

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

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GUIDE FOR QUALITY CONTROL AND ACCEPTANCE PLANS FOR SUBGRADE,  
BASE COURSE, AND AGGREGATE ITEMS

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**1. PURPOSE**

- 1.1 Testing of highway construction materials has traditionally been a two-phased activity; that done by industry in their Quality Control Program and that done by the purchaser to determine the acceptability of the material. In the case of crushed aggregate base course, and other aggregate items, the contractor (whether or not he/she is actually the manufacturer) is by positive statement in the specifications responsible for quality control, and the Division of Highways, as purchaser, is responsible for acceptance (verification) testing. The purpose of this Materials Procedure (MP) is to present guidelines for adequate Quality Control and Acceptance Plans.

**2. SCOPE**

- 2.1 This procedure is intended to apply to aggregate products as listed on Attachment 1.

**3. REFERENCED DOCUMENTS**

3.1 *Material Procedures:*

- MP 300.00.51, Procedural Guidelines for Maintaining Control charts for Aggregate Gradation
- MP 700.00.54, Procedure for Evaluating Quality Control Sample Test Results with Verification Sample Test Results

3.2 *Materials Letter:*

- ML-25, Procedure for Monitoring the Activities Related to Sieve Analysis of Fine and Coarse Aggregate


#### **4. QUALITY CONTROL PLAN**

- 4.1 As stated in the specifications, a Quality Control Plan must be designed by the contractor and submitted to the Engineer at the Pre-Construction Conference. The plan must clearly describe the methods by which the Quality Control Program will be conducted. A Quality Control Plan must include the following:
- 4.1.1 Name of company official responsible for quality control.
- 4.1.2 Name of person(s) actually conducting the sampling and testing. These should be Certified Aggregate Sampling Inspectors or Certified Aggregate Inspectors depending upon their assigned responsibilities. If they are not certified, a clear and complete resume of their qualifications should be included for review prior to approval. All persons sampling and testing on National Highway System (NHS) projects will be a Certified Aggregate Sampling Inspector or a Certified Aggregate Inspector depending upon their assigned responsibilities. The Inspector's certification identification number should be included along with any other supporting information.
- 4.1.3 Items to be controlled and the tests to be performed. Each test should be listed separately.
- 4.1.4 Sampling and Testing Plan: As a minimum, the sampling and testing plan should detail sampling locations, test methods, and test frequencies to be used (*see* Attachment 1). To facilitate the Division of Highways' monitoring activities, which are described in Section 4.1, all completed gradation samples must be retained by the contractor until further disposition is designated by the District Materials Supervisor. The Quality Control Plan should state where and how these samples will be maintained. Applicable sections of Materials Letter (ML) 25 should be used for guidance.
- 4.1.5 Testing Facility: The plan should state the specific location where the samples(s) will be tested and retained.
- 4.1.6 Documentation Plan: The method by which the contractor will document and distribute test results must be described.
- 4.2 Forms and Distribution: Approved processing forms furnished by the Division will be used to record the test data. Gradation tests will be recorded on Form T300. The laboratory number will always start with a "C" for all quality control samples taken and tested by the contractor. One copy of each completed form should be retained by the contractor until the work is completed and accepted. The original signed copy is to be delivered to the District Materials Supervisor. To be an effective quality control function, tests must be completed and results distributed in a regular and timely manner. The plan, therefore, must state what action will be taken in the event that testing and reporting are not completed in a reasonable period of time – preferably within 72 hours after the sample is taken.

- 4.3 Control Charts: The specifications require the plotting of gradation test results on control charts using the moving average concept as described in MP 300.00.51. The Quality Control Plan should state where and how the charts will be maintained and made available to Division personnel. These charts are part of the Division's acceptance procedures and must be available to the Division when the project is completed. At the contractor's request, the requirement of Control Charts may be waived. The contractor will submit a written request to the Materials Control, Soils and Testing Division asking that Control Charts be waived. Materials Control, Soils and Testing Division will make a determination based on the size of the project and the number of gradation tests required.
- 4.4 Disposition of Non-Specification Material: A detailed plan of action providing for the immediate notification of all parties involved in the event that nonconforming situations are detected.
5. **ACCEPTANCE PLAN**
- 5.1 The specifications state that acceptance (verification) sampling and testing is the responsibility of the Division. Quality control tests are the responsibility of the contractor. Acceptance activities (sampled and tested at the frequency given in Section 4.1.2) may be accomplished by conducting verification sampling and testing completely independent of the contractor and, in some cases, by witnessing tests performed by the contractor, or by a combination of the two. The following guidelines provide a system which should result in sufficient confidence in the contractor's documentation of his quality control operations to permit acceptance of the material in accordance with the procedure set forth in the specifications.
- 5.1.1 Review all information supplied by the contractor on the Quality Control Plan. Note in particular the qualifications of the sampler and tester and the location and other qualifying statements about the testing facility. In the event the testing facility is such that little qualifying information is supplied or known, this facility should be visited prior to the work and reviewed relative to the availability, type, and suitability (including applicable calibration checks) of the testing equipment. This information should be documented and kept available at the District Materials Section.
- 5.1.2 Sample and test for applicable items completely independent of the contractor at a frequency equal to or greater than ten (10) percent of the frequency for testing given in the approved Quality Control Plan. Witnessing the contractor's sampling and testing activities may also be a part of the acceptance procedure, but only to the extent that such tests are considered "in addition to" the ten (10) percent independent tests.
- 5.1.3 Plot the results of gradation tests performed by the Division on the contractor's quality control charts with a red circle, but do not include these values in the moving average. When the contractor's tests are witnessed, circle the contractor's test result on the control chart with red. These values are used in the moving

average calculations. The laboratory number will always start with an "M" for all acceptance (verification) samples taken and tested in this manner by the Division, and will always start with an "O" for all of the contractor's tests which are witnessed by the Division.

- 5.1.4 Evaluate the results of acceptance (verification) tests, whether performed or witnessed by the Division, in accordance with MP 700.00.54.
- 5.1.5 If the evaluation indicates similarity with the quality control test, the control chart will be considered acceptable to that point.
- 5.1.6 If dissimilarity is determined, an immediate investigation will be conducted in an effort to determine the cause. Until the situation is resolved, any samples held in accordance with ML 25 will be retained and may be used in whatever manner deemed appropriate during the investigation.
- 5.2 Implement ML 25 for aggregate gradations.



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ACG:Mw

Attachments

**GUIDELINES FOR CONTRACTOR'S QUALITY CONTROL**

<b>Item Description</b>	<b>Property</b>	<b>Minimum Frequency</b>
207 Subgrade	Gradation	One (1) sample per day of placement. Note 1
	Atterburg Limits	From an approved aggregate source: one (1) test at the beginning of placement and then each 10,000 tons. Not from an approved aggregate source: a minimum of one (1) test per 6 days of placement.
212 Select Material for Backfilling	Gradation	Minimum of one (1) sample per day of production, shipment, or stockpiling.
307 Crushed Aggregate	Gradation	One (1) sample per each one-half (1/2) day of placement. Note 1
	Other tests required by the Contract documents: percent crushed particles, unit weight, Atterburg limits, etc.	One (1) test at the beginning of placement and then each 10,000 tons thereafter (this includes one or more projects)
307 Crushed Aggregate Shoulder Course for Resurfacing Projects	Gradation	One (1) sample per day of placement. Note 1
	Other tests required by the Contract documents: percent crushed particles, unit weight, Atterburg limits, etc.	One (1) test at the beginning of placement and then each 10,000 tons thereafter (this includes one or more projects)
604 Class 1 Aggregate	Gradation	Minimum of one (1) sample per day of production, stockpiling, or placement
606 Aggregate for Underdrain	Gradation	Minimum one (1) sample per day of placement.

**GUIDELINES FOR CONTRACTOR'S QUALITY CONTROL**

<b>Item Description</b>	<b>Property</b>	<b>Minimum Frequency</b>
609 Bed Course Material	Gradation	Minimum of one (1) sample per day of production, stockpiling or placement.
626 Aggregate	Gradation	One (1) Sample per day of placement. Note 1
	Atterburg Limits	From an approved aggregate source: one (1) test at the beginning of placement and then each 10,000 tons. Not from an approved aggregate source: a minimum of one (1) test per 6 days of placement.
636 Aggregate	Gradation	One (1) sample per each one-half (1/2) day of placement. Note 1
	Atterburg Limits	One (1) test at the beginning of placement and then each 10,000 tons thereafter.

Note 1 - In the event project activities are such that relatively small quantities of material are being placed per placement date, and to prevent over sampling, the Engineer may approve the following alternate sampling method: A minimum of one (1) sample per 6 consecutive days shall be taken to represent up to each 170 cubic yards(250 tons). Sampling is to be done on the first day of aggregate placement. In this case the sample shall be taken at a random time and place, represent the same material and production, and shall represent material placed in a reasonable time period.