PRACTICE AND PROCEDURE DIRECTIVE

PPD No. 13b **EFFECTIVE DATE: August 27, 2025**

SUBJECT: Certification and Acceptance of Hydraulic Cements, Fly Ash, Natural Pozzolan, Silica Fume, and Lime

1. GENERAL

1.1. This Practice and Procedure Directive outlines the procedures to be followed for certification and acceptance of hydraulic cements, fly ash, natural pozzolan, silica fumes, and lime.

1.2. The Practice and Procedure Directive modifies the certification procedures for hydraulic cements, fly ash, natural pozzolan, and lime. It shall be used in conjunction with the requirements of Subsection 106.05 of the Specifications.

1.3. The certification and acceptance of hydraulic cement, fly ash, natural pozzolan, or lime for use in Portland cement concrete or asphaltic concrete is performed as specified in Section 2

1.4. The certification and acceptance of silica fumes for use in Portland cement concrete is performed as specified in Section 3

1.5. The certification and acceptance of lime or hydraulic cement for use in soil stabilization (Lime Treated Subgrade, Cement Treated Subgrade, or Cement Treated Base) is performed as specified in Section 4.

1.6. The acceptance of Portland cement and hydrated lime for use in mortar or grout is performed or specified in Section 5.

2. CERTIFICATION AND ACCEPTANCE OF HYDRAULIC CEMENTS, FLY ASH, NATURAL POZZOLAN, OR LIME FOR USE IN PORTLAND CEMENT CONCRETE OR ASPHALTIC CONCRETE

2.1. Hydraulic cement, fly ash, and natural pozzolan used in Portland cement concrete shall conform to the requirements of Section 1006 of the Specifications.

2.2. Portland cement, blended hydraulic cement, and hydrate lime used as a mineral admixture in asphaltic concrete shall conform to the following:

Material	Requirements
Portland Cement, Type I or II	ASTM C 150
Blended Hydraulic Cement, Type IP	ASTM C 595
Hydrated Lime	ASTM C 1097

2.3. The certification and acceptance of hydraulic cements, fly ash, natural pozzolan, of lime for use in Portland cement concrete or asphaltic concrete will be on the basis of the material originating from Approved Materials Source.

2.4. Approved Materials Source lists for “Hydraulic Cements”, “Fly Ash and Natural Pozzolan”, and “Lime (mineral admixture for asphaltic concrete)” are maintained by Materials Group, Structural Materials Testing Section. Current lists are available on the Materials Group, Structural Materials Testing Section homepage through the ADOT intranet (ADOTNet) and the ADOT internet website.

2.5. Project personnel shall verify that materials being used on their project are on the current Approved Materials Source List.

2.6. Certificate of Compliance and Certificate of Analysis are not required to be submitted with the deliveries of material.

2.7. No samples of hydraulic cement, fly ash, natural pozzolan, or lime are required.

2.7.1. The Department reserves the right to sample and test material for acceptance from any source without notification.

2.8. Source approval of hydraulic cement, fly ash, natural pozzolan, or lime producers/suppliers will be based on the satisfactory submittal to the Materials Group, Structural Materials Testing Engineer, on a monthly and timely basis, of the following

2.8.1. A Certificate of Compliance which lists the lots produced during that month.

2.8.2. A separate Certificate of Analysis for each lot shown on the corresponding Certificate of Compliance for the month.

2.8.3. Certificates of Compliance and Certificates of Analysis shall be submitted in electronic format (pdf) to the Structural Materials Testing Engineer at cert@azdot.gov.

2.9. Examples of typical Certificate of Compliance and Certificate of Analysis are given in the attachments to this Practice and Procedure Directive.

2.9.1. Certificates of Compliance and Certificates of Analysis for natural pozzolan would be similar to Certificates of Compliance and Certificates of Analysis for fly ash.

2.10. To maintain an active status on the Approved Materials Source List, the producer/ supplier shall, on a monthly and timely basis provide either the required Certificate specified above, or other documentation described below.

2.10.1. If no materials are produced during any given monthly reporting period, the producer/supplier shall so notify the Structural Materials Testing Engineer by email at cert@azdot.gov.

2.10.2. If no materials are produced during any given monthly reporting period, but materials are shipped from a previously certified lot of material, the producer/supplier shall so notify the Structural Materials Testing Engineer by email at cert@azdot.gov.

2.10.3. If there is a temporary (more than one month) stop in production of materials from a specific source, the producer/supplier shall so notify the Structural Materials Testing Engineer by email at cert@azdot.gov.

2.11. If there is permanent stop in production of materials from a specific source, the producer/supplier shall so notify the Structural Materials Testing Engineer by email at cert@azdot.gov.

2.12. The suspension of source approval shall be instituted for any of the following reasons. The Structural Materials Testing Engineer will notify the producer/supplier in writing (by letter or email) of such suspension.

(a) The producer/supplier provides materials from n approved source which fail to meet specification requirements to an ADOT project

(b) The producer/supplier fails to provide the required documents to the Department as specified for the source approved on a monthly and timely basis.

2.12.2. Any suspension shall be in effect until such time that the hydraulic cement, fly ash, natural pozzolan, or lime producer/supplier can demonstrate that the deficiency in the material has been corrected and the product meets specification requirements, and/or the requirements for submittal of the required documents have been met. The structural Materials Testing Engineer will notify the producer/supplier in writing (by letter or email) of the removal of such suspension.

3. CERTIFICATION AND ACCEPTANCE OF SILICA FUME FOR USE IN PORTLAND CEMENT CONCRETE

3.1. Silica fumes used in Portland cement concrete shall conform to the requirements of ASTM C 1240.

3.2. A Certificate of Compliance conforming to the requirements of Subsection 106.05 shall be submitted for each delivery of silica fume.

3.3. No samples of silica fume are required.

3.3.1. The Department reserves the right to sample and test material which has been accepted on the basis of a Certificate of Compliance.

4. CERTIFICATION AND ACCEPTANCE OF LIME OR HYDRAULIC CEMNT FOR USE IN SOULD STABILIZATION (LIME TREATED SUBGRADE, CEMENT TREATED SUBGRADE, OR CEMENT TREATED BASE)

4.1. Lime used in soils stabilization shall conform to the requirements of ASTM C 977 and Section 301 of the Specifications.

4.2. Hydraulic cement used in soils stabilization shall conform to the requirements of Section 302 or Section 304 of the Specifications.

4.3. If desired by the producer/supplier, the acceptance and certification of hydraulic cement used in soil stabilization may be performed as specified in Section 2.

Otherwise, a Certificate of Compliance conforming to the requirements of Subsection 106.05 shall be submitted for each delivery of hydraulic cement.

4.4. A Certificate of Compliance conforming to the requirements of Subsection 106.05 shall be submitted for each delivery of lime.

4.5. No samples of lime or hydraulic cement are required.

4.5.1. The Department reserves the right to sample and test material as deemed necessary by the Engineer.

5. ACCEPTANCE OF PORTLAND CEMENT AND HYDRATED LIME FOR USE IN MORTAR OR GROUT

5.1. Portland cement used in mortar or grout shall conform to the requirements of Section 1006 of the ADOT Specifications.

5.2. Hydrated lime used in mortar or grout shall conform to the requirements of ASTM C 207, Type N.

5.3. Certificates of Compliance or Certificates of Analysis are not required.

5.4. Portland cement and hydrated limes used in mortar or grout shall be approved by the Engineer.

5.4.1. If desired by the producer/supplier, the acceptance and certification of Portland cement used in mortar and grout may be performed as specified in Section 2.

5.5. No samples of Portland cement or hydrated lime are required.

5.5.1. The Department reserves the right to sample and test material as deemed necessary by the Engineer.

Attachments (6)

ACME CEMENT COMPANY
9876 N. Notled Drive
Bigtown, AZ 85555
Phone No. 602-555-4321

CERTIFICATE OF COMPLIANCE

Date: April 29, 2010
Material: Type II/V Portland Cement
Source: Newton Plant

The following lots of Type II/V Portland Cement have been produced during the month of **March 2010** at the Newton Plant in Bigtown, Arizona.

Lot Number
0011562
0011563
0011564
0011565
0011566
0011567
0011568
0011569
0011570

I hereby certify that the Type II/V Portland Cement produced in the lots listed above meets or exceeds the requirements specified in ASTM C 150 and Subsection 1006-2.01 of the Arizona Department of Transportation Specifications.

Respectfully,

(Signature)
Billy B. Bop
General Manager

Attachment #1 – Example of a Certificate of Compliance for Cement

ACME CEMENT COMPANY

9876 N. Notled Drive
Bigtown, AZ 85555
Phone No. 602-555-4321

CERTIFICATE OF ANALYSIS

Date: April 29, 2010
Material: Type II/V Portland Cement
Source: Newton Plant

The following are the test results for **Lot Number 0011566** of Type II/V Portland Cement produced during the month of **March 2010** at the Newton Plant in Bigtown, Arizona.

TESTS	RESULTS	SPECIFICATIONS	
		TYPE II	TYPE V
Silicon Dioxide (SiO_2), %	20.9		
Aluminum Oxide (Al_2O_3), %	4.0	6.0 max.	
Iron Oxide (Fe_2O_3), %	3.7	6.0 max.	
Calcium Oxide (CaO), %	63.5		
Magnesium Oxide (MgO), %	2.8	6.0 max.	6.0 max.
Sulfur Trioxide (SO_3), %	2.9	3.0 max.	2.3 max.*
Loss on Ignition, %	2.6	3.0 max.	3.0 max.
Insoluble Residue, %	0.52	0.75 max.	0.75 max.
Equivalent Alkalies, %	0.56	0.60 max.	0.60 max.
Carbon Dioxide, (CO_2), %	1.7		
Limestone, %	4.5	5.0 max.	5.0 max
Calcium Carbonate, ($CaCO_3$ in Limestone), %	88	70 min.	70 min.
Potential Composition:			
C_3S, %	51		
C_2S, %	21		
C_3A, %	4	8 max.	5 max
C_4AF, %	11		
$C_3S + 4.75(C_3A)$, %	70	100 max.	
$C_4AF + 2(C_3A)$, %	19		25 max.
Physical Analysis:			
Blaine Fineness, m^2/kg	406	280 min.	280 min.
Air Content, %	7	12 max.	12 max.
Autoclave Expansion, %	0.03	0.80 max.	0.80 max.
3-Day Compressive Strength, psi	3980	1450 min.	1160 min.
7-Day Compressive Strength, psi	5060	2470 min.	2180 min.
28-Day Compressive Strength, psi	6350		3050 min.
Autoclave Expansion, %	0.03	0.80 max.	0.80 max
Initial Vicat, minutes	120	45 min.	45 min.
Mortar Bar Expansion, %	0.010	0.020 max.	0.020 max.

*Must conform to ASTM C 1038 mortar bar expansion limit of 0.020% if the maximum percent specified for SO_3 is exceeded.

I certify that **Lot Number 0011566** of Type II/V Portland Cement, produced during the month of **March 2010** at the Newton Plant, meets or exceeds the requirements specified in ASTM C 150 and Subsection 1006-2.01 of the Arizona Department of Transportation Specifications.

Respectfully,

(Signature)
Billy B. Bop
General Manager

Attachment #2 – Example of a Certificate of Analysis of Cement

FLYASH R' US
1234 N. Gwegowy Way
Littletown, AZ 85111
Phone No. 602-555-6789

CERTIFICATE OF COMPLIANCE

Date: May 13, 2010
Material: Class F Fly Ash
Source: Ashley Plant

The following lots of Class F Fly Ash have been produced during the month of **March 2010** at the Ashley Plant in Littletown, Arizona.

Lot Number
041562
041563
041564
041565
041566
041567
041568
041569
041570

I hereby certify that the Class F Fly Ash produced in the lots listed above meets or exceeds the requirements specified in ASTM C 618 and Subsection 1006-2.04 of the Arizona Department of Transportation Specifications.

Respectfully,

(Signature)
Mat Erial
President

Attachment #3 – Example of a Certificate of Compliance for Fly Ash

FLYASH R' US
1234 N. Gwegowy Way
Littletown, AZ 85111
Phone No. 602-555-6789

CERTIFICATE OF ANALYSIS

Date: May 13, 2010
Material: Class F Fly Ash
Source: Ashley Plant

The following are the test results for **Lot Number 041567** of Class F Fly Ash produced during the month of **March 2010** at the Ashley Plant in Littletown, Arizona.

TESTS	RESULTS	SPECIFICATIONS
Silicon Dioxide (SiO_2), %	61.12	
Aluminum Oxide (Al_2O_3), %	22.09	
Iron Oxide (Fe_2O_3), %	5.78	
Sum of SiO_2, Al_2O_3, Fe_2O_3, %	89.99	70 min.
Calcium Oxide (CaO), %	4.79	
Magnesium Oxide (MgO), %	0.98	
Sulfur Trioxide (SO_3), %	0.42	5.0 max.
Sodium Oxide (Na_2O), %	0.87	
Potassium Oxide (K_2O), %	1.30	
Total Alkalies (as Na_2O), %	1.73	
Available Alkalies (as Na_2O), %	0.50	
Moisture Content, %	0.03	3.0 max.
Loss on Ignition, %	0.21	3.0 max.
Amount Retained on No. 325 Sieve, %	26.14	34 max.
Specific Gravity	2.25	
Autoclave Soundness, %	-0.01	0.8 max.
SAI, 7 Days, % of Control	76.5	75 min.*
SAI, 28 Days, % of Control	95.5	75 min.*
Water Required, % of Control	96.3	105 max.

*Meeting the 7 day or 28 day Strength Activity Index will indicate specification compliance.

I certify that **Lot Number 041567** of Class F fly Ash, produced during the month of **March 2010** at the Ashley Plant, meets or exceeds the requirements specified in ASTM C 618 and Subsection 1006-2.04 of the Arizona Department of Transportation Specifications.

Respectfully,

(Signature)
Mat Erial
President

Attachment #4 – Example of a Certificate of Analysis for Fly Ash

LIME INCORPORATED
4321 South Seger Drive
Middletown, AZ 85999
Phone No. 602-555-9876

CERTIFICATE OF COMPLIANCE

Date: April 2, 2010
Material: Hydrated Lime (ASTM C 1097)
Source: Seger Plant

The following lots of Hydrated Lime (ASTM C 1097) have been produced during the month of **March 2010** at the Seger Plant in Middletown, Arizona.

Lot Number
030110
030810
031510
032210
032910

I hereby certify that the Hydrated Lime produced in the lots listed above meets or exceeds the requirements specified in ASTM C 1097.

Respectfully,

(Signature)
Barbie Que
Vice President, Quality Control

Attachment #5 – Example of a Certificate of Compliance for Lime

LIME INCORPORATED
4321 South Seger Drive
Middletown, AZ 85999
Phone No. 602-555-9876

CERTIFICATE OF ANALYSIS

Date: April 2, 2010
Material: Hydrated Lime (ASTM C 1097)
Source: Seger Plant

The following are the test results for **Lot Number 030810** of Hydrated Lime (ASTM C 1097) produced during the month of **March 2010** at the Seger Plant in Middletown, Arizona.

TESTS	RESULTS	SPECIFICATIONS
Total Calcium Oxide (CaO) and Magnesium Oxide (MgO), %	97.37	90.0 min.
Carbon Dioxide, %	0.69	5.0 max.
Unhydrated CaO and MgO (Insolubles), %	0.90	5.0 max.
Free Moisture of Dry Hydrates, %	0.40	2.0 max
Retained on No. 30 Sieve, %	0.19	3.0 max.
Retained on No. 200 Sieve, %	5.65	30 max.

I certify that **Lot Number 030810** of Hydrated Lime produced during the month of **March 2010** at the Seger Plant, meets or exceeds the requirements specified in ASTM C 1097.

Respectfully,

(Signature)
Barbie Que
Vice President, Quality Control

Attachment #6 – Example of a Certificate of Analysis for Lime