SEAL COAT SUPPLY, Inc.

TUFFCOAT P+ ASPHALT POLYMER SURFACE TREATMENT

DOCUMENT INCLUDES:

A. Product Description

Tuffcoat P+ is a high-performance, high-density, emulsion-based asphalt polymer surface treatment. Consisting of cutting edge polymers for added durability and resistance to ultraviolet rays, oxidation, water and chemicals. Tuff Coat P+ incorporates industry leading aggregates providing unmatched mix stability, size gradation, hardness, minerology, and chemical compatibility-resulting in unparalleled friction characteristics and life longevity of the fixative film that is Tuff Coat P+. Tuff Coat P+ is always manufactured and sold at 60% residue solids. Tuffcoat P+ meets ASTM D8099/ D8099M-17 Standard Specification for Asphalt Emulsion Pavement Sealer.

B. References

1. **ASTM/AASHTO/ISSA Standards**
   a. AASHTO T59 Standard Method of Test for Emulsified Asphalts
   b. AASHTO T49 Standard Method of Test for Penetration of Bituminous Materials
   c. AASHTO T51 Standard Method of Test for Ductility of Asphalt Materials
   d. AASHTO T44 Standard Method of Test for Solubility of Bituminous Materials
   e. ASTM C128 Standard Method of Test for Relative Density
   f. ASTM C170 Standard Method of Test for Compressive Strength of Dimension Stone
   g. ASTM C114 Standard Method of Test for Dimension Stone (Loss on Ignition)
   h. ASTM D2216 Standard Method of Test for Determining Water Content of Stones by Mass
   i. ASTM C616 Standard Method of Test for Dimension Stone (Determining Moisture Content)
   j. ASTM C2216 Standard Method of Test for Dimension Stone (MOHS Hardness)
   k. ASTM C136 Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates
   l. ASTM D2172 Standard Method of Test for Quantitative Extraction of Asphalt Binder from Asphalt Mixtures
   m. ASTM D244 Standard Method of Test for Emulsified Asphalt Determining Solids Content
   n. ASTM D95 Standard Method of Test for Determining Density of Asphalt Mixtures
   o. AASHTO T111 Standard Method of Test for Mineral Matter of Ash in Asphalt Materials
   p. ASTM D2196 Standard Method of Test for Rheological Properties
   q. ASTM E70 Standard Method of Test for PH of Aqueous Solutions

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r. ASTM D3960 Standard Method of Test for Determining Volatile Organic Compound Content of Coatings
s. ASTM D2939 Standard Method of Test for Emulsified Bitumen's used as Protective Coatings (Resistant to Re-emulsification)
t. ISSA TB1000 (Modified) Standard Method of Test for Scrub Resistance of Protective Coatings

C. Submittals

1. **Mix Design:** If required, provide the following and allow Engineer/Property Manager the requested time to evaluate the submittal.
   a. Date of mix design - If older than 60 days, manufacturer must recertify mix design.
   b. Proportions of aggregate, water, polymer and emulsion in mix
   c. Residual asphalt binder content in pounds per square yard
   d. Residual aggregate/mineral solids content in pounds per gallon
   e. Total minimum gallons per square yard
   f. Results of wet track wear resistance test current within one calendar year of the mix design

D. Weather Limitations

1. **Temperature**
   a. Apply only when pavement and air temperature in the shade is at 55° F and rising.
   b. Cease application if weather is forecasted to drop below 40° F within 48 hours.
2. **Moisture and wind**
   a. Do not apply on wet pavement, in the rain, 24 hours prior to forecasted rain, or in inapt windy weather.

E. Asphalt Binder

1. Use emulsified asphalt SS-1H in accordance with **UDOT** specification, **Section 02745 - AASHTO T59, AASHTO R 5, ASTM D977**
2. Tuffcoat P+ meets all requirements in **TABLE 1, 2, 3.**

TABLE 1 - EMULSIFIED ASPHALT PROPORTIES			
CRITERION	**STANDARD**	**MIN**	**MAX**
Sybot Furol Viscosity	AASHTO T 59	50	100
Storage Stability 24 Hour, %	AASHTO T 59		1.0
Cement Mixing, %	AASHTO T59		2.0
Sieve Test, %	AASHTO T59		0.10
Residue	AASHTO T59	59	63
TABLE 2 - RESIDUE FROM DISTILLATION			
CRITERION	**STANDARD**	**MIN**	**MAX**
Penetration, 100g, 5s,dmm	AASHTO T49	40	80
Ductility, (5cm/min.), cm	AASHTO T51	5 0	70
Solubility In Trichloroethylene	AASHTO T44	97.5	
TABLE 3 - POLYMER MODIFIED ASPHALT AND SPECIALTY POLYMERS			
Polymer, Blended Pre-Mill, Percent of Total Asphalt Binder		**Minimum 4%**	

F. Aggregate

1. Aggregate must be free from organic material and other contaminants. The mineral aggregate must consist of natural crushed stone such as slate, lime stone and sand.
   a. Total sand in aggregate blend shall not **exceed 6%** of total aggregate weight.
2. Gradation annualized according to **ASTM C136** on dry weight and percent passing. The combined aggregate blend shall conform to the following gradation on **TABLE 4, 5.**

TABLE 4 – AGGREGATE PHYSICAL PROPERTIES			
CRITERION	**STANDARD**	**MIN.**	**MAX.**
Specific Gravity	ASTM C128		2.7
Compressive Strength of Dimension Stone	ASTM C170	11,000	
Loss on Ignition at 1000 deg. C, Percent	ASTM C 114		5
Determining Moisture Content, Percent	ASTM D 2216		1
MOHS Hardness	ASTMC 616	6.5	

TABLE 5 - GRADATION (A)		
SIEVE	**STANDARD**	**JOB MIX GRADATION BAND**
# 16	ASTM C 136	75-100
# 30	ASTM C 136	70-98
# 60	ASTM C 136	40-90
# 100	ASTM C 117	35-80
# 200	ASTM C117	20-50

NOTES:
(A) Gradation "BAND" analyzed to ASTM C 136 on dry weight and percent passing basis.

G. Mix Design

1. Tuffcoat P+ meets all requirements in **Table 6.**

TABLE 6 - TUFFCOAT P+ MIX DESIGN			
CRITERON	**STANDARD**	**MIN.**	**MAX.**
Solids Content % by Weight	ASTM D244	59	62
Density, Lbs./gal	ASTM D95	10.9	11.4
Aggregate % by weight of wet mix	ASTM D 308	35	45
Sand Content % by weight of total aggregate			**6**
Initial Brookfield Viscosity (Spindle 4 @ 20 RPM)	ASTM D 2196	7,500	8,000
Ph	ASTM E70	6	8
Maximum VOC, g/L	ASTM D 3960		5
Tests on Residue from Evaporation			
Asphalt Content %, by Weight	ASTM D 2172	24	30
Minerals, Aggregate content % by weight of cured mix by weight	AASHTO T 130	60	
Resistance to Re-emulsification	ASTM D 2939	Very-good	
Wet-track Abrasion one-day soak	ISSA TB1000 Modified		5 grams
Wet-track Abrasion six-day soak	ISSA TB1000 Modified		10 grams

H. Additives and Dilution

1. Dilution, additional polymers and aggregate may be added to achieve mix design requirements.
   a. Use clean potable water that is free from contaminants; a maximum of 5% water for dilution.
   b. Always consult with manufacturer before the use of additional polymers, aggregate and other additives.

I. Asphalt Pavement Surface Preparation

1. **Surface Repair**
   a. Tack coat on highly absorbent, oxidized, polished or raveled asphalt.
   b. Crack filling and patching must be completed before applying surface treatment application.
   c. Severe oil spots should be either thoroughly cleaned then treated with an Oils Spot Primer or cut out and patched.
2. **Cleaning**
   a. Remove loose material, mud, sand, vegetation and other loose material.

J. Tolerances

1. Two coat application will approximately cover 24-26 square feet per gallon.
   a. Target tolerances on each application as follows:
   First application = Approximately 48-52 square feet per gallon
   Second application = Approximately 48-52 square feet per gallon

K. Application

1. Two separate applications are required. The first must be thoroughly set and free of any damp areas before the second application begins.
2. **Spreading**
   a. Keep material delivery at a constant rate.
   b. Do not reduce coverage along curb edges, manhole covers, etc. on either application.
   c. Apply complete and uniform coverage on entire pavement.
   d. Measure the total application of Tuffcoat P+ to verify it meets the required application rate.
   e. Tuffcoat P+ can be applied either with hand held squeegees, motorized buggy, or a spray wand/bar system. A qualified contractor will be able to determine which application technique will best suit the job needs.

L. Pavement Marking and Paints

1. Do not paint or restripe until Tuffcoat P+ has had ample time to dry.
2. For best results, the use of “water borne” paint is recommended when striping seal coated roadways or parking lots. The use of “chlorinated rubber” or other solvent paints is **NOT** recommended when striping roadways or parking lots as “lifting” or “bleeding” may occur. As always it is recommended to follow paint manufacturers specifications on recommended film thickness, etc.

M. Opening to Traffic

1. Do not open to traffic until Tuffcoat P+ has had ample time to dry. Cure time depends on pavement condition, mixture characteristic's and weather. Keep traffic off until material does not track out.

N. Standard Specification ASTM D8099/D8099M for Asphalt Emulsion Pavement Sealer

1. **Scope**
   a. This specification covers water-based asphalt emulsion (mineral colloid or chemically stabilized type) pavement sealer suitable for use as a weather-protective coating over bituminous pavements, such as roadways, parking areas, and driveways.
   b. The values stated in SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.
   c. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*
   d. *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*
2. **Referenced Documents**
   a. *ASTM Standards:*
   b. C136/C136M Test Method for Sieve Analysis of Fine and Coarse Aggregates
   c. C142/C142M Test Method for Clay Lumps and Friable Particles in Aggregates
   d. D95 Test Method for Water in Petroleum Products and Bituminous Materials by Distillation
   e. D140/D140M Practice for Sampling Asphalt Materials
   f. D2939 Test Methods for Emulsified Bitumen's Used as Protective Coatings
3. **Materials and Manufacture**
   a. *Base Asphalt Emulsion*—This emulsion shall be made using binders prepared from crude petroleum.
   b. *Mineral Filler (when used),* shall consist of finely ground clay, silica, limestone, slate, basalt, slag, or other inert inorganic filler materials.
   c. *Aggregate*—The aggregate shall be either a natural or manufactured angular aggregate composed of clean, hard, durable particles free of clay or other objectionable material. Aggregate used shall follow the manufacturer's recommendations; however, in all cases, 100 % of the aggregate shall pass a 2.38 mm [No. 8] mesh-sieve. Aggregate may either be added at the point of manufacture, post-added at the job site, or both.
   d. *Additive*—The optional use of an additive shall be approved by the asphalt emulsion pavement sealer manufacturer.

4. **Physical Requirements**
   a. The manufacturer shall approve the asphalt emulsion pavement sealer as to the specific composition to be used in the mix design.
   b. The asphalt emulsion pavement sealer shall be of smooth, uniform consistency without separation or settlement in storage to the extent that it cannot be readily dispersed by ordinary stirring.
   c. The asphalt emulsion pavement sealer shall be of suitable consistency for application above 10°C [50°F] in films by mechanical squeegee/brush equipment, or spray equipment capable of spraying coatings with aggregate without heating and shall bond to dry surfaces.
   d. *Mixture Testing*—Prior to application, the contractor shall submit samples of component materials for the proposed. In accordance with the terms of agreement between the contractor and owner/related parties. The samples shall be blended according to the manufacturer's recommendations and tested for conformance with the physical property requirements contained in **Table 7.** The samples shall be tested by a laboratory designated by the owner/related parties.
5. **Sampling**
   a. Sample in accordance with Practice D140/D140M and Test Methods D2939.
6. **Inspection**
   a. Inspection of material shall be made as agreed upon between the purchaser and the supplier.
7. **Packaging and Package Marking**
   a. The asphalt emulsion pavement sealer shall be packaged to permit acceptance by the carrier for transportation and to afford adequate protection from the normal hazards of shipping and handling.
8. Tuffcoat P+ meets all requirements within ASTM D8099/D8099M Refer to **Table 7.**

TABLE 7 - ASTM D8099/899M-17 MIX PROPERTIES					
		ASTM D8099/D8099M-17		Tuffcoat P+	
Property	ASTM Designation	MIN	MAX	MIN	MAX
Uniformity	D2939	No separation, coagulation or settlement that cannot be overcome by moderate stirring.		No separation, coagulation or settlement that cannot be overcome by moderate stirring.	
Wet Film Continuity	D2939	Uniform homogeneous consistency		Uniform homogeneous consistency	
Density @25 C 77 F b/Ml lbs/gal	D2939	1.0 [9]	1.5 [12]	1.31 [11]	1.37 [11.5]
Residue by Evaporation %	D2939	30	…	59	61
Water Content %	D95	…	70	30	40
Ash Content of residue %	D2939	10	70	50	70
Drying Time, Film set, hours	D2939		8	2	8
Resistance to Heat	D2939	No blistering or slipping.		No blistering or slipping.	
Resistance to Water (A)	D2939	No loss of adhesion, no blistering or tendency to re-emulsify.		1	2
Flexibility (B)	D2939	No flaking, cracking, or loss of adhesion to the substrate.		1	2

Notes:

(A) Report the rating number that describes the condition of the film or description of the film.
1 No softening, loss of adhesion, or re-emulsification.
2 Slight softening, no loss of adhesion or re-emulsification
3 Evidence of softening and loss of adhesion. No re-emulsification.
4 Evidence of softening, loss of adhesion and re-emulsification.

(B) Immediately after bending, examine the coating for cracking. The following crack rating table is to be used for assessment of the film's condition.
1 Perfect, no cracks hairline or otherwise, no loss of adhesion.
2 Hairline cracks present, no loss of adhesion
3 Slight cracking present, no loss of adhesion, hairline cracks may or not be present.
4 Moderate cracking and/or loss of adhesion. Slight cracking, hairline cracking, may or may not be present.

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