

**DELAWARE COUNTY
DELAWARE COUNTY ENGINEER'S OFFICE**

SUPPLEMENTAL SPECIFICATION 1210

STRESS ABSORBING MEMBRANE INTERLAYER

MARCH 17, 2011

- 1210.01 Description**
- 1210.02 Specifications and Materials**
- 1210.03 Equipment**
- 1210.04 Pre-paving on site meeting**
- 1210.05 Weather Limitations**
- 1210.06 Construction**
- 1210.07 Application of Bituminous Binder**
- 1210.08 Quality Control**
- 1210.09 Documentation**
- 1210.10 Acceptance**
- 1210.11 Placement of Asphalt Overlay**
- 1210.12 Method of Measurement**
- 1210.13 Basis of Payment**

1210.01 Description. This work shall consist of furnishing all materials, equipment, labor and preparation necessary for the application of Stress Absorbing Membrane Interlayer (SAMI). The applied material shall completely seal the entire pavement surface and provide a uniform textured surface, suitable for placement of hot mixed asphalt, micro-surfacing or as a finished surface.

1210.02 Materials.

A. Polymer Modified Bituminous Binder.

**TABLE 1210.02-1
POLYMER MODIFIED BITUMINOUS BINDER**

Property	Minimum	Maximum	Test Method
S.F. Viscosity, 50°C (sec.)	50	400	ASTM D 244
Percent Solids (%)*	70	----	ASTM D 244
Storage Stability, 24 hrs. (%)	----	1.0	ASTM D 244
Sieve Test, #20 mesh (%)	----	0.1	ASTM D 244

Tests on Residue by Distillation Test

Penetration, 25°C, 100g. 5 sec.	70	100	ASTM D 5
Softening Point, Ring & Ball (°C)	65	----	ASTM D 36
Elastic Recovery, 4°C, 10 cm (%)**	70	----	ASTM D 113

Force Ductility, 4°C, 40 cm***	25 lb/in ²	ASTM D 4
--------------------------------	-----------------------	----------

* By distillation or evaporation

** The specimen is extended 10 cm. The extended area is severed in the middle using a pair of shears. After 1 hour, at the test temperature the severed ends are returned to contact and the ductilometer reading is made again. The sample must recover at least 70 percent of the original 10 cm distance.

*** ASTM D 113 as modified by the addition of a load cell to the standard ductility apparatus. The load cell is calibrated in pounds per square centimeter. Reading is measured at 40 cm. Reading is multiplied by 6.45 to yield pounds per square inch force required to extend the test specimen.

The asphalt modifier shall be a SBS type polymer, Styrene-Butadiene-Styrene. The modifier shall be added to the asphalt cement prior to the emulsification process.

B. Fiberglass Strands. For Fiberized Type I and Type II materials, the fiberglass strands shall be in uniform lengths of 2.0 to 4.0 inches. The manufacturer shall submit to the Department the source of the fiberglass strands and confirm the suitability of use of the fiberglass in the SAMI.

C. Course Aggregate. The course aggregate shall be 100% crushed material from quarried stone, natural gravel or other high quality aggregate and meet the following requirements:

**TABLE 1210.02-2
COURSE AGGREGATE PROPERTIES**

Property	Minimum	Maximum	Test Method
S.F. Viscosity, 50°C (sec.)	50	400	AASHTO T96
Deleterious Material (%)	70	1.0	S1029
Crushed Pieces (%)	100	----	S1021
Sodium Sulfate Soundness Test, 5 cycle	----	15	AASHTO T104

**TABLE 1210.02-3
GRADATION REQUIREMENTS – ASTM C-117**

Sieve Size	Total Percent Passing	
	Type I	Type II
1 inch	100	100
3/4 inch	100	90 to 100
1/2 inch	95 to 100	20 to 50
No. 4	5 to 25	0 to 10
No. 8	0 to 10	0 to 5
No. 200	2	2

1210.03 Equipment. All equipment required for performance of the work shall be approved before construction is to begin, and shall be maintained in satisfactory operating condition. The Contractor shall furnish an accurate thermometer, hand brooms and other small tools and equipment essential for the completion of the work.

A. Pressure Distributor. The pressure distributor shall have a computerized rate control that automatically adjusts the distributor's pump to the ground speed. The pressure distributor shall be capable of heating and re-circulating the bituminous binder to the specified temperature. The proper nozzles shall be used for the material and rate specified.

B. Fiberglass Spreader. The fiberglass spreader, if using a Fiberized material, shall be attached to or integrally constructed with the pressure distributor machine and be designed to cut and distribute the fiberglass strands into the SAMI. The machine shall be equipped as necessary to produce a uniform distribution of materials at the specified rate.

C. Aggregate Spreader. The aggregate spreader shall be self-propelled and shall be equipped with hoppers, revolving cylinders and adjustments necessary to produce a uniform distribution of material at the specified rate.

D. Pneumatic Tire Roller. The pneumatic tire rollers shall conform to CMS 401.12 Type P-2.

1210.04 Pre-paving on Site Meeting. A meeting between the Contractor and Engineer will be held at the project site prior to beginning work. The agenda for this meeting will include:

- Review of Contractors detailed work schedule
- Review of the traffic control plan
- Inspection of equipment
- Calibration and adjustment to equipment

1210.05 Weather Limitations. The stress absorbing membrane interlayer shall be placed when the pavement and atmospheric temperature is 50°F or above. Placement is not permitted if it is raining, when the pavement surface is wet, or when temperatures are forecasted to be below 32° F within 24 hours of placement.

1210.06 Construction. The Contractor shall follow the construction methods as described.

A. The Contractor shall establish stations, at 200 foot intervals, for project segments less than 1 mile in length, or 500 foot intervals, for project segment lengths 1 mile or greater, on the entire project, prior to placing the stress absorbing membrane interlayer. The stations shall be maintained until the project is completed.

B. Preparation of the surface shall be in accordance with CMS 407.04. The surface shall be cleaned by the Contractor and shall be dry when the bituminous binder is applied. Material cleaned from the surface shall be disposed of in accordance with CMS 203.01.

C. The specified aggregate shall be spread uniformly onto the bituminous binder within 30 seconds of the bituminous spray and shall be placed in accordance with CMS 409.09, except that three-wheel rollers will not be required.

D. Projects greater than 12,000 yd² shall use a minimum of two rollers. Rollers shall proceed at maximum speed of 5 mph. The entire surface shall receive a minimum of two roller passes. The first roller pass shall be performed within one minute of aggregate spreading.

E. Brooming of the completed surface shall be accomplished prior to unrestricted use by traffic. The entire surface shall be clean of all loose material within 24 hours and prior to placement of surface course material.

F. The Contractor shall protect all utility castings using tarpaper or other approved material. All covers shall be properly fitted to the casting and removed prior to sweeping.

1210.07 Application of Bituminous Binder, Fiberglass Strands and Course Aggregate.

The bituminous binder shall be heated to specified temperature and uniformly placed to prevent ridges or streaks in the surface and shall be in accordance with CMS 409.08.

A. Bituminous Binder. The bituminous binder shall be applied at a temperature of 150°F to 180°F, and at the rate specified.

B. Fiberglass Strands. The fiberglass strands for Fiberized Type I and Type II materials shall be cut and blown or otherwise placed between layers of bituminous binder at the point of placement at the rate specified. The fiberglass strands shall be completely coated by the binder and uniformly incorporated into the SAMI. Clumping of fiberglass strands shall be cause for rejection of the SAMI.

C. Course Aggregate. Stockpiling and loading methods shall permit ready identification of material and to minimize segregation and contamination of the aggregate.

The moisture content of the course aggregate shall be below 4% and maintained throughout the project.

Course aggregate shall be spread uniformly without ridges or gaps at the specified rates.

Spreading of the aggregate shall be adjusted to produce a minimum of excess loose particles and shall provide complete coverage after rolling.

The spreading operation shall be accomplished in such a manner that the tires of trucks or the spreader at no time comes into contact with the newly applied bituminous material.

D. Material Application Rates

**TABLE 1210.07-1
BINDER APPLICATION RATE**

APPLICATION TYPE	Gallons per Square Yard		
	TYPE I	TYPE II	TOLERANCE
Finished Surface	0.40 – 0.45	N/A	± 0.2
Prior to Micro-Surfacing	0.45 – 0.50	N/A	± 0.2
Prior to 1 inch min. overlay	0.50 – 0.55	0.65 – 0.70	± 0.2

Cut fiberglass strands shall be applied at a rate of 3.0 to 4.0 ounces per square yard as determined by the supplier of the SAMI binder. Higher application rates shall be used for more severely cracked pavements.

Aggregate application rate shall be as determined by the supplier of the SAMI binder and shall produce a completed surface with no exposed binder. The supplier of the SAMI binder shall determine the application rate for emulsion and aggregate, based on the existing pavement condition and aggregate size. This information shall be reported to the Engineer prior to beginning work and shall include an aggregate gradation on the job specific materials.

1210.08 Quality Control. The Contractor to measure compliance shall use the methods described in this section.

- Aggregate gradation
- Aggregate Moisture Content
- Yield Check on Bituminous Binder
- Temperature Check on Bituminous Binder
- Placement rate of fiberglass strands
- Length of fiberglass strands

If the Contractor's test results exceed any of the identified quality control tolerances, the Engineer shall be immediately notified. The Engineer will review the explanation and the corrective action taken by the Contractor. Another test will be taken and if the results still exceed the quality control tolerance, placement shall stop. The Contractor shall immediately notify the Engineer, and identify the cause of the excessive deviation and detail corrective action necessary to bring the deficiency into compliance. The Engineer will give approval prior to resuming work.

A. Bituminous Binder. The application rate shall not exceed a tolerance of 0.02 gallons per square yard from the specified rate, and within the temperature range as specified in 1510.07.

B. Course Aggregate. The aggregate shall be clean and uniform, and shall be within the gradation range as specified in 1510.02, Moisture content shall not exceed the tolerance as specified in 1510.07.

C. Fiberglass Strands. The fiberglass application rate shall be measured and verified from material tickets or other forms that are acceptable to the Engineer. Length of strands shall be checked at least twice daily during placement.

1210.09 Documentation. The Contractor shall provide the Engineer a daily report with the following information:

- Control Section/Project Number/County/Route
- Date/Air Temperature/Pavement Temperature
- Bituminous Binder Temperature (3 per day)
- Station Location per Test
- Beginning and Ending Stations
- Yield Check on Bituminous Binder (3 per day)
- Aggregate Gradation & Moisture (1 per day)
- Length/Width/Total Area
- Fiberglass strand application rate calculated from material tickets and area completed (1 per day)

Other required documentation shall include bill of lading on aggregate and bituminous binder, to be provided as requested or at project completion.

1210.10 Acceptance. The Contractor shall inspect the completed Stress Absorbing Membrane Interlayer during the application process for any deficiencies. The deficiencies will be limited to flushing, surface patterns and loss of stone retention.

Workmanship shall be inspected for the following:

- Untreated areas (missed)
- No overlap on longitudinal joints
- No overlap on construction joints
- No clumping of fiberglass strands

All corrective work shall be accomplished prior to resurfacing with bituminous materials, or within 24 hours. The Contractor shall furnish materials, equipment and labor to make corrections at no additional cost to the Contract. The Engineer shall give final approval on inspection and corrective work.

1210.11 Placement of Asphalt Overlay. If the SAMI application is used as an intermediate layer for an asphalt overlay, a minimum period of 24 hours shall be observed prior to the placement of the asphalt surface course after placement of the SAMI material. This time limit may be increased or decreased by the Engineer dependent on ambient temperatures and conditions.

1210.12 Method of Measurement. Stress absorbing membrane interlayer will be measured by the square yard as provided for in the Contract Documents. The accepted quantities,

measured as provided for above, will be paid for at the contract unit price for stress absorbing membrane interlayer.

1210.13 Basis of Payment. Stress absorbing membrane interlayer shall be paid for per square yard for furnishing all preparation, materials, equipment, labor, clean up, and incidentals necessary to complete the work as specified.

Item	Description	Unit
1210	SAMI, Non-Fiberized, Type I	Square Yard
1210	SAMI, Non-Fiberized, Type II	Square Yard
1210	SAMI, Fiberized, Type I	Square Yard
1210	SAMI, Fiberized, Type II	Square Yard