

State of Nevada  
Department of Transportation  
Materials Division

STANDARD METHODS OF SAMPLING STONE, GRAVEL,  
SAND AND PAVING MIXTURES FOR USE AS HIGHWAY MATERIALS

SCOPE

This method, which is a modification of AASHTO Designations T2 and T168 is intended to apply to the sampling of stone, gravel, sand and certain paving mixtures for the following purposes:

- Preliminary investigation of sources of supply.
- Acceptance or rejection of sources of supply.
- Inspection of shipments of materials.
- Inspection of materials on the site of the work.

Among the types of materials covered by this method are base aggregates, aggregates for bituminous courses, aggregates for Portland Cement products, plantmix and roadmix bituminous paving mixtures, and Portland Cement treated base mixtures.

A. SECURING SAMPLES

1. Samples of all materials for tests upon which are to be based the acceptance or rejection of the supply, shall be taken by the Engineer or his authorized representative. Samples for informational tests may be submitted by the contractor, seller or owner of the supply.
2. Sampling is as important as the testing, and the sampler shall use every precaution to obtain samples that will show the true nature and condition of the materials that they represent.

B. PROCEDURES

1. Stone from Ledges or Quarries
  - a. Inspect the ledge or quarry face of the stone to determine any variation in different strata.
  - b. Obtain separate samples of stone from all strata that appear to vary in color and structure. Include overburden as a separate sample.

- c. Each sample should weigh at least 50 pounds (23 kg), and should consist of specimens that are not obviously weathered beyond a degree of usefulness for the purposes intended.
- d. When the toughness or compression test is required, include one piece in each sample of not less than 6" x 6" x 4" (150 mm x 150 mm x 100 mm) in size with the bedding plane clearly marked. This piece should be free of seams or fractures.
- e. Pieces that have been damaged by blasting shall not be included in the sample.

## 2. Field Stone and Boulders

Carefully inspect the deposits of field stone and boulders over the area where the supply is to be obtained. Note and record the different kinds of stone and the condition in the various deposits.

- a. Select separate samples of all classes of stone that visual inspection indicates would be considered for use in construction. Individual samples shall weigh at least 50 pounds (23 kg).
- b. Estimate and record the percentages of different classes of stone that were sampled, and the percentages of material that can be rejected by visual examination and may therefore have to be handled and rejected.

## 3. Deposits of Sand and Gravel

- a. If the deposit is worked as an open-face bank or pit, take the sample by channeling the face vertically, bottom to top, so that the sample will be representative of the material to be used.
  - (1) If visual inspection indicates that there is considerable variation in the material, select individual samples to represent the material in each well-defined stratum. Include overburden or disturbed material as a separate sample. Note and record the elevations of the individual strata.
  - (2) Where there is little or no variation in the material, obtain a large sample from each test location and reduce to the proper size by thorough mixing and quartering.
- b. If the deposit does not have an exposed face, or if samples are desired in other parts of a proposed deposit, excavate or drill test holes at numerous locations to determine the quality of the material

and the extent of the deposit. The number and depth of these test holes will depend on the quantity of the material needed, topography of the area, nature of the deposit, character of the material and value of the resultant product.

- c. Size of the samples shall be such that at least 25 pounds (12 kg) of sand and 75 pounds (34 kg) of gravel are available for tests, if both are present.
- d. Estimate the quantity of the different materials that are available in the deposit

#### 4. Stockpiles

- a. Sample at the top, middle, bottom and around the circumference. Do not sample exposed material. Be aware of the segregation that usually occurs when material is stockpiled, with the coarser particles rolling to the outside base of the pile.
  - (1) Separate samples may be tested individually to show the extent of variation existing in the stockpile.
  - (2) Separate samples may be combined to form a composite sample to show the overall quality of the stockpile.
  - (3) When possible, use power equipment to expose various levels of the stockpile.
  - (4) Use a board shoved into the pile above the point of sampling to aid in preventing further segregation during sampling.
- b. Sample size shall be as outlined in Section C below.

#### 5. Conveyor Belt

- a. Sample aggregate when the plant is in full production and there is a uniform layer of material on the belt. Stop the belt before sampling unless a special device is used to sample the complete cross section of flow. (See paragraph 11a. below)
- b. Sample from the entire width of the belt. Use a metal plate, shaped to fit the contour of the belt, to isolate the sample and to prevent segregation during sampling.
- c. Use a brush to collect all fines.

- d. Sample size shall be as outlined in Section C below.

## 6. Storage Bins

- a. Sample from the bin as the material is being discharged.
- b. Allow sufficient material to flow before sampling to insure normal uniformity.
- c. Sample from the complete cross section of flow.
- d. Sample size shall be as outlined in Section C below.

## 7. Transport Vehicles

- a. Use the following procedure for trucks, railroad cars or any other uncovered vehicle.
- b. Make three or more trenches across the width of the load, depending on the size of the load and the amount of material segregation.
  - (1) The bottom of the trench should be at least one foot below the surface of the aggregate at the sides of the vehicle and approximately one foot wide at the bottom.
  - (2) The bottom of the trench should be as level as possible.
- c. Take five different equal portions from the trench at equally spaced intervals with two portions being against the sides of the vehicle.
- d. Sample size shall be as outlined in Section C below.

## 8. Processed Windrows

- a. Remove the top one-half of the windrow by cutting a trench across the width of the windrow.
  - (1) Slope the sides of the trench to prevent segregation during sampling.
  - (2) Remove all disturbed material from the sampling area.
  - (3) Strike off the ends of the trench vertically with the blade of the shovel.

- b. Sample the full length of the trench prepared as above.
  - (1) Remove material to a depth of at least one and one-half times the maximum size of the particles.
  - (2) Sample from each end of the trench toward the center.
- c. Sample size shall be as outlined in Section C below.

#### 9. Paving Machine

- a. Sample from the windrow in front of paving machine or in front of the auger before spreading and screeding.
- b. Collect the sample at intervals to represent an entire truckload of material.
- c. Obtain the sample from both sides of the paving machine.
- d. Sample size shall be as outlined in Section C below.

#### 10. Roadbed, behind laydown machine

- a. Take samples from the roadbed behind the laydown machine and prior to rolling.
- b. Take three samples of material deposited from one truckload and combine to form a single composite sample.
  - (1) Samples shall be taken from the first, middle and last parts of the load.
  - (2) Samples shall be equal portions from the left, center and right segments of the placement.
  - (3) Remove material in a neat, clean-cut hole to prevent segregation. Remove all loose particles to the full depth of placement.
  - (4) Composite sample size shall be as outlined in Section C below.

## 11. Sampling with Mechanical Devices

- a. Crushing plants may be equipped with some type of mechanical device for securing samples of the finished product prior to or as the material leaves the conveyor belt for the bin or stockpile.

### C. NUMBER AND SIZE OF SAMPLES

1. The number of samples required depends on the intended use of material, quantity of material, involved and variations in the material. A sufficient number of samples must be obtained, as outlined above, to cover all variations in the material. Where multiple samples are taken to show variation, each sample shall conform to the minimum size specified below.
2. Frequencies for sampling processed construction materials in the field are set forth in the Department's Construction Manual, Section 4-701.2, and in the Material Division's Sampling Letter for each contract.
3. Sample Sizes
  - a. The sample sizes set forth below are tentative. Quantities must be based on the type and number of tests to which the material is to be subjected and sufficient material obtained to provide for proper execution of these tests. Generally speaking, the amounts specified in Table 1 will provide adequate material for routine grading analysis. The minimum amount depends on maximum size of the particles, as follows:

TABLE 1 – SIZE OF SAMPLES

Nominal Maximum Size of Particles, Passing Sieve	Minimum Weight of Field Sample, Pounds (Kilograms)
No. 10 (2.00 mm)	10 (5 kg)
No. 4 (4.75 mm)	10 (5 kg)
3/8" (9.75 mm)	10 (5 kg)
1/2" (12.50 mm)	20 (10 kg)
3/4" (19.00 mm)	30 (15 kg)
1" (25.00 mm)	50 (25 kg)
1-1/2" (37.00 mm)	70 (30 kg)
2" (50.00 mm)	90 (40 kg)
2-1/2" (63.00 mm)	100 (45 kg)
3" (75.00 mm)	125 (60 kg)
3-1/2" (90.00 mm)	150 (65 kg)

- b. Field samples of bituminous and cement treated mixtures taken from the roadbed behind the paver, shall not be less than 144 square inches (1000 sq cm) of pavement surface area, and shall extend full depth of the course of bituminous mixture placed.
4. The samples prepared for tests shall be obtained from the field sample by quartering or other suitable means to insure a representative portion.

#### D. MARKING AND SHIPPING SAMPLES

1. Each sample or separate container of material submitted for testing shall be accompanied by form # 032-018.
  - a. Location of proposed use of material (County, Contract or E.A. Number, Project Number).
  - b. Type of material (if classified), name of producer and if commercial source.
  - c. Geographic location of source.
  - d. Quantity of material or amount of work represented by sample.
    - (1) By whom taken, and official title of the sampler.
    - (2) Date sampled and date shipped.
2. Immediately upon sampling, samples shall be placed in sample sacks or buckets and covered to prevent contamination.
3. Coarse aggregate shall be shipped in a secure container or sample sack.
4. Samples containing fine aggregate shall be shipped in a tight container or sample sack that will prevent the loss of fines.
5. In addition to the transmittal form inside the container, attach a tag to the outside to each container giving a brief description of the contents which includes the material type and contract number.