

Standard Method of Test for

Determining Drain-Down Characteristics in an Uncompacted Asphalt Mixture

SCDOT Designation: SC-T-90 (7/2019)

1. SCOPE

1.1 This test method covers the determination of the amount of binder drain-down in an uncompacted asphalt mixture. This test is applicable to Open Graded Friction Course (OGFC) and Stone Matrix Asphalt (SMA) mixtures.

2. REFERENCED DOCUMENTS

2.1 AASHTO T-305, SC-T-62, SC-T-72, and SC-T-88

3. APPARATUS

3.1 Oven capable of maintaining a temperature of $400 \pm 5^{\circ}\text{F}$.

3.2 9-inch paper plate capable of withstanding test temperatures of $350 \pm 5^{\circ}\text{F}$.

3.3 Standard wire basket meeting the dimensions shown in AASHTO T-305.

3.4 Spatulas, trowels, mixer, and bowls as needed

3.5 Minimum of 4000 gram balance accurate to 0.1 grams.

4. TEST SPECIMENS

4.1 Laboratory Prepared Samples

4.1.1 Two samples are required for this test.

4.1.2 Dry aggregate to a constant mass. Sieve to appropriate size fractions as indicated in the job mix formula.

4.1.3 Select a mixing temperature of the binder using the temperature-viscosity curve or as recommended by supplier.

4.1.4 Weigh into separate pans for each test sample the amount of each size aggregate fraction required by the job mix formula to produce sample having a total mass of approximately 1200 g. Place the samples in an oven and heat to a temperature not to exceed the mixing temperature of the binder by more than 50°F , or per manufacturer recommendations (i.e. – WMA).

4.1.5 Heat the binder to mixing temperature as determined in 4.1.3. Add any WMA additives that are typically terminally blended if needed per manufacturer's recommendation.

4.1.6 Place the heated aggregate in the mixing bowl. Add stabilizing fibers and/or other dry admixtures as specified to the dried aggregate. Thoroughly mix the dry components before the addition of the binder. Form a crater in the aggregate and add the required amount of binder as established in SC-T-91. At this point, the temperature of the aggregate and binder shall be within the limits established in 4.1.3. Mix until aggregate is thoroughly coated.

4.2 Plant Produced Samples

4.2.1 Two samples shall be required from plant-produced mixture.

4.2.2 Sample in accordance with SC-T-62 from the truck. Quarter sample in accordance with SC-T-72 until asphalt mixtures have a total mass of 1000 g – 1500 g.

5. PROCEDURE

5.1 Transfer the laboratory or plant-produced loose mixture to the tared test basket. Do not consolidate or otherwise disturb the sample. Determine the mass of the sample to the nearest 0.1-g (W).

5.2 Record the mass of a paper plate to the nearest 0.1-gram. (P_i) Place the basket on the paper plate and transfer the assembly into the oven set at 350 ± 5°F (WMA - see manufacturer's recommendation or maximum of 285° F). Ensure there is no excessive vibration in the oven that may cause the mix to consolidate.

5.3 After the sample has been in the oven for 1 hour, remove the basket and paper plate. Record the mass of the paper plate plus the drained binder to the nearest 0.1-gram. (P_f)

6. CALCULATIONS

6.1 Calculate the percentage of binder that is retained by subtracting the initial paper plate mass from the final paper plate mass and divide this by the initial sample mass of binder in mixture. Multiply the result by 100 to obtain a percentage.

$$R = \frac{(Wb - (P_f - P_i))}{Wb} * 100$$

Where:

P_i - Initial paper plate mass (g)

P_f - Final paper plate mass (g)

W - Mixture mass (g)

Wb - Weight of binder in mixture (g) = W * % Binder in mixture*

R - % Retention or draindown of asphalt binder

*Note: Lab samples prepared at design-optimum binder content. Plant produced samples use ignition oven tests to determine binder content

7. REPORT

7.1 Report the average percentage drain-down to the nearest 0.01% on Form MD 418.

7.2 Submit mix design information per SC-T- 88.