

## Fly Ash - 21

### 1. REFERENCED DOCUMENTS

#### 1.1 ASTM Standards:

- ASTM C 219 Standard Terminology Relating to Hydraulic Cement
- ASTM C 311 Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland Cement Concrete.
- ASTM C 618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

### 2. TERMINOLOGY

- 2.1 See ASTM C 219 Standard Terminology Relating to Hydraulic Cement.
- 2.2 Supplier, Fly Ash – In this Standard, a *Fly Ash Supplier* shall be defined as one who provides fly ash for use on CDOT projects.
- 2.3 Supplier, Concrete – In this Standard, a *Concrete Supplier* shall be defined as one who manufactures concrete mix. Fly ash may be among the ingredients of a concrete mix.
- 2.4 Contractor – The Company under contract with CDOT to produce products using fly ash.

### 3. SIGNIFICANCE AND USE

- 3.1 This Standard specifies procedures intended to minimize disruption of fly ash shipments. This is accomplished by a certification system that evaluates quality control and specification compliance tests performed by the Fly Ash Supplier according to their quality control plans.
- 3.2 This Standard specifies requirements and procedures for a certification system that shall apply to all fly ash suppliers providing fly ash. The requirements and procedures shall apply to, materials that meet the requirements of CDOT specifications for fly ash. These provisions apply to the plant producing the fly ash. These provisions apply to the Contractor, after delivery of the concrete mix, for use on CDOT projects.

### 4. SAMPLING

- 4.1 All test samples shall be obtained per ASTM C 311. The use of a random sampling procedure is mandatory to the establishment of a valid quality assurance program.

## 5. TESTING REQUIREMENTS

- 5.1 Testing shall be performed by a laboratory currently accredited by the Cement and Concrete Reference Laboratory (CCRL). Any satellite laboratory of a Fly Ash Supplier that performs required testing under this Standard shall be identified in the submitted Quality Control Plan (Section 7).

## 6. SUPPLIER CERTIFICATION REQUIREMENTS

- 6.1 Fly Ash Suppliers shall submit to the CDOT Product Evaluation Coordinator (PEC), the CDOT Form 595, Pre-Approved Product Evaluation Request & Summary for each source and Class of fly ash intended for use on CDOT projects. Instructions for completing CDOT Form 595 can be found at: <https://www.codot.gov/business/apl> within the Notice to Manufacturers.
- 6.2 In addition to completing the CDOT Form 595, the following shall be supplied to the PEC:
- 6.2.1 A brief outline of the procedures used to evaluate the finished product including; sampling and testing frequency and the sample preparation employed, including chemical analysis methods used such as X-ray, atomic absorption spectroscopy, and/or wet chemistry.
- 6.2.2 The results of all applicable chemical and/or physical tests required by ASTM C 618 on the most recent 40 samples (20 pairs) tested. The results shall be submitted in the format outlined in ASTM C 311, in particular the table entitled "Test Data" with the critical limits calculated as described.
- 6.2.3 A copy of the CCRL certification for the laboratory performing testing.
- 6.2.4 A copy of the Fly Ash Supplier's Quality Control Plan, which complies with the requirements of Section 7, if one has not been supplied to CDOT for previously submitted products.
- 6.3 A sample of the proposed fly ash shall be shipped to the PEC at the Materials and Geotechnical Branch, 4670 North Holly Street, Unit A, Denver, Colorado 80216-6408.
- 6.4 The Fly Ash Supplier shall allow CDOT to visit the production and/or shipping site to observe the Fly Ash Supplier's quality control activities, inspect the facilities, and obtain samples for tests.
- 6.5 The Fly Ash Supplier shall follow the procedures described in the CDOT approved quality control plan.
- 6.6 The Fly Ash Supplier shall establish a continuing test record for every test required for each type of fly ash included in the written request as prepared to satisfy the requirements of Subsection 6.1.
- 6.7 The Fly Ash Supplier shall submit to CDOT all reports required by this standard in a format approved by CDOT.

6.8 The Fly Ash Supplier shall have a satisfactory record of compliance with CDOT project specifications. Decisions by CDOT concerning this requirement shall be based on the test results furnished by the Fly Ash Supplier and satisfactory results when the splits and field tests are compared with Fly Ash Supplier tests.

## 7. SUPPLIER QUALITY CONTROL PLAN (MINIMUM REQUIREMENTS)

7.1 The Fly Ash Supplier's Quality Control Plan shall identify the following:

7.1.1 Facility location.

7.1.2 Name and telephone number of a person at each production facility, responsible for quality control of material shipped to CDOT projects.

7.1.3 Quality control tests and testing frequency to be performed on each fly ash.

7.1.4 Name and location of the laboratory performing quality control tests on the fly ash.

7.2 The Fly Ash Supplier's Quality Control Plan shall include a declaration stating that if a test result indicates that a shipment of fly ash does not comply with the purchase specifications, the Fly Ash Supplier shall:

7.2.1 Identify the material in the shipment,

7.2.2 Immediately cease the shipment until the material complies with the specification,

7.2.3 Immediately notify CDOT regarding the shipment in question,

7.2.4 Immediately notify the Contractors and Concrete Suppliers scheduled to use the material from the shipment in question,

7.2.5 Notify CDOT before resuming shipment; and

7.2.6 Implement any mutually agreed-upon procedures for the disposition of the material.

7.3 The Fly Ash Supplier's Quality Control Plan shall describe the method and frequency for initial testing and quality control testing.

7.3.1 **Initial Testing** – For each fly ash product to be supplied, testing shall be performed and the results of that testing provided to CDOT, accompanied by a sample of the material represented by the test results.

7.3.2 **Quality Control Testing** – Tests to determine conformance with ASTM C 618 shall be conducted as needed for quality control. The Supplier's Quality Control Plan shall indicate the frequency of this testing.

7.4 The Fly Ash Supplier's Quality Control Plan shall include a statement that the Fly Ash Supplier will prepare and maintain summary reports for all quality control tests performed, and will submit them to CDOT on request.

7.5 The Fly Ash Supplier's Quality Control Plan shall provide an outline of the procedure to be followed for checking transport vehicles before loading to prevent contamination of shipments. The outline shall be maintained in the Fly Ash Supplier's records and will be made available to CDOT on request.

## **8. CDOT EVALUATION PROCEDURE**

8.1 CDOT will verify that the Fly Ash Supplier's Quality Control Plan is adequate. CDOT may visit the shipping site when required.

8.2 CDOT will notify the Fly Ash Supplier whether or not the Fly Ash Supplier's application has been granted.

8.3 CDOT may verify that the Fly Ash Supplier's testing laboratory is currently CCRL accredited.

8.4 CDOT may perform split sample testing per Section 10.

8.5 CDOT may sample and perform testing on random samples.

8.6 CDOT may inspect the operations of the Fly Ash Supplier's facility including those related to shipments if required.

8.7 Products approved for use will be posted on the CDOT APL.

## **9. REQUIREMENTS FOR SHIPPING FLY ASH BY AN APPROVED SUPPLIER**

9.1 The Fly Ash Supplier's Quality Control Plan as approved by CDOT (Section 7) shall be implemented.

9.2 Each shipment shall be accompanied by two copies of the bill of lading, which shall include:

9.2.1 The name and location of the Fly Ash Supplier and the plant producing the fly ash,

9.2.2 The class of fly ash,

9.2.3 The quantity of material shipped,

9.2.4 The date of shipment,

9.2.5 A statement certifying the material meets specification requirements (COC) and,

9.2.6 A statement certifying that the transport vehicle was inspected before loading and was found acceptable for the material shipped.

9.3 If the test results do not conform to ASTM C 618 specifications, the Fly Ash Supplier shall remove the non-compliant material from the shipping queue as outlined in Subsection 7.2.

**10. SPLIT SAMPLE TESTING**

- 10.1 CDOT may request split sample testing. The test results will be exchanged as soon as they are available.
- 10.2 If the split sample test data is not within the precision specified for that particular test a review of both sampling and testing procedures will be conducted by both the Fly Ash Supplier and CDOT.

**11. REPORT AND DATA SHEETS**

- 11.1 Fly Ash Supplier Reports -The Fly Ash Supplier shall prepare the reports described in Subsections 6.1, 6.2, and 9.2.

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