

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

MICROSILICA (SILICA FUME)

MATERIAL SPECIFICATION REFERENCE:

DOTD Standard Specifications, Subsection 1001.06, AASHTO M 307, 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
 - Complete name and address of the supplier
 - Complete name and address of the microsilica source and owner
 - Complete name and address of the producer of microsilica for use in concrete and mortars
 - Type of microsilica produced
- An outline of the producer's/supplier's quality assurance sampling and testing program
- Description of microsilica storage facilities including capacities
- An outline of production procedures, description of additives mixed with microsilica during production, and microsilica collection methods
- Letter requesting evaluation of the material
 - Intended use of microsilica
- Product Data Sheets
- Manufacturer's specifications
- Safety Data Sheet (SDS)
- Samples
- Independent Laboratory Test Results
 - Name and address of the accredited Concrete and Cement Reference Laboratory (CCRL) performing the quality control tests and a copy of their latest inspection report.

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

Submit a Certificate of Analysis (CA) for five (5) daily production samples to the Materials and Testing Section. The CA shall show test results applicable to the intended use of the microsilica and the test results shall meet all specifications for AASHTO M 307. All test results included on the CA shall be performed by a laboratory which is CCRL accredited.

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

Submit five (5) daily composite production samples to the DOTD Materials and Testing Coordinator for evaluation. Each sample shall be randomly taken each day for five (5) days of production from one (1) identifiable storage unit. Each composite sample shall be continually split until a 10 lb. sample is obtained. Half of each of the five (5) daily 10 lb. composite samples shall be sent to the Materials and Testing Section in a 1-gallon water tight container with a re-sealable lid. The other half of each of the five (5) daily 10 lb. composite samples shall be retained and tested by the supplier. The supplier shall forward the applicable physical and chemical test results obtained on the retained samples to the DOTD Materials and Testing Coordinator upon completion of testing.

TEST REQUIREMENTS:

Laboratory Testing

Each approval sample shall be tested by a laboratory currently accredited by CCRL for compliance with the applicable Departmental Specification for its intended use. All testing will be conducted in accordance with AASHTO M 307, with the following adjustments:

Perform the Accelerated Pozzolanic Strength Activity Index with Portland Cement as specified. However, the mixing times for the mix with microsilica will be increased and shall be as follows:

1. 30 seconds at low speed (AASHTO T 162).
2. Additional 30 seconds at low speed while adding sand.
3. 1 minute at medium speed (AASHTO T 162).
4. Stop, then 15 seconds scraping the sides of the mixer.
5. Cover mixer and wait 1 minute and 15 seconds.
6. 2 minutes mixing at medium speed.
7. Stop and conduct flow test.
8. Mix 1 minute at medium speed and then make compressive strength cubes.

In addition, a liquid high range water reducer, instead of a powdered one, may be used as long as it is added to, and measured with the mixing water.

TEST REQUIREMENTS CONTINUED:

After the approval samples have been tested, the average fineness and specific gravity will be determined and initial variability limits will be established for each source as follows:

Fineness: $\pm 5\%$ from average

Specific Gravity: $\pm 5\%$ from average

Field Evaluation

The Department may require an inspection of the plant to review methods of sampling, testing and handling of microsilica.

Evaluation Time (6 Months)

GENERAL:

The microsilica manufacturer and/or supplier shall abide to the following requirements:

Effective Quality Control Program

The source shall have an effective quality control program to ensure that the microsilica possesses uniform characteristics within the Department's specifications. The variability limits as defined above will be based on the five (5) most current test results and will be re-calculated after each quarterly sample has been tested.

Maintain List of Authorized Representatives

All approved suppliers shall submit and maintain a list of representatives authorized to sign documents pertaining to the handling, certification, testing and shipment of microsilica in accordance with this procedure. The manufacturer is required to submit this list to the DOTD Materials and Testing Coordinator.

Allow Periodic Inspections by Department Personnel

The Department reserves the right to send a representative to make on-site inspections of the plant's facilities with emphasis on the method of sampling and testing. When a plant is inspected by CCRL, a copy of the latest CCRL report shall be submitted to the DOTD Materials Section accompanied with documentation of resolutions for any discrepancies. CCRL reports shall be treated with strict confidentiality.

GENERAL CONTINUED:

Provide Quarterly Mill Samples and Mill Reports

A mill sample shall be representative of the production of microsilica for each quarter. A 20 lb. mill sample shall be split with half retained and tested by an independent CCRL accredited laboratory and the other half submitted to the DOTD Materials and Testing Coordinator. All results obtained on quarterly mill samples shall be submitted to the DOTD Materials and Testing Coordinator with proper identification stating the quarter represented and mill sample number. Mill test data shall be kept on file for three (3) years and available upon request.

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 Material 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.

A 1-gallon mill sample conforming to the requirements above shall be accompanied with a CA of the material and submitted quarterly to the DOTD Materials and Testing Section to remain on the AML.

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:

A completed "Certificate of Compliance for Microsilica (Silica Fume)" form, supplied by the Department, shall accompany each shipment of microsilica intended for use on state projects. A copy of each form shall also be sent to the Materials Engineer Administrator for review. This form shall be signed by an authorized representative.

The inclusion of any material 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 plant to provide quarterly mill samples in accordance with this procedure
- Failure of the supplier to provide proper certifications as required by this procedure
- Failing test results obtained by the Materials Section of consecutive quarterly mill samples or project verification samples
- Continued violation of variability limits
- 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:

Justin Morris, P.E.
Physical Test Engineer
DOTD Materials and Testing Section
5080 Florida Blvd.
Baton Rouge, LA 70806-4132
(225) 248-4219
Justin.Morris@la.gov

Approved 05/24/17



BRIAN OWENS, P.E.
DOTD MATERIALS ENGINEER ADMINISTRATOR