

ORINATION FORM

Proposed Revisions to the Specifications

(Please provide all information - incomplete forms will be returned)

Date:

Office:

Originator:

Specification Section:

Telephone:

Article/Subarticle:

email:

****Will the proposed revision require changes to:**

| Publication | Yes | No | Office Staff Contacted and date contacted |
|--|-----|----|---|
| Standard Plans Index | | | |
| Traffic Engineering Manual | | | |
| FDOT Design Manual | | | |
| Construction Project Administration Manual | | | |
| Basis of Estimate/Pay Items | | | |
| Structures Design Guidelines | | | |
| Approved Product List | | | |
| Materials Manual | | | |

**This section must be completed prior to processing proposed revisions.

Will this revision necessitate any of the following:

Design Bulletin

Construction Bulletin

Estimates Bulletin

Materials Bulletin

Are all references to external publications current?

Yes

No

If not, what references need to be updated? (Please include changes in the redline document.)

Why does the existing language need to be changed?

Summary of the changes:

Are these changes applicable to all Department jobs?

Yes

No

If not, what are the restrictions?

Contact the State Specifications Office for assistance in completing this form.

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RON DESANTIS
GOVERNOR

KEVIN J. THIBAUT, P.E.
SECRETARY

MEMORANDUM

DATE: November 25, 2020
TO: Specification Review Distribution List
FROM: Daniel Strickland, P.E., State Specifications Engineer
SUBJECT: Proposed Specification: **9290100 SUPPLEMENTARY CEMENTITIOUS MATERIALS**

In accordance with Specification Development Procedures, we are sending you a copy of a proposed specification change.

The changes are proposed by Tim Counts from the State Materials Office to update and clarify language regarding slag, calcined clay, ground glass, and metakaolin in the Standard Specification.

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 online at <http://fdotewp1.dot.state.fl.us/programmanagement/development/industryreview.aspx> . Comments received after **December 28, 2020**, may not be considered. Your input is encouraged.

DS/dh

Attachment

**SUPPLEMENTARY CEMENTITIOUS MATERIALS
(REV 10-29-20)**

ARTICLE 929-1 is expanded by the following:

929-1 General.

Supplementary cementitious materials (SCMs) shall conform to the requirements of this Section. SCMs shall be used in concrete mix designs in accordance with Section 346.

Fly ash, slag cement, and ultra-fine fly ash shall not be used in conjunction with Type IP or Type IS cements.

Repulable bags may be accepted by the Engineer, provided a successful demonstration by the producer has indicated complete degradation of the repulable bags during the mixing operation and before the mix is discharged.

The Engineer may require additional testing beyond the requirements of this Section prior to the acceptance of any SCM sources.

929-1.1 Definitions.

The following definitions are applicable to the production and quality control (QC) of SCMs:

1. **Approved Laboratory:** A laboratory that is currently inspected by the Cement and Concrete Reference Laboratory (CCRL), is actively participating in the CCRL proficiency program and has corrected all deficiencies noted at the time of inspection. The laboratory must authorize the CCRL to send a copy of the final inspection report and proficiency sample results to the State Materials Office (SMO).

2. **SCM Producer:** Indicates an SCM supplier, including but not limited to a plant, a terminal, or a transfer facility, that has been qualified by the SMO. The Cementitious Materials Production Facility Listing will be maintained by the SMO.

3. **Test Report:** A certification from the SCM producer showing that the SCM meets the requirements of this Section. The test report must include, at a minimum, the following information:

- a. The Type of SCM.
- b. The production period.
- c. Chemical and physical analysis of the SCM.
- d. The silo numbers where the SCM is stored.
- e. The specific gravity of the SCM.
- f. The approved laboratory that performed all tests.

4. **Purchaser:** The term “purchaser” in the ASTM requirements shall be taken as the Department.

ARTICLE 929-2 is deleted and the following substituted:

929-2 Quality Control Program.

929-2.1 General: Develop a Producer QC Program as specified in Section 105.

SCM producers shall submit a proposed QC Plan to the SMO for acceptance.

Complete the Cementitious Materials Producer QC Plan Checklist (Appendix B02) and submit it along with the QC Plan, in a separate file. The checklist can be found on the SMO

website: <https://www.fdot.gov/materials/quality/programs/qualitycontrol/checklists/index.shtm>.

In addition to the QC Plan, the SCM producer must submit monthly test reports from an approved laboratory which certifies that the SCM in current production or supply conforms to the requirements of this Section.

SCM producers with an accepted QC Plan will appear on the Cementitious Materials Production Facility Listing.

QC test data that does not comply with the Specification will not be reason for rejection of the material if the SCM producer's QC Plan indicates that material will be diverted and not used for Department projects.

929-2.2 Sampling and Testing: Representatives from the Department may take verification samples at the SCM producer's plant, terminal, distribution facility or the concrete production facility. Samples shall be obtained by one of the methods described in FM 5-503. Sample sizes shall be a minimum of one gallon by volume. At the concrete production facility, cementitious samples shall be jointly obtained by the Department inspector and the concrete producer's representative.

Upon request of the Department, the SCM producer shall provide split samples of the cementitious material collected for QC testing. Split samples shall be delivered to the SMO and shall be identified as representing a designated LOT of the SCM.

Notification of failing verification sample test results will be distributed to the SCM producer and concrete producers (if applicable). Split samples of the initial sample may be provided to the SCM producer and concrete producer upon request.

SUBARTICLE 929-3.4.1 is deleted and the following substituted:

929-3.4.1 Concrete/Mortar Testing: Six concrete mixes shall be prepared by an accredited laboratory, three control batches using an approved Class F fly ash and three ~~trial~~comparison batches with petroleum coke, bark ash, or Class C fly ash, while all other constituents remain the same except for small adjustments to get the mix to yield. Follow the below criteria for each mix:

1. Use a previously approved FDOT Class IV (5,500 psi) mix design.
2. Size No. 57 Coarse Aggregate from an approved FDOT source.
3. 18 to 22% fly ash replacement.
4. Water/cementitious materials ratio of 0.41.

The following testing shall be performed on each concrete mix, as appropriate.

| Table 929-1 Concrete Testing Requirements | | |
|--|----------------------------|------------------------------------|
| Test Description | Standard Test Method | Test Age |
| Surface Resistivity | AASHTO T 358 | 28 days |
| Compressive Strength | ASTM C39 | 28 days |
| Chloride Diffusion | ASTM C1556 or NT Build 443 | 6 months, 12 months ⁽¹⁾ |
| Length Change | ASTM C157 | 28 days ⁽²⁾ |
| <p>(1) Upon completion of all 28 day and 6 month testing, the SCM producer may present the data to the SMO for acceptance. The 12 month data shall be provided to the SMO upon completion.</p> <p>(2) <u>Follow the Air Storage procedure.</u></p> | | |

Sulfate Resistance testing shall be performed on a mortar mix in accordance with ASTM C1012 and results reported after 6 and 12 months of testing.

SUBARTICLE 929-4.1 is deleted and the following substituted:

929-4.1 General: Slag cement and reference cement used for determination of slag activity tests shall meet the requirements of ASTM C989. Sampling and testing procedures shall follow the requirements of ASTM C989. ~~Only slag cement Grade 100 and 120 will be permitted.~~

SUBARTICLE 929-5.2.1 is deleted and the following substituted:

929-5.2.1 Concrete/Mortar Testing: Six concrete mixes shall be prepared by an accredited laboratory, three control batches using an approved Class F fly ash and three comparison batches with the calcined clay, while all other constituents remain the same except for small adjustments to get the mix to yield. Follow the below criteria for each mix:

1. Use a previously approved FDOT Class IV (5,500 psi) mix design.
2. Size No. 57 Coarse Aggregate from an approved FDOT source.
3. Control batches: Replace 18 to 22% fly ash replacement of the portland cement with Class F fly ash replacement.
4. ~~Water/cementitious materials ratio of 0.41 for the control Comparison batches: Replaced a portion of portland cement with the necessary amount a quantity of calcined clay sufficient to produce properties comparable to those for the control batches for comparison batches.~~

5. Water/cementitious materials ratio of 0.41

Testing shall be performed in accordance with Table 929-1.

Sulfate Resistance testing shall be performed on a mortar mix in accordance with ASTM C1012 and results reported after 6, 12, and 18 months of testing.

929-6.2.1 Concrete/Mortar Testing: Six concrete mixes shall be prepared by an accredited laboratory, three control batches using an approved Class F fly ash and three comparison batches with the ground glass, while all other constituents remain the same except for small adjustments to get the mix to yield. Follow the below criteria for each mix:

1. Use a previously approved FDOT Class IV (5,500 psi) mix design.
2. Size No. 57 Coarse Aggregate from an approved FDOT source.
3. Control batches: Replace 18 to 22% of the portland cement with Class

F fly ash replacement.

4. Water/cementitious materials ratio of 0.41. Comparison batches: Replace a portion of portland cement with a quantity of ground glass sufficient to produce properties comparable to those for the control batches.

5. Water/cementitious materials ratio of 0.41.

Testing shall be performed in accordance with Table 929-1.

Sulfate Resistance testing shall be performed on a mortar mix in accordance with ASTM C1012 and results reported after 6, 12, and 18 months of testing.

SUBARTICLE 929-7.2.2 is deleted and the following substituted:

929-7.2.2 Acceptance Testing of Metakaolin: Acceptance of metakaolin from sources operating under an accepted QC Plan shall be based on the monthly test reports meeting the chemical and physical requirements of ASTM C618 Class N, as modified herein, and this Section.

~~Metakaolin may be used in concrete if the test results provide an improvement or comparable compressive strength, sulfate resistance, corrosion protective properties, and other durability requirements of concrete, when compared to ASTM C618 Class F fly ash concrete.~~

SUBARTICLE 929-7.2.3 is deleted.

~~**929-7.2.3 Concrete/Mortar Testing:** Six concrete mixes shall be prepared by an accredited laboratory, three control batches using an approved Class F fly ash and three comparison batches with the metakaolin, while all other constituents remain the same except for small adjustments to get the mix to yield. Follow the below criteria for each mix:~~

- ~~1. Use a previously approved FDOT Class IV (5,500 psi) mix design.~~
- ~~2. Size No. 57 Coarse Aggregate from an approved FDOT source.~~
- ~~3. 18 to 22% fly ash replacement.~~
- ~~4. Water/cementitious materials ratio of 0.41.~~

~~Testing shall be performed in accordance with Table 929-1.~~

~~Sulfate Resistance testing shall be performed on a mortar mix in accordance with ASTM C1012 and results reported after 6, 12, and 18 months of testing.~~