

Field Sample Size

The ASTM, AASHTO and ODOT Supplemental Test Procedures have guidelines for the minimum field sample size.

AASHTO T2 Section 4.4.2 states: The field sample masses cited are tentative. The masses must be predicated on the type and number of tests to which the material is to be subjected and sufficient material obtained to provide for the proper execution of these tests.

ODOT Supplement S1004 table of sample weights required for sieve analysis

Standard Aggregate Size	Minimum Weight of Sample lb(kg)	Minimum Number of Splits to Obtain Portion for Test	Minimum Weight of Sample to be Tested, lb (kg)
1	100 (45)	0	100 (45)
2 and 24	100 (45)	0	77 (35)
3 and 357	100 (45)	1	44 (20)
4 and 467	66 (30)	1	33 (15)
5, 56 and 57	66 (30)	1	22 (10)
6, 67 and 68	66 (30)	2	11 (5)
7 and 78	66 (30)	3	7.7 (3.5)
8 and 89	66 (30)	3	7.7 (3.5)
9 and 10	22 (10)	4	1.1 (0.5)

Sample Sizes and Sample Reduction

LABORATORY SAMPLE SIZE

The ASTM, AASHTO and ODOT Supplemental Specifications have established standards for the minimum sample sizes for laboratory processing. Field Samples are reduced for laboratory testing purposes. Some standards are:

ASTM & AASHTO Requirements for Sieve Analysis Test (T-27)

Fine Aggregate

95 % passing # 8 (2.36 mm) Sieve 100g
 85% passing # 4 (4.75 mm) Sieve 500g

Coarse Aggregate

Nominal Maximum Size of Square Opening	Minimum Weight of Test Sample lb. (kg),
3/8" (9.5 mm)	2 (1)
1/2" (12.5 mm)	4 (2)
3/4 (19.0 mm)	11 (5)
1" (25.0 mm)	22 (10)
1 1/2" (37.5 mm)	33 (15)

ODOT S1004 Weights required for Sieve Analysis

Fine Aggregate

500g + or - 25g

Coarse Aggregate

(AASHTO M43)

Standard Aggregate Size	Minimum Weight of Sample lb(kg)	Minimum Number of Splits to Obtain Portion for Test	Minimum Weight of Sample to be Tested, lb (kg)
1	100 (45)	0	100 (45)
2 and 24	100 (45)	0	77 (35)
3 and 357	100 (45)	1	44 (20)
4 and 467	66 (30)	1	33 (15)
5,56 and 57	66 (30)	1	22 (10)
6,67 and 68	66 (30)	2	11 (5)
7 and 78	66 (30)	3	7.7 (3.5)
8 and 89	66 (30)	3	7.7 (3.5)
9 and 10	22 (10)	4	1.1 (0.5)

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

SUPPLEMENT 1004
METHOD OF TEST FOR SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES
(AASHTO METHOD T 27 MODIFIED)

January 15,2010

1004.01 Scope

1004.02 Apparatus

1004.03 Samples

1004.04 Procedure

1004.05 Calculations

1004.06 Report

1004.01 Scope. This method of test covers the requirements in addition to or superseding the requirements of AASHTO T 11 AND T 27 for the determination of the particle size distribution of fine and coarse aggregates. This method of test does not apply to the sieve analysis of aggregates recovered from bituminous mixtures nor to the sieve analysis of mineral fillers.

The quantities of material usually referred to by Methods of Sampling and Testing are (a) the quantity represented by the sample, (b) the size of the sample and (c) the portion for test. The use of "sample" under AASHTO T 27 and AASHTO T 11 has the same meaning as "portion" as used below.

1004.02 Apparatus

A. Balance. The balance for weighing all fine aggregate portions for test and the test portions for No. 9 and No. 10 standard sizes of coarse aggregates shall have a capacity of 800 to 1000 grams and shall be capable of weighing to 0.1 gram. The balance for weighing the standard sizes of coarse aggregate larger than No. 9 size shall have a capacity of 20 kg and shall be capable of weighing to 10 grams.

B. Sieves. Sieves of appropriate sizes shall be included to furnish the information required by the specifications covering the material to be tested, and where necessary to reduce the load on a specified sieve size. The woven wire cloth sieve shall conform to the Standard Specifications for Sieves for Testing Purposes, AASHTO M 92.

C. Oven. The oven shall be capable of maintaining a temperature of 230 ± 9 °F (110 ± 5 °C).

1004.03 Samples

A. The portion for sieve analysis shall be obtained from the sample by the use of a sample splitter. Fine aggregates shall be thoroughly mixed and in a moist condition prior to splitting.

The selection of a portion for test of an exact predetermined weight shall not be attempted. However, the weight of the sample portion before sieving shall be determined and recorded.

B. The portion of fine aggregate for sieve analysis shall weigh, after drying, approximately 500 grams and shall be weighed to the nearest 0.1 gram.

C. The portion of the coarse aggregate for sieve analysis shall be obtained by splitting the sample as follows:

Standard Aggregate Size	Minimum Weight of Sample lb(kg)	Minimum Number of Splits to Obtain Portion for Test	Minimum Weight of Sample to be Tested, lb (kg)
1	100 (45)	0	100 (45)
2 and 24	100 (45)	0	77 (35)
3 and 357	100 (45)	1	44 (20)
4 and 467	66 (30)	1	33 (15)
5 ,56 and 57	66 (30)	1	22 (10)
6 ,67 and 68	66 (30)	2	11 (5)
7 and 78	66 (30)	3	7.7 (3.5)
8 and 89	66 (30)	3	7.7 (3.5)
9 and 10	22 (10)	4	1.1 (0.5)

The portion of coarse aggregate for test shall be weighed to the nearest 10 grams on the larger balance except for the No. 9 and 10 standard sizes which shall be weighed to 1 gram on the smaller balance.

1004.04 Procedure. The sieve analysis for the coarse and fine aggregates shall be made in accordance with AASHTO T 11 and T 27 except that the wetting agent specified by T 11 in determining the material finer than the No. 200 (75 μ m) sieve is not required.

Method T 11 shall be omitted for aggregate gradations under 301 and 302 and for aggregates where the amount of material passing the No, 200 (75 μ m) sieve is not specified under the Construction and Material Specifications.

Coarse aggregates shall be surface dry or drier for sieve analysis. All fractions of fine aggregates and the No. 9 and 10 size coarse aggregates shall be weighed to the nearest 0.1 gram and all fractions of the larger sizes of coarse aggregate shall be weighed to the nearest 10 grams. All aggregates shall be sieved for 10 minutes.

1004.05 Calculations

A. The sum of the individual weights retained on each sieve and in the pan shall not vary by more than one percent from the original weight of the sample. When the loss or gain is greater than one percent, the test shall be considered invalid and another portion shall be tested. If the sum of the individual weights is within the one percent limit, the difference between the sum of the individual weights and the original weight shall be added to or subtracted from the sieve with the largest amount of material retained.

B. Fine Aggregate (% Retained). The percent retained on each sieve is computed by dividing the weight of the material retained on that sieve by the original weight (determined in 1004.03.A) of the sample before washing and multiplying by 100 and reported to the nearest 0.01 percent. This value shall be truncated at 0.01 percent and shall not be rounded.

C, Coarse Aggregate (% Retained). The percent retained on each sieve is computed by dividing the weight of the material retained on that sieve by the original weight (determined in 1004.03.A) of the sample and multiplying by 100 and reporting to the nearest 0.01 percent. This value shall be truncated at 0.01 percent and shall not be rounded. The material for determination of the percentage finer than the 75 μm (No. 200) sieve shall be obtained from a separate representative sample that has been placed in a proper plastic container. This percentage shall be determined in accordance with the above procedure.

D. Fine and Coarse Aggregate (% Passing). The percent passing a given sieve is computed by subtracting the percent retained on that sieve from the total percent passing the next larger sieve in the sieve series used and calculated to the nearest 0.01 percent.

1004.06 Report. After the percent passing has been determined for all sieves, the values shall be rounded* to the nearest whole number except for the percentage passing the No. 200 (75 μm) sieve which shall be reported to the nearest 0.1 percent.

*Rounding Values: When a figure is to be rounded to fewer digits than the total number available, the procedure is as follows:

1. When the first digit discarded is less than 5, the last digit retained should not be changed.
2. When the first digit discarded is greater than 5, or if it is a 5 followed by at least one digit other than 0, the last digit retained should be increased by one unit.
3. When the first digit discarded is exactly 5, followed only by zeros, the last digit retained should be rounded upward if it is an odd number, but no adjustment made if it is an even number.

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

SUPPLEMENT 1090
IN PLACE GRADATION SAMPLING

January 15, 2010

1090.01 General

1090.02 Pugmill or Mixer Sampling Procedure

1090.03 In Place Verification Road Sampling

1090.01 General. The Department will use the following procedure to field sample material when specified in Item 304 Aggregate Base and Item 850 Cement Treated Free Draining Base.

The Department will notify the Contractor/Producer 24 hours prior to sampling so that they may witness the sampling procedure. The Department will notify the Contractor/Producer of the test results within three working days of the test completion.

For Item 850, screen the material through a No. 8 (2.37 mm) sieve immediately after sampling. Wash the cement off the aggregate during the screening.

The Department will use this supplement in conjunction with Department Policy 512-005 (P) Acceptance of Nonspecification Materials.

1090.02 Pugmill or Mixer Sampling Procedure. Sample the material at the discharge point of the pugmill or mixing device according to ASTM D 75 Standard Practice for Sampling Aggregates, Sections 4.3.1, 4.3.2, or 4.3.3.

1090.03 In Place Verification Road Sampling

A. Verification samples for C&MS 304 and SS 850 acceptance. All samples will be obtained before compaction.

When Item 304 or 850 verification samples are being obtained to determine material gradation the Engineer will obtain one verification road sample for each day's production of 10 to 5500 tons (9 to 5000 metric tons) of material. When the daily production exceeds 5500 tons (5000 metric tons), the Engineer will obtain additional road samples for each 5500 tons (5000 metric tons) or portion thereof.

Provide a sample of 210 pounds (95 kg) of material consisting of three subsamples of 70 pounds (32 kg) each.

Take subsamples at random locations in the day's production. Take the subsamples before the compaction operation. Each subsample consists of three subset samples of 23 pounds (10.5 kg) each. The subset samples will be a full depth sample of the in place material.

Take the three (3) subset samples in a straight line perpendicular to the centerline. Do not take subset samples in the outside two feet (0.6 m) of the spreading operation width. Combine the subset samples to form a 70-pound (32 kg) subsample.

B. Evaluation samples for C&MS 304 and SS 850 placement segregation testing. If the Engineer determines the placed materials are visually segregated due to placement operations sample the material as follows:

The Engineer will obtain a 210 lb (95 kg) sample by combining three (3) subset samples of 70 lb (32 kg) obtained from three (3) visually segregated locations. The Engineer may include additional visually segregated locations into the sample when the subset sample size cannot be obtained without leaving the limits of the visually segregated area. The Engineer will define the quantity of in place material represented by the segregation sample.

When sampling visually segregated locations use a sampling shovel with a rectangular blade 9 inches by 11 inches (230 mm by 280 mm) to take each subset sample. Face the shovel toward the spreader and insert into the roadway for the full depth of the layer being spread. Retain as much material on the shovel blade as possible. Continue toward the spreader until approximately 23 pounds (10.5 kg) of material has been obtained. Avoid digging into the surface below the layer being spread.

When sampling for verification samples use the shovel method in the above paragraph or use a pan at each subset sample location large enough to obtain a 23-pound (10.5 kg) sample. Place the pan on the surface prior to spreading the material. Drive pins to hold the pan in place. Retrieve the subset samples after the spreading operation.

C. Testing of Field Samples. To check the sieve analysis, use a sample splitter to split each 70-pound (32 kg) subsample into one-third increments weighing approximately 23 pounds (10.5 kg) each. Combine a one-third increment from each subsample together to form a testing sample. The testing sample will be approximately 70 pounds (32 kg) and will consist of approximately equal amounts of each of the three subsamples. Split the testing sample in half prior to performing the sieve analysis.

For failed tests, the Department will determine deductions or removals conforming to Departmental Policy 512-005(P).