



**MINUTES
OF
IOWA DOT SPECIFICATION COMMITTEE MEETING**

July 13, 2017

Members Present:	Darwin Bishop Mark Brandl Jeff Devries Mark Dunn Eric Johnsen, Secretary Wes Musgrove Gary Novey Tom Reis, Chair	District 3 - Construction District 6 - Davenport RCE District 1 - Materials Contracts Specifications Section Office of Construction & Materials Office of Bridges & Structures Specifications Section
Members Not Present:	Donna Buchwald Charlie Purcell Brian Smith Willy Sorensen	Office of Local Systems Project Delivery Bureau Office of Design Office of Traffic & Safety
Advisory Members Present:	Joe Jurasic	FHWA
Others Present:	Dan Harness Mike Heller	Design Design

The Specification Committee met on Thursday, July 13, 2017, at 9:00 a.m. in the NW Wing, 1st Floor Conference Room. Tom Reis, Specifications Engineer, opened the meeting. The items were discussed in accordance with the agenda dated June 30, 2017:

The minutes are as follows:

1. Article 2301.03, U, 5, Time for Opening Pavement for Use (Portland Cement Concrete Pavement).

The Office of Construction & Materials requests to also allow Class F fly ash substitution.

**2. Article 2511.03, B, 1, General (Construction of Sidewalks and Recreational Trails).
Article 2526.05, Basis of Payment (Construction Survey)**

The Office of Design requests to clarify when tolerances are within those mentioned in the specifications, slopes are to be verified using the form work prior to placing concrete.

**3. Article 2601.03, E, Mulching.
Article 4169.07, B, Hydraulic Mulches.**

The Office of Design requests to add organic fiber matrix (OFM) as a new type of mulch.

4. DS-15020, Structural Concrete (4500 PSI or Greater).

The Office of Construction & Materials requests to revise the Developmental Specifications for Structural Concrete (4500 PSI or Greater).

5. DS-15XXX, Engineered Fog Seal.

The District 1 Materials Office requests approval of Developmental Specifications for Engineered Fog Seal.

Form 510130 (08-15)



SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove / Todd Hanson		Office: Construction and Materials	Item 1
Submittal Date: May 12, 2017		Proposed Effective Date: April 2018 GS	
Article No.: 2301.03, U, 5		Other:	
Title: Portland Cement Concrete Pavement			
Specification Committee Action: Approved as recommended.			
Deferred:	Not Approved:	Approved Date: 7/13/2017	Effective Date: 4/17/2018
Specification Committee Approved Text: See Specification Section Recommended Text.			
Comments:			
Specification Section Recommended Text: 2301.03, U, 5. Replace the first sentence: At the Contractor's option, when Type I/II cements are used, Class C fly ash may be substituted for up to 10%, by weight, of the cement in Class M concrete mixtures.			
Comments: The Office of Bridges and Structures asked if we need to specify "Class C or Class F" fly ash to differentiate between other classes, such as Class N. The District 1 Materials Office thought that since all fly ash sources must be approved, we can control any other classes that we may not want.			
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.) 2301.03.U Time for Opening Pavement for Use. 5. At the Contractor's option, when Type I/II cements are used, Class C fly ash may be substituted for up to 10%, by weight, of the cement in Class M concrete mixtures. Type IP and Type IS cements may be used in Class M concrete mixtures without fly ash substitution.			
Reason for Revision: Remove Class C. This was written when only Class C was available in Iowa. With fly ash shortages, there has been a large amount of Class F fly ash imported into the state. Article 2529 uses "fly ash" (either C or F) for substitution on 10 hour patches, but this article is specific to Class C when curing is 48 hours.			
New Bid Item Required (X one)	Yes	No X	
Bid Item Modification Required (X one)	Yes	No X	
Bid Item Obsolescence Required (X one)	Yes	No X	
Comments:			
County or City Comments:			
Industry Comments:			

Form 510130 (08-15)



SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Brian Smith		Office: Design	Item 2
Submittal Date: 2017.06.22		Proposed Effective Date: 10/17/17	
Article No.: 2511.03, B, 1 Title: General Article No.: 2526.05 Title: Basis of Payment		Other:	
Specification Committee Action: Deferred to the next Specification Committee meeting.			
Deferred: X	Not Approved:	Approved Date:	Effective Date:
Specification Committee Approved Text:			
<p>Comments: District 6 questioned whether the revised sentence in Article 2511.03, B, 1, c, was necessary or caused more confusion with what was stated in the previous article. The second sentence in Article 2511.03, B, 1, c may be more appropriate somewhere in the previous article. This revision will be reviewed and brought back to the Specification Committee.</p> <p>The committee thought that construction survey should be included on all Iowa DOT projects that involve construction of close tolerance sidewalks.</p>			
Specification Section Recommended Text:			
2511.03, B, 1, b.			
<p>Replace the Article: The contract documents will contain sheets for construction of curb ramps, turning spaces, and transitions. Measure or stake as required to construct features.</p> <p>1) Verification of form work slopes at quadrants identified in the contract documents, by using a level or other means, is required prior to placing concrete if either of the following is met, Engineer will provide staking for that quadrant and verify slopes during finishing:</p> <ul style="list-style-type: none"> • Running Slope. Tolerance between design slope and maximum allowable slope is less than 1.0%. • Cross Slope and Turning Space Slopes. Tolerance of ±0.5% from design slope would exceed minimum or maximum allowable slope. <p>2) If Construction Survey is not a bid item, Engineer will verify slopes of form work. If Construction Survey is a bid item, Contractor's surveyor shall verify form work slopes.</p>			
2511.03, B, 1, c.			
<p>Replace the first sentence: If adequate construction tolerances are allowed, Engineer slope verification of the form work prior to pouring concrete will not provide staking for construction of sidewalk or recreation trail be required.</p>			
2511.03, B, 1, d.			
<p>Replace the Article: After concrete has been poured, Vverify slope compliance according to Materials I.M. 363.</p>			
2526.05, Basis of Payment.			

<p>Add the Article: D. Verifying form work slopes according to Article 2511.03, B, 1, b, is incidental to Construction Survey and will not be paid for separately.</p>		
<p>Comments:</p>		
<p>Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.) 2511.03, B, 1, b.</p>		
<p>Replace the article: The contract documents will contain sheets for construction of curb ramps, turning spaces, and transitions. Measure or stake as required to construct features.</p>		
<p>1) Verification of form work slopes at the quadrants identified in the contract documents, by using a level or other means, is required prior to placing concrete if either of the following is met, Engineer will provide staking for that quadrant and verify slopes during finishing:</p> <ul style="list-style-type: none"> • Running Slope. Tolerance between design slope and maximum allowable slope is less than 1.0%. • Cross Slope and Turning Space Slopes. Tolerance of ±0.5% from design slope would exceed minimum or maximum allowable slope. 		
<p>2) If Construction Survey is not a bid item, the Engineer will verify slopes of the form work. If Construction Survey is a bid item, the Contractor's surveyor shall verify form work slopes.</p>		
<p>2511.03, B, 1, c.</p>		
<p>Replace the first sentence: If adequate construction tolerances are allowed, Engineer slope verification of the form work prior to pouring concrete will not be required provide staking for construction of sidewalk or recreation trail.</p>		
<p>2511.03, B, 1, d.</p>		
<p>Replace the article: After concrete has been poured, Vverify slope compliance according to Materials I.M. 363.</p>		
<p>2526.05, D.</p>		
<p>Add as new article: Verifying form work slopes according to Article 2511.03, B, 1, b, is incidental to Construction Survey and will not be paid for separately.</p>		
<p>Reason for Revision: To clarify that when tolerances are within those mentioned in this specification, slopes are to be verified using the form work prior to placing concrete. The intent of slope verification is to reduce occurrences of contractors removing and replacing out of tolerance sidewalk. Can this intent be placed in the specifications somehow? Clarify verifying form work slopes for ADA projects is incidental to Construction Survey.</p>		
New Bid Item Required (X one)	Yes	No X
Bid Item Modification Required (X one)	Yes	No X
Bid Item Obsolescence Required (X one)	Yes	No X
Comments:		
County or City Comments:		
Industry Comments:		

Form 510130 (08-15)



SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Brian Smith		Office: Design	Item 3
Submittal Date: 2017.06.22		Proposed Effective Date: 10/17/17	
Article No.: 2601.03, E Title: Mulching Article No.: 4169.07, B Title: Hydraulic Mulches		Other:	
Specification Committee Action: Approved as recommended.			
Deferred:	Not Approved:	Approved Date: 7/13/2017	Effective Date: 4/17/2018
Specification Committee Approved Text: See Specification Section Recommended Text.			
Comments: None.			
Specification Section Recommended Text: 2601.03, E, Mulching. Add the Article: 3. Organic Fiber Matrix. a. Apply at no less than 4500 pounds per acre using standard hydraulic mulching equipment, unless specified otherwise in the contract documents. b. If using with hydraulic seeding, apply as a separate operation. 4169.07, B, Hydraulic Mulches. Add the Article: 4. Organic Fiber Matrix. Provide hydraulic organic fiber matrix (OFM) meeting the following characteristics and requirements: a. Premixed formulation. b. Contains a minimum of 88% organic material derived from compost, peat moss, wood cellulose, straw fibers, wood bark, biochar, flax fibers, or other organic fibers. c. Phyto-sanitized to eliminate potential pathogens and weed seeds. d. Contains one or more of the following: humus, enzymes, vitamins, natural sugars, plant proteins, auxins, or amino acids. e. Contains zero ecotoxicity as per EPA 2021.0 in 48 hours. f. Passes EPA 503 Metal Limits. g. Passes 40 CFR 503 Class A for pathogen reduction. h. pH: 5.5 to 8.5 according to ASTM D 1293. i. Water Holding Capacity: 400% minimum according to ASTM D 7367. j. Vegetation Establishment: 400% minimum according to ASTM D 7322. k. Moisture Content: 10% minimum and 40% maximum according to ASTM D 2974. l. Use with a tackifier that is either applied separately within 24 hours of the organic material, or is premixed according to the manufacture's recommendations. Tackifier shall meet the following requirements: <ul style="list-style-type: none"> • Safe to the applicator, adjacent workers, and the environment when properly applied according to EPA and other regulatory agencies. • Nontoxic to plants, fish and other wildlife and 100% biodegradable. 			

Comments:

Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use **Strikeout** and **Highlight**.)
2601.03, E, 3, Organic Fiber Matrix.

Add as a new article:

- 1) Apply at no less than 4500 pounds per acre using standard hydraulic mulching equipment, unless specified otherwise in the contract documents.
- 2) If using with hydraulic seeding, apply as a separate operation.

4169.07, B, 4, Organic Fiber Matrix (OFM).

Add as a new article:

Organic Fiber Matrix (OFM).

Provide hydraulic organic fiber matrix meeting the following characteristics and requirements:

- a. Premixed formulation.
- b. Contains a minimum of 88 percent organic material that may be derived from compost, peat moss, wood cellulose, straw fibers, wood bark, biochar, flax fibers, or other organic fibers.
- c. Phyto-sanitized to eliminate potential pathogens and weed seeds
- d. Contains one or more of the following: humus, enzymes, vitamins, natural sugars, plant proteins, auxins, amino acids,
- e. Contains zero ecotoxicity as per EPA 2021.0 in 48 hours.
- f. Passes EPA 503 Metal Limits.
- g. Passes 40 CFR 503 Class A for pathogen reduction.
- h. pH: 5.5 to 8.5 according to ASTM D 1293.
- i. Water Holding Capacity: 400% minimum according to ASTM D 7367.
- j. Vegetation Establishment: 400% minimum according to ASTM D 7322.
- k. Moisture Content: 10% minimum and 40% maximum according to ASTM D 2974.
- l. Use with a tackifier that is either applied separately within 24 hours of the organic material, or is premixed according to the manufacture's recommendations. Tackifier shall meet the following requirements:
 - Safe to the applicator, adjacent workers, and the environment when properly applied according to Environmental Protection Agency (EPA) and other regulatory agencies.
 - Nontoxic to plants, fish and other wildlife and 100 percent biodegradable.

Reason for Revision: Adding in Organic Fiber Matrix as a new type of mulch. Add application rate for Mulching, Organic Fiber Matrix. Organic Fiber Matrix is a good substitute or complement to topsoil used with our TRM. Given the industry feedback on purchasing topsoil it seemed to be a good option to allow this product.

New Bid Item Required (X one)	Yes X	No
Bid Item Modification Required (X one)	Yes	No X
Bid Item Obsoletion Required (X one)	Yes	No X

Comments: New bid for Organic Fiber Matrix.

County or City Comments:

Industry Comments:

Form 510130 (08-15)



SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove / Todd Hanson		Office: Construction & Materials	Item 4
Submittal Date: 2017.06.28		Proposed Effective Date: October 2017	
Article No.: Title:		Other: DS-15020, Structural Concrete (4500 PSI or Greater)	
Specification Committee Action: Approved with changes.			
Deferred:	Not Approved:	Approved Date: 7/13/2017	Effective Date: 10/17/2017
Specification Committee Approved Text: See attached Developmental Specifications for Structural Concrete (4500 PSI or Greater).			
Comments: District 1 Materials Office asked about clarifying the bid item, as they had a mix design submitted for a 4500 psi mix, when the plans specified 5000 psi. The phrase "As Specified" will be added to the bid item to note that the mix strength may be anything 4500 psi or greater.			
Specification Section Recommended Text: See attached Draft Developmental Specifications for Structural Concrete (4500 PSI or Greater).			
Comments:			
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.) DS-15020 Attached			
Reason for Revision: Remove the maximum cement content. This DS has been used for 8000 psi and producers cannot make strength requirements with the maximum limit. Also, update the strength requirement table to the current ACI language.			
New Bid Item Required (X one)	Yes	No X	
Bid Item Modification Required (X one)	Yes	No X	
Bid Item Obsolescence Required (X one)	Yes	No X	
Comments:			
County or City Comments:			
Industry Comments:			

DS-15056
(Replaces DS-15020)



**DEVELOPMENTAL SPECIFICATIONS
FOR
STRUCTURAL CONCRETE (4500 PSI OR GREATER)**

**Effective Date
October 17, 2017**

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

15056.01 DESCRIPTION.

Provide concrete mix design for structural elements designed with a minimum compressive strength of 4500 psi or greater as shown in contract documents. Submit documentation for Class C or HPC mixes meeting strength criteria or submit a new mix design.

Sections 2403 and 2412, and Division 41 of the Standard Specifications shall apply with the following modifications.

15056.02 MATERIALS.

Material shall meet quality requirements for respective items in Division 41 of the Standard Specifications.

Submit a mix design meeting the minimum 28 day strength requirements noted in the contract documents. Mix design requirements and submittal are as follows:

A. New Mix Design.

If Class C or HPC mix design from a concrete production facility cannot meet the strength requirements, a new mix design shall be submitted. Proportions for a new mix design shall be based upon saturated surface dry aggregates and shall produce a workable concrete mixture meeting the following constraints:

Table DS-15056.02-1: Mix Design Constraints

Cementitious Content, minimum	560 pounds per cubic yard, (absolute volume 0.106)
Cementitious Content, maximum	650 pounds per cubic yard, (absolute volume 0.123)
Water/Cementitious Ratio	Maximum, 0.45
Target Air Content	6% (absolute volume 0.06)

Submit mix design to the District Materials Engineer for approval at least 60 calendar days prior to placement. Base mix design on a trial batch and mix in the equipment used to batch production concrete.

For a new mix design without previous experience and for which the concrete production facility

does not have field data for calculation of the standard deviation, the strength shall be an average of three cylinders and shall meet the following strength requirement at 28 days as shown below.

Table DS-15056.02-2: Strength Requirements

Specified minimum compressive strength, f'_c psi	Required average compressive strength, f'_c
4500 to 5000	$f'_c + 1200$ psi
Greater than 5000	$1.1 \times f'_c + 400$ psi

where, f'_c = specified compressive strength in contract documents

If the concrete production facility has test records for calculation of the standard deviation, the required 28 day compressive strength shall be as shown in Article 15056.02, B. Concrete shall represent materials, quality control procedures, conditions, materials and proportions within test records, and the mix design represented shall not have been more restricted than the proposed mix. Strength represented by test records shall be within 1000 psi of the required compressive strength.

B. Mix Design with History of Strength.

A Class C mix, or other mixes with satisfactory record of strength, may be submitted in lieu of a new mix design. In accordance with ACI 301, a minimum of 30 tests for 28 day compressive strength shall be required as supporting documentation. The concrete produced for this specification shall be produced in accordance with Section 2403 of the Standard Specifications, representing material sources (fly ash source changes may be included), and shall be batched and mixed in the same equipment used to produce the concrete represented by the performance strength documentation. The standard deviation shall be calculated from the 30 strength tests, except as provided below. The required 28 day compressive strength, f'_c , shall be the greater of the following

$$f'_c + 1.34 s \text{ or}$$

$$f'_c + 2.33 s - 500 \text{ psi}$$

where: f'_c = specified compressive strength in contract documents
 s = standard deviation.

When the concrete production facility has less than 30 tests (15 to 29), the standard deviation shall be increased by the factor included in the following table:

Table DS-15056.02-3: Standard Deviation Factors

Number of tests*	Factors for increasing the Standard Deviation
15 to 19	1.16
20 to 24	1.08
25 to 29	1.03

*Less than 15 tests shall require a new mix design.

Submit modifications to an accepted concrete mix design to the Engineer for review and approval prior to use.

15056.03 CONSTRUCTION.

A. Trial Batch Concrete.

1. A trial batch will be required for any new mix design or any mix design with a history of strength without past experience on Interstate and primary projects. Approval will be based on trial batch mix properties and submittal of a trial batch report. The District Materials Engineer may waive the trial batch testing and perform testing on initial production placements where lower strengths are required, provided the concrete

production facility produces acceptable test records for proposed mix demonstrating mix properties have been achieved through previous trial batches.

2. The District Materials Engineer shall be given notice and mix proportions 7 calendar days prior to this event. The trial batch shall be made at least 30 calendar days prior to planned placement and shall be a minimum of 3 cubic yards in size. Establish batching sequence during trial batch. Transport the concrete a distance comparable to the distance from the ready mix plant to the placement site. Use concrete for testing representative of the entire batch while having a slump within 1 inch of the maximum slump allowed, an intended in place air content of $6\% \pm 1\%$, and a w/c ratio that will be typical in the placement. Perform the following tests for each trial batch:

Table DS-15056.03-1: Trial Batch Tests

Specific Gravity of Each Individual Aggregate	Materials I.M. 307
Gradation of Each Individual Aggregate	Materials I.M. 302
Unit Weight of Plastic Concrete	Materials I.M. 340
Slump of Plastic Concrete	Materials I.M. 317
Air Content of Plastic Concrete	Materials I.M. 318

3. Submit a trial batch mix design report and include the following:

Table DS-15056.03-2: Trial Batch Report

Cover Page	Contractor and Producer Name Project Number Date and Location of Trial Batch Date Submitted Signature of Contractor/Producer Representative
Material Source Information	Brand, Type, and Source
Proportion Information	Specific Gravity Relative % of Each Individual Aggregate Design and As Mixed Batch Weights (SSD) Design and As Mixed w/c Ratios
Mix Properties	Unit Weight of Plastic Concrete Air Content of Plastic Concrete Slump Individual Compressive Strength results at 7 and 28 days

B. Production Concrete.

1. Prior to placing production concrete, develop a strength maturity curve in accordance with Material I.M. 383 based on compressive strength. Monitor unit being placed with a minimum of two probes. Forms may be removed and concrete may be subjected to exterior loads once the maturity meets the required design strength for the unit being placed. The Engineer remains responsible for determining if sufficient strength has been achieved. Submit documentation to the Engineer prior to form removal or loading.
2. Perform quality control testing of production concrete for strength to determine if production concrete meets the minimum required design strength. Cast, cure, and handle strength samples according to Materials I.M. 315 using a PCC Level I Concrete Field Testing Technician. At the site ensure cylinders are cured properly with wet burlap and plastic. Do not move cylinders for 16 hours and ensure they remain at the site for a maximum of 1 calendar day before being transported to a certified laboratory for final curing and testing. Cast one random set of three strength samples in 4 inch by 8 inch cylinder molds for each pier, abutment, and deck with required design strength of 4500 psi or higher. Document slump, air content, and w/c ratio (adjusted for all water) of the concrete for the cylinders cast.

3. Test strength samples by a qualified lab in accordance with AASHTO T 22. Test three cylinders for strength at 28 days.
4. Submit test results to the Engineer and the District Materials Engineer no later than 1 working day after testing is completed. Submittal shall clearly indicate the project number, location, Contractor, producer, structural element constructed, slump, air content, w/c ratio (adjusted for all water), date sampled, date tested, break age, individual compressive strengths, and average compressive strengths. Attach plant report for the placement to the submittal.

C. Failure to Comply.

According to ACI 318, strength is acceptable if the average compressive strength of three cylinders meets the required compressive strength and no individual test falls below the required compressive strength by more than 500 psi. When the average 28 day compressive strength does not meet or exceed the specified strength, propose evaluation methods to determine the in-place concrete strength. Submit the proposal to the Engineer for approval. Notify the Engineer 48 hours in advance of any sampling and testing and will witness the sampling and testing of the in-place concrete. The Engineer will review the results with the Office of Bridges and Structure and determine corrective action required. The Contractor shall be responsible for the cost of evaluation and any corrective action required.

15056.04 METHOD OF MEASUREMENT.

The quantity of Structural Concrete 4500 psi or Greater, As Specified, in cubic yards, will be the quantity shown in the contract documents.

15056.05 BASIS OF PAYMENT.

The Contractor will be paid the contract unit price for Structural Concrete 4500 psi or Greater, As Specified per cubic yard. The cost for testing the production concrete shall be included in the contract unit price for Structural Concrete 4500 psi or Greater, As Specified.

Form 510130 (08-15)



SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jeff De Vries		Office: District 1 Materials	Item 5
Submittal Date: 2017.05.04		Proposed Effective Date:	
Article No.: Title:		Other: Developmental Specifications for Engineered Fog Seal	
Specification Committee Action: Deferred to the next Specification Committee meeting.			
Deferred: X	Not Approved:	Approved Date:	Effective Date:
Specification Committee Approved Text:			
<p>Comments: As the engineered fog seal will be an alternative to the standard bituminous fog seal, it was decided to add this option to the Standard Specifications so there will not be a need to bid alternates. Currently there is only one producer of this product.</p> <p>By adding to the Standard Specifications, this product could be used for shoulders also.</p> <p>District 6 asked about the retroreflectivity requirements listed in the DS and how this is different than other fog seals. This product is clear and can be applied over the existing pavement markings so that is why they must measure the post application retroreflectivity.</p>			
Specification Section Recommended Text: See attached Draft Developmental Specifications for Engineered Fog Seal.			
Comments:			
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.)			
New DS			
Reason for Revision: New technologies providing acceptable results.			
New Bid Item Required (X one)	Yes X	No	
Bid Item Modification Required (X one)	Yes	No X	
Bid Item Obsolescence Required (X one)	Yes	No X	
Comments:			
County or City Comments:			
Industry Comments:			

DRAFT DS-15XXX
(New)



**DEVELOPMENTAL SPECIFICATIONS
FOR
ENGINEERED FOG SEAL**

Effective Date
October 17, 2017

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

15XXX.01 DESCRIPTION.

Clean pavement surface and apply engineered fog seal to entire pavement surface using bituminous distributor.

15XXX.02 MATERIALS.

- A. Minimum 75% of applied material by volume shall be composed of agricultural oil derivatives and polymers.
- B. Use approved products from Materials I.M. 439 Appendix A. See Materials I.M. 439 for approval process.
- C. **Material Properties.**

Table 15XXX.02-1: Engineered Fog Seal Properties

	Min.	Max.
Distillation: Oil Distillate, by Volume of Emulsion, %	12.0	18.0
Tests on Residue from Distillation Test: Penetration @ 77°F @ 0.1 mm Ductility @ 39°F 5 cm/min., cm	100 30 (300)	150 -
Elastic Recovery (Materials Method Test No. Iowa 631)	85	-
Specific Gravity	0.8700	0.8800
pH	3.1	5.0
Boiling Point (°F)	310	330
Sieve Test	0	0.3
Saybolt Viscosity (Materials I.M. 343), seconds	5	20

- D. Do not reduce retroreflectivity of traffic paint and/or pavement markings by more than 3% when measured per Materials I.M. 386.

15XXX.03 CONSTRUCTION.

A. Equipment.

Use equipment meeting requirements of Articles 2001.12 and 2001.14 of the Standard Specifications.

B. Cleaning.

Immediately prior to placement, clean entire pavement surface. Use scrapers, compressed air, or other approved methods.

D. General.

Calibrate distributor to specified target rate prior to start of work on pavement surface.

E. Application.

1. Uniformly apply Engineered Fog Sealer at the rate of 0.02 gallons per square yard of pavement surface.
2. The optimum application rate may be adjusted by the Engineer based on texture, porosity, and age of pavement. For excessive application rates, Engineer may require a light coat of sand. Engineer may require brooming of ponded areas prior to placing traffic on pavement.
3. Use as a controlling factor safety and convenience to the public without soiling their vehicles.
4. Apply at a width of one-half the roadway plus an overlap of approximately 4 inches at the middle of the road. Cover each width in one application while the opposite one-half of roadway is left open to public traffic.
5. Do not apply to bridge decks or railroad rails and flangeways.
6. Demonstrate to Engineer at start of work the ability to retain 97% of initial retroreflectivity of pavement markings at no additional cost to the Contracting Authority. Use the procedure in Materials I.M. 386 to determine retroreflectivity.

F. Limitations.

1. Unless Engineer approves, do not place on damp or wet surfaces, during rainy or damp weather, or when rain is anticipated within one hour after application is completed. Work will not be allowed on Sundays or holidays, according to Article 1108.03 of the Standard Specifications.
2. Apply during weather conditions which allow satisfactory application. Do not apply when either pavement temperature or air temperature is below 50°F.
3. A sand dam or other approved means may be necessary to prevent material from running on to the pavement adjacent to work area in areas of superelevated curves.
4. Do not allow traffic on roadway surface until engineered fog sealer has fully cured.

H. Scheduling.

1. A preconstruction conference will be required for this work. This may be a single conference for all work of this type in each Engineer's area of responsibility.
2. At the preconstruction conference, provide the Engineer a probable schedule for work of this type in the District jurisdiction, including the sequence for each project.

15XXX.04 METHOD OF MEASUREMENT.

Measurement for Engineered Emulsion for Fog Seal (Pavement) will be in gallons as provided in Article 2307.04, B of the Standard Specifications.

15XXX.05 BASIS OF PAYMENT.

- A. Payment for Engineered Emulsion for Fog Seal (Pavement), measured as provided above, will be at the contract unit price per gallon that is mixed and used on the project. Emulsion that is delivered to the job site, but not applied to the roadway surface will not be considered for payment.
- B. Payment is full compensation for:
 - Cleaning the pavement surface,
 - Furnishing and applying the emulsion including water for dilution,
 - Furnishing and applying sand cover,
 - Brooming of ponded areas as necessary, and
 - Protecting the pavement adjacent to the work area in areas of superelevated curves.