

Method of Test for
**DETERMINING DEGREE OF PARTICLE COATING OF
BITUMINOUS-AGGREGATE MIXTURES (ROSS COUNT)**

DOTD Designation: TR 328-02
(AASHTO DESIGNATION: T 195-67)

I. Scope

This method of test determines the degree of particle coating in an asphaltic concrete mixture, on the basis of the percentage of coarse aggregate particles that are completely coated. Determination of the percentages of coated particles for varying mixing times may be used to establish the least mixing time required to produce satisfactory coating of the aggregate for a given set of conditions. This determination is also used to determine if drum-mix plants meet certification requirements for this parameter.

II. Apparatus

- A. Sieves** – 9.5 mm (3/8-in.) and 4.75 mm (No. 4). The sieves shall conform to the AASHTO M 92, Wire-Cloth Sieves for Testing Purposes.
- B. Stop Watch** – For checking actual mixing time.
- C. Thermometer** – Range at least 10°C (50°F) to 205°C (400°F).
- D. Sample Shovel**
- E. Sample Trays**
- F. Worksheet** – Asphaltic Concrete Job Mix Formula (Figure 1)

III. Sampling

- A. Batch Plant** – Permit the plant to operate at an established mixing time per batch (timed by stop watch).
- B. Continuous Plant** – Establish a mixing time by use of the following formula:

$$\frac{\text{pug mill contents, kg (lb)}}{\text{pug mill output, kg/s (lb/s)}}$$

- C.** Samples should be taken at the site of the bituminous mixing plant, immediately after discharge from the mixer unit, from three alternate truck loads of mixture. (See AASHTO 168, Sampling Bituminous Paving Mixtures). (Samples taken in accordance with the DOTD Materials Sampling Manual are permissible.)
- D.** The amount of material required to perform the test is approximately 2.3 kg to 3.5 kg (5 to 8 lb).

Note 1: *The sample size shall be sufficient to yield between 200 to 500 coarse particles when sieved in accordance with Step IV.A.*

IV. Procedure

- A.** Sieve each sample immediately, while it is still hot, on a 9.5 mm (3/8 - in.) sieve. Use a 4.75 mm (No. 4) sieve for mixes with a 9.5 mm (3/8 - in.) maximum size aggregate. Do not overload the sieves. If necessary, sieve the sample in two or three operations. Shaking should be reduced to a minimum to prevent recoating of uncoated particles.
- B.** Place particles on a clean surface in a one-particle layer and start count immediately.
- C.** Very carefully examine each particle under direct sunlight, fluorescent light or similar light conditions. If even a tiny speck of uncoated stone is noted, classify the particle as "partially coated." If completely coated, classify the particle as "completely coated."

D. Count and record the number of particles classified as “completely coated” and the total number of particles in the test sample.

E. Calculate the Percent of Coated Particles (Ross Count) in accordance with Step V.

Percent of Coated Particles

$$\text{(Ross Count)} = \frac{312}{321} \times 100$$

$$= 0.971962 \times 100$$

$$= 97.1962$$

$$= 97\%$$

V. Calculation

The required computation is as follows:

$$\text{Percent of Coated Particles} = \frac{\text{No. of Completely Coated Particles} \times 100}{\text{Total No. of Particles}}$$

example:

No. of Completely Coated
Particles = 312

Total Number of Particles = 321

VI. Report

Report the Ross Count to the nearest percent on the Asphaltic Concrete Job Mix Formula or as needed for asphaltic concrete plant control.

VII. Normal Test Reporting Time

Normal test reporting time is two hours.

