ORIGINATION FORM

THE INFORMATION BELOW IS TO BE PROVIDED BY THE ORIGINATOR

X Modify Specification _____921_____.
Section/File number

☐ New Section _____.
Section number

Subject: Portland Cement and Blended Cement

Origination date: 10/04/2007

Originator: Tom Malerk
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rt820tm

Problem statement: AASHTO M-85 test method has recently been revised. Specification 921 is being changed to reflect new information and requirements from the test method.

Information source: AASHTO M-85 changes include allowing cement producers to use limestone. These changes are being made to allow cement producers to have the option of incorporating limestone in cement.

Background data: For more information, please contact Michael Bergin at 352-955-6666.

Recommended Usage Note: July 2008 workbook

Expected fiscal impact, if implemented: These changes should result in the cost of cement to be reduced.

Implementation of these changes, if and when approved, will begin with the July 2008 letting.

Florida Department of Transportation

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GOVERNOR

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STEPHANIE KOPELOUSOS
SECRETARY

M E M O R A N D U M

DATE: October 22, 2007

TO: Specification Review Distribution List

FROM: Duane F. Brautigam, P.E., State Specifications Engineer

SUBJECT: Proposed Specifications Change: 9210000 Portland Cement and Blended Cement

In accordance with Specification Development Procedures, we are sending you a copy of a proposed new specification change for Portland Cement and Blended Cement.

This change was proposed by Tom Malerk of the State Materials Office to update the specification with new information and requirements from the recently revised AASHTO M-85 test method allowing cement producers to use limestone in cement.

Please share this proposal with others within your responsibility. Review comments are due within four weeks and should be sent to Mail Station 75 or to my attention via e-mail at SP965DB or duane.brautigam@dot.state.fl.us. Comments received after November 19, 2007 may not be considered. Your input is encouraged.

DFB/ft

Attachment

COMMENTS:

Submitted by: Phone #:

PORTLAND CEMENT AND BLENDED CEMENT.
(REV 10-04-2007)

SECTION 921 (Pages 787-789) is deleted and the following substituted:

SECTION 921
PORTLAND CEMENT AND BLENDED CEMENT

921-1 General.

921-1.1 Type of Cement: Cement shall conform to the requirements of the following AASHTO designations 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). 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.

921-1.2 Alkali Content: Only Portland cement containing a maximum of 0.6*0*% alkali, or less, calculated as Na_2O (% Na_2O plus 0.658% K_2O), ~~shall~~ *may* be used *with no further testing*. *When tests performed in accordance with ASTM C-33 on coarse and fine aggregate indicate the aggregate to be non-reactive to alkalis, cements exceeding 0.60% alkali will be allowed, but a supplementary cementitious material meeting the requirements of Section 929 will be used.*

921-1.3 Heat of Hydration: ~~Ensure that the heat of hydration of the cement does not exceed 80 cal/g at seven days measured as the average of three samples, and that no individual measurement exceeds 90 cal/g.~~

~~Where fly ash is 18% or greater or slag is 50% or greater of the total cementitious material, ensue that the heat of hydration of the cement does not exceed 88 cal/g at seven days measured as the average of three samples, and ensure that no individual measurement exceeds 96 cal/g.~~ *When the cement heat of hydration is 80 cal/g or less at seven days, the cement may be used in a moderately and slightly aggressive environment without pozzolans or slag. If the heat of hydration ~~at 7 days~~ is between 81 and 88 cal/gm at 7 days, pozzolans or slag meeting the requirements of Section 929 will be used. If the heat of hydration is greater than 88 cal/gm at 7 days, use the cement in slightly aggressive environments only.*

Do not apply these requirements to Type *I or* III cement.

921-2 Terminology.

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

~~Sources of Supply:~~

~~A source~~ *Source* of ~~supply~~ *Supply* - ~~shall be the~~*indicates a* 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*s* a cement supplier that has been qualified by the State Materials Office. A list of Approved Cement

Sources will be maintained by the ~~State *Director,*~~*State Materials Office.* ~~*of* Materials Engineer~~.

~~Current~~ Quality Control Plan ~~Approval~~ *Status* - ~~A current indication~~ *indicates* ~~of~~ quality control approval status, for each cement supplier *and*~~,~~ will be maintained by the ~~State *Director,*~~*State Materials Office* ~~*of* 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 ~~–~~ *indicates a* ~~An approved~~ laboratory ~~is a laboratory~~ acceptable to the ~~State *Director,*~~*State Materials Office* ~~*of* Materials Engineer and~~ which has been currently inspected by the Cement and Concrete Reference Laboratory (CCRL)*, is actively participating in their proficiency program* 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 *Director,*~~*State Materials Office.* ~~*of* Materials Engineer~~.

Mill Test Report – indicates a certification from the cement producer identifying that the cement meets Section 921 and AASHTO M-85, the Type, the production period the sample represents and the chemical and physical analysis of the cement, and the silo number(s) where the cement will be stored. The mill test report must identify that there is limestone in the cement, if limestone is included. An acceptable mill test report is found in the appendix of AASHTO M-85.

921-3 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.

921-4 Rejection.

The entire contents of the sack or bulk container which contains cement that does not meet the requirements of this Specification or has been damaged, is partially set, lumpy or caked 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.

921-5 Quality Control Plan.

921-5.1 General: The quality control program of a cement supplier shall conform to Section 6-8. Cement suppliers shall submit a proposed quality control plan to the ~~State *Director,*~~*State Materials Office* ~~*of* Materials Engineer~~ for plan approval. In addition to the quality control plan, the supplier must submit test reports from a~~n~~ *CCRL* 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 mill test report*, the suppliers will be placed in an approved source status with an approved quality control plan. An approved laboratory shall perform one quality control test per 400 ton LOT and a copy of their mill certificates shall be sent to the ~~State *Director,*~~*State Materials Office* ~~*of* Materials Engineer~~ when the material is in use on

Department projects. The ~~certification~~ *mill test report* shall indicate that the cement meets the requirements of this Specification. Also, the corresponding samples along with mill ~~certificates~~ *test reports* shall be submitted to the Department, upon request.

Producers intending to use limestone as a component material in the production of their cement will describe the type and source of the limestone. In addition, the producer will supply the Department with a sample of the limestone, a sample of the cement prior to the limestone being added and a sample of the cement after the limestone has been added. The analysis of these materials will be used as a baseline for our information. In the event that the source of limestone used by the cement producer changes, additional samples of both limestone and cement will be provided to the State Materials Office for evaluation.

Representatives ~~,~~ *from the Department may take samples from the cement production facility at a minimum of once per year to verify compliance* ~~*to*~~*with the producer's QC 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 State Materials Office and shall be identified as representing a designated LOT of cement.

921-5.2 Acceptance of Portland Cement: Portland Cement from an approved source with a current quality control plan approval may be accepted on the basis of ~~certified~~ mill ~~analysis~~ test ~~results~~ *reports* meeting the requirements of the applicable AASHTO and FDOT Specifications *and a delivery ticket printed on the producer's letterhead and traceable to the mill test report*. Certification of these test results shall be provided upon request to the ~~District~~ *State* Materials Office and corresponding samples for verification testing. Quality Control testing shall be performed by an approved *CCRL* laboratory.

921-5.3 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~~ *Reinstatement* is made by the ~~State *Director*,~~*State Materials Office* ~~*of* Materials Engineer~~.

921-5.4 Quality Control Plan Approval Control: The ~~Department~~ *State Materials Office* may withdraw quality control plan approval and may require cement shipments to be individually tested prior to incorporation into Department work. Quality control plan approvals may be rescinded when the performance of cement is in question, including problems with concrete quality, inconsistent quality control data, or failure of quality control or verification test results. 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 by the Department, *at the cement source,* the failure shall initiate the Department to ~~collect an additional~~ *retest the* sample ~~from the location of the original failure~~. Failure of ~~this~~

~~sample~~ *the retest* will be considered adequate evidence to withdraw the Quality Control Plan of the Cement Supplier.

Notification of failing test results will be distributed to the cement supplier (and concrete producers if applicable) as designated in the Approved Quality Control Plan. Split samples of the additional sample will be provided to the cement supplier and concrete producer upon request.

Reinstatement of the Quality Control Plan will occur when the cement producer identifies and corrects the specific cause of the failures or that a statistical analysis indicates that the current cement production meets or exceeds the requirements of this Specification.

921-5.5 Sampling of Cement: The verification samples may be taken at the manufacturer's plant, distribution facility or at the concrete production facility. Samples shall be obtained by one of the methods in Florida Methods FM 5-503. Samples shall be a minimum of 10 pounds in size. At the concrete production facility, cement samples shall be jointly obtained by the Department Inspector and the concrete producer's representative. ~~The concrete producer may select a preferred sampling method and shall provide safe access and the necessary equipment to collect the required samples.~~