

ORIGINATION FORM

THE INFORMATION BELOW IS TO BE PROVIDED BY THE ORIGINATOR

Specification: 929

Subject: Basis for Source Approval, Fly Ash, Acceptance Testing of Fly Ash, Acceptance Testing of Silica Fume, Acceptance Testing of Metakaolin, Acceptance Testing of Ultra Fine Fly Ash

Origination date: June 25, 2010

Originator: Tom Malerk

Office/Phone: State Materials Office/352-955-6620

Problem statement: Current Specification requirements do not limit the amount ammonia present in fly ash. Recent changes to manufacturing processes have resulted in fly ash with a high amount of ammonia. The presence of ammonia poses a safety risk to workers and Department personnel exposed to the concrete containing the fly ash. Also included is language to clarify the Department's inspection of pozzolan production facilities; clarification that the restrictions currently listed in 929-2.3 apply to all Class C and Class F fly ash types; certification for acceptance of silica fume; and certification requirements for other pozzolans to align with the latest version of ASTM C-618.

Proposed solution: Section 929 should include a maximum allowable amount of ammonia in fly ash. This revision includes a proposed maximum amount as well as a test method for determining the amount. The proposed language also aligns certification requirements with the most current version of ASTM C-618.

Information source: For additional information, contact Mike Bergin, 352-955-6666.

Recommended Usage Note: All contracts

Estimated fiscal impact, if implemented: No fiscal impact. This change is being proposed to address safety concerns for personnel exposed to the fumes present in concrete mixes containing fly ash with high ammonia levels. Fly ash producers are already performing the testing required in the revision so they will not have additional requirements to meet the specification. The products that exceed the amount will not be permitted to be used in FDOT concrete mixes but there is a supply of readily available material that does not exceed the limit. The changes to certification requirements will mean less testing and reporting to the Department for the chemical Supplementary Optional portion which is no longer required by ASTM C-618.

Implementation of these changes, if and when approved, will begin with the July 2011 letting.



Florida Department of Transportation

CHARLIE CRIST
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

STEPHANIE KOPELOUSOS
SECRETARY

MEMORANDUM

DATE: November 1, 2010

TO: Specification Review Distribution List

FROM: Rudy Powell, Jr., P.E., State Specifications Engineer

SUBJECT: Proposed Specification: **9290200 Pozzolans and Slag.**

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

These changes were proposed by Susan Blazo of the State Materials Office to clarify the requirements for all Class C and F fly ash types, to align the acceptance of fly ash and metakaolin with the latest version of ASTM C-618, and to accept silica fume by certification instead of by submitting monthly test results.

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 ST986RP or rudy.powell@dot.state.fl.us. Comments received after **November 30, 2010**, may not be considered. Your input is encouraged.

RP/dt
Attachment

POZZOLANS AND SLAG.
(REV ~~6910-102418~~-10)

ARTICLE 929-2 (Pages 861 – 862) is expanded by the following:

929-2 Fly Ash.

~~929-2.1 **General Class C or Class F:** Fly ash derived from the combustion of ground or powdered coal shall meet the requirements of ASTM C-618, Class C or Class F Fly ash. Sampling and testing of fly ash shall follow the requirements of ASTM C-311. Fly ash shall not include the residue resulting from the burning of municipal garbage or any other refuse with coal, or the burning of industrial or municipal garbage in incinerators.~~

~~929-2.2 **Fly Ash (Class F):** Fly ash derived from the combustion of ground or powdered coal shall meet the requirements of ASTM C-618 Class F fly ash. Sampling and testing of fly ash shall follow the requirements of ASTM C-311.~~

~~929-2.2.1 **Petroleum Coke Class -F:** Fly ash resulting from the combustion of coal and petroleum coke shall meet the physical and chemical requirements of ASTM C-618 Class F fly ash. When petroleum coke Class F fly ash is used in concrete, the test results shall verify improved or comparable strength, sulfate resistance, corrosion protective properties and other durability requirements of concrete, as compared to ASTM C-618 Class F fly ash concrete. The strength and durability tests of concrete shall be performed in accordance with ASTM C-39, ASTM C-157, ASTM C-1012, ASTM C-1202, ASTM G-109, FM 5-516 and FM 5-522. Fly ash shall not include the residue resulting from the burning of municipal garbage or any other refuse with coal, or the burning of industrial or municipal garbage in incinerators. Sampling and testing of fly ash shall follow the requirements of ASTM C-311.~~

~~929-2.3.2 **Bark Ash Class -F:** Fly ash resulting from the combustion of timber bark ash and coal shall meet the physical and chemical requirements of ASTM C-618 Class F fly ash. When bark ash is used in concrete, the strength and durability of the bark ash concrete shall be improved or comparable to the strength and the durability properties of ASTM C-618 Class F fly ash concrete. The tests shall be performed as specified in 929-2.2.1. Sampling and testing of fly ash shall follow the requirements of ASTM C-311.~~

~~929-2.3 **Fly Ash (Class C):** Fly ash derived from the combustion of ground or powdered coal shall meet the requirements of ASTM C-618 Class C fly ash. Sampling and testing of fly ash shall follow the requirements of ASTM C-311. When Class C fly ash is used in concrete, the test results shall verify improved sulfate resistance and improved or comparable corrosion protective properties, as compared to ASTM C-618 Class F fly ash concrete. The durability tests of concrete shall be performed in accordance with ASTM C-1012 and FM 5-522.~~

~~929-2.4 **Special Requirements:**~~

~~929-2.4.1 **Fly Ash (Class C):** When a Class C fly ash is used in moderately or extremely aggressive environments, tests made by the CCRL approved independent laboratory shall verify improved sulfate resistance of the concrete in accordance with ASTM C-1012, and improved or comparable corrosion protective properties measured by FM 5-522, as compared to similar concrete made with Class F fly ash.~~

~~929-2.4.2 **Petroleum Coke and Bark Ash (Class F):** For sources where the fly ash is not derived solely from ground or powdered coal combustion, certified test results performed by an independent approved laboratory, shall be submitted by the supplier. The~~

~~performance-based comparison test results shall meet the requirements of 929-2.2 and 929-2.3 for petroleum coke and bark ash fly ashes, respectively.~~

929-2.54 Exceptions: Fly ash shall not be used in conjunction with Type IP or Type IS cements.

929-2.65 Acceptance Testing of Fly Ash: Acceptance of fly ash from sources operating under an approved quality control plan shall be based on the monthly certified ~~quality control tests~~ *mill analysis* meeting the chemical ~~(Supplementary Optional included)~~ and physical requirements of ASTM C-618. When the loss on ignition exceeds 5%, the ~~Uniformity Requirements in the~~ Supplementary Optional Physical Requirements shall be mandatory *except that the Effectiveness in Controlling Alkali-Silica Reaction will not be required*. An approved laboratory shall perform the monthly quality control tests and a copy of their mill certificates shall be sent to the State Materials Office when the material is in use on Department projects. The certification shall indicate that the fly ash meets the requirements of this Specification. Also, the corresponding samples along with mill certificates shall be submitted to the Department, upon request.

SUBARTICLE 929-3.2 (Page 862) is deleted and the following substituted:

929-3.2 Acceptance Testing of Silica Fume: Acceptance of silica fume from sources operating under an approved quality control plan shall be based on ~~the monthly certified quality control tests meeting the chemical (Supplementary Optional included) and certification that the material meets the~~ physical requirements of ASTM C-1240. ~~An approved laboratory shall perform the monthly quality control tests and a copy of their mill certificates shall be sent to the State Materials Office when the material is in use on Department projects. The certification shall indicate that the silica fume meets the requirements of and this Specification. Also, the corresponding samples along with mill certificates shall be submitted to the Department, upon request.~~

SUBARTICLE 929-4.2 (Page 863) is deleted and the following substituted:

929-4.2 Acceptance Testing of Metakaolin: Acceptance of metakaolin from sources operating under an approved quality control plan shall be based on the monthly certified ~~quality mill analysis~~ *control tests* meeting the chemical ~~(Supplementary Optional included)~~ and physical requirements of ASTM C-618 Class N, as modified herein. An approved laboratory shall perform the monthly quality control tests and a copy of their mill certificates shall be sent to the State Materials Office, when the material is in use on Department projects. Also, the corresponding samples along with mill certificates shall be submitted to the Department, upon request. The certification shall indicate that the metakaolin meets the requirements of this Specification.

SUBARTICLE 929-6.3 (Page 864) is deleted and the following substituted:

929-6.3 Acceptance Testing of Ultra Fine Fly Ash: Acceptance of fly ash from sources operating under an approved quality control plan shall be based on the monthly certified *quality*

mill analysis~~control tests~~ meeting the chemical (~~Supplementary Optional included~~) and physical requirements of ASTM C-618. When the loss on ignition exceeds 2.0%, the Uniformity Requirements in the Supplementary Optional Physical Requirements shall be mandatory. An approved laboratory shall perform the monthly quality control tests and a copy of their mill certificates shall be sent to the State Materials Office when the material is in use on Department projects. The certification shall indicate that the fly ash meets the requirements of this Specification. Also, the corresponding samples along with mill certificates shall be submitted to the Department, upon request.