State of Louisiana
Department of Transportation and Development (DOTD)
Materials and Testing Section Approved Materials Procedure
for

ADMIXTURES FOR PORTLAND CEMENT CONCRETE

MATERIAL SPECIFICATION REFERENCE:

DOTD Standard Specifications Subsections 901.08.3, 1011.02, ASTM C494, ASTM C260, ASTM C1582, ASTM G109, Supplemental Specifications and Special Provisions.

APPROVED MATERIAL EVALUATION SUBMITTAL:

The manufacturer shall submit a completed Approved Materials Evaluation Submittal to the DOTD Materials and Testing Section Coordinator listed below.

PRELIMINARY REQUIREMENTS:

The complete submittal must include:

- Complete Approved Materials Evaluation Form
- Letter requesting evaluation of the admixture and admixture type(s)
- Product Data Sheets
- Manufacturer's specifications
- Safety Data Sheet (SDS)
- Sample
- National Transportation Product Evaluation Program (NTPEP) report (if available)

The address of the contact affiliated with AASHTO NTPEP is:

NTPEP Coordinator
AASHTO National Transportation Products Evaluation Program
444 N. Capitol St. N.W.
Suite 249
Washington, D.C. 20001
Phone: (202) 624-3695
Fax: (202) 624-5806
http://data.ntpep.org

- Independent Laboratory Test Results
  - Name and address of the Concrete and Cement Reference Laboratory (CCRL) accredited laboratory performing the quality control tests and a copy of their latest CCRL inspection and accreditation report
  - Infrared Spectrophotometric Analysis (FTIR Curve)

NOTE: Evaluation will not begin until all required items listed above are received by the Materials Laboratory

PRELIMINARY REQUIREMENTS CONTINUED:

Certifications and/or Test Reports

Product Data Sheets shall provide all pertinent information relative to the material to be evaluated, including but not limited to:

- Manufacturer's specifications
- Test procedure used to evaluate the admixture:
  - ASTM C494
  - ASTM C260
  - ASTM C1582
  - ASTM G109
- Agitation requirements
- Manufacturer's recommended dosage rate
- Chloride content
- Solids content
- Basic composition:
  - Carboxylic acids
  - Lignosulfonic acids
  - Neutralized vinsol resin

The manufacturer shall provide a Certificate of Analysis (CA) from a CCRL accredited laboratory in accordance with the test procedure the admixture was evaluated. The CA shall report the following:

- Aggregate sources and proportions
- Cement source
- Water content
- Tested dosage rate
- Plastic and hardened properties of both the reference/control concrete and test concrete
- Any supplemental cementitious materials or additional admixtures that were used

The manufacturer shall submit a chemical Infrared Spectrophotometric Analysis (FTIR Curve).

Sample (to be furnished at no cost to the Department)

Submit a one (1) quart sample of the admixture that was tested and evaluated by a CCRL accredited laboratory to the Materials and Testing Section for chemical analysis.

TEST REQUIREMENTS:

Laboratory Testing (AASHTO NTPEP or 3rd Party)

The manufacturer may elect to choose either a private CCRL accredited laboratory or submit the admixture to the AASHTO NTPEP to perform the preliminary tests required by the Department. The manufacturer and/or the CCRL accredited laboratory representative shall submit the mix design and pertinent information to the DOTD Materials and Testing Coordinator for review. The manufacturer's authorized representative is responsible for providing the final evaluation report to the DOTD Coordinator for review.

The following procedures apply to approval testing of admixtures for source approval:

- ASTM C494 – Chemical Admixtures for Concrete
- ASTM C33 – Specification for Coarse Aggregates
- ASTM C39 – Compressive Strength of Cylindrical Concrete Specimens
- ASTM C78 – Flexural Strength of Concrete
- ASTM C136 – Sieve Analysis of Fine and Coarse Aggregate
- ASTM C138 – Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
- ASTM C143 – Slump of Hydraulic Cement Concrete
- ASTM C150 – Specification for Portland Cement
- ASTM C157 – Length Change of Hardened Hydraulic Cement Mortar and Concrete
- ASTM C183 – Sampling and the Amount of Testing of Hydraulic Cement
- ASTM C192 – Making and Curing Concrete Test Specimens in the Laboratory
- ASTM C231 – Air Content of Freshly Mixed Concrete by Pressure Method
- ASTM C260 – Air-Entraining Admixtures for Concrete
- ASTM C403 – Time of Setting of Concrete Mixtures by Penetration Resistance
- ASTM C666 – Resistance of Concrete to Rapid Freezing and Thawing
- ASTM C1064 – Temperature of Freshly Mixed Concrete
- ASTM C1582 – Admixtures to Inhibit Chloride-Induced Corrosion of Reinforcing Steel in Concrete
- ASTM G109 – Determining Effects of Chemical Admixtures on Corrosion of Embedded Steel Reinforcement in Concrete Exposed to Chloride Environments
- ASTM D75 – Practice for Sampling Aggregates

The final report supplied to the DOTD Materials Section Coordinator shall contain the average compressive strengths of the reference/control and test concrete at various ages required by the type of admixture under evaluation. Compressive strength of the test concrete shall be reported as a percentage of the reference/control concrete.

A one (1) quart sample of the admixture used during the mix shall be obtained and brought to the Materials and Testing Section for the following chemical tests and evaluation:

- DOTD TR 610 – Infrared Spectrophotometric Analysis.
- DOTD TR 643 – Determining the Chloride Content in Admixtures for Portland Cement Concrete.

Evaluation Time (4 Months)

TEST REQUIREMENTS CONTINUED:

Alternate Testing (Trial Batching)

In lieu of the approved Laboratory Testing listed above, the manufacturer may elect to have a local concrete producer or ready mix plant conduct a verification trial mix. The manufacturer shall notify the Materials Lab Coordinator and together schedule a date and time to witness batching of the trial mix. The manufacturer shall submit:

- Producer or ready mix plant code
- Name(s) of the ACI certified technician(s) responsible for batching and performing testing
- Name and location of the CCRL accredited lab conducting the compressive strength testing

After approval for the trial mix has been granted, the manufacturer shall submit the local producer's currently approved "Standard Mix" design and history of test results. This historical data will be used for evaluation and comparison of the trial mix. The trial mix shall have a prescribed admixture dosage rate within the manufacturer's dosage range. Report the following plastic and hardened properties:

- ASTM C33 – Specification for Coarse Aggregates
- ASTM C39 – Compressive Strength of Cylindrical Concrete Specimens
- ASTM C78 – Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
- ASTM C136 – Sieve Analysis of Fine and Coarse Aggregate
- ASTM C138 – Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
- ASTM C143 – Slump of Hydraulic Cement Concrete
- ASTM C150 – Specification for Portland Cement
- ASTM C157 – Length Change of Hardened Hydraulic Cement Mortar and Concrete
- ASTM C183 – Sampling and the Amount of Testing of Hydraulic Cement
- ASTM C192 – Making and Curing Concrete Test Specimens in the Laboratory
- ASTM C231 – Air Content of Freshly Mixed Concrete by Pressure Method
- ASTM C403 – Time of Setting of Concrete Mixtures by Penetration Resistance
- ASTM C1064 – Temperature of Freshly Mixed Concrete

The final report supplied to the DOTD Materials Section Coordinator shall contain the average compressive strengths of the reference/control and test concrete at various ages required by the type of admixture under evaluation. Compressive strength of the test concrete shall be reported as a percentage of the reference/control concrete.

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GENERAL:

If approved, the Admixture Manufacturer shall abide by the following:

Provide Sample and Certificates of Analysis Every Six (6) Months

A minimum of a four (4) ounce sample conforming to the requirements above shall be accompanied with a Certificate of Analysis of the material and submitted every six (6) months to the DOTD Materials and Testing Section to remain on the AML.

Upon completion of the evaluation, the submitter will be notified in writing concerning the results of the evaluation and whether the material will or will not be added to the Approved Materials List (AML). The DOTD Materials and Testing Section Coordinator shall be notified in writing of any change from the original material submittal. The Department reserves the right to re-evaluate any material at any time.

It is also the manufacturer's responsibility to supply the contact information of the representative responsible for the material to the Materials Section Coordinator to remain on the AML. This is done by completing the Approved Materials Evaluation Form every two (2) years or when there is a change in the manufacturing representative responsible for the material.

PROJECT ACCEPTANCE REQUIREMENTS:

The inclusion of any materials on the AML is not blanket approval for its use. All materials, regardless of prior approval, shall be sampled in accordance to the Materials Sampling Manual.

DISQUALIFICATION AND REMOVAL:

Any material may be removed from the AML at any time. Causes for removal from the AML may include, but are not limited to the following:

- Non-conformance with specifications
- Performance requirements
- Failure to notify the Department of any change in material formulation
- Failure of the supplier to provide proper certifications as required by this procedure
- Failing test results obtained by the Materials Section of project verification samples
- Failure to supply current contact information for the material representative in accordance with this procedure

REQUALIFICATION:

Any material which has been disqualified and/or removed from the AML will be considered for re-evaluation only after submission of a formal request along with acceptable evidence that the problems causing the disqualification and/or removal have been resolved.

DOTD MATERIALS AND TESTING SECTION COORDINATOR:

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Approved 03/11/2020

BRIAN OWENS, P.E.
DOTD MATERIALS ENGINEER ADMINISTRATOR