
Test Procedure for

SAMPLING AGGREGATE FOR BITUMINOUS MIXTURES, SURFACE TREATMENTS, AND LIMESTONE ROCK ASPHALT



TxDOT Designation: Tex-221-F

Effective Date: January 2018

1. SCOPE

- 1.1 Use this test method to sample:
- limestone rock asphalt aggregate before the addition of flux oil and water and
 - aggregates used for bituminous mixtures and surface treatments (pre-coated) before the addition of asphaltic materials or water.
- 1.2 The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.
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2. SECURING SAMPLES

- 2.1 A Department representative will select samples that are characteristic of the true nature and condition of the materials.
- 2.2 Samples, which require a mechanical analysis in accordance with Tex-200-E, must conform to the weight requirements shown in Table 1.
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3. SAMPLING PROCEDURES

- 3.1 *Sampling from the Plant:*
- 3.1.1 Make a general inspection of the plant and a record of the screening facilities.
- 3.1.2 Before sampling, permit the plant to produce a minimum of 4.5 Mg (5 tons) of mixture.
- 3.1.2.1 For a weight-batching type plant, take samples from the aggregate bins that feed into the weigh-box.
- 3.1.2.2 For a continuous mix-type plant, take samples from the aggregate bins that feed the proportioning mechanism.
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- 3.1.2.3 For a drum type plant, take samples from the collector belt feeding the aggregate into the drum. When an aggregate flow diversion chute is not available, stop the feed belt before obtaining the sample.
- 3.1.3 Take samples from the entire cross-section of the flow of material from each individual bin as it is being discharged.
- 3.2 *Sampling Before Plant Processing:*
 - 3.2.1 *Sampling from Bins or Belt:*
 - 3.2.1.1 For preliminary investigation work, sample aggregates in their natural condition before plant processing.
 - 3.2.1.2 If the materials are being fed to the plant from bins, obtain the sample from the collector belt after materials have passed the scalping screen.
 - 3.2.1.3 The preferred method of sampling from the belt is a mechanical belt-sampling device approved by the Engineer. This method does not require the belt to be stopped, but simply diverts the flow of aggregate for a designated period where the sample is collected.
 - 3.2.1.4 When mechanical devices are not used, stop the belt before sampling, and take the sample from the entire width of the belt and at least 3 ft. (1 m) of the length, using a square-nosed scoop.
 - 3.2.1.5 After removing the aggregate, brush all fines from the exposed section of the belt using a stiff bristled brush, and add to the sample.
 - 3.2.2 *Sampling from Stockpiles that Contain Coarse and Fine Aggregate:*
 - 3.2.2.1 Identify locations around the perimeter of the stockpile that represent the approximate quarter points of the stockpile. Clean and level the ground at these locations to prevent contamination of the sampling pile.
 - 3.2.2.2 Sample each quarter point of the stockpile.
 - 3.2.2.2.1 Using a front-end loader large enough to cut into the stockpile from bottom to top in one continuous cut, make enough cuts into the stockpile at one of the quarter points so that the cut at ground level is perpendicular to the top edge of the stockpile at the quarter point. If available, the blade of the loader bucket must be straight, flat, and without teeth. Only use a loader with a toothed bucket when a loader with a bucket that is straight, flat, and without teeth is not available. Make the cuts from the bottom to the top to expose a clean, interior vertical face representing the full height of the stockpile. Clean out the cut as needed to leave a minimal amount of material on the ground before obtaining the sample.
 - 3.2.2.2.2 Discard the material obtained from the cuts.

- 3.2.2.2.3 Using the front-end loader, cut into the exposed interior face to a depth equal to approximately half the depth of the loader bucket, taking care not to overload the bucket in the bottom half of the stockpile. Make the cut from the bottom to the top in one continuous motion.
- 3.2.2.2.4 Lower the bucket until it is as close as possible to the surface of the ground, and empty the entire contents of the bucket onto the ground in one motion without having to raise the bucket before all contents are emptied. Repeat this process 3 more times, each time emptying the loader bucket next to the last load, as shown in Figure 1.

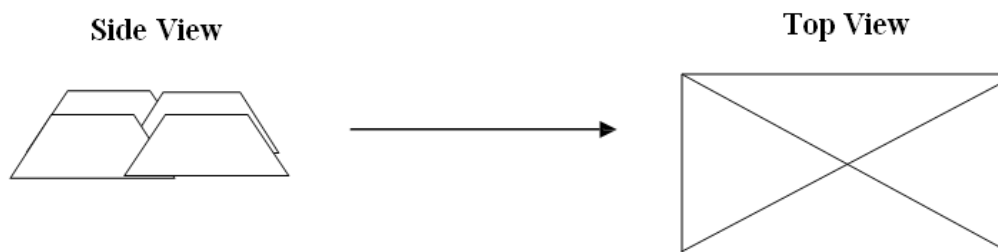


Figure 1—Placement and Sampling of Piles

- 3.2.2.2.5 Using the loader bucket, strike and level the sample piles at mid-height in the direction the bucket was emptied.
- 3.2.2.2.6 Using a shovel, identify the approximate midpoint of each bucket load, and dig straight down to remove material for sampling. Deposit the material removed from the hole into sample containers (preferably 5-gal. buckets). Minimize loose material falling from the sides of the hole and loss of material from the shovel into the hole or adjacent ground while filling sample containers. Remove enough material from each hole to fill one sample container. This method will yield 4 containers of sampled material for each quarter point of the stockpile sampled.
- 3.2.2.2.7 Seal and label the sample containers. Include the quarter point location on the label.
- 3.2.2.3 Repeat Sections 3.2.2.2.1–3.2.2.2.7 at each of the stockpile quarter points.
- 3.2.2.4 A Department representative will divide the total sample into 3 equal portions and offer one portion of the sample to the producer, retain one portion for district testing, and retain one portion for CST/M&P for referee and random blind sample testing.
- 3.2.3 *Sampling from Stockpiles that Contain Only Coarse or Only Fine Aggregate:*
- 3.2.3.1 Obtain a representative sample from a stockpile. When conditions require sampling from this source, take separate samples from different parts of the pile. Avoid any segregated areas.
- 3.2.3.2 Take samples from stockpiles near the top of the pile, near the base of the pile and at an intermediate point.

- 3.2.3.3 Shove a board into the pile just above the point of sampling to prevent further segregation during sampling.
- 3.2.3.4 Do not use the aggregate on the surface of the stockpile as a part of the sample.
- 3.2.3.5 In each instance, dig a small trench or hole into the pile approximately 1 ft. deep and take the sample from the innermost part of the hole.
- 3.2.3.6 Take samples from these 3 points at several places around the stockpile and combine them to form a composite sample.
- 3.2.4 *Sampling from Railroad Cars and Trucks:*
 - Note 1**—Provide a proper sampling stand and take adequate safety precautions to prevent bodily injury. Avoid walking or standing on the aggregate while sampling.
 - 3.2.4.1 View the material after loading is complete. Note areas of obvious segregation, and avoid sampling from these locations.
 - 3.2.4.2 Select a minimum of 3 representative sections in the truck bed or railcar. Dig a minimum of 12 in. (300 mm) below the surface, and remove at least 10 lb. (4.5 kg) of material from each of the sections.
 - 3.2.4.3 Combine all of the samples and mix thoroughly.
 - 3.2.4.4 Reduce the sample by quartering (as directed in Tex-200-F) to the required size in accordance with Table 1.

Table 1—Minimum Size of Samples

Nominal Max Size of Particles, Passing Sieve ¹	Minimum Weight of Field Sample, g (lb.) ²	Minimum Weight of Sample for Test, g (lb.) ³
Fine Aggregate		
No. 8 (2.36 mm)	4500 (10)	500 (1.1)
No. 4 (4.75 mm)	4500 (10)	500 (1.1)
Coarse Aggregate		
3/8 in. (9.75 mm)	4500 (10)	1000 (2)
1/2 in. (12.5 mm)	4500 (10)	1500 (3)
3/4 in. (19.0 mm)	4500 (10)	2000 (4)
1 in. (25.0 mm)	6800 (15)	3000 (6)
1-1/2 in. (37.5 mm)	9000 (20)	4000 (8)

1. Nominal maximum size is one sieve size larger than the first sieve that retains more than 10% of the aggregate.
2. When sampling hot bins, samples need to be larger than is necessary to provide the test sample weight when combining two opposite quarters; therefore, the weight of the composite hot bin sample must equal twice the minimum weight of sample for tests.
3. Obtain the test sample from the field sample by quartering, or other suitable means, to ensure a representative portion (as described in Tex-200-F).

4. SAMPLE IDENTIFICATION

- 4.1 Adequate identification on [Form 202](#), “Identification of Material Samples,” should accompany each individual sample.

5. ARCHIVED VERSIONS

- 5.1 Archived versions are available.