Designation: D 5624 – 00

Standard Test Method for Determining the Transverse-Aggregate Spread Rate for Surface Treatment Applications[1]

This standard is issued under the fixed designation D 5624; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method details the procedure for calibrating the transverse-aggregate spread rates in 0.3–m (1–ft) increments.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

C 566 Test Method for Total Moisture Content of Aggregate by Drying[2]

C 136 Test Method for Sieve Analysis of Fine and Coarse Aggregates[2]

E 898 Method of Testing Top Loading, Direct-Reading Laboratory Scales and Balances[3]

3. Summary of Test Method

3.1 The transverse-aggregate spread rate is determined by the use of a series of rubber pads laid side by side width-wise across the pavement. The chip spreader is then allowed to proceed across the rubber mats with the gates open allowing the aggregate to drop onto the mats. Aggregate collected on each of the mats is removed and weighed. The transverse-aggregate distribution can then be calculated, and the chip spreader adjusted if desired. Moisture content and aggregate gradation can be determined from the collected material.

4. Significance and Use

4.1 This test method can be used to calibrate aggregate spreaders prior to construction.

4.2 Quality control during construction can be monitored.

4.3 Moisture content and sieve analysis of the aggregates at the time of construction can also be obtained.

5. Apparatus

5.1 *Balance*—A balance of sufficient capacity to handle the weight of the aggregate shall be provided. This balance shall be readable and accurate to 1 g if only the transverse spread rate is being determined; an accuracy of 0.1 g is needed if moisture content is being determined. All scales shall meet the requirement set forth in Method E 898 for top loading, direct-reading laboratory scales and balances.

5.2 *Containers*—Any container of a sufficient size to hold the contents of one rubber mat. If moisture content is to be determined, then the container should be sealable.

5.3 *Rubber Mats*— Rubber mats should have grooves of sufficient depth to prevent aggregate from rolling and slipping when the chips are spread. The mats should be cut in widths appropriate for the gate openings of the equipment being adjusted. Widths of 0.3 m (1 ft) have been commonly used. The length of the mats should be a minimum of 0.9 m (3 ft). Mats should be cut so that the grooves are perpendicular to the 0.9 m (3 ft) side.

NOTE 1—Rubber floor mats conforming to these specifications are available at local hardware stores. Various sizes can be accommodated and both English and SI units can be handled.

5.4 *Oven*—The oven shall be a forced air type oven capable of maintaining a uniform temperature of 110 ± 5°C (230 ± 9°F) .

PROCEDURES

6. Determination of Transverse Spread Rate

6.1 Place the rubber mats side by side width-wise on the pavement with the grooves perpendicular to the centerline (Fig. 1). The number of rubber mats to be used shall be equal to the width of aggregate distribution to be monitored.

6.2 Tare one container for each mat to be used. If the container has a lid, tare the container with the lid. Designate this mass as *B*.

6.3 Drive the aggregate spreader over the pads with the gates open to allow the aggregate to fall onto the rubber mats. The gates must be opened a minimum of 2.5 m (8 ft) before reaching the rubber mats. This allows time for the transverse-aggregate distribution to stabilize.

6.4 The aggregate spreader should be operated just as if it

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[2] *Annual Book of ASTM Standards*, Vol 04.02.

[3] *Annual Book of ASTM Standards*, Vol 14.02.

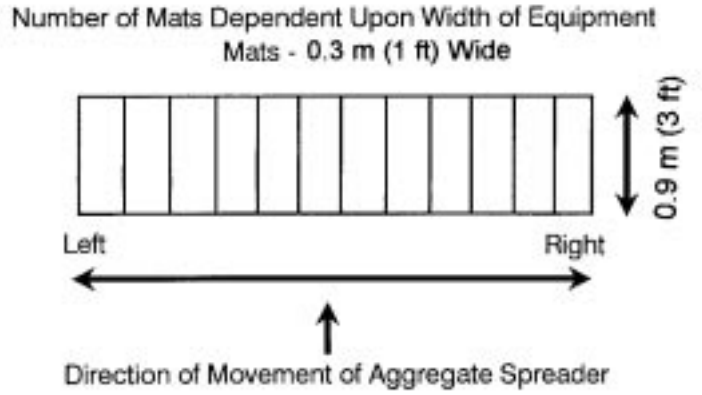

FIG. 1 Layout of Mats

were being used during construction. Speed and gear settings should be representative of anticipated construction use.

6.5 After the aggregate spreader has passed over the rubber mats, carefully brush away the aggregate from all edges of each rubber mat. Fold each mat lengthwise into a 0.9 m (3 ft) long funnel. Pour the aggregate into a tared, and labeled one gallon container. Repeat this procedure for each mat until all of the aggregate has been placed in the container.

6.6 Weigh each container of aggregate. Designate this mass as *A*.

7. Moisture Content of Aggregate (Optional)

7.1 When the moisture content of the aggregate at the time of construction is required, obtain the samples using the steps in 6.1 through 6.6. The samples for moisture content determination must be placed in a sealed container within 5 min of spreading the aggregate.

7.2 Weigh each sealed container of moist aggregate within 4 h of obtaining the sample. Subtract the mass of the container to determine the mass of the moist aggregate.

7.3 Determine the moisture content of the aggregate in accordance with Test Method C 566.

8. Aggregate Gradation (Optional)

8.1 Combine the aggregate from all individual containers into one container. Mix aggregate through riffle splitter at least twice to ensure adequate mixing.

8.2 Oven dry to a constant mass.

8.3 Perform sieve analysis according to Test Method C 136.

9. Calculation

9.1 (SI Units) Mass of aggregate on each mat:

$$S = \frac{10\,(A - B)}{LW} \tag{1}$$

where:

A = mass of aggregate and container, g,
B = mass of container, g,
L = length of mat, mm,
S = aggregate spread rate in kg/m ^{2}, and
W = width of mat, mm.

9.2 (Inch-Pound Units) Mass of aggregate on each mat:

$$S = \frac{A - B}{\frac{(LW)}{9}453.6} \tag{2}$$

where:

A = mass of aggregate and container, g,
B = mass of container, g,
L = length of mat, ft,
S = aggregate spread rate in lbs/yd ^{2}, and
W = width of mat, ft.

10. Report

10.1 Report the following information:

10.2 Moisture content of aggregate, if determined,

10.3 Aggregate gradation, if determined, and whether the aggregate was pre-coated, pre-wet or dry, and

10.4 The aggregate quantity in kg/m ^{2}(lbs/yd^2) per transverse foot. Report results from left to right from the driver's perspective.

11. Precision and Bias

11.1 Preliminary testing suggests that the reproducibility (within-laboratory) standard deviation for this test is 0.47 kg/m^2 (0.86 lbs/yd^2). Because test results are dependent upon individual pieces of equipment, local requirements for operation of equipment, equipment speed, as well as the fact that there is no means of providing a standard material for testing, no estimate of repeatability (between-laboratory standard deviation) can be developed. This precision statement is only for the purposes of defining the ability of one technician to measure the transverse spread rate for any given set of testing conditions.

NOTE 2—Precision estimated from data reported in "Evaluation of 1989 Chip Seal Test Sections on US95A Between Wabuska and Yerington, Nevada", University of Nevada, Reno report to Nevada Department of Transportation, June, 1991.

11.2 Preliminary testing also suggests that standard deviations will vary depending on whether pre-wet or pre-coated aggregate is used. However, this has not been proven and more research is being done on this subject.

11.3 *Bias*—Since there is no accepted reference material suitable for determining the bias for the procedure for measuring density, no statement on the bias of this test method is being made.

12. Keywords

12.1 surface treatment