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**ASPHALT PAVING SURFACE TREATMENT: Slurry 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 | Reference Standards Updated. General Upgrade. |
| 19 May 14 | Chris Barker | Procedural Note Updated. |
| 25 Apr 14 | Chris Barker | Testing and Inspection updated. Reference Standards upgrade. |
| 27 Nov 13 | Chris Barker | Asphalt Maintenance Checklists and Guideline Attachments eliminated and moved to AEC Webpage. General Upgrade. |

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| PROCEDURAL NOTES |
| COORDINATIONGENERAL: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.
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| DESIGN INFORMATION AND BACKGROUND |

SECTION 32 0113

ASPHALT PAVING SURFACE TREATMENT: Slurry Seal

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

Furnish and apply slurry seal to existing asphalt 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 paving crack seal repair.

Section 32 0117.02: “Asphalt Paving Crack Fill” for completion of paving crack fill repair.

**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, 2696 Research Park Dr., Lexington, KY [www.asphaltinstitute.org](http://www.asphaltinstitute.org):

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).

International Slurry Surfacing Association (ISSA):

ISSA A105, ‘*Recommended Performance Guidelines for Emulsified Asphalt Slurry Seal’* (Revised May 2020).

ISSA A143, ‘*Recommended Performance Guidelines for Micro-Surfacing’* (Revised May 2020).

ISSA TB-106, ‘*Measurement of Slurry Seal Consistency’*.

* + - * 1. Definitions:

Fine Aggregate: Aggregate passing No. 8 (2.36 mm) sieve.

Seal Coat: Thin surface treatment used to improve surface texture and protect an asphalt surface. Main types of surface treatments are asphalt based emulsion seals, cape seals, chip seals, fog seals, micro surfacing, penetrating seals, refined coal tar emulsion seals, sand seals, sandwich seals and slurry seals.

Slurry Seal: A mixture of emulsified asphalt, well graded fine aggregate, mineral filler or other additives, and water. It is applied from 1/8 inch to 3/8 inch (3 mm to 10 mm) thick and used to renew pavement surfaces and retard moisture and air intrusion into underlying pavement. Slurry seal will fill minor cracks, restore a uniform surface texture, and restore friction values.

Slurry Types:

Type I is used for maximum crack penetration and provides fine textured surface. Also makes an excellent pretreatment for hot-mix overlay or chip seal. Usually used in low-density traffic areas such as light-aircraft airfields, parking areas, or shoulders where primary objective is sealing. It is about 1/8 inch (6 mm) thick.

Type II is most widely used gradation and provides medium textured surface. Used to seal; correct severe raveling, oxidation, and loss of matrix; and to improve skid resistance. Used for moderate (medium) traffic, depending on quality of aggregates available and design. It is about 1/4 inch (6 mm) thick.

Type III is used to correct surface conditions and provides highly textured surface. Used as first course in multicourse applications for heavier traffic, and to provide skid resistance. Use only on very old and weathered, raveled, oxidized asphalt paving.

Tack Coat: Very light application of liquid asphalt, cutback asphalt, or asphalt emulsion diluted with water applied to highly oxidized or weathered asphalt surfaces.

* + - * 1. Reference Standard:

ASTM International:

ASTM C131-20, 'Standard Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine'.

ASTM D242/D242M-19, 'Standard Specification for Mineral Filler for Bituminous Paving Mixtures'.

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

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

ASTM D2419-22, ‘Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate'.

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

**CANADIAN PROJECTS:** Include following paragraph.

Canadian General Standards Board:

CAN/CGSB 8-2-M88, 'Sieves, Testing, Woven Wire, Metric'.

**EDIT REQUIRED:** Testing and Inspection for resurfacing of asphalt paving should be considered by Owner's Representative. Include following paragraph if **testing and inspection** of resurfacing of asphalt paving is included in Project.

International Building Code (IBC):

Chapter 17, ‘Structural Tests and Special Inspections’ (2021 or most recent edition adopted by AHJ).

* + - 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' section that involve asphalt maintenance.

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

Review asphalt slurry seal schedule.

Review asphalt slurry seal mix design.

Review asphalt slurry seal preparation requirements.

Review asphalt slurry seal application requirements.

Review safety issues.

* + - * 1. Scheduling:

Provide to Owner’s Representative at least seven (7) days before slurry 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.

Slurry 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.

Provide quantities of each material delivered to job site and used on project.

Design Data Submittals:

Slurry Seal:

Application Rate (Type I, II or III slurry seal).

Test And Evaluation Reports:

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

Manufacturer Instructions:

Slurry Seal:

Slurry 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:

Slurry Seal:

1. Manufacturer’s product literature.
2. Design Data Submittal for Application Rate of Slurry 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:

Apply sealer at ambient temperatures between 50 and 80 deg F (10 and 27 deg C). Do not apply sealer if pavement or ambient temperature is below 50 deg F (10 deg C).

Do not apply slurry seal if it will be adversely affected by rain, or wet conditions 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:

Manufacturers whose products meet requirements of this Section

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

* + - 1. DESIGN CRITERIA

**EDIT REQUIRED:** Edit following paragraph to match gradation option selected.

* + - * 1. Slurry Seal:

This specification meets requirements of ISSA, Type I, II, or III:

* + - 1. MATERIALS
				1. Asphalt Emulsion:

Conform to requirements of ASTM D977 Grade SS-1h or ASTM D2397/D2397M Grade CSS-1h, CQS-1h.

Water: 40 percent maximum by weight.

Emulsion Amount:

**EDIT REQUIRED:** Select **ONE** of following **OPTIONS**.

**OPTION ONE, Type I:** Standard option, little to no large truck traffic. This is used for maximum crack penetration where primary objective is sealing.

Type I:

Percent of emulsion to aggregate shall be between 10 and 16 percent residual asphalt based on dry weight of aggregate.

**OPTION TWO, Type II:** Parking lots with low large truck traffic volume. This is most common slurry seal and is used to correct severe raveling, oxidation, loss of matrix and to improve skid resistance.

Type II:

Percent of emulsion to aggregate shall be between 7.5 and 13.5 percent residual asphalt based on dry weight of aggregate.

**OPTION THREE, Type III:** First course in multicourse applications for heavier traffic, and to provide skid resistance. Use only on very old and weathered, raveled, oxidized asphalt paving.

Type III:

Percent of emulsion to aggregate shall be between 6.5 and 12 percent residual asphalt based on dry weight of aggregate.

* + - * 1. Latex Additive:

Added at asphalt plant at a rate of 2.5 parts latex to 100 parts emulsified asphalt.

* + - * 1. Aggregate:

Mineral aggregate consisting of natural or manufactured sand, slag, or combination thereof.

100 percent crushed material.

Material shall be clean and free from organic matter and other deleterious substances and show loss of not more than 35 when tested in accordance with ASTM C131.

Sand equivalent value, ASTM D2419, shall be 45 minimum

Las Angeles abrasion loss, ASTM C131, Grading C or D shall be 35 minimum.

**USA PROJECTS:** Include following paragraph.

Mineral inert fillers shall not exceed 35 percent by weight and meet requirements of ASTM D242/D242M and following gradation requirements:

**CANADIAN PROJECTS:** Include following paragraph.

Mineral inert fillers shall not exceed 35 percent by weight and meet requirements of D242/D242M or CAN / CGSB Specification 8-GP-2M, and following gradation requirements:

**EDIT REQUIRED:** Select **ONE** of following **OPTIONS**.

**OPTION ONE, Type I:** Standard option, little to no large truck traffic. This is used for maximum crack penetration where primary objective is sealing.

Sieve Percent of Weight Passing

No. 4 (4.750 mm) 100

No. 8 (2.360 mm) 90 - 100

No. 16 (1.191 mm) 65 - 90

No. 30 (0.594 mm) 40 - 65

No. 50 (0.297 mm) 25 - 42

No. 100 (0.150 mm) 15 - 30

No. 200 (0.075 mm) 10 - 20

**OPTION TWO, Type II:** Parking lots with low large truck traffic volume. This is most common slurry seal and is used to correct severe raveling, oxidation, loss of matrix and to improve skid resistance.

Sieve Percent of Weight Passing

3/8 inch (9.5 mm) 100

No. 4 (4.750 mm) 90 - 100

No. 8 (2.360 mm) 65 - 90

No. 16 (1.191 mm) 45 - 70

No. 30 (0.594 mm) 30 - 50

No. 50 (0.297 mm) 18 - 30

No. 100 (0.150 mm) 10 - 21

No. 200 (0.075 mm) 5 - 15

**OPTION THREE, Type III:** First course in multicourse applications for heavier traffic, and to provide skid resistance. Use only on very old and weathered, raveled, oxidized asphalt paving.

Sieve Percent of Weight Passing

3/8 inch (9.5 mm) 100

No. 4 (4.750 mm) 70 - 90

No. 8 (2.360 mm) 45 - 70

No. 16 (1.191 mm) 28 - 50

No. 30 (0.594 mm) 19 - 34

No. 50 (0.297 mm) 12 - 25

No. 100 (0.150 mm) 7 - 18

No. 200 (0.075 mm) 5 - 15

* + - * 1. Water:

Potable and free from harmful soluble salts.

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:

Determine whether Type I, II or III slurry seal is 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. Slurry Seal Mixing Machine:

All equipment used must be capable of keeping material thoroughly mixed and homogeneous throughout the application process:

Provide continuous flow mixing unit capable of delivering accurately predetermined proportion of aggregate, water, and asphalt emulsion to mixing chamber and to discharge thoroughly mixed production on continuous basis.

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

Attach to mixer mechanical type squeegee distributor equipped with flexible material in contact with surface to prevent loss of slurry from distributor.

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

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:

Remove all pavement markings in preparation for slurry seal application.

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 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 tack coat. 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 slurry seal. Cracks that contain weed and other live vegetation matter must be treated with Pre-emergent Herbicide prior to crack repair.

* + - 1. APPLICATION
				1. Tack Coat:

Apply tack coat as per Manufacturer’s recommendations:

Use one (1) part undiluted asphalt 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 manufacturer.

* + - * 1. Slurry Seal:

Do not apply slurry seal until completion of preparation items.

Follow Sealer Manufacturer’s recommendations in regard of tack coat to substrate and dilution of tack coat.

* + - * 1. Surface may be pre-wetted by fogging ahead of slurry box providing no water is accumulated in front of slurry box.
				2. Maintain adequate amounts of slurry in spreader to insure complete coverage. No lumping, balling, unmixed aggregate or streaking due to oversize aggregate is acceptable.
				3. Use approved squeegees to spread slurry in areas not accessible to slurry mixer.
				4. Aggregate Amount:

**EDIT REQUIRED:** Select **ONE** of following **OPTIONS**.

**OPTION ONE, Type I:** Standard option, little to no large truck traffic. This is used for maximum crack penetration where primary objective is sealing.

Apply at rate of 6 to 12 lbs per sq yd (29.3 to 48.8 kg per sq m) based on dry aggregate weight.

**OPTION TWO, Type II:** Parking lots with low large truck traffic volume. This is most common slurry seal and is used to correct severe raveling, oxidation, loss of matrix and to improve skid resistance.

Apply at rate of 12 to 20 lbs per sq. yd (48.8 to 73.2 kg per sq m) based on dry aggregate weight.

**OPTION THREE, Type III:** First course in multicourse applications for heavier traffic, and to provide skid resistance. Use only on very old and weathered, raveled, oxidized asphalt paving.

Apply at rate of 18 to 30 lbs per sq. yd (48.8 to 73.2 kg per sq m) based on dry aggregate weight.

**EDIT REQUIRED:** Following paragraph may be deleted if Type I or Type II slurry is used, however, it is best to roll slurry seals.

* + - * 1. Roll with 5 to 8 ton pneumatic tired roller with minimum contact pressure of 50 psi (345 kPA) after emulsion has broken.
				2. No unsightly joints or other visual imperfections are permitted on finished product.
				3. No run-off will be allowed against curbs or gutters.
				4. Apply one (1) coat which shall contain maximum aggregate recommended by Manufacturer for slurry seal.
				5. Paint Stripes:

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

* + - 1. CLEANING
				1. Upon completion of slurry seal operations, clean up and remove debris.
				2. Areas where slurry seal has been applied should be swept clean within twenty one (21) - forty five (45) days after application of slurry seal.
			2. PROTECTION
				1. Do not allow traffic on paving until slurry 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