 837 - "Standard Test Method for Methylene Blue Index of Clay".
3. State of Ohio Department of Transportation - Supplement 1052 - "Determination of Methylene Blue Adsorption Value of Mineral Aggregate Fillers and Fines" (September 25, 1996 Edition).