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**ASPHALT PAVING SURFACE TREATMENT: Refined Coal Tar Emulsion Seal**

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| **SECTION USAGE MATRIX** |
| C | NA | Seminary and Small Institute Standard Plan (CHURCH EDUCATION SYSTEM) - 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 |
| T | NA | TEMPLE Project |

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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 | New Specification for Asphalt Paving Surface Treatment. |

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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.
9. Refined Coal Tar Emulsion Seal:
10. Church discourages use of refined coal tar emulsion seals and prefers to use asphalt based emulsion seals but where refined coal tar emulsion seals are available and allowed by authority having jurisdiction, they may be used.
11. Installers of coal tar seals must wear splash resistant goggles, protective gloves and clothing and use respirators.
12. Pavements previously sealed with asphalt based seals should be allowed to weather for minimum of two (2) years or until 50 percent of pavement aggregate is exposed before applying refined coal tar emulsion seal. Do not apply refined coal tar emulsion seals over seals that contain gilsonite.
13. New asphalt and patched areas should be allowed to cure for at least thirty (30) days at 60 deg F (15.6 deg C) temperatures prior to application to eliminate any concentration of oils on pavement surface. Longer cure times of up to sixty (60) days may be required. New asphalt must not exhibit ribboning, crawling nor show oil rings when clean water is poured onto surface.
14. To determine if surface oils have dissipated, pour one (1) or two (2) gallons of clean water over pavement surface.
	1. If water sheets out, uniformly wetting surface and no oil rings appear, surface is ready to be sealed.
	2. If water balls up and/or shows signs of oils rings, additional curing time is required prior to sealing.
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| DESIGN INFORMATION AND BACKGROUND |

SECTION 32 0113

ASPHALT PAVING SURFACE TREATMENT: Refined Coal Tar Emulsion Seal

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

Furnish and install refined coal tar emulsion 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'.

Section 32 1723: 'Pavement Markings'.

* + - 1. REFERENCES
				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).

Sand: Fine aggregate resulting from natural disintegration and abrasion of rock or processing of completely friable sandstone.

Refined Coal Tar Emulsion: Refined coal tar is produced from “crude coal tar”, a byproduct of manufacturing steel in coking ovens. Refined coal tar emulsion is an emulsion of refined coal tar and water that contains a small amount of emulsifying agent. This is combined with, mineral aggregates, sand, polymers and other additives for a seal.

Prime Coat: Very light application of refined coal tar seal diluted with water applied to highly oxidized or weathered asphalt surfaces.

* + - * 1. Reference Standards:

ASTM International:

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

ASTM C142/C142M-17, ‘Standard Test Method for Clay Lumps and Friable Particles in Aggregates’.

ASTM D140/D140M-18a, ‘Standard Practice for Sampling Bituminous Materials’.

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

ASTM D490-92(2016), ‘Standard Specification for Road Tar’.

ASTM D3423/D3423M-15(2023), ‘Standard Practice for Application of Emulsified Coal-Tar Pitch (Mineral Colloid Type’.

ASTM D4866/D4866M-88(2023), ‘Standard Performance Specification for Coal Tar Pitch Emulsion Pavement Sealer Mix Formulations Containing Mineral Aggregates and Optional Polymeric Admixtures.

ASTM D5727/D5727M-00(2017), ‘Standard Specification for Emulsified Refined Coal Tar (Mineral Colloid Type)’.

ASTM D6948/D6948M-03(2017), ‘Standard Practice for Application of Refined Coal Tar (Ready to Use, Commercial Grade)’.

* + - 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 refined coal tar 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 crack repair schedule and verify that other repairs will be completed before application of refined coal tar emulsion seal.

Review refined coal tar emulsion seal schedule.

Review refined coal tar emulsion seal mix design.

Review refined coal tar emulsion seal preparation requirements including:

New asphalt and patched areas should be allowed to cure for at least thirty (30) days at 60 deg F (15.6 deg C) temperatures prior to application to eliminate any concentration of oils on pavement surface. Longer cure times of up to sixty (60) days may be required. New asphalt must not exhibit ribboning, crawling nor show oil rings when clean water is poured onto surface.

To determine if surface oils have dissipated, pour one (1) or two (2) gallons of clean water over pavement surface. If water sheets out, uniformly wetting surface and no oil rings appear, surface is ready to be sealed. If the water balls up and/or shows signs of oils rings, additional curing time is required prior to sealing.

Review refined coal tar emulsion seal application rate requirements

Review use of prime coat on existing surfaces

Review safety issues.

* + - * 1. Scheduling:

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

* + - 1. SUBMITTALS
				1. Action Submittals:

Product Data:

Aggregate:

Provide recommended aggregate meeting Part 2 ‘Materials’ requirements of this specification.

Refined Coal Tar Emulsion Seal:

Asphalt Manufacturer’s product literature.

* + - * 1. Informational Submittals:

Certificates:

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

Design Data Submittals:

Refined Coal Tar Emulsion Seal:

Application Rate (based on two (2) separate refined coal tar emulsion seal coats of undiluted material):

1st coat: 0.10 to 0.15 gal/square yards (0.4527 to 0.6791 liters/square meter).

2nd coat: 0.08 to 0.12 gal/square yards (0.3622 to 0.5433 liters/square meter).

3rd coat: 0.08 to 0.12 gal/square yards (0.3622 to 0.5433 liters/square meter) (used only if requested by Owners representative for areas of high traffic).

Test And Evaluation Reports:

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

Manufacturers’ Instructions:

Refined Coal Tar Emulsion Seal:

Mix design is to be submitted with substrate preparation and sealant application instructions.

Field Quality Control Submittals:

Provide Scale Tags with following information:

Product Name.

Project Number.

Gallons/liters and pounds/kilograms of undiluted material supplied and used 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:

Refined Coal Tar Emulsion Seal:

1. Manufacturer’s product literature.
2. Design Data Submittal for Application Rate of Refined Coal Tar Emulsion 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. FIELD CONDITIONS
				1. Ambient Conditions:

Refined Coal Tar Emulsion Seal:

Apply refined coal tar emulsion seal when ambient and pavement temperatures are minimum of 50 deg F (10 deg C) and are expected to remain above 50 deg F (10 deg C) for twenty-four (24) hours after seal application.

Do not apply if subsequent temperatures for forty eight (48) hours are anticipated to drop below 50 deg F (10 deg C).

Do not apply refined coal tar emulsion seal if seal will not cure prior to freezing temperatures.

Do not apply refined coal tar emulsion seal if it will be affected by rain, or during rain or when surface contains standing water.

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

Design Criteria:

Meet following requirements:

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

Type One Acceptable Manufacturers and Products:

GemSeal Pavement Products, Charlotte, NC [www.gemsealproducts.com](http://www.gemsealproducts.com).

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

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

Star Specialty Technology and Research, Columbus, OH [www.starseal.com](http://www.starseal.com).

The Brewer Company, Milford, OH [www.thebrewerco.com](http://www.thebrewerco.com).

Vance Bros, Inc., Kansas City, MO [www.vancebrothers.com](http://www.vancebrothers.com).

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

* + - 1. DESIGN CRITERIA
				1. Refined Coal Tar Emulsion Seal:

Base Emulsion:

Meet requirements of:

ASTM D140/D140M.

ASTM D244.

ASTM D5727/D5727M.

Must be prepared from straight run high temperature coke-oven crude tar meeting requirements of ASTM D490. Petroleum tar and oil and water gas tars shall not be used even though they comply with ASTM D490.

Must be produced using continuous process colloid mill.

Shall be homogeneous and show no separation or coagulation of components that cannot be re-dispersed with moderate stirring.

Application Rate:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Area of Use | Mix Type | Coat | Refined Coal Tar Emulsion Gallons | Sand (Pounds) | Latex Additive Gallons |
| Moderate Traffic | Latex Fortified Emulsion | 1st Coat | 100 | 100-300 | 2-3 |
| 2nd Coat | 100 | 100-300 | 2-3 |
| 3rd Coat | 100 | 100-300 | 2-3 |
| • | The amount of water added to undiluted material will vary by manufacturer. |
| • | The emulsion and water is to be uniformly blended into a suitable mixing tank with mechanical agitation. |
| • | After mixing to a smooth homogeneous and uniform consistency, the specified additive with an equal amount of water is to be slowly added with continuous agitation. |
| • | After mixing, the specified amount of aggregate is to be slowly added with continuous agitation. |
| • | Mixing shall be continuous from the time the materials are placed into the mixing tank until the time the sealer is applied to the pavement. |

* + - 1. MATERIALS
				1. Refined Coal Tar Emulsion Seal:

Design Criteria:

Manufacturer's Certification of compliance required.

Type One Acceptable Products:

GemSeal: PolyTar

Neyra: Tarconite.

SealMaster: SealMaster Coal Tar Concentrate).

Star Specialty: Star Seal.

The Brewer: Brewer Cote.

Vance Brothers: ProtecTar Coal Tar Sealer.

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

* + - * 1. Sand:

General:

Washed dry silica sand, or crushed and washed boiler slag, free of dust, trash, silt, clay, salts, and organic materials or other contaminates.

Gradation:

Sand shall meet following gradation when tested in accordance with ASTM C136/C136M (50 to 70 mesh AFS rating). Gradation outside these ranges may be used provided past history shows evidence of durable surface:

|  |  |
| --- | --- |
| Sieve Size | Percent Retained |
| #20 | 0-0 |
| #30 | 0-2 |
| #40 | 0-10 |
| #50 | 10-30 |
| #70 | 15-100 |
| #100 | 0-35 |
| #140 | 0-10 |
| #200 | 0-3 |

**EDIT REQUIRED:** Include following paragraph if Prime Coat is to be used as determined in Part 3 of this specification with Owner's Representative and Contractor prior to bid.

* + - * 1. Prime Coat:

Design Criteria:

Apply prime coat if determined in Evaluation and Assessment in Part 3 of this specification with Owner's Representative and included in bid.

Use prime coat on older pavements that are highly oxidized weathered and show signs of raveling and surface distress to improve sealer adhesion.

Use prime coat if existing paving cannot be thoroughly cleaned.

Prime coat is not to be considered as one of the two (2) required applications of refined coal tar emulsion seal.

Same type of refined coal tar used in refined coal tar emulsion seal is to be used for prime coat.

Manufacturer's Certification of compliance required.

Type One Acceptable Products:

Product that meets design criteria for prime coat as approved by Owner’s Representative before bidding. See Section 01 6200.

1. EXECUTION
	* + 1. EXAMINATION

**EDIT REQUIRED:** Edit this specification accordingly based on decisions from the Evaluation and Assessment of Project with Owner's Representative and Contractor.

* + - * 1. Evaluation And Assessment:

Examine Project Site with Owner's Representative prior to bid with Contractor:

Sand added to refined coal tar emulsion seal mix: Determine whether amount to use.

Refined Coal Tar Emulsion Seal Coats: Determine if additional emulsion seal coats are necessary to attain Manufacturer's recommended coverage including the following:

Additional third coat of refined coal tar emulsion seal coat required everywhere.

Additional third coat of refined coal tar emulsion seal coat required in drive aisles and entries only.

Paint Stripes: Verify if Acrylic or Thermoplastic and if paints stripes must be removed in preparation of refined coal tar emulsion seal application.

Prime Coat: Determine if prime coat is to be used and if used, what type and amount of prime coat to be used.

* + - 1. PREPARATION
				1. Owner Responsibilities:

Remove Scout Trailer(s) if needed.

* + - * 1. General:

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

* + - * 1. Equipment:

Spray Equipment:

Capable of spraying pavement refined coal tar emulsion seal with sand added.

Equipped with positive displacement pumps to ensure uniform application of sealer.

Mechanical Squeegee:

Provide at least two (2) squeegee and/or brush assemblies (one behind the other) to assure adequate distribution and uniform application of refined coal tar emulsion seal.

Hand Squeegee and Brushes:

Use of hand squeegee or brushes is restricted to areas not accessible to mechanized equipment or to accommodate neat trim work at curbs, parking stops and so forth.

Acceptable in areas where practicality prohibits use of mechanized equipment.

Equipment used must be capable of keeping material thoroughly mixed and homogeneous throughout application process.

Equipment used must be capable of supplying sufficient quantity of material for uniform application over entire width of application mechanism to provide uniformly coated surface.

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

Refined Coal Tar Emulsion Seal:

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

* + - * 1. Surface Preparation:

Paint Stripes:

During Evaluation and Assessment as specified in Part 3 of this specification, verify if acrylic, thermoplastic or paint stripes must be removed in preparation for refined coal tar emulsion seal application.

If new paint stripes will not match exact location of existing paint stripes that will not be removed, then paint stripes must be removed or be covered with black acetone based paint.

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 oil spot primer.

Seal areas damaged by oil or grease with an oil spot primer compatible with tack coat or 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 refined coal tar emulsion seal. Cracks that contain weed and other live vegetation matter must be treated with Pre-emergent Herbicide prior to crack repair.

**EDIT REQUIRED:** Include following paragraph if Prime Coat is to be used as determined in Part 3 of this specification with Owner's Representative and Contractor prior to bid.

Prime Coat:

Follow refined coal tar emulsion seal Manufacturer's recommendations for substrate preparation, prime coat preparation, and prime coat application to substrate.

* + - 1. APPLICATION

**EDIT REQUIRED:** Include following paragraph if Prime Coat is to be used as determined in Part 3 of this specification with Owner's Representative and Contractor prior to bid.

* + - * 1. Prime Coat:

Apply prime coat as per Manufacturer’s recommendations:

Use one (1) part undiluted refined coal tar emulsion and three (3) parts water at rate of 0.05 to 0.10 gal per sq yd (0.23 to 0.45 L per sq m). Verify dilution requirements with Manufacture.

* + - * 1. Refined Coal Tar Emulsion Seal:

Surface preparation:

Do not apply refined coal tar emulsion seal until completion of preparation items.

Follow Seal Manufacturer's recommendations in regard to preparation of substrate, application of prime coat to substrate, and dilution of refined coal tar emulsion seal.

Apply refined coal tar emulsion seal using spray equipment, mechanical squeegee equipment, brush or rubber squeegee designed for such purpose.

Apply two (2) separate refined coal tar emulsion seal coats minimum in all areas. Allow first, or subsequent refined coal tar emulsion seal coats to dry before applying next coat:

**EDIT REQUIRED:** Edit accordingly following paragraph if additional emulsion coats are to be used as determined in Part 3 of this specification with Owner's Representative and Contractor prior to bid.

Apply additional emulsion seal coat:

Additional refined coal tar emulsion seal coat required everywhere.

Additional refined coal tar emulsion seal required in drive aisles and entries only.

Allow individual refined coal tar emulsion seal coats to dry prior to applying additional coats which can take up to twenty four (24) hours.

* + - * 1. Paint Stripes:

If paint stripes were removed in preparation for refined coal tar emulsion seal, include following:

Apply paint stripes after refined coal tar emulsion seal has been applied and cured.

* + - 1. CLEANING
				1. General:

Upon completion of refined coal tar emulsion seal operations, clean up and remove debris.

* + - 1. PROTECTION
				1. Do not allow traffic on paving until refined coal tar emulsion seal is thoroughly cured:

Allow final coat to cure for at least twenty-four (24) hours under ideal conditions (70 deg F (21 deg C) and fifty (50) percent relative humidity).

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