SECTION 32 12 16.1 - LIQUID ROAD SEAL COATING FOR PARKING LOTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Asphalt Pavement Sealcoating- Liquid Road for Parking Lots

1.2 REFERENCE STANDARDS

A. American Society for Testing Materials (ASTM)
   1. D 2939-03 (Sections 7,8,9,10,11,12,13,14,15,16) Standard Test Methods for Emulsified Bitumens Used as Protective Coatings
   2. The following ASTM test methods: ASTM D5, ASTM D6937, ASTM D6930, ASTM D113, ASTM E70, ASTM D6378, ASTM D36, ASTM D93, ASTM D562, ASTM D4060, ASTM D552, ASTM D870, ASTM D6904, ASTM D4585, ASTM D1735, ASTM D2247, ASTM D4541, ASTM E303, ASTM E70, ASTM E274, ASTM D3359, ASTM D3910, ASTM D4799
   3. Liquid Road meets ASTM D8099/D8099M-17 Standard Specification for Asphalt Emulsion Pavement Sealer and FAA Item P-623 specification for emulsified asphalt spray sealcoat.

B. South Coast Air Quality Management District
   1. SCAQMD Method 304 – Determination of Volatile Organic Compounds (VOC) In Various Materials.

C. Federal Specifications for Waterborne Traffic and Airfield Marking Paints
   1. TT-P-1952E Types I, II, and III
   2. TT-P-1952D
   3. TT-P-1952B

1.3 SUBMITTALS

A. Product Data
   1. Submit manufacturer’s Product Data Sheet.

1.4 PROJECT/SITE CONDITIONS

A. Ambient Conditions
   1. Both surface and ambient temperature must be a minimum of 50°F and rising before applying cold applied crack fillers, oil spot primers, pavement sealers or traffic paints (materials). Ambient and surface temperature shall not drop below 50°F for a 24 hour period following application of materials.

2. Apply materials during dry conditions when rain is not imminent or forecast for at least 24 hours after application.

B. Pavement/Surface Conditions
1. Newly placed (paved) asphalt pavement surfaces should be allowed to cure a minimum of four (4) weeks under ideal weather conditions (70°F) before applying coatings.

2. New pavement surfaces shall be free of residual oils or chemicals associated with the placement of new asphalt pavement.

3. Aged pavement surfaces shall be cleaned and prepared as recommended in this specification under PART 3 of this specification.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. SealMaster Pavement Products and Equipment. SealMaster has a nationwide network of manufacturing and distribution facilities. Phone: 800-395-7325. Website: www.sealmaster.net. E-mail: spec@sealmaster.net.

2.2 LIQUID ROAD PAVEMENT COATING

A. Liquid Road is a polymer-modified, fiber-reinforced asphalt emulsion coating that is job-mixed with specifically graded aggregate and applied to asphalt pavement surfaces, providing a highly durable, slip-resistant bituminous surface treatment that greatly extends pavement service life.

Liquid Road provides a “like new” black appearance to oxidized and weathered asphalt pavement surfaces. The deep black color helps to melt snow and ice significantly faster than untreated pavements.

Liquid Road produces an even textured surface with no loose stones, making it ideal for vehicle, bicycle and pedestrian traffic.

TABLE 1- PHYSICAL PROPERTIES OF LIQUID ROAD AS SUPPLIED WITHOUT SAND

ASTM	Test Description	Result
D5	Penetration of Bituminous Materials-Base Asphalt	12-45 Pen
D6937	Density of Emulsified Asphalt	1,000 -1300 g/l
D6930	Settlement and Storage Stability of Emulsified Asphalts	20% max./24 hr.
D113	Ductility of Bituminous Materials-Base Asphalt	5-15 cm
Std. %	Percent Polymer Solids to Asphalt by wt.	3% min.
E70	PH of Aqueous Solutions with Glass Electrodes	6-10 PH
D6378	Vapor Pressure (VPX), mm Hg @ 25° C (77° F)	22-26 mm Hg
D36	Softening Point of Emulsion Residue (Ring and Ball Apparatus)	> 200° F
D93	Flash Point of Liquid Emulsion	None detected
D562	Viscosity using a Stormer-Type Viscometer	60-110 KU

D4060	Abrasion Resistance- Taber Abraser Dry Method	< 1% Loss
D522	Mandrel Bend Test of Attached Coatings	No Cracking
D870	Water Resistance of Coatings using Water Immersion	No Delamination
D6904	Resistance to Wind-Driven Rain	No Delamination
D4585	Water Resistance of Coatings Using Controlled Condensation	No Delamination
D1735	Water Resistance of Coatings Using Water Fog Apparatus	No Delamination
D2247	Water Resistance of Coatings in 100% Relative Humidity	No Delamination
D4541	Adhesion Strength over Asphalt Pavement	> 200 PSI
D3910-6.4	Wet Track Abrasion Test	< 5 g/ft² Loss
D2939-5	Uniformity of Emulsified Bituminous Coatings	PASS
D2939-7	Weight per Gallon	9-11 lbs./gal
D2939-8	Residue by Evaporation, %	40% min.
D2939-13	Drying Time- 50% humidity, 73.4 ± 3.6°F. Firm in 24 hrs.,	PASS
D2939-14	Resistance to Heat- No Blistering, sagging or slipping	PASS
D2939-15	Resistance to water- No softening, delamination or re-emulsification	PASS
D2939-16	Flexibilty- No Cracking or Delamination	PASS
D2939-26	Resistance to Impact- No Chipping, Cracking or Delamination	PASS
D2939-27	Resistance to Impact After Accelerated Weathering	PASS
D2172	Asphalt Content by Weight, %	Min. 16%
D4799	QUV UV Aging-1,000 Hours	No Color Fade
D3359	Measuring Adhesion by Tape- No More than a Trace of Peeling	PASS
SCAQMD Method 304	Determination of Volatile Organic Compounds (VOC) in various Coatings	< 50 g/l

TABLE 2- PHYSICAL PROPERTIES OF LIQUID ROAD JOB-MIXED WITH SPECIFIED AGGREGATE AND READY FOR PARKING LOT APPLICATION (see table 3 for Aggregate Specifications)

ASTM	Test Description	Result
D2939-8	Residue by Evaporation, %	Min. 52%
E303	Measuring Surface Frictional Properties- British Pendulum Tester	Min. 60 BPN
E274	Locked Wheel Skid Testing	> 30 SN
D4060	Abrasion Resistance- Taber Abraser Dry Method	< 1% Loss
D3910-6.4	Wet Track Abrasion Test	< 25g/ft² Loss
D5	Penetration of Bituminous Materials-Base Asphalt	12-45 Pen
D113	Ductility of Bituminous Materials-Base Asphalt	5-15 cm
Std. %	Percent Polymer Solids to Asphalt by wt.	5-15 cm
E70	PH of Aqueous Solutions with Glass Electrodes	6-10 PH
D6378	Vapor Pressure (VPX), mm Hg @ 25° C (77° F)	22-26 mm Hg
D36	Softening Point of Emulsion Residue (Ring and Ball Apparatus)	> 200° F
D93	Flash Point of Liquid Emulsion	None detected
D562	Viscosity using a Stormer-Type Viscometer	60-110 KU
D870	Water Resistance of Coatings using Water Immersion	No Delamination
D6904	Resistance to Wind-Driven Rain	No Delamination
D4585	Water Resistance of Coatings Using Controlled Condensation	No Delamination
D1735	Water Resistance of Coatings Using Water Fog Apparatus	No Delamination
D2247	Water Resistance of Coatings in 100% Relative Humidity	No Delamination
D4541	Adhesion Strength over Asphalt Pavement	> 200 PSI
D2939-7	Weight per Gallon	10-12 lbs./gal
D2939-13	Drying Time- 50% humidity, 73.4 ± 3.6°F. Firm in 24 hrs.	PASS
D2939-14	Resistance to Heat- No Blistering, sagging or slipping	PASS
D2939-15	Resistance to water- No softening, delamination or re-emulsification	PASS
D2939-16	Flexibilty- No Cracking or Delamination	PASS
D2939-26	Resistance to Impact- No Chipping, Cracking or Delamination	PASS

D2939-27	Resistance to Impact After Accelerated Weathering	PASS
D4799	QUV UV Aging-1,000 Hours	No Color Fade
D3359	Measuring Adhesion by Tape- No More than a Trace of Peeling	PASS
SCAQMD Method 304	Determination of Volatile Organic Compounds (VOC) in various Coatings	< 50 g/l

TABLE 3- LIQUID ROAD AGGREGATE SPECIFICATIONS FOR PARKING LOT APPLICATION

Mesh-Sieve Size (ASTM E11)	Typical Mean Retained On Individual Sieves %
No. 12 Mesh (1.68 mm)	-0-
No. 16 Mesh (1.19 mm)	0-5%
No. 20 Mesh (.841 mm)	5-15%
No. 30 Mesh (.595 mm)	30-50%
No. 40 Mesh (.420 mm)	30-50%
No. 50 Mesh (.297 mm)	2-10%
No. 70 Mesh (.210 mm)	1-5%
No. 100 Mesh (.149 mm)	0-5%
Sand or Aggregate shall have a typical AFS of 23-27 Mesh	

2.3 MATERIALS

A. SealMaster Petro Seal Oil Spot Primer (Concentrate)

B. SealMaster Prep Seal Oil Spot Primer (Ready-To-Use)

C. SealMaster FlexMaster Crack Sealant (Cold-applied pourable crack sealant)

D. SealMaster Pourable Crack Sealant (Cold-Applied crack sealant)

E. SealMaster CrackMaster Parking Lot Grade Hot Rubberized Crack Sealant

F. SealMaster CrackMaster Supreme DF Hot Rubberized Crack Sealant

G. SealMaster Asphalt Binder Plus

H. SealMaster GatorPave Patching Material

I. SealMaster Pothole Patch (Cold Patch)

J. SealMaster Liquid Thermoplastic Traffic Marking Paint (White and Yellow)

K. SealMaster Fast-Dry Traffic Paint (White and Yellow)

L. SealMaster TTP-1952B Traffic Paint (White and Yellow)

M. SealMaster Handicap Blue Traffic Paint

N. SealMaster Firelane Red Traffic Paint

O. SealMaster Line Block-out Paint

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine pavement surface prior to performing work
B. Notify architect or project engineer of any adverse or unacceptable conditions that would affect successful repair efforts or application of materials
C. Do not commence work until unacceptable conditions are corrected

3.2 SURFACE PREPARATION

A. Surface must be clean and free from all loose material and dirt. Remove grass along edge of pavement to find true edge of pavement. Power blowers, mechanical sweeping devices and push brooms are acceptable cleaning methods.

3.3 CRACK REPAIR

Specifier's Notes: Specifier should select between Option A. (Fill Cracks with Cold-Applied Sealants and/or Crack Fillers) or, Option B. (Fill Cracks with Hot Applied Rubberized Asphalt Crack Sealant) listed below. Hot Applied Rubberized Crack Sealant provides a more durable solution for crack filling. However, Cold-Applied Materials offer an acceptable and more economical approach.

A. Cold Applied Crack Filling Materials and Methods
1. Clean cracks of all dirt, debris and vegetation prior applying crack filling.
2. For cracks up to ½" apply SealMaster FlexMaster or SealMaster Pourable Crack Sealant. FlexMaster or Pourable Crack Sealant may be applied directly from container, pour pot, crack banding equipment or mechanized pumping equipment. Allow to dry before sealcoating.
3. For cracks larger than ½" wide and up to 1" wide apply SealMaster Trowel Grade Crack Filler or SealMaster GatorPave Patching material. Apply Trowel Grade or GatorPave with trowel, squeegee or straightedge. Allow to dry before sealcoating.
4. Contractor or other Entity Responsible for performing work shall refer to Manufacturer's Product Data Sheet for more detailed application instructions for FlexMaster, Pourable Crack Sealant, Trowel Grade Crack Filler and GatorPave.

B. Hot Applied Crack Sealant/Filling Materials and Methods
1. Cracks must be free from dust, dirt, vegetation and moisture. Clean cracks with mechanical wire brush followed by a compressed air heat lance to remove loose debris and moisture.
2. For all cracks up to 1" wide apply either SealMaster CrackMaster Parking Lot Grade crack sealant or SealMaster Crackmaster DF Supreme crack sealant.
3. SealMaster CrackMaster Parking Lot Grade crack sealant shall be melted in a conventional oil-jacketed unit equipped with an agitator.
4. Apply heated CrackMaster Parking Lot Grade crack sealant using a pump and wand system, a crack banding unit or a pour pot.
5. Contractor or other Entity Responsible for performing work shall refer to Manufacturer's Product Data Sheet for more detailed application instructions for CrackMaster Parking Lot Grade Crack Sealant.

3.4 ALLIGATORED PAVEMENT REPAIR

Specifier's Notes: Alligator cracks are interconnected cracks forming a series of small blocks resembling an alligator's skin or chicken wire. Specifier should select between Option A. (Apply SealMaster GatorPave), Option B. (Infrared Patch Repair Method) or Option C. (Removal of distressed pavement material and replacement with 4 inches of Hot Mix Asphalt). With regards to longevity of pavement repair, these options represent a good (A), better (B), best (C) approach.

A. Repair Alligator Cracks with SealMaster GatorPave
1. Remove all dirt, dust and vegetation on alligatored area.
2. Apply GatorPave with trowel, squeegee or straightedge.
3. Allow to dry before sealcoating.
4. Contractor or other Entity Responsible for performing work shall refer to Manufacturer's Product Data Sheet for more detailed application instructions for GatorPave.

B. Repair Alligator Cracks with Infrared Heater Method
1. Remove all dirt, dust and vegetation on alligatored area.
2. Heat alligatored pavement area to a temperature between 290°F and 325°F to soften pavement. Scarify heated softened asphalt with an asphalt rake to a depth of 2-3 inches. Add SealMaster Asphalt Binder Plus at a rate of .20 gallon per square yard while pavement material is still soft and workable. Mix Asphalt Binder Plus into heated softened asphalt with the asphalt rake. Level smooth with rake and compact area with either a plate compactor or asphalt roller. Note- A small amount of fresh Hot Mix blacktop may be added to heated material if needed to assure a smooth, flush finish to adjoining pavement surface.
3. Contractor or other Entity Responsible for performing work shall refer to Manufacturer's Product Data Sheet for more detailed application instructions for SealMaster Asphalt Binder Plus.

C. Repair Alligator Cracks with Full-Depth Hot Mix Asphalt
   1. Saw cut and remove the alligatored pavement to the depth necessary to reach firm support (firm base materials).
   2. Prime bottom of patch area and vertical sides of saw cut with SealMaster Asphalt Binder Plus.
   3. Fill patch area with fresh hot mix asphalt.
   4. Compact fresh hot mix with hand tamper, vibratory-plate compactor or asphalt roller. Finished patchwork shall be flush and level with adjoining pavement.
   5. Contractor or other Entity Responsible for performing work shall refer to Manufacturer's Product Data Sheet for more detailed application instructions for SealMaster Asphalt Binder Plus.

3.5 POTHOLE REPAIR

Specifier's Notes: Specifier should select between Option A. (Fill Potholes with SealMaster Pothole Patch (Cold Patch)) or, Option B. (Fill Potholes with Hot Mix Asphalt). Hot Mix Asphalt provides a more durable solution for patching. However, SealMaster PatchMaster Pothole Patch offers an acceptable and more economical approach to filling potholes.

A. Fill Potholes with SealMaster PatchMaster Pothole Patch
   1. Remove loose material, debris and standing water from pothole prior to application.
   2. Apply PatchMaster directly from bag into pothole
   3. Compact PatchMaster with a hand tamper, vibratory-plate compactor or asphalt roller. Finished patchwork shall be flush and level with adjoining pavement.
   4. Contractor or other Entity Responsible for performing work shall refer to Manufacturer's Product Data Sheet for more detailed application instructions for SealMaster PatchMaster Pothole Patch.

3.6 OIL SPOT PRIMING

A. Prime Oil Spots with SealMaster Prep Seal or SealMaster Petro Seal
   1. Wipe or scrape excessive build-up of oil, grease, and gasoline spots. A torch may be used to burn away any residual.
   2. Apply oil spot primer with brush, roller or sprayer.
   3. Allow to dry before sealcoating.
   4. Contractor or other Entity Responsible for performing work shall refer to Manufacturer's Product Data Sheet for more detailed application instructions for SealMaster Prep Seal or SealMaster Petro Seal.

3.7 LINE BLOCK-OUT PAINT

Specifier's Notes: SealMaster Line Block-Out Paint should only be used when specifier is changing the pattern or lay-out of existing traffic markings. If pattern and lay-out of existing traffic markings will remain the same after applying sealcoating materials, then Line Block-Out Paint is not necessary.

A. Applying SealMaster Line Block-Out Paint
   1. Remove all loose material and dirt from existing traffic markings.
   2. Apply SealMaster Line Block-out paint with pressurized spray equipment, brush or roller.
   3. Allow to dry before sealcoating.
   4. Contractor or other Entity Responsible for performing work shall refer to Manufacturer's Product Data Sheet for more detailed application instructions for SealMaster Line Block-Out Paint.

3.8 LIQUID ROAD APPLICATION

Specifier's Notes: The Liquid Road application process for parking lots begins with an initial squeegee applied coat in all drive lanes, entrances, exits and high traffic areas (excluding parking stalls). A second squeegee coat is applied to the entire pavement surface. A third spray coat (finish coat) is applied to the entire pavement surface.

A. Applying SealMaster Liquid Road
   1. Remove all loose material and dirt from pavement surface. Remove grass along edge of pavement to find true edge of pavement. Power blowers, mechanical sweeping devices and push brooms are acceptable cleaning methods.
   2. Equipment used to apply Liquid Road shall have continuous agitation or mixing capabilities to maintain homogeneous consistency of pavement sealer mixture throughout the application process. Spray equipment shall be capable of mixing and spraying pavement sealer with sand added. Self-propelled squeegee equipment with mixing capability shall have at least 2 squeegee or brush devices (one behind the other) to assure adequate distribution and penetration of sealer into pavement surface. Hand squeegees and brushes shall be acceptable in areas where practicality prohibits the use of mechanized equipment.
   3. Liquid Road shall be mixed in accordance with the following mix design (based on 100 gallons of Liquid Road for ease of calculation):
      - Liquid Road……100 gallons
      - Sand (23 to 27 mesh AFS fineness gradation)…….400 lbs.
        (see table 3 under section 2.3 – Liquid Road Aggregate Specifications)

      Note: If required, a small amount of water may be added to facilitate application of mixed material.
   4. Apply, by squeegee application, the first coat of mixed Liquid Road and Sand to all drive lanes, entrances, exits and high traffic areas (excluding parking stalls) at a rate of .17 to .20 gallon per square yard (45-55 square feet per gallon). Allow first coat to dry thoroughly before applying second coat.

5. Apply, by squeegee application, the second coat of mixed Liquid Road and Sand to the entire pavement surface at a rate of .17 to .20 gallon per square yard (45-55 square feet per gallon). Allow second coat to dry thoroughly before applying the third coat.
6. Apply, by spray application, the third coat (finish coat) of mixed Liquid Road and Sand to the entire pavement surface at a rate of .17 to .20 gallon per square yard (44-55 square feet per gallon). Allow final coat of pavement sealer to dry 24 hours prior to opening up to vehicle traffic.

3.9 TRAFFIC MARKINGS/LINE STRIPING

Specifier's Notes: Specifier should select between Option A. (SealMaster TT-P-1952B Traffic Paint- White or Yellow), Option B. (SealMaster Fast Dry Traffic Paint- White or Yellow), or Option C. (SealMaster Liquid Thermoplastic Traffic Paint- White or Yellow). These options represent a good (A), better (B), or best (C) approach to material selection. All materials are 100% Acrylic water-base. With regards to Handicap parking stalls; a square section of handicap blue is applied and allowed to dry, followed by a white handicap symbol painted in the center of the blue area. Firelane Red Traffic Paint is designed to paint curbing designated as a fire zone (specifier should designate such areas).

A. Applying SealMaster Traffic Paint
   1. Remove all loose material and dirt from existing pavement. Freshly applied pavement sealer shall be allowed to cure for a minimum of 24 hours prior to applying Traffic paint.
   2. Apply SealMaster Traffic Paint with pressurized line striping spray equipment at wet thickness of 15 to 20 mils.
   3. Apply SealMaster Handicap Blue to all handicap parking spots.
   4. Apply SealMaster Firelane Red Traffic Paint to areas designated as Fire Zones (by specifier).
   5. Allow paint to dry thoroughly prior to opening to traffic.

END OF SECTION