

MATERIALS FOR PORTLAND CEMENT CONCRETE (STRUCTURAL PAVEMENT AND MISCELLANEOUS)

SECTION 921 PORTLAND CEMENT AND BLENDED CEMENT

921-1 General.

The production and quality control of cement shall conform to the Florida Department of Transportation Standard Operating Procedures included in the Specifications Package.

The cement shall conform to the requirements of the AASHTO designations shown in (a) below with the additional restrictions as required by (b) below:

(a) Types Permitted: Except where a particular type of cement is specified on the plans or Specifications, and as specifically restricted in Section 346, cement may be Types I, II, III, IV, V (AASHTO M 85), or IP, IP(MS), IS (AASHTO M 240).

(b) Restrictions:

1. Alkali Content: Only Portland cement containing a maximum of 0.6% alkali, or less, calculated as Na_2O (% Na_2O plus 0.658 % K_2O), shall be used.

2. Heat of Hydration: Limits on the maximum heat of hydration may apply if required in Section 346.

The following definitions are applicable to the production and quality control of cement:

Sources of Supply - A source of supply shall be the cement supplier responsible for supplying the final product. Where the supplier has more than one manufacturing facility, the source of supply may be designated as the manufacturer/facility.

Approved Source - The term Approved Source shall indicate a cement supplier that has been qualified by the State Materials Office. A list of Approved Cement Sources will be maintained by the State Materials Engineer.

Current Quality Control Plan Approval - A current indication of quality control approval status, for each cement supplier, will be maintained by the State Materials Engineer in conjunction with the Approved Source List.

Purchaser - The term "purchaser" in the AASHTO Specifications shall be taken as the Department.

Approved Laboratory - An approved laboratory is a laboratory acceptable to the State Materials Engineer and which has been currently inspected by the Cement and Concrete Reference Laboratory (CCRL) and which has corrected all deficiencies noted at the time of inspection. The laboratory must also authorize CCRL to send copies of inspection reports to the State Materials Engineer.

921-2 Mixing Different Cements.

Different brands of cement, cement of the same brand from different facilities, or different types of cement shall be stored separately and shall not be mixed. Concrete containing different cements shall not be mixed during any continuous placement.

921-3 Methods of Acceptance of Portland Cement.

(a) Certification: Cement from an approved source with a current quality control plan approval may be accepted on the basis of certified mill analysis test results meeting the requirements of the applicable AASHTO and FDOT Specifications. Certification of these test results shall be provided to the District Materials Office and corresponding samples for independent assurance shall be provided upon request. Certification testing shall be performed by an approved laboratory.

(b) Acceptance Tests: Cement from approved sources without an approved quality control plan shall be acceptance tested for compliance to AASHTO and this Specification prior to incorporation into

work. Acceptance tests shall be performed on designated LOTs of 400 tons [360 metric tons] or less. Acceptance testing shall be performed by an approved laboratory which shall be inspected by the Cement and Concrete Reference Laboratory (CCRL) as a cement testing laboratory and which has corrected any deficiencies noted at the time of inspection. The laboratory to perform acceptance testing must authorize CCRL to send a copy of the inspection report to the State Materials Office.

921-4 Packing Handling and Storing.

Cement may be delivered in bags or in bulk. The storage building, bin or silo shall be weatherproof and shall be located convenient to the work. On small jobs, storage in the open may be permitted by the Engineer in which case raised platforms and adequate waterproof coverings shall be provided.

921-5 Rejection.

Cement failing to meet the requirements of this Specification shall be rejected. Cement which has been damaged, is partially set, lumpy or caked shall not be used. The entire contents of the sack or bulk container which contains damaged cement shall be rejected.

Bagged cement which varies more than 5% from the designated weight, or if the average weight of 50 sacks, taken at random, is less than the designated weight, the cement shall be rejected.

921-6 Standard Operating Procedures for Quality Control of Cement.

921-6.1 General: Cement suppliers shall submit a proposed quality control plan to the State Materials Engineer for plan approval. In addition to the quality control plan, the supplier must submit test reports from an approved laboratory which certifies that the cement in current production or supply conforms to these Specifications. Upon initial quality control plan approval and receipt of cement certifications, the suppliers will be placed in an approved source status with an approved quality control plan.

921-6.2 Quality Control Plan: The supplier's quality control plan shall be sufficient to insure that more than 97% of all cement delivered for FDOT work shall meet all Specification requirements. Upon request of the Department, the supplier shall provide split samples of the cement collected for quality control testing. Split samples shall be delivered to the Office of Materials in Gainesville, Florida and shall be identified as representing a designated LOT of cement.

The quality control plan shall include the following elements:

Company name, address and location.

Facility addresses and locations.

Designation of Responsible Personnel including facility managers, quality control managers and qualified technicians.

Description of the facility and procedures for material storage, material handling, material selection and material diversion.

Description of the quality control program including LOT designation, required testing and analysis, testing frequencies and correction, and control mechanisms.

Description of the testing facilities and methods.

Transportation/shipping facilities and procedures.

Documentation and record keeping facilities and procedures.

921-6.3 Cement Ownership and Responsibility: For purposes of Quality Control Plan approval status, the cement supplier will be responsible for cement quality until the cement is accepted by the concrete producer. Where the cement has been accepted by a concrete producer and is subsequently found deficient, the concrete plant approval may be withdrawn with respect to further use of that cement and reinstated only when the deficiency is adequately resolved and such reinstatement is made by the State Materials Engineer.

921-6.4 Quality Control Plan Approval Control: Continued approval of the Cement Quality Control Plan is the responsibility of the State Materials Engineer. Discontinuance of approval may be based on testing at the point of use, testing by the manufacturer or proven poor performance of the cement in concrete.

In the specific instance of a failing cement sample taken as part of the FDOT Independent Assurance Program, the failure shall initiate a three day sampling program. After the initial cement sample failure, the FDOT will collect three additional samples, one each on three consecutive working days, from the location of the original failure. Failure of any one of the three additional samples will be considered adequate evidence to withdraw the Cement Quality Control Plan Approval.

Notification of failing test results will be distributed to both cement suppliers and concrete producers as designated in the Approved Quality Control Plans. Split samples of additional samples will be provided to the cement supplier and concrete producer upon request.

Reinstatement of the Cement Quality Control Plan Approval will occur when the cement producer satisfies the State Materials Engineer that the specific cause of the failures has been identified and corrected or that a statistical analysis on the current cement production indicates that the current cement production meets or exceeds the requirements of this Specification.

921-6.5 Sampling of Cement: Cement samples shall be jointly obtained, by the FDOT Inspector and the concrete producer representative, during delivery or from the concrete producers storage facilities. Samples shall be obtained by one of the methods in Florida Methods FM 5-503. The concrete producer may select a preferred sampling method and shall provide safe access and the necessary equipment to collect the required samples. Samples shall be a minimum of 10 pounds [4.5 kg] in size. Sample documentation shall include signatures of both the FDOT Inspector and the concrete producer representative.