



## **SAM-1**

# **SPECIFICATIONS FOR POLYMER MODIFIED ASPHALT CHIP SEAL**

## **GENERAL**

The work to be accomplished under these specifications includes such equipment, personnel, materials and skill as may be necessary to place a polymerized chip seal onto an existing asphaltic concrete pavement.

## **DESCRIPTION**

As referenced in these specifications, the term "chip seal" is defined as the application of a polymer modified asphalt chip seal.

## **CONTROL OF MATERIALS**

## **CERTIFIED TEST REPORTS**

The Contractor shall submit certified test reports stating that the following materials are in compliance with these specifications:

Mineral Aggregates

Bituminous Materials

## **MANUFACTURER'S DATA**

The Contractor shall submit the temperature-viscosity relationship of the asphalt cement.

## **CERTIFICATE OF COMPLIANCE**

The Contractor shall furnish the Engineer, at least one (1) week prior to the start of work, a list of sources of materials along with Certificates of Compliance, indicating the materials to be incorporated in the work fulfill the requirements of these specifications. The Certificates of Compliance shall be designed by the material supplier or his representative.

## **DELIVERY AND STORAGE**

Materials delivered to the site shall be inspected for contamination and damage. Materials shall be unloaded and stored with a minimum of handling. Aggregates shall be stored in such a manner to protect them from contamination and segregation.

## **SAMPLES**

The Engineer shall have the right to obtain samples of all materials to be used in the work and to test such samples for the purpose of determining specification compliance. The Engineer reserves the right to obtain same samples at the point of delivery and/or at the point of manufacture. The Engineer shall also have the right to inspect sources of materials to be used in the work to determine acceptability of procedures used by the materials supplier.

## **MATERIALS**

Only materials conforming to these specifications shall be incorporated in the work.

### **POLYMER MODIFIED STRESS ABSORBING MEMBRANE:**

#### **ASPHALT**

The base grade of asphalt cement for the polymer modified asphalt mixture shall be PG 64-16 which shall comply with the requirements of AASHTO MP-1. The grade selected shall be based on laboratory testing by the polymer modified asphalt supplier, to ensure compatibility with the polymer.

The polymer modified asphalt shall be PG 76-16 which shall comply with requirements of AASHTO MP-1.

If indicated necessary by laboratory testing, an approved anti-stripping addition may be added to the asphalt.

The blending of the asphalt and polymer modifier to form polymer modified asphalt shall take place through the use of a high speed Siefel mill.

### **POLYMER MODIFIED STRESS ABSORBING MEMBRANE SPECIFICATIONS:**

<b>TEST DESCRIPTION ORIGINAL ASPHALT</b>	<b>ASTM/AASHTO METHOD</b>	<b>SPECIFICATION MINIMUM</b>	<b>LIMITS MAXIMUM</b>	<b>TYPICAL</b>
Penetration 4°C (200 g/60sec), dmm	D5	15	-	18
Penetration 25°C (100 g/5sec), dmm	D5	35	75	39
Softening Point °C 93	D36	80	-	-

Flash Point °C	D92	230	-	260
Ductility 4°C (1 cm/min), cm	D113	20	-	24
<b>TEST DESCRIPTION ORIGINAL ASPHALT</b>	<b>ASTM/AASHTO METHOD</b>	<b>SPECIFICATION MINIMUM</b>	<b>LIMITS MAXIMUM</b>	<b>TYPICAL</b>
Viscosity 135°C	D2170	500	-	850
Solubility in Trichloroethylene %	D2042	99	-	99.9
Dynamic Shear 76°C (10rad/s),G*/sin(delta)(kPa)	TP5	1.00	-	1.405
<b>ROLLING THIN FILM OVEN RESIDUE (T240)</b>				
Penetration 4°C (200 g/60sec), dmm	D5	5	-	10
Penetration 25°C (100 g/5sec), dmm	D5	15	-	18
Viscosity Ratio, 135°C, %	D2170	1.8	-	-
Softening Point °C	D36	80	-	85
Ductility 4°C (1 cm/min)	D113	8	-	10
Dynamic Shear 76°C (10rad/s),G*/sin(delta)(kPa)	TP5	2.20	-	2.529
<b>PRESSURE AGED RESIDUE (PP1)</b>				
Dynamic Shear, 34°C (10rad/s), G* $\sin(\delta)$ (MPa)	TP5	5.000	-	1.41
Bending BcamRheometer PP1 M-value at 60 secs	-	0.300	-	0.358
Stiffness at 60 secs (MPa)	-	300	-	100

## SCREEN AGGREGATE

Screen aggregate shall consist of crushed stone, crushed gravel or both. The crushed stone and crushed gravel shall consist of clean, sound, durable particles, free of soft or disintegrated fragments and foreign matter. At least 70 percent by weight of the aggregate shall have one fractured face produced by crushing.

The aggregate shall be preheated to a temperature between 275°F and 325°F and precoated with 0.50% to 1.00%, by weight, of PG 70/30 asphalt as directed by the Engineer. Precoated aggregate shall be delivered to the job site at a temperature of not less than 240°F. If the precoated aggregate is not delivered to the project site immediately following the time of being manufactured, it shall be stored in a container which shall keep the material free from impurities and which shall retain the elevated temperature.

Maximum aggregate size shall conform to the following gradation:

Sieve Size	Percent Passing
3/8"	100
No. 4	0-25
No. 8	0-5
No. 200	0-2

Aggregate screenings shall also conform to the following requirements:

Test	Individual Test Results
Loss in L.A. Rattler per ASTM C131 (after 100 revolutions)	10% Max.
Loss in L.A. Rattler per ASTM C131 (after 500 revolutions)	40% Max.
Film Stripping per California Test Method 302	25% Max.

**POLYMER MODIFIED ASPHALT CHIP SEAL**

**GENERAL**

The equipment used by the Contractor shall include a self-propelled rotary power broom or mobile pickup broom for pavement cleaning and excess cover material removal.

**POLYMER MODIFIED ASPHALT EQUIPMENT**

All equipment utilized in the production and application of the polymer modified asphalt shall be as described as follows:

**ASPHALT DISTRIBUTOR**

A truck-mounted self-powered distributor truck equipped with a retort heating unit will be used. It shall be equipped with a full circulating spreader bar and a pumping system capable of applying polymer modified asphalt material within  $\pm$  0.05 gallons per square yard tolerance of the specified application rate and must give a uniform covering of the surface to be treated. The application of material shall be controlled by a C.R.C. computer. The distributor shall also include a tachometer, pressure gauge, volume measuring device and a thermometer. The distributor truck shall be ADOT bar certified within the previous six months.

The Engineer reserves the right to order the discontinuance of use of equipment which in his/her opinion fails to produce a satisfactory distribution of polymer modified asphalt in accordance with these specifications.

### **COVER MATERIAL SPREADER**

The cover material (chip) spreader shall be a self-propelled machine with an aggregate receiving hopper in the rear and belt conveyors with at least a 30 inch width to carry the aggregate to the front. The spreader shall be in good mechanical condition and be capable of applying the cover material uniformly across the spread at the specified rate. The chip spreader shall be computer controlled, capable of accurately distributing chips evenly within one-half (1/2) pound per square yard, such as Bearcat or approved equal. If in the opinion of the Project Officer, chip application exceeds what is required, the Contractor will be paid by the specified application rate instead of actual quantities in those areas.

### **ROLLING EQUIPMENT**

A minimum of three operational self-propelled pneumatic-tired rollers shall be used for the required rolling of the cover material. The pneumatic-tired roller shall carry a minimum loading of 3,000 pounds on each wheel and minimum air pressure of 80 pounds per square inch in each tire.

### **CLEANING EQUIPMENT**

Only mobile type, or sidekick sweepers will be permitted to clean the chip seal surface.

### **HAND TOOLS**

Asphalt lutes and other equipment shall be available for those areas inaccessible to the spreader box.

### **NOTIFICATION OF WORK**

All homeowners and businesses affected by the paving shall be notified one day in advance of the surfacing. Suitable tow-away signs may be posted prior to the surfacing. Should work not occur on the specified day, a new notification will be distributed.

The notification shall be in a form of written posting, stating the time and date that the surfacing will take place.

### **DISPOSAL OF EXCAVATED MATERIALS**

The Contractor shall remove and transport debris and rubbish in a manner that will prevent spillage on streets and adjacent areas. Clean up of spillage will be at the Contractor's expense.

All materials removed from the site shall be disposed of at the Contractor's expense at a site approved by the Engineer.

### **TRAFFIC CONTROL**

Traffic control methods shall conform to the local or state traffic control manuals.

Payment for traffic control shall be included in the lump sum price for "traffic control" in the bid schedule and shall include full compensation for all labor, cones, lights, signs and all other incidentals.

### **POLYMER MODIFIED ASPHALT CHIP SEAL**

#### **GENERAL**

Due to the handling characteristics of the polymer modified asphalt, when radii or other irregular areas are to be sealed, it is recommended that this be done with a CRS-2P asphalt emulsion.

### **PAVEMENT REPAIRS**

#### **DEEP PATCH**

This work shall conform to the specifications for "Removal and Replacement Patching" (see [www.sunlandasphalt.com](http://www.sunlandasphalt.com)).

#### **SURFACE PATCH**

This work shall conform to the specifications for "Surface Patching" (see [www.sunlandasphalt.com](http://www.sunlandasphalt.com)).

#### **CRACK SEALING**

This work shall conform to the specifications for "Cracksealing" (see [www.sunlandasphalt.com](http://www.sunlandasphalt.com)).

### **MEASUREMENT AND PAYMENT**

Payment for asphaltic concrete for both the deep patch and surface patch areas shall be per square foot of asphaltic concrete installed. The price shall include all excavation, compaction, installation, and tack coat application.

The payment for sealing cracks shall be per pound of crack sealing material applied. The price shall include full compensation for cleaning all cracks and all labor and materials necessary for the work.

Payment for the tack coat shall be per square yard of asphalt emulsion installed. The price shall include installation, labor and all materials necessary for the work.

### **SURFACE PREPARATION**

Immediately prior to applying the polymer modified asphalt, the surface shall be cleaned by sweeping, flushing or other means necessary to remove all loose particles of paving, all dirt and all other extraneous material. Pavements impregnated with grease, oil or fuel shall be thoroughly cleaned.

The polymer modified asphalt shall not be applied until an inspection of the surface has been made by the Engineer, and the Engineer has determined that the surface is suitable for polymer modified asphalt application.

At the Engineer's direction, a tack coat of SS1H asphalt emulsion shall be applied. The material to be diluted with water at a rate of 1:1 at an application rate of .05 to .10 gallons per square yard.

### **APPLICATION OF POLYMER MODIFIED ASPHALT MATERIAL**

Placement of the polymer modified asphalt shall be made only under the following conditions:

1. The pavement surface temperature shall be 40°F and rising.
2. The pavement surface is clean and absolutely dry.
3. The wind conditions are not excessive.
4. All construction equipment such as polymer asphalt distributor, cover material spreader, haul trucks with cover material and rollers are in position and ready to commence polymer modified asphalt placement operations.

5. Rain is not imminent.

The polymer modified asphalt mixture shall be applied at a temperature of 290°F to 375°F at a rate of .50 to .60 gallons per square yard as directed by the Engineer.

The polymer modified asphalt shall not be applied until sufficient screenings are on hand for immediate cover.

The polymer modified asphalt shall not be spread a greater distance than can be immediately covered by aggregate screenings unless otherwise permitted by the Engineer.

### **SPREADING OF SCREENED AGGREGATE**

Cover material shall be spread immediately and uniformly over the polymer modified asphalt at a spreading rate of 28 to 35 pounds per square yard.

At the time of application to the polymer modified asphalt cover material shall be preheated and coated to gain proper adhesion to the polymer modified asphalt material.

The joint between adjacent applications of aggregate shall coincide with the line between designated traffic lanes.

Operating the aggregate-spreading equipment at speeds which cause the chips to roll over after striking the polymer modified asphalt surface will not be permitted.

The transverse cut-off of screenings shall be complete and any excess screenings shall be removed from the surface prior to resuming operations.

Stockpiling of screenings prior to placing will be permitted, however; any contamination resulting from storage or reloading will be cause for reflection.

### **FINISHING**

At least three operational pneumatic-tired rollers complying with the requirements of Section 3.1.3 shall be provided to accomplish the required embedment of the cover material. At some project locations, or where production rates dictate, fewer rollers may be utilized as directed by the Engineer. At no time shall there be less than two operational pneumatic-tired rollers on a project.

Sufficient rollers shall be used for the initial rolling to cover the width of the aggregate spread with one pass. The first pass shall be made immediately

behind the cover material spreader, and if the spreading is stopped for an extended period, the cover material spreader shall be moved ahead or off the side so that all cover material may be immediately rolled. Three completed passes with rollers shall be made with all rolling completed within 1/2 hour after the application of the cover material.

Sweeping of loose cover material can begin a minimum of one (1) hour after polymer modified asphalt placement.

Excess screenings which, in the opinion of the Engineer, are not salvageable and which interfere with drainage shall be removed and disposed of by the Contractor at the Contractor's expense. The removed screenings shall be disposed of as directed by the Engineer.

### **SET AND CURE TIME**

Except when it is necessary that hauling equipment must travel on the newly applied membrane, traffic of all types shall be kept off the membrane until it has had time to set properly. The speed of all hauling equipment shall not exceed 15 miles per hour when traveling over a membrane which is not adequately set. The minimum traffic-free period shall not be less than one half (1/2) hour.