# 106 CONTROL OF MATERIALS

## 106.01 SOURCE OF SUPPLY AND QUALITY

Only materials meeting the requirements of these specifications and approved by the Chief Engineer shall be used. Materials may be subjected to inspection or test at any time during their preparation for use.

The materials used on the work shall meet all quality requirements of the contract. In order to expedite the inspection and testing of materials, the Contractor shall notify the Chief Engineer of his proposed sources of materials prior to delivery. At the option of the Chief Engineer, materials may be approved at the source of supply before delivery is started. If it is found that sources of supply for previously approved materials do not produce specified products, the material and/or source of supply may be rejected.

The entire output of any source of supply may be rejected when a continuous supply of satisfactory material cannot be obtained.

Unless specifically approved by the Chief Engineer, material sources shall not be changed in the course of a project.

Approval of a material for a particular purpose, use, or project in a specified manner does not constitute approval for its use for any other purpose, project or manner.

Materials which appear defective upon arrival shall not be used until approved. All rejected materials shall be promptly removed from the site.

## 106.02 SAMPLES, TESTS AND CITED SPECIFICATIONS

All materials shall be inspected, tested and accepted by the Chief Engineer before incorporation in the work. Any work in which untested or unaccepted materials are used will be performed at the Contractor's risk and may be considered as unacceptable and unauthorized work.

The Contractor, when directed by the Chief Engineer, shall furnish material samples for inspection or testing. These samples may be required prior to or during the use of the material or at any time prior to acceptance of the work. Unless otherwise designated, materials shall be sampled and tested in accordance with the requirements of the standards which are current on the date of advertisement for bids.

Samples shall be taken in accordance with the following:

1. Samples of untreated aggregates or soils shall be taken from the road at the laydown machine prior to compaction.
2. Samples of bituminous mixtures shall be taken from the road at the lay down machine and/or from the plant out of the truck; for the determination of gradation, bituminous content, and other properties as specified. In addition, the Contractor shall furnish test samples cut from the compacted mixtures (2 per city block) at locations designated by the Chief Engineer. The Contractor shall repair the areas from which the samples were cut at no additional cost to the District.

3. Samples of portland cement concrete shall be taken from the hauling unit at the project site for the determination of slump and air content, unit weight and for the fabrication of test beams and cylinders.
4. Samples of cement-treated and lime-treated materials shall be taken from the road at the laydown machine prior to compaction for the determination of gradation, moisture content, unit weight and the fabrication of test cylinders.
5. Tests for density shall be made after the compaction process has been completed.
6. Thickness determinations of pavement layers shall be made on the road, by coring or test pitting, after all compacting and processing has been completed.
7. Manufactured materials such as portland cement, steel, hydrated lime, bituminous materials, paint, materials used in signs, lighting and traffic signals may be sampled at the producer's plant. Before final acceptance, such materials shall be subject to inspection and further testing after delivery to the project as determined by the Chief Engineer. Project samples shall be taken before the material is incorporated into any other product.

Where sampling and testing of a material prior to use is required by the Chief Engineer, the Contractor shall provide the necessary samples sufficiently in advance of contemplated use for testing and approval. Samples shall be delivered to the location as determined by the Chief Engineer. Material samples shall be submitted with the appropriate project name, source of material, and intended use of material.

When samples are taken at the job site by the Department's personnel or by any personnel of a materials testing firm employed by the Department to obtain such samples for testing, the Contractor shall provide sufficient personnel of his employment to convey the samples from the sampling location to the vehicle waiting to transport them for testing, and load the samples upon the vehicle for shipment to the testing laboratory. All costs to the Contractor for assisting in this effort shall be absorbed as part of the payment made for the item for which the material is being furnished.

Table 106.02 gives the minimum sampling requirements for materials for test.

Longer times required to test materials does not waive any specification requirements for the material or work.

New materials sources or non standard materials are job dependent.

**TABLE 106.02 MINIMUM SAMPLING REQUIREMENTS FOR MATERIALS**

| MATERIAL | MINIMUM SAMPLE REQUIRED | WORKING DAYS TO OBTAIN VERBAL TEST RESULTS |
|---|---|---|
| Admixtures (Portland Cement Concrete) | See 814 | |
| Aggregate, Coarse (PCC & Asphalt) | 70 pounds | 5 |
| Aggregate, Fine | | |
| Bituminous | 20 pounds | 5 |
| Blanket | 10 pounds | |
| Concrete | 20 pounds | |
| Filter | 10 pounds | |
| Mortar | 10 pounds | |
| Vertical | 10 pounds | |
| Aggregate, Source (new) | 200 pounds | 60 |
| Anchor Bolts | 1 specimen per lot | 6 |
| Asphalt Cement (complete) | Standard 16 oz. can | 5 |
| Asphalt Cores | Job Dependent | 1 |
| Asphalt, Cut-Back | 1 quart | 5 |
| Asphalt, Emulsified | 4 quarts | 5 |
| Asphalt Primer for Waterproofing | 1 quart | 5 |
| Asphalt Seal Coat for Waterproofing | 1 quart | 5 |
| Bituminous Mixtures | 12 pounds | 12 |
| Job Mix Formulas | 75 pounds | 21 |
| Brick: | | |
| Building | 10 specimens | 12 |
| Sewer | 10 specimens | 12 |
| Burlap | 3 foot length x width of roll | 4 |
| Caulking Compound | 1 pint | 20 |
| Canvas | 2 square yards | 4 |
| Ceramic Tile | 25 specimens | 40 |
| Concrete Mix Design | 6 cubic feet | 50 |
| Concrete, Wet (Dunagan) | 30 pounds | |
| Dowel Bars | 3 specimens | 6 |
| Electrical Items | Job Dependent | |
| Expansion Joint Filler | 3 foot length x width (4-1/2 inch min.) | 16 |
| Gravel | 70 pounds | |
| High Tensile Strand (or wire) | 5 foot length | 11 |
| Load Transfer Devices | 1 specimen | 6 |
| Masonry Cement | 10 pounds | 16 |
| Membrane (liquid) Curing Compound | 1 quart | 6 |
| Mineral Fiber | 5 pounds | 5 |
| Paint and Coatings (2) | 4 – 1 quart cans | 30 |
| Pipe: | | |
| Clay | 2 specimens | 6 |
| Concrete | | |
| Polyethylene Sheeting | 2 yards x 10 inches | 11 |

**TABLE 106.02 MINIMUM SAMPLING REQUIREMENTS FOR MATERIALS (Continued)**

| MATERIAL | MINIMUM SAMPLE REQUIRED | WORKING DAYS TO OBTAIN VERBAL TEST RESULTS |
|---|---|---|
| Portland Cement | 10 pounds | |
| Preformed Bearing Pads | 4 inch x 4 inch | |
| Prestressed Reinforcement | Per Section 815.02 | |
| Reinforcing Steel: | | |
| Bar Nos. 2 through 9 | 1 specimen 5 feet in length | 6 |
| Bars larger than No. 9 | 1 specimen 7 feet in length | 6 |
| Saturated Cotton Fabric | 4 foot length x width of roll | 6 |
| Sealing Compounds: | | |
| Cold Poured, Emulsion | 1 quart | 16 |
| Cold Poured, Mastic | 1 quart | 16 |
| Cold Poured, Two-component | 1 quart | 20 |
| Hot Poured | 5 pounds | 16 |
| Shear Connector Studs | 1 specimen | |
| Soils: | | |
| Gradation LL and PI | 20 pounds | 5 |
| Gradation and Proctor | 100 pounds | 6 |
| Top Soil | 20 pounds | 11 |
| Subgrade Paper | 3 foot length x width of roll | 6 |
| Tar (Creosote) Primer for Waterproofing | 1 quart | 6 |
| Tar, Road | 1 quart | 6 |
| Tar Seal, Coat for Waterproofing | 1 quart | 6 |
| Tie rod assemblies | 3 specimens | 6 |
| Waterproof Paper | 2 square yards | 11 |
| Waterstop, Rubber | 2 square feet | 11 |
| Waterstop, PVC | 2 square feet | 30 |
| Welded Wire Fabric | 3 feet x 3 feet | 6 |
| Miscellaneous Materials and Tests: | | |
| Determining Thickness of Metals | Representative sample | 6 |
| Determining Unit Weight of Metals | Representative sample | 6 |
| Determining Thickness of Galvanizing | Representative sample | 6 |
| Identification of Wrought Iron Infra Red Spectrum | Representative sample | 2 |

## 106.03 MATERIALS COMPLIANCE CERTIFICATION

The Contractor shall furnish material compliance certifications for all manufactured materials obtained from vendors or producers, prior to their incorporation into the work.

The Contractor shall submit certificates to demonstrate proof of compliance with requirements for products and materials, qualifications of personnel, and results of testing. Each certificate shall be signed by an official authorized to certify on behalf of the issuing organization. Certificates shall show the name and address of the Contractor, the Project identification (Invitation Number, Project Description and Federal-Aid Number(s), if applicable, as shown on the title pages of the Specifications and Bid Proposals) and, if for a material, the quantity and date(s) of shipment to which the certification applies. Certificates shall not be construed as relieving the Contractor from furnishing satisfactory material if in subsequent testing of samples the material does not meet specified requirements. The original and two copies of all certificates shall be submitted unless otherwise specified.

The Contractor shall certify monthly that the portland cement, portland blast furnace slag cement, coarse and fine aggregates, admixtures and water conform to the source, quality and grading as stated on the current approved job mix formulae and the contract documents.

The Chief Engineer may permit use prior to sampling and testing of certain materials or assemblies accompanied by certifications stating that such materials or assemblies fully comply with the requirements of the Contract. The certificate shall be signed by the manufacturer. Each lot or assembly delivered to the work must be accompanied by a certification in which the lot is clearly identified.

Materials used on the basis of certifications may be sampled and tested at any time and if found not to be in conformity with contract requirements will be subject to rejection whether in place or not.

**106.04 PLANT INSPECTION**

The Department shall have full access at all times to those parts of materials sources, asphalt and PCC plants, steel fabrication shops and pre-cast facilities as may concern the production and manufacture of materials and products needed for the Contract.

The Contractor shall notify the office of the chief plant inspector 24 hours before concrete or asphalt is to be delivered to the project site. In the event that delivery is suspended for an indefinite period, a 24 hour notice is also required in advance of a resumption of delivery.

**106.05 QUALITY CONTROL OF PLANTS**

The Contractor shall assume the responsibility for the quality control and condition of all material during the handling, blending and mixing operations. The Contractor shall assume responsibility for the initial determination and all necessary subsequent adjustments in proportioning of materials used to produce the specified job-mix. The Contractor shall have available the testing equipment necessary to perform stockpile and hot bin analysis (asphalt) or bin samples (PCC) required below.

The Department's Inspector will not assume by act or word the responsibility for mix control adjustments, calculations or the setting of dials, gages, scales and meters. Such duties are to be assumed only by the Contractor. Tests for conformance with the specifications may be made on samples of the materials entering into the composition of the mix, samples of the mixture, and samples cut from the completed pavement. The Contractor shall cooperate with the Chief Engineer in obtaining these samples. When samples are cut from the pavement, the voids caused by the cuts shall be replaced and refinished without additional compensation. The

preparation of all bituminous mixtures and portland cement concrete mixes shall be subject to inspection at the plant. For this purpose, the Contractor shall provide an acceptably furnished and equipped laboratory in accordance with the requirements of 106.06(A).

Generally, the testing of bituminous and Portland cement concrete mixes at the plant is provided by the Department as a routine check upon the adequacy of the Contractor's quality control procedures.

In lieu of an acceptance program involving continuous sampling, testing, and weight verifications at the source, small quantities of material may be accepted by the Chief Engineer based upon continuous or occasional sampling and testing at the source, supplemented by visual examination at point of delivery; and, based upon weights furnished by the Contractor (or supplier) on the weight tickets. The frequency of sampling, testing and weight verification by an Inspector at the source will be established by the Chief Engineer based upon the Department's current acceptance program and local conditions encountered.

**106.06 FIELD FACILITIES**

**(A) ASPHALT AND PCC PLANTS**. The Contractor shall furnish and maintain a laboratory wherein approval testing for mixture composition will be performed by the Department at the location(s) approved for plant processing of material at the Contractor's expense. The Contractor may utilize the laboratory and equipment for the purpose of performing quality control testing; however, in the event the dual testing programs overlap in such a manner as to interfere with the check and acceptance tests to be performed by the Department, the Department shall have priority in the use of the facilities and equipment. Only one laboratory will be required by the Department per plant regardless of the number of contracts from which the material is being processed.

The plant laboratory and equipment furnished by the Contractor shall remain the property of the Contractor. Equipment furnished by the Contractor shall be subject to inspection and calibration by the District at anytime during the contract performance period. Test equipment found not to be in calibration and proper working condition shall be adjusted, repaired or replaced immediately to the satisfaction of the Chief Engineer. The space provided for the plant laboratory shall be used for laboratory purposes only. The laboratory shall be erected before the processing of material begins and shall be available throughout the duration of the plant operation. It shall be removed upon completion of the project, if located on the project.

The laboratory shall be of weatherproof construction, tightly floored and roofed, and constructed with an air space above the ceiling for ventilation.

The width of the laboratory shall not be less than 8 feet and the floor-to-ceiling height shall not be less than 6 feet 6 inches. The floor space shall be not less than 160 square feet, with a minimum working area of not less than 140 square feet. The inside walls and ceiling shall be constructed of plywood, masonite, gypsum board, or other suitable materials. Walls and ceiling shall be insulated.

The laboratory shall contain at least 2 windows, each having an area of not less than 540 square inches, can be easily opened and secured from the inside only. The laboratory shall contain at least one door. Both window and door screens shall be provided. The

door(s) shall be equipped with lock(s) and at least 2 keys for each lock shall be furnished to the Chief Engineer.

The laboratory shall have satisfactory lighting, telephone, heating equipment, water supply, exhaust fan, air-conditioner and electrical outlets (120 V and 220 V) and shall be connected to an operational power source.

Heating and air conditioning equipment shall maintain a temperature of not less than 68°F and not more than 78°F.

The capacity of the exhaust fan shall be such that it will exhaust, each hour, a volume of air equal to at least 10 times the cubical volume of the laboratory. Fuel for the heating equipment and electrical current shall be furnished by the Contractor. The Contractor shall also furnish and maintain one chemical type and one 2-1/2 gallon pressurized water fire extinguisher of standard commercial quality.

A suitable indoor toilet connected to a sanitary sewer shall be provided. If a sanitary sewer is not available a suitable outdoor toilet conforming to the requirements of the Board of Health, or other bodies having jurisdiction in the area, shall be provided.

In addition to the general requirements stated herein, the laboratory shall be equipped with the following:

| No. | DESCRIPTION |
|---|---|
| 1 | Work bench (96 x 30 inches) |
| 1 | Desk (60 x 34 inches) |
| 1 | Sink connected to operational water source with approximate dimensions: length 24 inches; front to back 18 inches; depth 8 inches |
| 1 | Printing electronic calculator |
| 1 | Metal, 4 drawer file cabinet (15 inch drawer width) |
| 2 | Chairs |
| 1 | Waste basket |
| 1 | Pencil sharpener |
| 1 | First aid kit |
| 1 | Potable water supply |
| 1 | Eye wash station connected to a potable water supply (asphalt laboratory) |

The Contractor will furnish the following minimum testing equipment:

| | |
|---|---|
| 1 | Centrifuge extractor (3,000 grams capacity) or equal |
| 2 | Electric hot plates thermostatically controlled with 3-way plug and cord |
| 1 | Triple beam balance with scoop, capacity 2600 grams |
| 1 | Triple beam balance with scoop, capacity 20 kilograms |
| 1 | Set of sampling equipment, steel buckets, square nose shovel, sampling thief and sampling bags |
| 1 | Mechanical sieve shaker for 8 inch diameter sieves, 2 inch through No. 200 mesh |
| 1 | Set of brass frames, 8 inch diameter sieves, 2 inch through No. 200 mesh |
| 1 | No. 200 Wet Washing Sieve, brass frame 4” height above mesh |
| 1 | Sample Splitter with opening to one and one half inches |
| 1 | Mechanical Shaker, with the following screen tray sizes: 2”, 1-1/2”, 1”, 3/4”, |

1/2", 3/8", No. 4, No. 8, No. 10, No. 16 and pan; and also, for asphalt plants, the following specified equipment which shall conform to the requirements of AASHTO T 245.
Concrete thermometers

| | |
|---|---|
| 3 | Specimen Mold Assembly |
| 1 | Specimen Extractor |
| 1 | Compaction Hammer Mechanical Compactor with counter and pedestal |
| 1 | Safety can, 2-1/2 gallon capacity |
| 1 | Lab Type Oven |
| 2 | Dial Type Asphalt Thermometers |

Extraction fluid Conforming to AASHTO T 164. Used extraction fluid shall be disposed of by the Contractor in conformance with Federal and City laws.

Miscellaneous supplies; pans, brushes, scoops or large spoons, trowels, graduated beakers and an adequate supply of running water shall be provided. The equipment specified shall be installed ready for operation in a field laboratory conforming to the above requirements.

Adjacent to the platform scales at asphalt plants, the Contractor shall furnish a platform of sufficient height for checking mix temperatures and operations.

**(B) STEEL FABRICATION SHOP**. The Contractor shall make provisions, at his expense, to furnish and maintain at the Steel fabrication shop acceptable office space with adequate light and a telephone for the exclusive use of personnel performing shop inspection for the District.

This office space shall be furnished with the following:

| No. | DESCRIPTION |
|---|---|
| 1 | Drawing table |
| 1 | Metal, 4 drawer file cabinet (15" drawer width) |
| 1 | Desk |
| 2 | Chairs |

**(C) PRECAST FACILITIES**. The Inspector shall have full access at all times to all parts of the yard where units to be inspected are being constructed. The Contractor shall furnish the necessary equipment and facilities for inspection of workmanship and physical tests. The Contractor shall provide for the Inspector a suitable office with all utilities including telephone service.

### 106.07 STORAGE OF MATERIALS

Materials shall be stored so as to insure the preservation of their quality and fitness for the work and shall be located so as to facilitate prompt inspection. When considered necessary, they shall be placed on concrete platforms or other hard, clean surfaces and not on the ground, and shall be placed under cover when necessary for proper protection. Materials from different sources of supply shall not be stored in the same stockpile unless approved by the Chief Engineer.

Stockpiles of aggregate shall be built in horizontal layers not to exceed 3 feet in height. Each layer shall be completely in place before the next is started and shall not be of such height as to cause coning or segregation. Aggregates which become mixed or contaminated with soil or other foreign material when in stockpiles shall be rejected. Care must be used in removing the material near the base of the pile.

### 106.08 HANDLING OF MATERIALS

Vehicles used in transporting aggregates, portland cement, asphalt, or similar construction materials must be kept clean and free from all foreign matter, be in proper working condition and have strong, substantial bodies which will prevent the escape of materials during transportation. Any material shipped in a conveyance containing foreign material shall be rejected regardless of the quality of said materials as determined otherwise.

Aggregates shall be handled in such a manner as to prevent coning or segregation.

### 106.09 UNACCEPTABLE MATERIALS

All materials not conforming to the requirements and specifications shall be considered as unacceptable and will be rejected and be removed immediately from the site of the work. Rejected material shall not be used until the defects have been corrected and approved by the Chief Engineer.

**REFERENCE TESTS**. In the event the Contractor demonstrates that the test results obtained from a sample taken to evaluate a particular lot appear questionable, the Contractor may request in writing that additional tests be taken of that lot. Upon receipt of the written request, additional samples will be randomly selected and an appropriate number of retests made.

If the results of the new tests indicate the material does not conform to the specifications and is not acceptable, the full cost of the test shall be borne by the Contractor.

### 106.10 MATERIAL SHORTAGES

The Contractor is advised to anticipate shortages of certain products particularly those containing steel, copper, aluminum, portland cement, and asphalt, and is urged to place orders as early as practicable to provide producers and suppliers with maximum lead time. If timely deliveries still cannot be assured from usual sources, alternative suppliers should be fully considered.

Reasonable time extensions, exclusive of further compensation, for delays due to such products being in short supply, will be granted only if delays are beyond the control of the Contractor, fabricator, or supplier and written evidence of such delays, satisfactory to the Chief Engineer, is submitted concurrently with the delays and not after the fact.

### 106.11 MATERIALS ORDER

A completed materials order shall accompany each quantity and shipment of materials from issue point to the job site, and shall be delivered to the Inspector. Each materials order shall consist of an approved form serially numbered; additional information and certification shall be promptly furnished if requested.

A copy of each order shall be retained by the Inspector at material issue point. Payment may not be made for materials not accompanied by a proper materials order.

### 106.12 PROCESSING OF MATERIALS

All work shall conform to the appropriate provisions of the current Occupational Safety and Health Standards (OSHA). The attention of those contractors furnishing and processing materials in the District is specifically directed to OSHA 29 CFR 1926.58 issued June 1986.

### 106.13 CONTRACTOR PROCESS QUALITY CONTROL AT ASPHALT AND CONCRETE PLANTS

**SCOPE –** This section establishes minimum requirements and activities for Contractor-based process quality control systems (Process Control). Process control is a series of samples and tests for controlling the delivery, handling, measuring, batching and mixing of construction materials at Asphalt and Concrete Plants. The results of process control tests may be used as a basis to accept or reject a material.

**FUNCTIONS AND RESPONSIBILITIES** – The District of Columbia Department of Transportation (DDOT) will approve mix designs and job mix formulas. DDOT will also provide random plant inspections to monitor and verify control of the operations to assure conformity of materials with the Contractual Specifications.

At no time will the DDOT representative issue instructions to the Contractor or their producer as to setting of dials, gauges, scales and meters. However, DDOT representatives may question and warn the Contractor against the continuance of any operation(s) or sequence of operations which may result in unsatisfactory compliance with specification requirements.

The Contractor shall submit in writing their proposed quality control plan to DDOT prior to the pre-construction conference for review and approval. The plan should contain the sampling, testing, inspection, and frequencies to maintain process quality control. Minimum testing, and inspection activities are shown in Table 106.13A and 106.13B.

The activities shown in Tables 106.13A and 106.13B are minimum activities necessary to control production at an acceptable quality level. It is recognized, however, that depending on the type of process or materials, some of the activities listed may not be necessary and in other cases, additional activities may be required. The frequency of these activities will also vary with the process and the materials. The frequency of these activities, when there are deficiencies in the quality of the materials processed, will be increased until the proper conditions have been restored.

The Contractor shall provide and keep up-to-date control charts/computer data bases (as approved by the Contractor's QA/QC Plan) for all quality control sampling and testing.

The Contractor shall be responsible for the formulation of all mix designs. In accordance with D.C. Standard Specifications 817 and 818, the Contractor's proposed mix designs must be submitted to DDOT for approval, thirty-five (35) calendar days prior to their use. The Contractor shall be responsible for the process control of all materials during handling, blending, mixing, and the placing operations.

**TABLE 106.13A**
**MINIMUM CONTRACTOR PROCESS QUALITY CONTROL REQUIREMENTS FOR BITUMINOUS MATERIALS**

A. All Types of Plants
   1. Stockpiles
      a. Determine gradation of all incoming aggregates as per AASHTO T-27 (Weekly or as directed by the Chief Engineer)
      b. Inspect stockpiles for separation, contamination, segregation, etc. (Daily)
   2. Cold Bins
      a. Observe operation of cold feed for uniformity (Daily)
   3. Bituminous Mixture
      a. Determine percent bitumen as per AASHTO T-308 (per 500 tons)
      b. Determine mix gradient per AASHTO T-30 (per 500 tons)
      c. Determine mix percent air voids as per AASHTO T-269 (per 500 tons)
      d. Produce and test Gyratory samples as per AASHTO TP4 (per 500 tons)
      e. Check mix temperatures (Hourly)
      f. Maintain file of incoming asphalt binders (asphalt cement) certifications.
      g. Determine asphalt dust ratio as per DDOT Specifications
      h. Maintain log of various asphalt binders in storage tanks.
   4. Completion of Shipping Tickets shall include the following information:
      a. Name of Asphalt supplier.
      b. Ticket serial number.
      c. Quality control person's certification of performance for each mix type and each Contract number (with first load).
      d. Date, truck and load number.
      e. Name of Contractor.
      f. D.C. Contract number and location of placement.
      g. DDOT approved job mix formula and asphalt class.
      h. Temperature of mix loaded on truck.
      i. Certified truck weight and total volume weight of asphalt shipped.
      j. Release agent for truck beds.

B. Batch Plants
   1. Check mixing times.
   2. Check operations of weight bucket and scales.

C. Drum Mixer Plants
   1. Determine gate calibration chart for each bin.
   2. Determine gate settings for each bin to assure compliance with DDOT approved job mix formula.
   3. Determine gallons per revolution or gallons per minute to assure compliance with DDOT approved job mix formula.
   4. Determine moisture content of stockpiles.

**TABLE 106.13B**
**MINIMUM CONTRACTOR PROCESS QUALITY CONTROL REQUIEMENTS FOR PORTLAND CEMENT CONCRETE (PCC)**

A. Incoming Materials
   1. Maintain file of incoming Portland cement and admixture shipment certifications.
   2. Check proper Portland cement storage.
   3. Determine gradation of incoming aggregates and fineness modulus of fine aggregate as per ASTM C-136 (Daily).
   4. Certify that all incorporated materials are from approved sources.
   5. Maintain stockpiles to prevent separation, contamination, segregation, frozen aggregates, etc. (Daily).

B. Measuring Devices
   1. Check that scales are calibrated/checked for accuracy and precision (Daily).
   2. Check that flow meters are calibrated/checked (Daily).
   3. Moisture meter checked/verified by ASTM C-566 method moisture testing (Daily).
   4. Check admixture dispensers calibrated and functioning (Daily).
   5. Check Plant clock for accuracy (Daily).

C. Mixers
   1. Manufacturer's design details on-hand.
   2. Check that the central mixer-timing device is certified and properly functioning (Daily)
   3. Check that truck mixer-timing device is certified and is properly operating.
   4. Check water gauges, etc. (Daily).
   5. Check that mixes are free of hardened concrete (Twice annually).
   6. Inspect mixers for proper functioning, wear, hardened concrete, etc. (Twice annually).

D. Mixing Concrete
   1. Check for proper batching sequence (Daily)
   2. Check for proper mixing speed and time (Daily)
   3. Check concrete for uniformity, tested for specification compliance (Twice daily) (Slump as per ASTM C-143; Air Content as per ASTM C-172,C-173 and C-231; unit weight as per ASTM C-138)
   4. Mixture Adjustment- adjustment for moisture correction (Twice daily)

E. Completion of Batch Tickets
   Include the following information:
   1. Name of Concrete supplier
   2. Ticket serial number, date, D.C. Contract number, and truck number.
   3. Name of Contractor
   4. Quality control person's certification of performance for each mix type and Contract number (for first load).
   5. Location of placement.
   6. DDOT mix design approval number and concrete class.
   7. Component quantities and concrete total volume.
   8. Moisture correction for aggregate moisture, and total water in mix.
   9. Time of batching.
   10. Maximum amount of water that may be added to the mix at the project site.

**QUALITY CONTROL SYSTEM**

1. **General Requirements.** The Contractor shall furnish and maintain a quality control system that will provide reasonable assurance that all materials and products submitted to DDOT for acceptance conform to the Contract requirements, whether manufactured or processed by the Contractor or procured by the Contractor from suppliers or subcontractors. The Contractor shall have performed the inspection and tests required to substantiate product conformance to contract requirements by a DDOT certified materials testing laboratory. The Contractor shall have a qualified quality control technician, who has been certified by DDOT at an asphalt or concrete plant where materials are being produced for DDOT. DDOT certification is dependent upon a Mid-Atlantic State's certification and on-the-job performance evaluated through the DDOT Independent Assurance Test Program and random inspections conducted by DDOT staff. The Contractor's quality control procedures, inspection, and test results shall be documented and available for review by DDOT throughout the life of the contract. Upon completion of the project, the Contractor shall submit these items to DDOT.

2. **Documentation.** The Contractor shall maintain adequate records of all inspections and tests. The records shall indicate the nature and number of tests made, the number of deficiencies found, the quantities approved and rejected, and the nature of corrective action taken. The Contractor's documentation procedures will be subject to the review and approval of DDOT prior to start of the work and to compliance checks during the progress of the work. All charts and records documenting the Contractor's quality control tests and inspections shall become the property of DDOT upon completion of the work.

3. **Charts and Forms.** All conforming and nonconforming inspections and test results shall be recorded on approved forms and charts, which shall be kept up-to-date and complete, and shall be available at all times to DDOT assuring the performance of the work. Test properties for various materials and mixtures shall be charted on forms that are in accordance with applicable requirements of DDOT. A copy of each chart and form to be used by the Contractor shall be furnished to DDOT. DDOT will design and provide standardized test report forms and material control charts in an electronic format. The Plant Laboratory shall utilize the forms and charts as designed for their reporting purposes.

4. **Corrective Actions.** The Contractor shall take prompt action to correct any errors, equipment malfunctions, process changes, or other assignable causes, which have resulted in or could result in the submission of non-compliant materials or products. When it becomes evident to DDOT that a Contractor is not controlling its process and is making no effort to take corrective actions, DDOT will require that operations be ceased until such time as the Contractor can demonstrate that it can and will control the process. Should it become evident that a fraudulent claim has been made as to the quality of the material(s) utilized or produced, or a similarly fraudulent claim is made to the calibration of equipment, the DDOT Chief Engineer may de-certify the Plant operation for a period of thirty (30) calendar days, or as otherwise determined by the DDOT Chief Engineer. Additional fines, penalties or damages

may be assessed as determined by the Chief Engineer and authorized by law, regulation or contract terms.

5. **Asphalt and Concrete Laboratories with Measuring and Testing Equipment.** The Contractor shall ensure that the Plant's testing laboratory is equipped with all the necessary equipment and supplies for proper process control sampling, testing, record keeping and test reporting purposes. To assure accuracy, the testing equipment shall be checked prior to startup and periodically as directed by DDOT in accordance with applicable standards.

6. **Sampling and Testing.** Sampling testing methods and procedures used by the Contractor to determine quality conformance of the materials and products will be the same as those used by DDOT (See Tables 106.13 A and 106.13B). The Contractor's quality control plan will include the taking of samples on a random basis as approved in Quality Assurance Control Plan and the plotting of test results on control charts and/or computer data files.

7. **Alternative Procedures.** The Contractor may use alternative sampling methods, procedures, and inspection equipment when such procedures provide, at a minimum, the quality assurance required by the contract documents. Prior to applying such alternative procedures, the Contractor shall describe them in written proposal and shall demonstrate for the approval of DDOT that their effectiveness is equal to, or better than, the contract requirements. In case of dispute as to whether certain procedures proposed by the Contractor may be used, the contract documents shall apply. Where contract documents are silent on the matters in question, it is left to the final determination of the Chief Engineer.

8. **DDOT Inspection at Subcontractor or Suppliers Facilities.** DDOT reserves the right to inspect materials not manufactured within the Contractor's facility. This inspection shall not constitute acceptance nor shall it in any way replace the Contractor's inspection or otherwise relieve the Contractor of their responsibility to furnish an acceptance material or product. When inspection of the subcontractor's product is performed by DDOT, such inspection shall not be used by the Contractor as evidence of effective inspection of such subcontractor's or supplier product. The Contractor, as necessary to assure conformance with contract requirements, shall inspect subcontracted or purchased materials when received. The Contractor shall report to DDOT any nonconformance found on DDOT source inspection material and shall require the supplier to take necessary corrective action.

## 106.14 MINIMUM REQUIREMENTS FOR TESTING LABORATORIES AT ASPHALT AND CONCRETE PLANTS

**(A) SCOPE –** To have assurance that testing laboratories are capable of achieving an acceptable level of results, it is necessary that certain minimum standards be established. The minimum requirements include criteria for personnel, equipment and quality control procedures. The requirements apply to all construction acceptance testing and inspection including asphalt concrete job mix formulas and portland cement concrete mix designs.

**(B) REQUIREMENTS –** To achieve approval, the testing laboratory shall meet the current DDOT specifications requirements applicable to the work for which it is to be engaged.

The testing laboratory shall have its laboratory equipment and procedures inspected and approved annually by DDOT. In addition, testing machines and weighing devices must be calibrated as per AASHTO Designation R18 by impartial means using devices of accuracy traceable to the National Institute of Standards and Technology (NIST).

In fields other than those covered by the referenced AASHTO/ASTM Standards, the Contractor's own testing laboratory shall accept only those assignments that it is capable to perform competently by use of its own personnel and equipment. Any work to be subcontracted must be subcontracted to laboratories meeting the appropriate criteria.

The inspection and testing services of the testing laboratory shall be under the direction of a full-time employee certified by one of the States in the Mid-Atlantic States Region. They shall have experience in inspection and testing of the specific materials and construction they direct.

The supervisor of the laboratory and field technicians shall have documented experience of inspection and/or testing of materials involved in a related area of construction. Technicians must have a current Mid-Atlantic Region Technician Certification in their area of testing available for inspection.

It is the responsibility of the testing laboratory to provide the documents necessary to show continuing compliance with requirements outlined in this section.