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**ASPHALT PAVING SURFACE TREATMENT: Fog Seal**

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| **SECTION USAGE MATRIX** | | |
| C | NA | Seminary and Small Institute Standard Plan (CHURCH EDUCATION SYSTEM) - New Project |
| SM | NA | Standard MEETINGHOUSE and PHASED MEETINGHOUSE Standard Plan - New Project |
| R | SUP | OM/RI (REPLACEMENT & IMPROVEMENT) for Existing Meetinghouse / Seminary and Institute Project |
| CM | NA | Meetinghouse and Phased Meetinghouse Standard Plan with S&I MODULE ADDITION - New Project |
| SI | NA | S&I MODULE Addition to Existing Meetinghouse Building |
| MO | NA | MISSION OFFICE MODULE Addition to Existing Meetinghouse Building |
| UM | NA | URBAN MEETINGHOUSE for Custom Meetinghouse - New or Addition Project |
| FM | NA | Small Maintenance Project specification for FACILITY MANAGER |
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| **MODIFICATION LOG** | | |
| DATE | SOURCE | DESCRIPTION |
| 26 Apr 24 | Mike Molyneux | Reference Standards Updated. |
| 19 Feb 19 | Gail Olsen | Reference Standards Updated. |
| 19 Jul 16 | Chris Barker | Cleaning requirements updated in Surface Preparation in Part 3. |
| 27 Oct 15 | Chris Barker | Procedural Note changes. Reference Standards Updated. |
| 10 Jul 14 | Chris Barker | Procedural Note Updated. |
| 25 Apr 14 | Chris Barker | General Upgrade. |
| 27 Nov 13 | Chris Barker | Asphalt Maintenance Checklists and Guideline Attachments eliminated and moved to AEC Webpage. General Upgrade. |
| 05 Nov 12 | Chris Barker | General Upgrade. |
| 24 Sep 12 | Chris Barker | Asphalt Maintenance Checklists added as Attachment. Changed Procedural Note. |
| 02 Jul 12 | Chris Barker | Updated Pre-Installation Conferences. Updated Reference Standards. |
| 10 Feb 12 | Chris Barker | New Section Added. |

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| **PROCEDURAL NOTES** |
| **COORDINATION**  GENERAL:   1. This Specification is written for small Maintenance Projects that use Division 01 Maintenance Project Specification instead of full Division 01 Specification. 2. Refer to 'Asphalt, Site Concrete and Pervious Concrete Maintenance Guidelines’ for preservation maintenance program and recommendations for each asphalt paving surface treatment at <http://aec.churchofjesuschrist.org/aec/design_guidelines/>. 3. Refer to *'Asphalt Maintenance Checklists for Facilities Manager and Contractor’* available at <http://aec.churchofjesuschrist.org/aec/design_guidelines> for project checklists. 4. Use the '*Agreement for Asphalt Maintenance'* available on MFD Resource Library for asphalt maintenance scoping, budgeting and for contracts. 5. Applicators: 6. By requiring mechanical application and information about prior Projects, this specification is intended to limit bidding to top, professional applicators and products available in Project area. 7. If Project is in remote area or for some other reason contractors of level required to meet specification requirements are not available, Section should be edited to specify requirements which can be met by top applicators available in Project Area. 8. This relaxation of standard requirements should be done with prior approval of Owner’s Representative. |
| DESIGN INFORMATION AND BACKGROUND |

SECTION 32 0113

ASPHALT PAVING SURFACE TREATMENT: Fog Seal

1. GENERAL
   * + 1. SUMMARY
          1. Includes But Not Limited To:

Furnish and install fog seal on existing asphaltic concrete paving as described in Contract Documents.

* + - * 1. Related Requirements:

Section 01 0000: ‘General Requirements’:

Section 01 3100: ‘Project Management and Coordination’ for pre-installation conference.

Section 01 4000: ‘Quality Requirements’ for administrative and procedural requirements for quality assurance and quality control.

Section 01 4301: ‘Quality Assurance – Qualifications’ establishes minimum qualification levels required.

Section 01 7800: ‘Closeout Submittals’.

Section 32 0117.01: ‘Asphalt Paving Crack Seal’ for completion of crack repair.

Section 32 0117.02: ‘Asphalt Paving Crack Fill’ for completion of crack repair.

Section 32 0118: ‘Asphalt Paving Repair – Full Depth Patch’.

**EDIT REQUIRED:** Include following paragraph if included in Project.

Section 32 1713: 'Parking Bumpers'.

**EDIT REQUIRED:** Include following paragraph if included in Project.

Section 32 1723: 'Pavement Markings'.

* + - 1. REFERENCES
         1. Association Publications:

Asphalt Institute:

MS-4, ‘*The Asphalt Handbook’* (Seventh Edition).

MS-16, ‘*Asphalt in Pavement Preservation and Maintenance’* (Fourth Edition).

Asphalt Emulsion Manufacturers Association:

MS-19, ‘*Basic Asphalt Emulsion Manual’* (Fourth Edition).

Asphalt Sealcoat Manufacturers Association (ASMA), Sacramento, CA [www.sealcoatmfg.org](http://www.sealcoatmfg.org):

*‘Standard Specifications’* (Latest Edition).

* + - * 1. Definitions:

Asphalt Emulsion: An emulsion of asphalt cement and water that contains a small amount of an emulsifying agent. Emulsified asphalt droplets may be of either anionic (negative charge) or cationic (positive charge).

Pavement Preservation: Sum of all activities undertaken to provide and maintain serviceable paving. This includes preventive corrective maintenance, as well as minor and major rehabilitation projects.

* + - * 1. Reference Standards:

ASTM International:

ASTM C136/C136M-19, ‘Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates’.

ASTM D217-21, ‘Standard Test Methods for Cone Penetration of Lubricating Grease’.

ASTM D244-23, ‘Standard Test Methods and Practices for Emulsified Asphalts’.

ASTM D562-10(2018), ‘Standard Test Method for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer-Type Viscometer’.

ASTM D977-20, 'Standard Specification for Emulsified Asphalt'.

ASTM D2042-22, ‘Standard Test Method for Solubility of Asphalt Materials in Trichloroethylene’.

ASTM D2397/D2397M-20, 'Standard Specification for Cationic Emulsified Asphalt'.

ASTM D3910-21, ‘Standard Practices for Design, Testing, and Construction of Slurry Seal’.

ASTM D4552/D4552M-20, ‘Standard Practice for Classifying Hot-Mix Recycling Agents'.

American Association of State and Highway Transportation Officials:

AASHTO T 59-16, ‘Standard Method of Test for Emulsified Asphalts’.

Federal Specifications and Standards:

Federal Specification TT-C-555B (1973), ‘Coating, Textured (For Interior and Exterior Masonry Surfaces’, Section 3.3.3: Resistance to Wind-Driven Rain.

* + - 1. ADMINISTRATIVE REQUIREMENTS

**INFORMATION:** This conference is mandatory. Do not delete or cancel. See Section 01 3100 PROJECT MANAGEMENT AND COORDINATION.

* + - * 1. Pre-Installation Conferences:

Participate in pre-installation conference as specified in Section 01 3100:

**EDIT REQUIRED:** Include following paragraph if other related sections are used in Project. Include only section(s) used for Project. Delete sections not used.

Schedule emulsion seal pre-installation conference to be held jointly with any other 'Asphalt Surface Treatment' sections involving asphalt maintenance.

In addition to agenda items specified in Section 01 3100, review following:

Review if paving cracks have been repaired before application of fog seal.

Review asphalt fog seal schedule.

Review asphalt fog seal mix design.

Review asphalt fog seal preparation requirements.

Review asphalt fog seal application requirements.

Review safety issues.

* + - * 1. Scheduling:

Provide to Owner’s Representative at least seven (7) days before fog seal placement commences, approved Laboratory Report and Manufacturer’s Certificate of compliance covering specific materials to be used on this project.

* + - 1. SUBMITTALS
         1. Action Submittals:

Product Data:

Asphalt Manufacturer’s product data and literature:

Fog Seal.

* + - * 1. Informational Submittals:

Certificates:

Manufacturer’s Certificate of compliance covering specific materials used on this project.

Design Data Submittals:

Fog Seal:

Application Rate (0.10 to 0.15 gallons/square yard (0.45 to 0.70 liters/square meter) of diluted material (use one (1) part emulsified binder asphalt to one (1) part water (based on undiluted material) is common):

Smooth dense surface: 20 gallons (76 liters) per 1,000 sq ft (93 sq m).

Medium surface: 30 gallons (113 liters) per 1,000 sq ft (93 sq m).

Rough, aged surface: 40 gallons (152 liters) per 1,000 sq ft (93 sq m).

Excessively rough, aged surface: 50 gallons (189 liters) per 1,000 sq ft (93 sq m).

Exact quantities are determined by the surface texture, dryness and degree of cracking or raveling.

Test And Evaluation Reports:

Laboratory Report of tests showing compliance of specific materials used on this project.

Manufacturers’ Instructions:

Fog seal mix design is to be submitted with substrate preparation and sealant application instructions.

Field Quality Control Submittals:

Upon request, provide to Owner’s Representative, Scale Tags with following information:

Product Name.

Project Number.

Gallons/liters supplied for Project.

Amount of water added to undiluted material.

Qualification Statement:

Installer / Supervisor:

Provide Qualification documentation if requested by Owner's Representative.

* + - * 1. Closeout Submittals:

Include following in Operations And Maintenance Manual specified in Section 01 7800:

Record Documentation:

Manufacturer’s documentation:

Fog Seal:

1. Manufacturer’s product literature.
2. Design Data Submittal for Application Rate of Fog Seal.
   * + 1. QUALITY ASSURANCE
          1. Qualifications: Requirements of Section 01 400 1.06 applies but not limited to following:

Installer:

Minimum five (5) years experience in asphalt surface treatment installations.

Minimum five (5) years satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding:

Project names and addresses.

Date of installations.

Supervisor:

Minimum of five (5) years satisfactorily completed projects of comparable quality, similar size, and complexity in past five (5) years as Supervisor of Applicators:

Project names and addresses.

Date of installation.

Name of Supervisor or Owner.

Upon request, submit documentation.

* + - 1. DELIVERY, STORAGE, AND HANDLING
         1. Storage And Handling Requirements:

Fog Seal:

Follow Manufacturer's storage and handling requirements.

* + - 1. FIELD CONDITIONS
         1. Ambient Conditions:

Fog Seal:

Do not apply fog seal when ambient temperatures is less than 55 deg F (13 deg C) or surface temperature is less than 60 deg F (16 deg C).

Do not apply fog seal within twenty four (24) hours prior to freezing temperatures, forecasted rain, during rain or when surface contains standing water.

1. PRODUCTS
   * + 1. MANUFACTURERS
          1. Manufacturers:

Type One Acceptable Manufacturers and Products:

Meet following requirements:

Manufacturers whose products meet requirements including Design Criteria of this Section.

Neyra Construction, Inc. Cincinnati, OH [www.neyraconstruction.com](http://www.neyraconstruction.com).

Quality Emulsions, LLC Mesa, AZ [www.qualityemulsions.com](http://www.qualityemulsions.com).

SealMaster, Sandusky, OH [www.sealmaster.net](http://www.sealmaster.net).

Equal as approved by Owner’s Representative before bidding. See Section 01 6200.

* + - 1. DESIGN CRITERIA
         1. Fog Seal:

Meet requirements of ASTM D977, Grade CSS-1h or meet requirements of AASHTO T 59-UL, Grade SS1h.

Materials, as manufactured, undiluted, except as noted, shall conform to following requirements:

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| --- | --- | --- | --- | --- |
|  |  | Minimum | Maximum | Method |
| a. | Weight (per gallon/liter) | 9.0 lbs  (4.0 kg) |  | ASTM D244 |
| b. | Cone Penetration | 340 mm | 700 mm | ASTM D217 |
| c. | % Non-Volatile | 50 |  | ASMA Standard Specification\* |
| d. | % Non-Volatile Soluble in Tri-Clorethylene | 10 | 35 | ASTM D2042 |
| e. | Wet Track Abrasion |  | 35 gram loss | ASTM D3910 |
| f. | Mineral Aggregate Components | #16 Sieve  100% passing |  | ASTM C136 |
| g. | Dried Film Color Viscosity | Black  75 KREB |  | ASTM D562 |
| h. | Accelerated Weathering | No Deterioration |  | Fed Spec TT-C-555B |
| i. | Residual Asphalt | 20%  by weight |  |  |
| j. | Water |  | 40% maximum  by weight |  |

\*weigh 10 grams of homogenous product into previously tared, small ointment can. Place in a constant temperature oven at 325 degrees F for 90 minutes. Cool, reweigh and calculate non-volatile components.

1. EXECUTION
   * + 1. PREPARATION
          1. Owner Responsibilities:

Remove Scout Trailer(s) if needed.

* + - * 1. General:

Do not apply fog seal over newly laid asphalt paving. Apply only on asphalt paving that has cured six (6) months minimum.

Asphalt patches, if present, must be allowed to cure at least thirty (30) to ninety (90) days under good weather conditions. Before applying fog seal, pour water on asphalt surface. If a film of oil appears, surface is not sufficiently cured. Required cure time shall be determined by Owner’s Representative.

Do not allow irrigation watering for at least twenty-four (24) hours prior to application.

* + - * 1. Equipment:

Spray Equipment:

Capable of spraying pavement fog seal.

Provide continuous agitation or mixing capabilities to maintain homogenous consistency of fog seal mixture throughout supplication process.

Self-Propelled Squeegee:

Provide at least two (2) squeegee or brush devices (one behind the other) to assure adequate distribution and penetration of fog seal into bituminous pavement.

Provide continuous agitation or mixing capabilities to maintain homogenous consistency of fog seal mixture throughout application process.

Hand Squeegee and Brushes:

Acceptable in areas where practicality prohibits use of mechanized equipment.

* + - * 1. Protection Of In-Place Conditions:

Fog Seal:

Protect sign posts, street lamp posts, trees, shrubs, and tops of curbs and gutters from being discolored by splashing asphaltic material.

* + - * 1. Surface Preparation:

Paint Stripes:

Do not remove paint strips and markings if they do not interfere with adhesion of fog seal.

Remove existing paint stripes and markings that interfere with adhesion of fog seal.

Remove existing paint stripes and markings that are not water based.

Remove existing thermoplastic stripes and markings.

If new paint stripes do not match exactly location of existing paint stripes, then paint stripes must be removed.

Grease or Oil Patches:

Remove grease or oil patches, and spillage of any material that has adhered to pavement. Do not place seal over unsound oil spots softened by fuel or oil.

Clean oil spots and treat with soil spot primer.

Seal areas damaged by oil or grease with an oil spot primer compatible with seal being used in accordance with Manufacturer's recommendations.

Cleaning:

Remove all debris, dirt, dust, leaves, loose material, moisture, mud spots, sand, silt spots, vegetation (including moss), water and other objectionable and foreign material from existing surface prior to placing seal. In areas where moss is prevalent, apply herbicide.

Power brooms, power blowers, air compressors, vacuum sweepers, rotary brooms, water flushing equipment, and blowers, or by another approved method.

Cracks:

Repair cracks if required per Section 32 0117.01 ‘Asphalt Paving Crack Seal’ or Section 32 0117.02 ‘Asphalt Paving Crack Fill’ prior to placing emulsion seal. Cracks that contain weed and other live vegetation matter must be treated with Pre-emergent Herbicide prior to crack repair.

* + - 1. APPLICATION
         1. Fog Seal:

Do not apply fog seal until completion of preparation items.

Follow fog seal Manufacturer's recommendations in regard to fogging of substrate and dilution of fog seal.

Apply fog seal using power driven machine that continually mixes fog seal, water, and sand.

Apply one (1) coat minimum in all areas. Apply additional coats if necessary to attain Seal Manufacturer's recommended coverage. Allow individual coats to cure prior to applying additional coats; up to twenty four (24) hours.

Application Rate:

Design Data Submittal of application rate used on Project.

* + - * 1. Paint Stripes:

If paint stripes were removed in preparation for fog seal, include following:

Apply paint stripes after fog seal has been applied and cured.

* + - 1. CLEANING
         1. General:

Upon completion of fog seal operations, clean up and remove debris.

* + - 1. PROTECTION
         1. Do not allow traffic on paving until fog seal is thoroughly cured:

Warm weather condition is approximately twenty four (24) hours.

* + - * 1. Do not allow irrigation watering for at least twenty-four (24) hours after application.

END OF SECTION