STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

SUPPLEMENT 1086
CERTIFICATION PROCEDURE
NON STANDARD CEMENTITIOUS REPLACEMENT MATERIALS

April 15, 2005

1086.01 Requirements for Cementitious Replacement Materials

Manufacturers of cementitious materials and pozzolans not conforming to CMS 701 and 499 will perform the following tests and provide the following test data to initiate the approval process.

Provide documentation of the components of the product including:

A. the chemical composition of the material
B. the percentage of each chemical component
C. the manufacturing ranges for each chemical component
D. recommended quality assurance test ranges and the test procedures to be used

1086.02 Test Data

Manufacturers will perform testing and provide test data for:

Compressive strength- For each 499 mix design for which the material will be included, the manufacturer will perform the following battery of compressive tests:

The manufacturer will cast at least 72 - 6" x 12" (152 x 305 mm) cylinders from the base 499 mix and test at least eight (8) cylinders to provide eight (8) test results for compressive strength at 3 days, 7 days, and 28 days, when cured at 50 °F (23 °C), at 73 °F (23 °C) and at 90 °F (32 °C). Provide separate test results for both an Ohio Gravel and an Ohio crushed Limestone source.

The Manufacturer will repeat the test process for the base 499 mix design, modified with the manufacturer's product and provide the test results for each time and curing temperature listed in the above process.

Provide all test results to the Department.

Freeze thaw- The manufacturer will provide freeze thaw test data, conforming to ASTM C666 for 350 cycles, for both the base 499 mix design and for the base 499 mix design,

modified with the manufacturer's product. Provide separate test data for the same Ohio gravel and Ohio limestone aggregate sources used in the compression testing.

Scaling test- The manufacturer will provide scaling test data conforming to ASTM C672 for both the base 499 mix design and the base 499 mix design modified with the manufacturer's product. The manufacturer will perform the test until a either a change in scaling level is noted or 100 cycles. Provide separate test data for the same Ohio gravel and Ohio limestone aggregate sources used in the compression testing.

Shrinkage- Provide shrinkage test data conforming to ASTM C157 for both the base 499 mix design and the 499 mix design modified with the manufacturer's product. Provide separate test data for the same Ohio gravel and Ohio limestone aggregate sources used in the compression testing

The manufacturer may propose alternative shrinkage test methods and test data but submittal will include an explanation of how this data can be used as a comparison to the ODOT base mix designs to make an evaluation of their product's increased or decreased shrinkage when used by ODOT.

Permeability- Manufacturers pursuing approval of their product for use in HP mixes will perform 90 day rapid permeability testing conforming to AASHTO T277 for both the base 499 HP mix design and the 499 HP mix design modified with the manufacturer's product. Provide separate test data for the same Ohio gravel and Ohio limestone aggregate sources used in the compression testing. The tests will be performed on 4" x 8" (100 x 200 mm) cylinders made from the compression strength mixes may be used.

Product Cost- The Manufacturer will provide a cost analysis for the concrete mix using the manufacturer's product as compared to the 499 mix design.

Manufacturers will perform the tests for each 499 mix design that they are requesting approval for. Testing does not have to be performed by an independent laboratory but the laboratory will be acceptable to OMM.

Test data submittals will include the specific gravity for the product for determining volumetric mix design requirements.

1086.03 Performance History

Manufacturers will provide a performance history for their product. The history will include information on where the product has been used; what was the application for which it was used; Date of installation; the owner's contact personnel to discuss performance; reports on the actual field performance of the product; installation and application requirements; and other data that support the use of the product based on actual field performance. Performance histories that include uses by state highway agencies, supported by field tests, will be considered more influential than government applications outside the highway industry or private applications.

1086.04 Approval Submittal

Manufacturers will submit the test data and performance history to the Office of Materials Management (OMM). OMM will review both the test data and the performance history. Materials that show lower performance in the laboratory than standard mixes will not be accepted. For those materials with equal or better performance than the standard mixes, an evaluation of the performance history will be done. If field performance histories show deterioration of the concrete, the material will not be accepted l. Submittals with no performance history will not be accepted. For performance histories showing at least acceptable field performance, the OMM may either approve the product or define the product as experimental and determine if a District is willing to use the product experimentally.

OMM may require actual samples of the material to perform additional testing.

Within 30 days of receiving the submittal, OMM will notify the manufacturer of one of the following actions:

A. the product will be forwarded to the specification committee for approval
B. the product is not acceptable
C. The product is experimental
D. OMM is performing in-house testing on the product and will include a projected schedule for results.

1086.05 Final Approval

Products accepted by OMM will be added to the appendix of this supplement and submitted to the appropriate specification committee for final approval. The appendix will define the required mix design adjustments, sampling requirements, and acceptance requirements. The specification committee has final approval on any change. The manufacturer will be notified of the specification committee meeting date and may be present to answer questions for the committee. Additional data will not be submitted at the specification meeting.

If the proposal note is approved by the committee it will go to executive committee and FHWA for final approval.

1086.06 Yearly Re-certification

The Manufacturer will re-certify the material yearly. The submittal will be made by the last day of January each year. The submittal will include:

A. a statement the product has not changed formulation and will not be changed within the year
B. any new test data the Manufacturer has performed for other highway agencies
C. new manufacturing locations for the product
D. any national specifications the product has been approved under in the pervious year

The submittal will be notarized.

OMM will review any new submitted data and the product's performance history for ODOT to determine if the product is re-certified. The Manufacturer will be notified if the product is not re-certified.

Appendix

Material	Blended Cement for use in HP3 and HP4 mixes
Product	Lafarge - Type SF Blended Cement

This approved blended cement, nominally composed of 92% Type 1 cement and 8% micro silica, may be used in 499.03 table 499.03-4 HP3 and HP4. The blended cement will replace the micro silica and Type 1 cement content in HP3 and HP4 as shown below:

Class HP3 (Fly Ash + SF Cement)							
Aggregate Type	**Fine Aggregate lb (kg)**	**#8 Coarse Aggregate lb (kg)**	**Blended Cement Content lb (kg)**	**Fly Ash[3] lb (kg)**	**Micro-silica lb (kg)**	**Water-CM Ratio Maximum[4]**	**Design Yield Cubic Feet (m^3)**
Gravel	1340(795)	1460(866)	510 (303)	150 (89)		0.40	26.96 (1.00)
Limestone	1350(801)	1480(878)	510 (303)	150 (89)		0.40	27.04 (1.00)
Slag	1340(795)	1290(765)	510 (303)	150 (89)		0.40	27.02 (1.00)
Class HP4 (GGBF Slag + SF Cement)							
Aggregate Type	**Fine Aggregate lb (kg)**	**#8 Coarse Aggregate lb (kg)**	**Blended Cement Content lb (kg)**	**GGBF Slag lb (kg)**	**Micro-silica lb (kg)**	**Water-CM Ratio Maximum [4]**	**Design Yield Cubic Feet (m^3)**
Gravel	1370 (813)	1470 (872)	470 (279)	190 (113)		0.40	27.00 (1.00)
Limestone	1370 (813)	1490 (884)	470 (279)	190 (113)		0.40	27.02 (1.00)
Slag	1370 (813)	1290 (765)	470 (279)	190 (113)		0.40	27.00 (1.00)

Do not use these mix proportioning tables if not choosing this blended cement option. Inform the Engineer at the pre-construction conference whether the blended cement option is to be used.

Lafarge Type SF Blended Cement Specific Gravity = 3.06

Sampling requirements for Lafarge Type SF:
Provide a 1 gallon sample of the cement in a sealed metal container to the Office of Materials Management, Cement and Concrete Section, 1600 W. Broad Street, Columbus, Ohio 43223.

Acceptance for Lafarge Type SF:
Provide the Engineer with a copy of the Lafarge's delivery ticket showing the concrete producer has received the Type SF cement.