

Materials & Tests Unit



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DIVISION OF HIGHWAYS

MATERIALS AND TESTS UNIT

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MODIFICATIONS OF AASHTO TESTING PROCEDURES

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AASHTO R58-----See Attached Sheet
AASHTO T88-----See Attached Sheet
AASHTO T89-----See Attached Sheet
AASHTO T90-----See Attached Sheet

Modification of AASHTO R 58-11 (Previous T87)

- 4.1.1 Mechanical Analysis (AASHTO T 88) – Delete the first sentence and substitute the following:

For the mechanical analysis material passing a 2.00 mm (No. 10) sieve is required in amounts equal to 100g of sandy soils and 50g of silty or clayey soils.

- 5.1 Delete the second sentence in this section and substitute the following:

A representative test sample weighing approximately 1,000 grams (or as otherwise established) is selected as the amount required to perform the desired tests (Section 4) ...

- 6.2 Delete “approximately 110g” and substitute “100g”.
Delete “approximately 60g” and substitute “50g”.

Modification of AASHTO T 88-10

APPARATUS:

3.1.3.1 (Alternate B) – Dispersing Device – Delete in entirety.

DISPERSING AGENT:

4.1 Delete in entirety and substitute the following:

Use a stock solution of sodium hexametaphosphate with a 6.0 hydrometer reading at 68° F.

NOTE: Correction factor of 6.0 should be deducted from all hydrometer readings when using this stock solution.

SAMPLES:

6.1 Delete use of AASHTO T146 - Wet Preparation of Disturbed Soil Samples for test unless directed otherwise.

6.1.2 (a) Delete “or 0.425-mm (No.40)”
(b) Delete “approximately 100g” and substitute “100g”; delete “approximately 50g” and substitute “50g”

DISPERSION OF SOIL SAMPLES:

10.1 Delete in entirety and substitute the following:

The 100g sample for sandy soils or 50g sample for silty or clayey soils which is to be used for hydrometer analysis shall be weighed, placed in a 250 ml evaporating dish or beaker, covered with 125-ml of stock solution of the selected dispersing agent specified in Section 4 and stirred thoroughly with a glass rod before placing in a dispersing cup. Distilled, demineralized, or pure tap water should be added until the dispersing cup is more than half-full, and the contents dispersed for a minimum of 1 minute in the mechanical stirring apparatus.

ALTERNATE METHOD FOR DISPERSION:

11.1~11.4 Delete in entirety

HYDROMETER TEST:

12.1~12.3 Delete in entirety and substitute the following:

After dispersion, the mixture should be transferred to a glass graduate and distilled, demineralized or pure tap water having the same temperature as the constant temperature bath added until the mixture attains a volume of 1000 ml. The graduate containing the soil suspension attains the temperature of the bath, the graduate should be removed and its contents thoroughly shaken for 1 minute, the palm of the hand being used as a stopper over the mouth of the graduate. At the conclusion of this shaking, a reading to determine the diameter of soil particles in suspension is taken, after approximately 35 seconds, with the hydrometer at the top of the meniscus formed by the suspension around its stem. The exact time is determined by use of a time-versus particle size-diameter chart. This is the initial silt-clay reading. Then the sample should be replaced in the constant temperature bath. After the sedimentation time of 60 minutes, a second hydrometer reading (clay) should be taken in the soil suspension with care being taken not to disturb the sedimentation of the material.

NOTE 1: The initial and 2nd hydrometer reading must be corrected for the dispersing agent solution (minus 6.0) and for temperature, if other than 68° F.

At the conclusion of the final reading of the hydrometer, the suspension should be washed on a No. 270 sieve. The fraction retained on the No. 270 sieve should be placed in a 250 ml. evaporating dish, the surface water poured off and the material dried in an oven at $100 \pm 5^\circ$ C and a sieve analysis made using the No. 40, No. 200 and such other sieves as may be required.

The weights of that part of the air-dried sample retained on each sieve should be corrected for hygroscopic moisture and converted to percent passing.

$$\text{Percentage of hygroscopic moisture} = \frac{W - W_1}{W_1} \times 100$$

Where:

W = mass of air-dried soil

W1 = mass of oven-dried soil

16.1~21.1 Delete in entirety unless directed otherwise.

Modifications of AASHTO T 89-10

- 3.7 Balance – A balance sensitive to 0.1g unless directed otherwise.
- 6.1 Tap water may be used in this test unless directed otherwise.
- 6.2 Delete the first sentence and substitute the following:

Modification of Liquid Limit Test of Plastic Materials (May be used in lieu of “flow curve” unless directed otherwise).

The cup containing the sample prepared as described in Section 6.2 should be lifted and dropped by turning the crank F at the rate of two revolutions per second until the two sides of the sample come in contact at the bottom of the groove along a distance of about ½ inch (12.7 mm) in 25 shocks. When it is ascertained that the flow of the material has closed the groove in exactly 25 blows at approximately ½ inch; a sample should be taken as described in Section 6.4, and the liquid limit should be determined by calculation as described in Section 8.1.

NOTE 6 – Delete the last sentence and substitute the following:

If the soil continues to slide on the cup at a lesser number of blows than 25, the test is not applicable and the following method should be used:

Modification of Liquid Limit Test of Non-Plastic Materials

When the liquid limit test cannot be performed on non-plastic soils with the device and in the manner prescribed in AASHTO T 89 due to slippage of the divided soil mass in the cup, the liquid limit should be determined as directed below.

A soil sample should be taken as directed in Section 4.1 and mixed with water as described in Section 6.1.

When sufficient water has been thoroughly mixed with soil to form a uniform mass of stiff consistency, the mass should be spread in a 250 ml evaporating dish in a manner similar to the operation of placing the mass in the cup of the liquid device as described in Section 6.2, except that the soil mass should not be divided with the grooving tool.

A clean, dry spatula shall be pressed firmly on the surface of the soil mass and then lifted without dragging, and the spatula surface observed for water. When sufficient water has been thoroughly mixed with the soil to just cause water to adhere to the spatula in the form of beads, the consistency of the liquid limit has been reached, and the percentage of moisture in the soil is its value.

- 11.1 through 14.3 – Delete in entirety.

Modification of AASHTO T 90-00

- 3.7 Balance – A balance sensitive to 0.1g unless otherwise directed.