

## Application Specification for Brewer Cote® Pavement Sealer

### 1. Objectives

- 1.1 To protect asphalt pavements from damage caused by gasoline and oil drippings, the ultraviolet rays of the sun, oxidation, deicing salts and the penetration of water.
- 1.2 To reduce the aging of the asphalt binder, thereby maintaining the flexibility and extending the life of the asphalt pavement.
- 1.3 To provide an affordable, long lasting pavement surface that is easy to clean and will enhance the value of any property.

### 2. References

#### 2.1 ASTM Specifications

- 2.1.1 C136 Method for Sieve Analysis of Fine and Course Aggregates
- 2.1.2 D140 Methods of Sampling Bituminous Materials
- 2.1.3 D490 Standard Specification for Road Tar
- 2.1.4 D2939 Standard Test Methods for Emulsified Bitumens Used as Protective Coatings
- 2.1.5 D3423 Standard Practice for Application of Emulsified Coal Tar Pitch (Mineral Colloid Type)
- 2.1.6 D4866 Standard Performance Specification for Coal Tar Pitch Emulsion Pavement Sealer Mix Formulations Containing Mineral Aggregates and Optional Polymeric Admixtures
- 2.1.7 D5727 Standard Specification for Emulsified Refined Coal Tar (Mineral Colloid Type)

### 3. Materials

#### 3.1 Refined Coal Tar Emulsion

- 3.1.1 The refined coal tar emulsion shall be prepared from a high temperature refined coal tar conforming to the requirements of ASTM D490 for RT-12.
- 3.1.2 The use of petroleum tar, oil or water gas tar shall not be permitted even though they may comply with the requirements of ASTM D490 for RT-12.
- 3.1.3 The base refined coal tar emulsion shall conform to the requirements ASTM D5727.
- 3.1.4 The refined coal tar emulsion shall have a non-volatile content of no less than 51.50 percent. Ash of non-volatile shall be no less than 36.00 and no greater than 37.00 percent.
- 3.1.5 If requested, the contractor will provide a certification with each bulk tanker delivery indicating compliance with the above requirements. Further, the certification will indicate the non-volatile (solids) and ash contents of the refined coal tar emulsion for a particular tanker load.

#### 3.2 Water

- 3.2.1 The water used for mixing shall be potable and free of harmful soluble salts and contaminants.
- 3.2.2 The water temperature shall be at least 50° F.

#### 3.3 Additive

- 3.3.1 The use of an additive will improve the sealer's durability, gasoline and oil resistance, drying time, color uniformity and aggregate suspension.
- 3.3.2 The additive used must mix homogeneously and be compatible with the refined coal tar emulsion, aggregate and water mixture.

#### 3.4 Aggregate

- 3.4.1 The use of aggregate will improve the sealer's wear and skid resistance.
- 3.4.2 The aggregate shall be either natural or manufactured angular aggregate.
- 3.4.3 The aggregate shall be washed and graded silica sand or boiler slag free of dust, clay, organic materials or other contaminants.

3.4.4 The aggregate shall meet the following gradation, when tested in accordance with ASTM C136:

Sieve Size	% Retained
No.30	0-5
No.40	0-10
No. 50	10-30
No.70	15-100
No. 100	0-35
No. 140	0-25
No. 200	0-10

3.4.4.1 Aggregate with gradations outside of these ranges may be used provided the aggregate is pre-approved for use.

3.4.5 The aggregate manufacturer's instructions for safe handling shall be followed at all times.

## 4. Manufacturing

- 4.1 The refined coal tar emulsion shall be produced using a continuous process colloid mill to ensure a homogeneous mixture and appropriate size and distribution of particles in suspension.
- 4.2 The refined tar emulsion pavement sealer shall have a non-volatile content of no less than 51.50 percent. Ash of non-volatiles shall be no less than 36.00 and no greater than 37.00 percent.

## 5. Storage

- 5.1 Bulk storage tanks used to store the refined coal tar emulsion shall be equipped with a mechanically powered, full sweep agitation system capable of homogeneously mixing the entire contents of the tank.
- 5.2 Bulk storage tanks shall be agitated daily to ensure a homogeneous mixture.

## 6. Equipment

- 6.1 Application equipment used to apply the refined coal tar emulsion shall be tank type with a mechanically powered, full sweep agitation system capable of homogeneously mixing the entire contents of the tank.
- 6.2 The application equipment shall be capable of applying the recommended coating rates evenly over the entire width of the application mechanism to provide a uniformly coated surface.
  - 6.2.1 All spray application equipment (spray bar or wand type) shall be equipped with positive displacement pumps to ensure uniform application of sealer.
  - 6.2.2 All squeegee/brush application equipment shall be equipped with two (2) or more squeegee and/or brush assemblies that are properly adjusted and in good condition to ensure uniform application of sealer.
- 6.3 Application by hand squeegee or brush should be restricted to areas not accessible to mechanized equipment or to accommodate neat trim work at curbs, parking stops, etc. Sealer applied by hand shall meet the same standards as sealer applied by machine.

## 7. Surface Preparation

### 7.1 Patching

- 7.1.1 All pavement areas that have failed for any reason and cracks exceeding 1" in width shall be repaired prior to sealing.
- 7.1.2 The damaged pavement and base materials shall be removed to the full depth of the damage and replaced with similar materials, thoroughly compacted.
- 7.1.3 Patched areas shall be allowed to cure a minimum of sixty (60) days at 60° F daytime temperatures prior to sealing.

### 7.2 Crack Sealing

- 7.2.1 All pavement cracks ¼" – 1" in width shall be repaired prior to sealing.
- 7.2.2 All vegetation, dirt and debris shall be removed from the cracks to a minimum depth of ½".
  - 7.2.2.1 If vegetation is extensive, the cracks shall be treated with a water based herbicide a minimum of one (1) week prior to cleaning the cracks to prevent regrowth.

7.2.3 The prepared cracks shall be filled, ignoring hairline cracks, with a rubberized hot or cold pour crack sealant.

7.2.4 The crack sealant must be compatible with the refined coal tar emulsion system.

### 7.3 Oil Spot Preparation

7.3.1 All oil and grease that has not penetrated the pavement surface shall be removed by scraping or burning and scrubbing the affected area with a detergent solution.

7.3.2 The treated area shall be thoroughly rinsed with clean water.

7.3.3 The area shall then be treated with an oil spot primer to improve sealer adhesion and prevent the oil spot from bleeding through the sealer.

7.3.4 The oil spot primer must be compatible with the refined coal tar emulsion system.

### 7.4 Surface Cleaning

7.4.1 All vegetation growing through the asphalt pavement shall be treated with a water based herbicide a minimum of one (1) week prior to sealing to prevent regrowth.

7.4.2 The pavement surface shall be thoroughly cleaned immediately prior to sealer application by sweeping, blowing, scrubbing and/or flushing the area with clean water to remove all debris that may restrict sealer adhesion.

7.4.2.1 All standing water shall be removed from the pavement prior to sealing.

### 7.5 Pavement Primer

7.5.1 Older, highly oxidized asphalt pavements may require the application of a prime coat prior to sealing to improve sealer adhesion.

7.5.2 The primer shall consist of refined coal tar emulsion diluted 50% by volume with clean water and applied at a rate of 0.05 gal/ yd<sup>2</sup> – 0.10 gal/ yd<sup>2</sup>. Primer not meeting this standard may be used provided it is pre-approved for use.

7.5.2.1 Any primer used must be compatible with the refined coal tar emulsion system.

### 7.6 New Asphalt Pavement Surfaces

7.6.1 New pavement surfaces, including patched areas, shall be allowed to cure a minimum of sixty (60) days at 60° F daytime temperatures prior to sealing to eliminate any concentration of oils on the pavement surface.

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

## 8. Mix Design and Areas of Use (use table below to select mix design(s) for specific pavement use and traffic patterns)

8.1 The refined coal tar emulsion system shall consist of a mixture of refined coal tar emulsion, water, additive and aggregate, and shall be proportioned as follows: (insert appropriate mix design in paragraph or table form)

8.1.1 The mix designs are based on using a sealer with solids content of 51.50 percent minimum.

MIX DESIGNS					
Traffic Pattern	No. of Coats	BrewerCote® Gals.	Water Gals.	Aggregate Lbs.	Additive Gals.
Pedestrian - maximum scuff resistance (playgrounds, walkways)	1st coat	100	50-60	100-200	2-3
	2nd coat	100	50-60	100-200	2-3
Residential or non-vehicular (driveways, multi-use trails)	1st coat	100	40-55	0-200	1-2
	2nd coat	100	50-55	100-200	1-2
Low traffic parking areas	1st coat	100	40-55	0-200	0-2
	2nd coat	100	40-55	100-200	0-2
Moderate traffic parking areas	1st coat	100	40-55	0-300	2-3
	2nd coat	100	35-50	100-300	2-3
High traffic parking areas, drive lanes, entrances and service roads	1st coat	100	40-55	0-400	3-4
	2nd coat	100	35-50	100-400	3-4
	3rd coat	100	45-60	100-400	3-4

## 9. Mixing

- 9.1 The refined coal tar emulsion and specified amount of water shall be uniformly blended in a suitable mixing tank with mechanical agitation.
- 9.2 After achieving a smooth homogeneous mixture of uniform consistency, the specified amount of additive, diluted with an equal amount of clean water, shall be slowly added under continuous agitation to prevent shocking the sealer.
- 9.3 After achieving a smooth homogeneous mixture of uniform consistency, the specified amount of aggregate shall be slowly added under continuous agitation.
- 9.4 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. During the entire mixing and application process, no breaking, segregating or hardening of the emulsion, nor balling or lumping of the aggregate will be permitted.
- 9.5 Small amounts of additional water may be added to the mixture to provide a workable consistency, but in no case is the total water content to exceed the specified amount.

## 10. Application

- 10.1 Application shall be made using spray or mechanical squeegee equipment, plastic or nylon bristled brushes or rubber squeegees designed for this purpose.
- 10.2 The sealer shall be uniformly applied over the entire asphalt surface and be free of voids.
- 10.3 Recommended coverage rates based on mix designs detailed in Table 8.1.3 of this specification are as follows:

1 <sup>st</sup> coat	0.10 gal/yd <sup>2</sup> – 0.15 gal/yd <sup>2</sup>
2 <sup>nd</sup> coat	0.08 gal/yd <sup>2</sup> – 0.12 gal/yd <sup>2</sup>
3 <sup>rd</sup> coat	0.08 gal/yd <sup>2</sup> – 0.12 gal/yd <sup>2</sup>
- 10.4 Before applying the next coat of sealer, the previous coat shall be allowed to cure so that it will withstand traffic without scuffing.
- 10.5 It is recommended that the final coat of sealer be allowed to cure for at least twenty-four (24) hours under ideal conditions (70° F and 50% relative humidity), then tested for trafficability before opening the pavement to regular use.
- 10.6 Precautions
  - 10.6.1 Sealer shall only be applied when ambient and pavement temperatures are in excess of 50° F and are expected to remain there for at least twenty-four (24) hours following application. Under these conditions, allow the sealer to cure for at least twenty-four (24) hours, then test for trafficability before opening the pavement to regular use.
  - 10.6.2 Sealer shall not be applied during rainy or wet weather, during heavy fog or dew, during hours of sprinkler system operation or when rain is predicted within twenty-four (24) hours following sealer application.
  - 10.6.3 Proper drying and curing of sealer requires direct exposure to sunlight and air circulation. Sealer should not be applied indoors or to areas such as underground or semi-enclosed, roofed parking structures.
  - 10.6.4 When the ambient temperature is in excess of 85° F, the pavement shall be fogged with cool, clean water immediately prior to sealing to reduce the pavement temperature and allow for better bonding and even spreading of the sealer.
    - 10.6.4.1 All standing water shall be removed from the pavement prior to sealing.
  - 10.6.5 Sealed surfaces subjected to concentrated pedestrian activity such as playgrounds are prone to scuffing and transfer of scuffed material to adjacent surfaces. Such areas should only be sealed under optimum curing conditions. The mix design detail for pedestrian traffic found in product technical data must be strictly followed. These areas should cure for a minimum of forty-eight (48) hours between coats and prior to opening for use.
  - 10.6.6 In case of accidental spill, contain the sealer; prevent surface runoff from entering any drainage system or pond; dispose of spilled materials in accordance with local, state and federal regulations.
  - 10.6.7 Do not allow the refined coal tar emulsion to freeze.