NTPEP Committee Work Plan for

Evaluation of Concrete Admixtures

NTPEP Designation: CADD-03-16
# Evaluation of Chemical Admixtures for Concrete

**NTPEP Designation: [CADD-03-16]**

## 1 SCOPE

### 1.1

This project work plan covers the procedures used by the National Transportation Product Evaluation Program (NTPEP) to evaluate chemical admixtures for addition to Portland cement concrete.

### 1.2

The NTPEP is a voluntary program whereby manufacturers may choose to have their products evaluated for a fee that is used to cover the costs of the evaluation and producing the associated reports. It is the goal of the NTPEP to eliminate duplicate testing of products by member states by providing a process where manufacturer / suppliers submit their products to the NTPEP for evaluation. The NTPEP reports the results of these evaluations to its member states, but does not accept or reject products. However, transportation officials may choose to use the results of the evaluations in developing and maintaining an approved/qualified products list.

### 1.3

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### 1.4

The technical committee shall consist of representatives of NTPEP member states who wish to actively serve in the evaluation process of chemical admixtures. These representatives shall be voting members. In addition, it is desired that there be two non-voting industry representatives to serve as resources to the technical committee. The industry representatives shall not represent the same company. It shall be the responsibility of industry in general, to elect/nominate its two members to serve on the technical committee. In addition, at any open meeting, views and comments of any industry representative may be voiced.

### 1.5

This work plan may involve the handling of hazardous materials, operations, and equipment. It does not purport to address all safety problems associated with its use. When conducting evaluations for the test methods included in this work plan, please use personal protective equipment (PPE). It is the responsibility of the user to establish the appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.
2 REFERENCED STANDARD SPECIFICATIONS

- AASHTO M194, Standard Specification for Chemical Admixtures for Concrete
- AASHTO T157, Standard Method of Test for Air Entraining Admixtures for Concrete
- ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete
- ASTM E1252, Standard Practice for General Techniques for Obtaining Infrared Spectra for Qualitative Analysis
- ASTM E70, Standard Test Method of pH of Aqueous Solutions with the Glass Electrode
- AASHTO R18, Standard Practice for Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories

3 EVALUATION

3.1 The evaluation protocol for air entraining agents shall be AASHTO T 157, Standard Method of Test for Air-Entraining Admixtures for Concrete.

3.2 The evaluation protocol for liquid chemical admixtures shall be AASHTO M 194, Standard Specification for Chemical Admixtures for Concrete

3.3 The evaluation protocol for solid chemical admixtures shall be AASHTO M 194, Standard Specification for Chemical Admixtures for Concrete with the following provisions for uniformity testing:
   - Specific Gravity shall be noted as “Not Required.”
   - A 5% admixture solution shall be prepared to determine the pH: Weigh 5.00 ± 0.05 grams admixture into a 150 mL beaker. Add 95.00 ± 0.05 grams of 25 ± 2 °C deionized water to the beaker. Add a stir bar magnet and cover with a watch glass. Using a stir plate, stir the solution for 30 minutes. Remove the watch glass, continue stirring, and measure the pH in accordance with ASTM E70, Standard Test Method of pH of Aqueous Solutions with the Glass Electrode.

3.4 Dry Cast Admixtures and Corrosion inhibitors will be accepted by the technical committee for uniformity and equivalence testing. They will be tested and data reported only for the physical properties of the neat material. The technical committee will not require, review or publish any data pertaining to the performance of the material in hardened concrete.

3.5 The evaluation laboratory(s) shall be selected by the technical committee and may be either a NTPEP member state's laboratory or a private independent laboratory. They shall be inspected by CCRL and accredited by AASHTO for the applicable tests.

3.6 Specialty Admixtures (Type S) will be tested using the standard evaluation protocol without evaluating special properties.
4 MANUFACTURER’S DOCUMENTATION

4.1 Upon submittal to NTPEP, the manufacturer shall complete an on-line NTPEP Product Evaluation Form. Before proceeding with any portion of the evaluation, all documentation submitted by the manufacturer will be reviewed by the technical committee chair, vice-chair, or liaison. Should any of the submitted data fail to comply with the specifications, that particular material would not be accepted by the technical committee for evaluation.

4.2 The manufacturer shall certify in a signed letter that as long as a material is furnished under the submitted brand name and designation, the material will be of the same composition and formulation as originally evaluated by the NTPEP.

4.3 The manufacturer shall submit every admixture type individually, even if dosage is the same, and every individual admixture type will be assigned a NTPEP CADD number. Admixtures meeting more than one type that do not require more than one set of evaluations, will not be charged additionally. Please reference table below for number of evaluations required by type combinations:

<table>
<thead>
<tr>
<th>Admixture Type Combination</th>
<th>Evaluations</th>
</tr>
</thead>
<tbody>
<tr>
<td>C, E</td>
<td>1</td>
</tr>
<tr>
<td>B, D</td>
<td>1</td>
</tr>
<tr>
<td>A, D</td>
<td>2</td>
</tr>
<tr>
<td>A, F</td>
<td>2</td>
</tr>
<tr>
<td>A, G</td>
<td>2</td>
</tr>
</tbody>
</table>

4.4 The manufacturer will be allowed to change the name of a product without re-evaluation, provided documentation is furnished certifying the composition and formulation is the same as the product evaluated by the NTPEP. Such name changes will be documented in the next NTPEP report and no confirmation testing will be performed unless the manufacturer submits the material through the normal process and pays the subsequent fees.

4.5 If the manufacturer changes the formulation, composition, or concentration or alters the physical properties of a product previously evaluated by NTPEP, but maintains the same proprietary name, the technical committee will require the product to be submitted as though it were new and had not previously been evaluated. In such an event, the manufacturer must notify NTPEP, regardless of whether they elect to re-submit the product, and the technical committee will inform NTPEP members of the product's name and that the new formulation has not been evaluated by NTPEP.

5 TESTING AND REPORTING

5.1 Testing Laboratory Criteria

5.2 Candidate laboratories to be considered for classification as an authorized testing laboratory for AASHTO/NTPEP shall meet the following requirements:

5.2.1 Facility Requirements:

5.2.1.1 The laboratory shall provide verification that they have experience performing testing of chemical admixtures and air-entraining admixtures for concrete.
5.2.1.2 The laboratory shall provide verification that they have the equipment, facilities, and capability to perform the required testing procedures contained in AASHTO Designation M 194, and T 157.

5.2.1.3 The laboratory shall identify their policies regarding qualifications and training of their staff to ensure a high quality level of performance. This shall include performance reviews of testing proficiencies and Standard Operating Procedures for each testing procedure as detailed in section 5.2.4.

5.2.1.4 The laboratory shall identify the administrative procedures that have been implemented to ensure a high quality level of comparative results.

5.2.1.5 The laboratory shall complete all admixture identification testing prior to starting the physical testing of AASHTO M 194. The laboratory shall have 30 calendar days to complete the identification testing from the date that samples are received.

5.2.1.6 The laboratory shall provide verification that it is in conformance with Federal and State regulations related to health and safety.

5.2.1.7 The laboratory shall provide verification that it has performed all testing procedures in conformance with requirements of the specified individual test methods. Accreditation by CCRL, ACI, ISO, or other nationally recognized accreditation programs shall be considered as verification. The laboratory shall maintain the accreditation through the term of the contract.

5.2.2 Personnel Requirements:

5.2.2.1 The laboratory shall provide an organizational chart that identifies the names and positions of management personnel and each person that will be involved in or associated with the testing and the review of the AASHTO/NTPEP reports. A laboratory Quality Control Manager shall be designated for review of all Standard Operating Procedures and Proficiency evaluations of technicians as described in AASHTO R 18.

5.2.2.2 The laboratory shall provide resumes or credentials for all persons indicated in item 5.2.2.1. It is recommended that the responsible person supervising the laboratory and staff performing the testing have adequate levels of formal education. A relevant Bachelor of Science degree is required as a minimum for the responsible person in charge of the laboratory.

5.2.3 Laboratory Testing Capability:

5.2.3.1 The testing laboratory shall be comprised of a single entity or the combination of not more than three entities. When more than one laboratory is used, a single lead laboratory shall be responsible for the coordination and oversight of all testing, reporting, and for the compilation of the final report in DataMine. The lead laboratory is responsible for identifying the tests that will be subcontracted and for providing the qualification, experience, and quality control programs of each contract laboratory for review and approval of AASHTO/NTPEP.

5.2.4 Quality Control/Quality Assurance

The laboratory shall identify the procedures being used to ensure a quality level of testing. The process used for quality control should be based upon statistically evaluated conclusions. The conclusions should verify that the laboratory is capable of producing testing results that are accurate and reproducible.

Physical testing proficiencies of all technicians shall be evaluated and documented by the laboratory Quality Control Manager. These evaluations shall be performed at intervals in accordance with Section 5.5 of AASHTO R 18. If the technician does not routinely perform the test, proficiency of the technician shall be evaluated and documented prior to testing of admixtures for this program.
5.2.4.1 The final report issued by the technical committee shall contain the test data generated by the contracted NTPEP laboratory(ies).

5.2.4.2 The lead testing laboratory is responsible for compiling and entering test results in the NTPEP online database.

5.2.4.3 The results from the NTPEP contracted laboratory(ies) of the analysis for uniformity of the neat liquid air entraining agent shall be determined by AASHTO T 157, Air-Entraining Admixtures for Concrete. The results from the NTPEP contracted laboratory(ies) of the analysis for uniformity of the neat liquid chemical admixtures agent shall be determined by AASHTO M 194, Chemical Admixtures for Concrete.

5.3 If certain tests fall under AASHTO (AMRL) accreditation, the laboratory shall be accredited for such tests.

5.4 The IR spectrum will be determined using Fourier transform infrared spectroscopy, FTIR, using the horizontal attenuated total reflectance method, HATR. FTIR spectra shall be collected at 16 scans using a diamond crystal. The method of obtaining the spectrum shall be noted on the uploaded spectrum. The uploaded scan will also include the 1) Manufacturer Name, 2) Product Name, 3) NTPEP Number, 4) Lot Number, 5) Lab ID, and 6) Date. Laboratory project identification may also be included, but is not required. In order to maintain confidentiality of proprietary information, IR Scans will not be publicly available. These will be password protected and available to NTPEP member states through DataMine.

5.5 If a sample does not meet the ranges submitted by the manufacturer for uniformity and equivalence testing, the laboratory representative is to notify the Lead State and technical committee liaison immediately. Only the TC’s chair, vice chair, or liaison is to correspond with the manufacturer. Complete property testing on fresh and hardened concrete will be at the discretion of the manufacturer if a product does not meet submitted ranges. If a product is withdrawn, it will be noted accordingly on DataMine. Withdrawal requests should be submitted in writing to technical committee’s chair, vice chair, and liaison.

6 LEVELS OF EVALUATION

6.1 Level 1 - The manufacturer may elect to submit products for full specification compliance under AASHTO designation M 194 to fulfill member states’ requirements to be placed on their approved/qualified products list.

6.2 Level 2 – Products must be submitted within five years for uniformity and equivalence testing. This evaluation is also required within the five year time frame if the manufacturer requests a name change for the product. The chemical evaluation must indicate the product is the same product (originally submitted for evaluation under Level 1) to remain on the list for a total of 10 years from completion of initial Level 1 evaluation. If the product is not submitted for uniformity and equivalence testing prior to the beginning of the sixth year after data is completed, the product must be submitted for full Level 1 testing to remain on the listing. At ten years, Level 1 testing will be required to recertify each product.

7 POLICIES FOR WITHDRAWING MATERIALS FROM THE NTPEP EVALUATION PROGRAMS

7.1 All policies for withdrawing materials from the NTPEP Evaluation Programs are referenced in the National Transportation Product Evaluation Program Standard Operations Guide - Section 2 available at www.ntpep.org.
8 PRODUCT SUBMISSION GUIDELINES

8.1 Product submission guidelines and quantities required for testing will be provided by the lead state, chair, vice-chair, or liaison upon acceptance of the product application.

8.2 The following information will be required by the manufacturer for product submittals at the time of the application:
- The lot number
- The batch number
- The production location
- The date of production
- The measured chloride content, both a range and specific value (to be consistent across application and submitted documentation)
- Solids, both a range and specific value (to be consistent across application and submitted documentation)
- Gravity, both a range and a specific value (to be consistent across application and submitted documentation)
- pH, both a range and a specific value (to be consistent across application and submitted documentation)
- A SDS form
- A Product Data Sheet
- A Dosage Recommendation Form
- Fourier Transform Infrared Spectroscopy (FTIR) Scan as explained in Section 5.4 (optional)

8.3 Products should be shipped within thirty days of notice that the product application has been reviewed. The manufacturer shall submit clearly marked samples in durable, sealed containers with all documentation (Lot Number, SDS, Product Data Sheets, and Dosage Recommendations) directly to the testing laboratory. The container shall be labeled with the manufacturer’s name, product name, and lot number.

8.4 The testing laboratory shall notify the Lead State and the AASHTO NTPEP Coordinator of receipt of samples for evaluation.

9 REVIEW OF DATA BEFORE PUBLICATION OR DISTRIBUTION

9.1 Manufacturers shall have the right to review test data of their product(s) prior to public release. In the event of a disputed result, it may be appealed under the guidelines of the NTPEP Information and Operations Guide.

9.2 All data generated by the technical committee shall be subject to NTPEP policy in regard to early release and dissemination to NTPEP member states.

9.3 Data generated by the technical committee may be published by a manufacturer under the guidelines of NTPEP policy.

10 FEES

10.1 Fees shall be determined by the technical committee and shall cover the cost of NTPEP testing and reporting. Current test fees are available on the CADD home page at http://www.ntpep.org or http://data.ntpep.org/.

10.2 Fees shall reflect the level of testing as outlined in Section 6.0 of this work plan.

10.3 An option will be available for products to be designated as “Rush” for a 50% increase in fees.