

ATTACHMENT 10
DETAILED SPECIFICATIONS
LIQUID BITUMINOUS MATERIALS
IFB #23232

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DETAILED SPECIFICATIONS – Cold Recycling**416 COLD RECYCLING ASPHALT CONCRETE****416-1 DESCRIPTION**

Cold recycling asphalt concrete consists of milling the existing pavement, mixing with bituminous material and aggregate, and compacting the mixture as indicated in the contract documents.

416-2 MATERIALS

416-2.01 Bituminous Material. Obtain liquid bituminous material meeting §702, supplied from a Department approved facility.

- A. Asphalt Emulsion.** Use material meeting 702-4 Anionic and Cationic Asphalt Emulsions, material designation 702-3301.
- B. Polymer-Modified Asphalt Emulsion.** Use material meeting 702-5 Polymer-Modified Asphalt Emulsion, material designation 702-3301P. Except that the minimum elastic recovery will be 25%. Use a materials designation of 702-3301R on all Asphalt Emulsion Certified Test Analysis sheets.

Other grades of asphalt emulsion having a certified minimum of 65% asphalt residue may be used with the approval of the Materials Bureau Director.

- C. Performance Graded Binder.** Use material meeting 702-1 Performance-Graded Binders for Paving.

Other grades of performance grade binder may be used with the approval of the Materials Bureau Director.

- D. Fog Seal.** Use material meeting 702-6 Asphalt Emulsion – Diluted Tack Coat.

416-2.02 Aggregates. Use material meeting the requirements of §703-02 Coarse Aggregate.

416-2.03 Portland Cement. Use material meeting the requirements of §701-01 Portland Cement, Type I/II.

Other types of cement may be used with the approval of the Director of the Materials Bureau.

416-2.04 Water: Meeting §712-01.

416-2.05 Equipment:

A. Recycling Equipment. Use equipment capable of:

- Milling the existing pavement to within 1/4" of required depth and cross slope.
- Producing a uniform surface texture free from gouges and ridges greater than 3/8" in depth.
- Controlling profile.
- Processing the reclaimed material to pass a 2-inch sieve.

DETAILED SPECIFICATIONS – Cold Recycling (Cont'd)

- Mixing the reclaimed material with bituminous material and other additives.
- Controlling surge material caused by irregularities in the pavement surface or width.
- Measuring water usage with a totalizing water meter.
- Measuring emulsion or performance-grade binder usage with a mass flow meter.

Calibration: Annual calibration of the mixing equipment is due prior to the start of the season, in accordance with Materials Procedure 417. Subsequent calibrations in accordance with manufacturers recommendations. Submit the calibration results for approval to the Director, Materials Bureau at DOT.sm.Pavement.Preservation.Friction@dot.ny.gov , at least 7 days prior to the start of work.

- B. Miller.** Meeting §490-2.01
- C. Paver.** Meeting §402-3.02
- D. Rollers.** Meeting §402-3.04
- E. Emulsion Distributer.** Meeting §407-3.01
- F. Pilot Vehicle.** Shall be equipped with; a two-way radio, construction sign meeting the requirements of Section 6F.58 of the MUTCD, an amber beacon, and have the name of the Contractor prominently displayed.

416-3 CONSTRUCTION DETAILS

- 416-3.01 Temperature & Seasonal Limitations.** Perform all work between May 1 and October 7. Work is not permitted when the air or surface temperature is below 45 °F or is expected to drop below 40 °F within 24 hours.
- 416-3.02 Mix Design.** Formulate a mix design in accordance with Materials Method 416. Identify type and amount of all additives incorporated. Submit to the Engineer, Regional Materials Engineer, and Director of the Materials at DOT.sm.Pavement.Preservation.Friction@dot.ny.gov , 7 days prior to the pre-recycling meeting.
- 416-3.03 Materials Management Plan (MMP).** Complete in accordance with Materials Method 416. Submit to the Engineer, Regional Materials Engineer, and Director of the Materials at DOT.sm.Pavement.Preservation.Friction@dot.ny.gov , 7 days prior to the pre-recycling meeting.
- 416-3.04 Pilot Vehicle.** Maintain traffic using a pilot vehicle to escort traffic through the work zone at a maximum speed of 20 mph.

DETAILED SPECIFICATIONS – Cold Recycling (Cont’d)

416-3.05 Milling. Mill to depth indicated in the contract documents. The depth of the milling will be measured at centerline. Mill the full width of the existing pavement and shoulder. Maintain existing cross slope unless otherwise noted. The milled surface will meet the requirements of §490.

All milled surfaces will be repaved with recycled material the same day milling is performed.

416-3.06 Recycling. Maintain bituminous material rates within 10% of the design rate. Make field changes in 0.10% - 0.20% increments. Changes exceeding 10% of the design rate require Regional Materials Engineer’s approval. Do not exceed the following rates without the approval of the Materials Bureau Director.

Maximum Liquid Application Rates Gallons / Square Yard Recycled		
Depth of Recycle	Emulsion	PG Binder
3-inch	1.45	1.09
4-inch	1.93	1.45

Do not adjust add stone rates without the Regional Materials Engineer’s approval.

Portland cement maximum rate of application is 1% by weight of recycled material. Portland cement shall be spread in a uniform manner, across the pavement, in front of the recycling equipment or as a slurry through the recycling equipment.

Report the water usage rate and any subsequent changes to the Regional Materials Engineer.

Minimum Water Application Rates Gallons / Square Yard Recycled		
Depth of Recycle	Emulsion	PG Binder
3-inch	0.36	0.72
4-inch	0.48	0.96

416-3.07 Quality Control Testing. Once continuous production has been achieved, test two samples of the recycled mixture for gradation and total asphalt content. Submit the test results to the Engineer, Regional Materials Engineer, and Director of the Materials at DOT.sm.Pavement.Preservation.Friction@dot.ny.gov , before the end of the next workday.

For each subsequent day of production, take a minimum of one sample of the recycled mixture for each lane mile of pavement recycled. Test each sample for gradation and total asphalt content. Submit the test results to the Engineer, Regional Materials Engineer, and Director of the Materials at DOT.sm.Pavement.Preservation.Friction@dot.ny.gov , within two workdays.

DETAILED SPECIFICATIONS – Cold Recycling (Cont’d)

If a second recycling train is brought to the project, take samples following the frequencies detailed above, including taking two samples on the first day of use.

Perform any additional quality control tests as described in Materials Method 416.

416-3.08 Spreading. Place millings, add stone, bituminous material, recycling additives, and water as a homogeneous mixture in a hopper or windrow. Use paver to reestablish cross slope of milled surfaces, unless noted otherwise.

416-3.09 Compaction. Compact the mixture in accordance with §402-3.07 Compaction, 70 Series Compaction and Table 416-1 – Rolling Requirements, with the following exception.

Reestablish a new Project Target Density, PTD, when two consecutive density readings are recorded less than 96%, or greater than 110% of the previous PTD.

Provide a minimum of three rollers.

TABLE 416-1 – ROLLING REQUIREMENTS

Compaction Sequence	Roller Type	Compaction Type	Minimum # of Passes
Initial	Steel or Pneumatic ¹	Vibratory or Static ²	2
Intermediate	Steel or Pneumatic ¹	Vibratory or Static ²	2
Finish	Steel	Static	2

¹ Either the initial or intermediate passes will use a pneumatic roller

² Either the initial or intermediate passes will operate using vibratory compaction

Operate rollers at a uniform speed. Complete all turning of the compaction equipment on material which has had a minimum of one roller pass.

Changes to the roller pattern require approval of the Engineer.

Remove material that cannot be properly and adequately compacted to a stable condition.

416-3.10 Longitudinal Joints. Construct a longitudinal joint at the centerline. Subsequent recycling passes will reclaim a minimum of 6 inches of the adjacent compacted recycled mat.

If any length of the recycled materials longitudinal joint is exposed at the end of the working day, construct a wedge of recycled material at a slope of 1 on 8 or flatter to meet the existing pavement elevation. Do not overlap recycled material onto the existing pavement.

416-3.11 Temporary Pavement Markings. Apply temporary pavement markings meeting the requirements of Section 619 at the centerline and edge line of the recycled material before the end of each workday. Maintain temporary markings until the recycled material is overlaid.

DETAILED SPECIFICATIONS – Cold Recycling (Cont’d)

416-3.12 Surface Tolerance. Construct the recycled surface to a 3/8th inch tolerance in 15 feet parallel to centerline, or 10 feet perpendicular to centerline. Construct the longitudinal joint such that the elevation difference of the joint is less than 3/16th inch.

Tolerance requirements apply from the time of recycling until the recycled material is overlaid, not exceeding 30 days.

416-3.13 Brooming. Broom the pavement and shoulders to remove loose stone or reclaimed material.

Brooming requirements apply from the time of recycling until the recycled material is overlaid, not to exceed 30 days.

416-3.14 Cure Times. Recycled mixtures cannot be overlaid until the minimum cure times in Table 416-2 have been met.

TABLE 416-2 Cure Time

Bituminous Material Used	Cure Period
PG Binder	3 Days
Asphalt Emulsion	10 Days

416-3.15 Fog Seal. Application of fog seal requires the Engineer’s daily approval. The maximum rate of application is 0.1 gallons/square yard.

Provide a work zone traffic control plan for the fog seal operation and submit to the Engineer for approval. Stopped traffic will not be allowed on a fog sealed surface for a minimum of 1 hour after application.

416-3.16 Damaged or Deficient Areas. Rework or replace all mix that ravel, is loose or broken, or is not uniform.

Correct any area showing an excess or deficiency of bituminous material.

Correct all areas not meeting the requirements of the surface tolerance. The repair method will be approved by the Engineer.

All repairs of damaged areas will be completed at no additional cost to the State.

416-4 METHOD OF MEASUREMENT

Cold recycling Asphalt Concrete is measured by the number of square yards of existing pavement surface milled and recycled.

The liquid bituminous material will be measured by the number of 60°F gallons actually incorporated in the work. The following formulas will be used to calculate 60°F gallons:

Fog Seal:

$$\text{Volume } 60^{\circ}\text{F} = \text{VolumeD} \times [1 - (\Delta\text{T} \times 0.00025)] \text{ Where:}$$

$$\Delta\text{T} = \text{Delivered Temperature } (^{\circ}\text{F}) - 60 \text{ VolumeD} = \text{Quantity Delivered (gallons)}$$

DETAILED SPECIFICATIONS – Cold Recycling (Cont’d)

A temperature conversion is not required for recyclers equipped with a mass flow meter. The liquid bituminous material will be measured from the following formula:

Asphalt Emulsion and Performance Graded Binder:

$$\text{VolumeD} = (\text{MassD} / 8.34 \text{ ppg}) \times \text{Liquid Bituminous Material Specific Gravity at } 60^{\circ}\text{F}$$

Where:

$$\text{MassD} = \text{Quantity Delivered (pounds)} \quad \text{VolumeD} = \text{Quantity Delivered (gallons)}$$

Portland Cement will be measured by the number of tons incorporated into the work.

Additional aggregate will be measured in accordance with section 623.

416-5 BASIS OF PAYMENT

The unit price bid per square yard for cold recycling asphalt concrete will include the cost of all labor, materials and equipment necessary to perform the work.

The unit price bid per gallon for bituminous material will include the cost of all labor, materials and equipment necessary to perform the work

The unit price bid per ton for Portland cement will include the cost of all labor, materials and equipment necessary to perform the work

Additional aggregate will be paid in accordance with section 623.

Payment will be made under:

Item No.	Item	Pay Unit
416.10	Cold Recycling Asphalt Concrete-Coarse	Square Yards
416.11	Cold Recycling Asphalt Concrete-Fine	Square Yards
416.20	Asphalt Emulsion	Gallons
416.21	Polymer Modified Asphalt Emulsion	Gallons
416.22	Performance Graded Binder	Gallons
416.30	Fog Seal	Gallons
416.40	Portland Cement	Tons
623.0X	Aggregate	Tons

DETAILED SPECIFICATIONS – Heater Scarification**417 – HEATER SCARIFICATION OF HOT MIX ASPHALT (HMA) PAVEMENT**

417-1 DESCRIPTION. This work shall consist of recycling the existing hot mix asphalt (HMA) pavement surface. The HMA pavement surface is heated using specialized equipment causing the asphalt to soften. In a continuous process, the softened HMA surface is scarified to a specified depth as detailed in the Contract documents. The scarified and milled asphalt pavement is then mixed with a recycling agent that rejuvenates the asphalt. This mix is then placed and compacted back onto to the roadway. The scarified layer must be covered by a wearing surface.

417-2 MATERIALS

417-2.01 Recycling Agent. Use a recycling agent specifically designed as a rejuvenator meeting the requirements outlined in Section 702 – *Bituminous Materials*, 8. *Asphalt Recycling Agent*, Table 702-9 *Recycling Agent* or Table 702-10 *Emulsified Recycling Agent*. At the start of and during production, provide certified test results and documented quantities to the Engineer for each shipment of recycling agent. The use of any other grade of recycling agent or other product requires prior approval from the Director, Materials Bureau. A minimum 2-week notice is needed for this approval.

417-2.02 Mixture Design. Determine the application rate of the recycling agent for heater scarification by taking and analyzing a minimum of three cores per lane mile or a maximum of 20 cores per project from the existing HMA pavement. Take these cores from locations that represent the entire project condition.

The design application rate of the recycling agent should provide an average penetration value of at least 30% or more than the average penetration value of the recovered asphalt binder from the existing pavement cores. Do not exceed the final penetration value of 90. Perform all the sample tests for the penetration values in accordance with AASHTO T 49, *Penetration of Bituminous Materials*.

417-3 CONSTRUCTION DETAILS.

417-3.01 Equipment. The heater scarification train consists of at least two heating units and a heater scarification unit consisting of a scarifier, a sprayer, a milling/remixer drum, and a screed.

A. Preheating or Heating Unit. This unit must generate sufficient radiant heat with no open flame to soften the asphalt pavement to the depth required. The burner assembly must be adjustable up to 14 feet wide. The entire heating unit must be enclosed and vented to contain the heat and prevent damage to adjacent properties and landscape. A minimum of two pre-heater units shall be used to allow lower heating temperatures and longer durations to enhance temperature penetration. Additional heating units may be required if the temperature behind the screed does not meet specification requirements.

B. Heater Scarification Unit. This equipment must be a self-contained machine designed to reprocess only the upper layers of the existing HMA pavement. The heater scarification unit must be self-propelled and capable of operating at speeds of 8 to 26 feet per minute while uniformly heating and scarifying the existing HMA pavement to the minimum loose mix depth specified in the contract documents. Listed below are the various units that are part of the heater scarification train.

DETAILED SPECIFICATIONS – Heater Scarification (Cont'd)

1. **Scarifier.** The scarifying unit must contain at least 2 rows of spring-loaded tines that are adjustable to scarify up to 14 feet wide. The tines in a row must be no more than 1.0 inch apart. This unit must also be able to conform to the pavement contours to ensure a uniform penetration from the tines and prevent damage to utility structures.
 2. **Sprayer.** This unit must be immediately behind the scarifying unit and capable of uniformly applying the recycling agent to the reclaimed asphalt pavement at the approved rate. Select the size of the nozzles located on the spray bar and pump based upon the rate of application and the forward speed of the heater scarification unit. This unit must be equipped with a measuring system which is capable of maintaining the required application rate of the recycling agent within a tolerance of $\pm 5\%$ for the mix design. The measuring system must continuously verify and display the application rate of recycling agent and cumulative total with respect to the volume of scarified material for the road surface.
 3. **Mill/Remixer.** Immediately following the application of the recycling agent, an enclosed milling unit is required to mill the asphalt pavement to the loose mix depth specified in the contract documents, thoroughly mixing the recycling agent with the scarified and milled pavement. If a loose mix depth is not specified, the loose mix shall be 1.5 inches. The mill/remixer unit must be located between the spray unit, which applies the recycling agent, and the screed. This unit must be operated hydraulically, be able to maintain depth control, and able to work at variable speeds up to 120 rpm. The mill must be adjustable up to 14 feet wide.
 4. **Screed.** The attached heated, augured vibratory screed must be able to uniformly distribute the hot scarified material to the desired longitudinal and transverse section. The screed must be adjustable up to 14 feet wide, equipped with an adjustable crown control and each end of the screed must have hand wheel adjusting screws for providing the desired longitudinal grade and transverse slope.
- C. **Safety Requirements.** Each unit shall have an integrated water spray system and water misters to pre-wet vegetation and provide heat control. Hand hoses with adjustable nozzles will be placed on each unit to allow for pre-wetting specific plants or objects. Each unit shall have integrated water tanks having a minimum 500 gallon capacity. The operation of these systems shall be demonstrated to the Engineer to be fully functional prior to the commencement of work and shall be refilled as required during daily production.

All propane tanks on recycling equipment units shall conform to Federal, State and local regulations and laws relative to the transportation of Liquid Propane Gas. Tanks are to be inspected and certified by a Federal and DOT registered inspection and repair facility. Certification compliance stickers shall be prominently displayed on recycling units. Each propane tank on the recycling units will have a ground fill system and meter to ensure safety of personnel during propane fill operations.

DETAILED SPECIFICATIONS – Heater Scarification(Cont’d)

Recycling units shall be equipped with a wireless remote safety shut down system. This allows the operators to immediately shut down propane flow, hydraulic power units and activate brakes on the recycling units. Each recycling unit operator shall carry a wireless remote control device. The wireless remote system shall meet all FCC requirements and have proper documentation.

417-3.02 Calibration. Calibrate the metering system in accordance with NYSDOT’s Materials Procedure (MP) 417-01 - *Calibration of Metering System for Recycling Equipment*. A minimum 2-week notice is required when scheduling this calibration. Perform the calibration of the metering system in the presence of the Regional Materials Engineer or designee. Work shall not progress until the calibration has been completed and verified. Approved calibrations are valid for 90 days and may be used for more than one project.

If the unit is equipped with a mass flow meter capable of self calibration,, the system calibration can be submitted in lieu of the above method. The self-calibrating meter shall be a continuous flow system that verifies and validates the application rate on-demand and at any time during production. The measuring system shall continuously verify and display the application rate of recycling agent and cumulative total with respect to volume of recycled material for the recycled surface.

Calibration of the self-calibration system shall be performed prior to the start of a project in the presence of the Regional Materials Engineer or designee.

417-3.03 Weather Limitations. Heater scarification is allowed only when the surface temperature is 45F or above.

417-3.04 Surface Preparation.

- A. Pavement Markings.** Remove epoxy or thermoplastic pavement markings, and other markings as directed.
- B. Cleaning.** Clean the existing pavement and shoulder to be heater scarified by using mechanical sweepers, or other effective means until the surface is free of all debris material, which might interfere with the scarification or milling process.
- C. Mastic Repair Material.** Remove mastic patches greater than 5 square feet. Remove other mastic patches as directed by the Engineer.

417-3.05 Recycling and Placement. Radiantly heat the existing HMA pavement surface with no open flame using specialized equipment to soften the HMA surface and scarify to a specified depth as detailed in the contract documents. HMA pavement to be recycled shall be heated in a manner so the underlying asphalt layers not to be recycled, are not disturbed or overheated. Operate the heating unit(s) in a manner to prevent damage to adjacent property and vegetation. Repair all heat-damaged areas immediately, at no additional cost to the State.

Control the heater scarification equipment to ensure the temperature of the scarified mixture is maintained between 275°F and 325°F. Verify this temperature within 5 feet behind the screed unit.

DETAILED SPECIFICATIONS – Heater Scarification (Cont'd)

Control the speed of the equipment to ensure that the recycled pavement is properly milled, mixed, and uniformly distributed to the proper thickness, slope, and crown shown on the contract plans. Material placed should be consistent and free from segregation. Control the width of each pass to provide proper placement of longitudinal joints, including a 3-inch overlap onto adjacent lane passes.

Add recycling agent uniformly to the scarified HMA pavement at the predetermined application rate documented on the mix design.

Ensure that the final recycled pavement conforms to the requirements of §402-3.10, *Surface Tolerance* and §402-3.11, *Thickness Tolerance*. Measure the depth of the loose scarified mix behind the screed unit prior to the rolling operation. Adjust the paving equipment if the loose mix depth does not provide the compacted depth specified in the contract documents.

In areas not accessible to scarifying equipment, such as around catch basins or manholes, the Engineer will determine if they require repair. Pavement surfaces that are in good condition do not require repair. Repair all areas with cracks or spalls, as approved by the Engineer, at no additional cost to the State.

417-3.06 Compaction – Compact the recycled mixture in accordance with 402-3.07, D., 80 Series Compaction Method.

417-3.07 Mixture Verification and QC Testing.

- A. First Day:** Prior to the scarification process, the Engineer will select two core locations on the existing pavement. These locations will be within a lane mile or fraction thereof if production is less than one mile. Extract two cores at each location and test one core from each location for penetration of the extracted asphalt binder from the surface layer only. Provide the companion core from each location to the Engineer for testing by the Department for verification purposes.
- B.** During the scarification process, take four loose mix samples prior to compaction at each location where cores were taken. These samples will be representative of the day's production. Take samples either behind the screed or any place after the spraying and mixing units. Identify all samples by their locations at the project site. Test two of the loose mix samples from each core location for penetration and provide the other two loose mix samples to the Engineer, which may be evaluated by the Department's Lab to verify test results. Take all the required core and loose mix samples after the first 500 feet of the day's production.

Submit penetration test results to the Engineer by the end of the next day's production. If test results are not provided, the Engineer may shut down the scarification process until the results are submitted. Determine the penetration of the PG binder recovered from the recycled mixture in accordance with AASHTO T 49. The average penetration value of the loose mix samples must be at least 30% or more than the penetration of the core samples taken from the existing pavement.

DETAILED SPECIFICATIONS – Heater Scarification (Cont’d)

If the average penetration values of the loose mix samples fail to meet this requirement, adjust the application rate and submit the new adjusted application rate to the Engineer. Repeat the procedure described above for taking and testing samples. Submit the penetration test results to the Engineer by end of the next day’s production. Continue adjusting the application rate and taking samples until average penetration values of the loose mix samples meet the specification requirement of at least 30% or more than the penetration values of the core samples.

- C. **Routine Day:** If the specification requirements are met after the first day’s production, take samples as described above every three days of production for quality control and quality assurance purposes. Samples of the scarified pavement prior to rejuvenation can be taken as an option instead of the core samples. When sample results do not meet the specification requirements, make adjustment to the application rate and take samples as described above.

If, at any time, the average penetration value of the loose mix samples is greater than 90, the Engineer may evaluate the pavement section and request the scarified pavement be removed and replaced at no additional cost to the State. The evaluation may include, but not limited to, testing penetration of the core sample, location of the section, etc. If core samples are required for this evaluation, take them at no additional cost to the State and submit them to the Department for testing. Also, if the recycled pavement is not satisfactory to the Engineer, additional tests may be required at no cost to the State.

417-4 METHOD OF MEASUREMENT

417-4.01 Heater Scarification (HS). This work will be measured as the number of square yards of pavement surface recycled as detailed in this specification.

417-4.02 Recycling Agent. The quantity of recycling agent to be measured for payment will be the number of gallons incorporated in the work, measured at a temperature of 60°F. The following formula will be used to calculate material quantity at 60°F:

$$\text{Volume@ 60°F} = \text{VolumeD} \times [1 - (\Delta T \times 0.00025)]$$

Where,

$$\Delta T = \text{Delivered Temperature (°F)} - 60$$

$$\text{VolumeD} = \text{Quantity at Delivered Temperature (gallons)}$$

417-5 BASIS OF PAYMENT. Removal of pavement markings and cleaning of the existing pavement will be paid under separate items in the contract documents.

417-5.01 Heater Scarification (HS). The unit price bid per square yard for this item shall include the cost of all labor, materials and equipment necessary to satisfactorily complete the work, including heating, scarifying, mixing, paving, compacting, coring, and testing of the recycled materials. No deduction will be made in areas such as catch basins or manholes where the scarifying equipment cannot be used.

DETAILED SPECIFICATIONS – Heater Scarification (Cont'd)

417-5.02 Recycling Agent. The unit price bid per gallon of recycling agent shall include the cost of all labor, material, and equipment necessary to complete the work satisfactorily. The Regional Materials Engineer will evaluate the material represented by any failing sample of recycling agent. If the Engineer elects to leave the material in place, the Contractor shall receive a pay reduction of 75% of the bid price of the recycling agent for the pavement section represented by the failing sample.

Payment will be made under:

Item No.	Item	Unit
417.01	Heater Scarification	Square Yards
417.0101	Recycling Agent	Gallons

DETAILED SPECIFICATIONS – Paver Placed Surface Treatment - Conventional

415.0X0F0218 PAVER PLACED SURFACE TREATMENT – Conventional

CONVENTIONAL DESCRIPTION

This work shall consist of providing and placing ITEM 415.0X0F0218 - PAVER PLACED SURFACE TREATMENT - CONVENTIONAL in accordance with the contract documents and as directed by the Engineer.

Paver Placed Surface Treatment consists of a polymer modified asphalt emulsion coat followed immediately with a thin hot mix asphalt wearing course.

MATERIALS

Mix Designs: Formulate a job mix formula that satisfies the design limits listed in Table 1- Mixture Requirements and submit it to the Regional Materials Engineer for approval. The use of recycled asphalt pavement in these mixes is prohibited.

TABLE 1 - MIXTURE REQUIREMENTS(1)

	Type A		Type B		Type C	
Sieve Sizes (in)	Design Limits (% Passing)	Production Tolerance (%)	Design Limits (% Passing)	Production Tolerance (%)	Design Limits (% Passing)	Production Tolerance (%)
3/4					100	
1/2			100		85 - 100	± 4
3/8	100		85 - 100	± 4	60 - 90	± 4
1/4	85 - 100	± 4	30 - 55	± 4	30 - 55	± 4
No. 4	40 - 80	± 3	24 - 45	± 3	24 - 45	± 3
No. 8	21 - 45	± 3	21 - 37	± 3	21 - 37	± 3
No. 16	16 - 32	± 3	16 - 26	± 3	16 - 26	± 3
No. 30	12 - 25	± 2	12 - 20	± 2	12 - 20	± 2
No. 50	8 - 16	± 2	8 - 16	± 2	8 - 16	± 2
No. 100	5 - 10	± 2	5 - 10	± 2	5 - 10	± 2
No. 200	5 - 7	± 2	5 - 7	± 2	5 - 7	± 2
% PG Binder	4.9 - 5.4		4.8 - 5.2		4.8 - 5.2	

(1) All aggregate percentages are based on total mass of aggregate.

Aggregate: §703-02 except as modified herein. Use coarse aggregate with a minimum coarse-aggregate angularity (CAA) of 90% one fractured face and 85% two fractured faces.

1. Coarse Aggregate Type F1 Conditions.

- a. Sandstone, granite, chert, traprock, ore tailings, slag or other similar non-carbonate materials.
- b. Gravel, a natural, or a manufactured blend of the following types of materials: limestone, dolomite, gravel, sandstone, granite, chert, traprock, ore tailings, slag, or other similar materials meeting the following requirements:

DETAILED SPECIFICATIONS – Paver Placed Surface Treatment - Conventional
(Cont'd)

Type A Mixes – Noncarbonate plus No. 8 particles must comprise a minimum of 30.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 90.0% of plus No. 4 particles must be noncarbonate.

Type B Mixes – Noncarbonate plus 1/8-inch particles must comprise a minimum of 30.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 90.0% of plus No. 4 particles must be noncarbonate.

Type C Mixes – Noncarbonate plus 1/8-inch particles must comprise a minimum of 30.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 90.0% of plus 3/8-inch particles must be noncarbonate.

2. Coarse Aggregate Type F2 Conditions.

- a. Limestone, dolomite, or a blend of the two having an acid insoluble residue content of not less than 20.0%.
- b. Sandstone, granite, chert, traprock, ore tailings, slag or other similar non-carbonate materials.
- c. Gravel, or a natural, or manufactured blend of the following types of materials: limestone, dolomite, gravel, sandstone, granite, chert, traprock, ore tailings, slag, or other similar materials, meeting the following requirements:

Type A Mixes – Noncarbonate plus No. 8 particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus No. 4 particles must be noncarbonate.

Type B Mixes – Noncarbonate plus 1/8-inch particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus No. 4 particles must be noncarbonate.

Type C Mixes – Noncarbonate plus 1/8-inch particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus 3/8-inch particles must be noncarbonate.

3. Coarse Aggregate Type F3 Conditions.

- a. Limestone or a blend of limestone and dolomite having an acid insoluble residue content of not less than 20.0%.
- b. Dolomite.
- c. Sandstone, granite, chert, traprock, ore tailings, slag or other similar non-carbonate materials.
- d. Gravel, a natural, or a manufactured blend of the following types of materials: limestone, dolomite, gravel, sandstone, granite, chert, traprock, ore tailings, slag, or other similar materials, meeting the following requirements:

Type A Mixes – Noncarbonate plus No. 8 particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus No. 4 particles must be noncarbonate.

DETAILED SPECIFICATIONS – Paver Placed Surface Treatment - Conventional
(Cont'd)

Type B Mixes – Noncarbonate plus 1/8-inch particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus No. 4 inch particles must be noncarbonate.

Type C Mixes – Noncarbonate plus 1/8-inch particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus 3/8-inch particles must be noncarbonate.

4. **Additional Coarse Aggregate Requirements.** Coarse aggregate must also meet the requirements listed in Table 2 – Coarse Aggregate Properties.

TABLE 2 - COARSE AGGREGATE PROPERTIES

Property	Method	Requirement
Maximum Flakiness Index	NFP 18-561	20
Maximum Flakiness Coefficient (G/E) ⁽¹⁾	NFP 18-561	1.58
Maximum percent passing No. 30, %	AASHTO T 11, T 27	2

(1) Where G is the smallest square opening the particle can pass through and E is the smallest slot the particle can pass through.

5. **Fine Aggregate.** Use 100% screenings, free from deleterious materials and manufactured from sources of stone or slag meeting the requirements of §703-02, Coarse Aggregate, having a minimum sand equivalent of 60%, as determined by AASHTO T 176, “Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test.”

Mineral Filler: § 703-08, Mineral Filler.

Asphalt Binder: The Performance-Graded Binder (PG Binder) grades are listed in Table 3, *PG Binder Selection*. Appropriate binder grade shall be selected based on the project location. The PG Binder shall meet the requirements of the AASHTO M 332, Standard Specification for Performance Graded Asphalt Binder using Multiple Stress Creep Recovery (MSCR).

Table 3 - PG Binder Selection		
Location	Location by Counties	PG Binder Grades ¹ (Material Designation)
Upstate	All Other Counties Not Listed Under Downstate	64S-22 (702-64S22)
Downstate	Orange, Putnam, Rockland, Westchester, Nassau, Suffolk Counties and City of New York	64H-22 (702-64H22)

Notes:

1. Use these grades unless directed otherwise by the contract documents.

In addition, the PG Binder shall meet the following requirements:

Upstate. Use of polyphosphoric acid (PPA) to modify PG binder properties is prohibited. This prohibition also applies to the use of PPA as a cross-linking agent for polymer modification.

DETAILED SPECIFICATIONS – Paver Placed Surface Treatment - Conventional
(Cont'd)

Downstate. Polyphosphoric (PPA) is the only type of acid allowed when PG binders are modified using acid. The use of PPA modified PG binder is prohibited for mixtures containing limestone, limestone as an aggregate blend component, limestone as a constituent in crushed gravel aggregate, or recycled asphalt pavement (RAP) that includes any limestone. This prohibition also applies to the use of PPA as a cross-linking agent for polymer modification.

Other PG Binder grades may be used with a prior approval by the Director of the Materials Bureau.

Polymer Modified Asphalt Emulsion: §702 - Bituminous Materials, 702- 4001P.

EQUIPMENT

1. **Paving.** Use a self-priming paver capable of spraying the polymer modified asphalt emulsion, applying the hot mix asphalt overlay and smoothing the surface of the mat in one pass. The self-priming paver must be equipped with a receiving hopper, feed conveyor, emulsion storage tank, metered high-pressure emulsion spray bar, and a variable width, heated screed. The screed must have the ability to be crowned at the center both positively and negatively and have vertically adjustable extensions to accommodate the desired pavement profile.
2. **Compaction.** Use steel wheeled double drum rollers weighing at least 10 tons, equipped with functioning water systems and scrapers to prevent material from adhering to the roller drums.
3. **Hauling.** Use vehicles that meet § 402-3.03, Hauling Equipment, to transport the hot mix asphalt wearing course.

CONSTRUCTION DETAILS

Hot Mix Production: The requirements of §401-3, Construction Details apply with the following modifications. If a test value for any sieve varies from the target value by more than the production tolerance given in Table 1 - Mixture Requirements, the Regional Materials Engineer will evaluate the material represented by that test to determine acceptability.

A delivery ticket meeting the requirements of §401-4, Method of Measurement shall accompany each vehicle supplying Hot Mix Asphalt.

Surface Preparation: Perform all surface preparation prior to applying the wearing course.

1. Thoroughly clean the entire area to be overlaid. The surface of the area to be overlaid must be free of dirt, oil, and other foreign materials. A damp surface is acceptable if favorable weather conditions are expected during paving operations.
2. Cover all manhole covers, water boxes, catch basins, and other such utility structures within the area to be paved with plastic, building felt, or other material approved by the Engineer. Reference each for location and adjustment after paving. Remove the covers each day.
3. Abrade pavement markings in accordance with contract documents.

Joint Adhesive. Apply joint adhesive to all pavement edges in accordance with Section 418 *Asphalt Pavement Joint Adhesive* prior to placing the asphalt mixture in order to provide bonding with the newly laid pavement.

DETAILED SPECIFICATIONS – Paver Placed Surface Treatment - Conventional
(Cont'd)

Application: The requirements of § 402-3.01, Weather and Seasonal Limitations apply.

1. Apply the polymer modified asphalt emulsion at a temperature of 140 -175 °F. Provide a uniform application across the entire width to be overlaid, at a rate of 0.15 - 0.25 gallons/square yard. Continuously monitor the spray rate.
2. No equipment shall come in contact with the polymer modified asphalt emulsion before the hot mix asphalt wearing course is applied.
3. Immediately after applying the polymer modified asphalt emulsion, apply the hot mix asphalt overlay across the full width of the emulsion at a temperature of 290 - 325 °F.
4. Apply the hot mix asphalt at a rate within the appropriate application range, listed in Table 4 – Wearing Course Application Ranges. The finished treatment has a minimum thickness of 1/2 inch for Type A, and 5/8 inch for Type B and Type C.
5. Paver Placed Surface Treatment shall not be applied to freshly placed concrete surfaces. Concrete surfaces must cure for a minimum of 90 days before being overlaid.

TABLE 4 - WEARING COURSE APPLICATION RANGES

Type	Minimum (lb/yd ²)	Maximum (lb/yd ²)
A	60	70
B	65	75
C	70	80

Compaction: Begin compaction immediately after application of the wearing course. Use a minimum of two static passes. Avoid using vibratory compaction. The roller(s) will not be allowed to stop on the freshly placed wearing course. Use an adequate number of rollers to complete compaction before the pavement temperature falls below 185°F. Protect the wearing course from traffic until the rolling operation is complete and the material has cooled sufficiently to resist damage.

Paver and Equipment Cleaning: The requirement of § 402-3.12, Paver and Equipment Cleaning apply.

Coring: The Engineer will require four cores from each section of compacted paver placed surface treatment applied below the appropriate minimum application rate listed in Table 4. The Engineer will randomly locate the four core locations. The Engineer will determine the thickness of the paver placed surface treatment and reject sections not meeting the required minimum thickness.

The Engineer may require four cores from each section of compacted paver placed surface treatment exceeding the appropriate maximum application rate, listed in Table 4, to determine the thickness of the paver placed surface treatment. The Engineer may stop paving operations immediately if the over application of the paver placed surface treatment will create problems, such as, but not limited to, reducing overhead clearance, curb reveal or guiderail height. The Engineer and Contractor will agree upon and document a maximum application rate and maximum thickness to prevent problems created by over applying the paver placed surface treatment. The Engineer will reject any additional paver placed surface treatment sections determined to exceed the maximum agreed upon application rate and thickness.

Coring is not required for sections paved within the appropriate application range, listed in Table 4 - Wearing Course Application Ranges.

DETAILED SPECIFICATIONS – Paver Placed Surface Treatment - Conventional
(Cont'd)

All labor, materials and equipment associated with required pavement coring, including maintenance and protection of traffic and filling core holes, will be done at the Contractor's expense.

METHOD OF MEASUREMENT

This work will be measured as the number of tons of Paver Placed Surface Treatment satisfactorily placed.

BASIS OF PAYMENT

The unit price bid shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work. All necessary pavement repairs, joint sealing, crack filling, pavement markings removal, milling of rebates and utility grade adjustments will be paid for under their appropriate items.

Payment will be made under:

Item No.	Item	Pay Unit
415.01010218	Paver Placed Surface Treatment – Conventional Type A, F1	Tons
415.01020218	Paver Placed Surface Treatment – Conventional Type A, F2	Tons
415.01030218	Paver Placed Surface Treatment – Conventional Type A, F3	Tons
415.02010218	Paver Placed Surface Treatment – Conventional Type B, F1	Tons
415.02020218	Paver Placed Surface Treatment – Conventional Type B, F2	Tons
415.02030218	Paver Placed Surface Treatment – Conventional Type B, F3	Tons
415.03010218	Paver Placed Surface Treatment – Conventional Type C, F1	Tons
415.03020218	Paver Placed Surface Treatment – Conventional Type C, F2	Tons
415.03030218	Paver Placed Surface Treatment – Conventional Type C, F3	Tons

DETAILED SPECIFICATIONS – Paver Placed Surface Treatment - Modified

415.1X0F0218 PAVER PLACED SURFACE TREATMENT – Modified

MODIFIED DESCRIPTION

This work shall consist of providing and placing ITEM 415.1X0F0218 – PAVER PLACED SURFACE TREATMENT – MODIFIED in accordance with the contract documents and as directed by the Engineer.

Paver Placed Surface Treatment – Modified consists of a polymer modified asphalt emulsion coat followed immediately with a thin hot mix asphalt wearing course.

MATERIALS

Mix Designs: Formulate a job mix formula that satisfies the design limits listed in Table 1- Mixture Requirements and submit it to the Regional Materials Engineer for approval. The use of recycled asphalt pavement in these mixes is prohibited.

TABLE 1 - MIXTURE REQUIREMENTS⁽¹⁾

	Type A		Type B		Type C	
Sieve Sizes (in)	Design Limits (% Passing)	Production Tolerance (%)	Design Limits (% Passing)	Production Tolerance (%)	Design Limits (% Passing)	Production Tolerance (%)
3/4					100	
1/2			100		85 - 100	± 4
3/8	100		85 - 100	± 4	60 - 90	± 4
1/4	85 - 100	± 4	30 - 55	± 4	30 - 55	± 4
No. 4	40 - 80	± 3	24 - 45	± 3	24 - 45	± 3
No. 8	21 - 45	± 3	21 - 37	± 3	21 - 37	± 3
No. 16	16 - 32	± 3	16 - 26	± 3	16 - 26	± 3
No. 30	12 - 25	± 2	12 - 20	± 2	12 - 20	± 2
No. 50	8 - 16	± 2	8 - 16	± 2	8 - 16	± 2
No. 100	5 - 10	± 2	5 - 10	± 2	5 - 10	± 2
No. 200	5 - 7	± 2	5 - 7	± 2	5 - 7	± 2
% PG Binder	4.9 - 5.4		4.8 - 5.2		4.8 - 5.2	

(1) All aggregate percentages are based on total mass of aggregate.

Aggregate: §703-02 except as modified herein. Use coarse aggregate with a minimum coarse-aggregate angularity (CAA) of 90% one fractured face and 85% two fractured faces.

1. Coarse Aggregate Type F1 Conditions.

- a. Sandstone, granite, chert, traprock, ore tailings, slag or other similar non-carbonate materials.
- b. Gravel, a natural, or a manufactured blend of the following types of materials: limestone, dolomite, gravel, sandstone, granite, chert, traprock, ore tailings, slag, or other similar materials meeting the following requirements:

DETAILED SPECIFICATIONS – Paver Placed Surface Treatment - Modified (Cont'd)

Type A Mixes – Noncarbonate plus No. 8 particles must comprise a minimum of 30.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 90.0% of plus No. 4 particles must be noncarbonate.

Type B Mixes – Noncarbonate plus 1/8-inch particles must comprise a minimum of 30.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 90.0% of plus No. 4 particles must be noncarbonate.

Type C Mixes – Noncarbonate plus 1/8-inch particles must comprise a minimum of 30.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 90.0% of plus 3/8-inch particles must be noncarbonate.

2. Coarse Aggregate Type F2 Conditions.

- a. Limestone, dolomite, or a blend of the two having an acid insoluble residue content of not less than 20.0%.
- b. Sandstone, granite, chert, traprock, ore tailings, slag or other similar non-carbonate materials.
- c. Gravel, or a natural, or manufactured blend of the following types of materials: limestone, dolomite, gravel, sandstone, granite, chert, traprock, ore tailings, slag, or other similar materials, meeting the following requirements:

Type A Mixes – Noncarbonate plus No. 8 particles must comprise a minimum of 30.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 90.0% of plus No. 4 particles must be noncarbonate.

Type B Mixes – Noncarbonate plus 1/8-inch particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus No. 4 particles must be noncarbonate.

Type C Mixes – Noncarbonate plus 1/8-inch particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus 3/8-inch particles must be noncarbonate.

3. Coarse Aggregate Type F3 Conditions.

- a. Limestone or a blend of limestone and dolomite having an acid insoluble residue content of not less than 20.0%.
- b. Dolomite.
- c. Sandstone, granite, chert, traprock, ore tailings, slag or other similar non-carbonate materials.
- d. Gravel, a natural, or a manufactured blend of the following types of materials: limestone, dolomite, gravel, sandstone, granite, chert, traprock, ore tailings, slag, or other similar materials, meeting the following requirements:

Type A Mixes – Noncarbonate plus No. 8 particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus No. 4 particles must be noncarbonate.

DETAILED SPECIFICATIONS – Paver Placed Surface Treatment - Modified (Cont'd)

Type B Mixes – Noncarbonate plus 1/8-inch particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus No. 4 inch particles must be noncarbonate.

Type C Mixes – Noncarbonate plus 1/8-inch particles must comprise a minimum of 10.0% of the total aggregate (by weight with adjustments to equivalent volumes for materials of different specific gravities). Additionally, a minimum of 20.0% of plus 3/8-inch particles must be noncarbonate.

4. **Additional Coarse Aggregate Requirements.** Coarse aggregate must also meet the requirements listed in Table 2 - Coarse Aggregate Properties.

TABLE 2 - COARSE AGGREGATE PROPERTIES

Property	Method	Requirement
Maximum Flakiness Index	NFP 18-561	20
Maximum Flakiness Coefficient (G/E) ⁽¹⁾	NFP 18-561	1.58
Maximum percent passing No. 30, %	AASHTO T 11, T 27	2

(1) Where G is the smallest square opening the particle can pass through and E is the smallest slot the particle can pass through.

5. **Fine Aggregate.** Use 100% screenings, free from deleterious materials and manufactured from sources of stone or slag meeting the requirements of §703-02, Coarse Aggregate, having a minimum sand equivalent of 60%, as determined by AASHTO T 176, “Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test.”

Mineral Filler: § 703-08, Mineral Filler.

Performance Graded Binder: The Performance Graded Binder (PG Binder) grades are listed in Table 3, *PG Binder Selection*. Appropriate binder grade shall be selected based on the project location. The PG binder shall be modified with either elastomeric polymer or terminal blend crumb rubber for the production of HMA mixture. The modified PG Binder shall meet the requirements of AASHTO M 332, Standard Specification for Performance Graded Asphalt Binder using Multiple Stress Creep Recovery (MSCR). In addition, the binder grade must also meet the **elastomeric** properties as indicated by one of the following:

$$\text{For } J_{nr3.2} \geq 0.1, Z = \%R_{3.2} - 29.371 * J_{nr3.2}^{-0.2633}$$

And Z must be greater than 0

For $J_{nr3.2} < 0.1$, $\%R_{3.2}$ must be greater than 55%

DETAILED SPECIFICATIONS – Paver Placed Surface Treatment - Modified (Cont'd)

Table 3 - PG Binder Selection		
Location	Location by Counties	PG Binder Grades (Material Designation)
Upstate ¹	All Other Counties Not Listed Under Downstate	64V-22 (702-64V22)
Downstate	Orange, Putnam, Rockland, Westchester, Nassau, Suffolk Counties and City of New York	64E-22 (702-64E22)

NOTES:

1. For high volume roadways in Upstate Counties, PG 64E-22 may be specified with the concurrence of the Regional Materials Engineer. “High Volume” is defined as 2 or 3 lane highways with design year two-way AADT over 8,000, or for more than three lanes, with two- way AADT over 13,000.

When terminal blend CRM PG binder is used, the following shall apply:

- Crumb rubber particles shall be finer than #30 sieve size.
- The CRM PG binder shall be storage-stable and homogeneous.
- The Dynamic Shear Rheometer (DSR) shall be set at 2-mm gap.
- The CRM PG binder shall be 99% free of particles retained on the 600µm sieve as tested in accordance with Section 5.4 of MP 19.

In addition, the PG Binder shall meet the following requirements:

Upstate. Use of polyphosphoric acid (PPA) to modify PG binder properties is prohibited. This prohibition also applies to the use of PPA as a cross-linking agent for polymer modification.

Downstate. Polyphosphoric (PPA) is the only type of acid allowed when PG binders are modified using acid. The use of PPA modified PG binder is prohibited for mixtures containing limestone, limestone as an aggregate blend component, limestone as a constituent in crushed gravel aggregate, or recycled asphalt pavement (RAP) that includes any limestone. This prohibition also applies to the use of PPA as a cross- linking agent for polymer modification.

Other modified PG Binder grades may be used with a prior approval by the Director of the Materials Bureau.

Polymer Modified Asphalt Polymer Modified Asphalt Emulsion: §702 - Bituminous Materials, 702-4001P.

EQUIPMENT

1. **Paving.** Use a self-priming paver capable of spraying the polymer modified asphalt emulsion, applying the hot mix asphalt overlay and smoothing the surface of the mat in one pass. The self-priming paver must be equipped with a receiving hopper, feed conveyor, emulsion storage tank, metered high-pressure emulsion spray bar, and a variable width, heated screed. The screed must have the ability to be crowned at the center both positively and negatively and have vertically adjustable extensions to accommodate the desired pavement profile.

DETAILED SPECIFICATIONS – Paver Placed Surface Treatment - Modified (Cont'd)

2. **Compaction.** Use steel wheeled double drum rollers weighing at least 10 tons, equipped with functioning water systems and scrapers to prevent material from adhering to the rollerdrums.
3. **Hauling.** Use vehicles that meet § 402-3.03, Hauling Equipment, to transport the hot mix asphalt wearing course.

CONSTRUCTION DETAILS

Hot Mix Production: The requirements of §401-3, Construction Details apply with the following modifications. If a test value for any sieve varies from the target value by more than the production tolerance given in Table 1 - Mixture Requirements, the Regional Materials Engineer will evaluate the material represented by that test to determine acceptability.

A delivery ticket meeting the requirements of §401-4, Method of Measurement shall accompany each vehicle supplying Hot Mix Asphalt.

Surface Preparation: Perform all surface preparation prior to applying the wearing course.

1. Thoroughly clean the entire area to be overlaid. The surface of the area to be overlaid must be free of dirt, oil, and other foreign materials. A damp surface is acceptable if favorable weather conditions are expected during paving operations.
2. Cover all manhole covers, water boxes, catch basins, and other such utility structures within the area to be paved with plastic, building felt, or other material approved by the Engineer. Reference each for location and adjustment after paving. Remove the covers each day.
3. Abrade pavement markings in accordance with contract documents.

Joint Adhesive. Apply joint adhesive to all pavement edges in accordance with Section 418 *Asphalt Pavement Joint Adhesive* prior to placing the asphalt mixture in order to provide bonding with the newly laid pavement.

Application: The requirements of § 402-3.01, Weather and Seasonal Limitations apply.

1. Apply the polymer modified asphalt emulsion at a temperature of 140 - 175° F. Provide a uniform application across the entire width to be overlaid, at a rate of 0.15 - 0.25 gallons/square yard. Continuously monitor the spray rate.
2. No equipment shall come in contact with the polymer modified asphalt emulsion before the hot mix asphalt wearing course is applied.
3. Immediately after applying the polymer modified asphalt emulsion, apply the hot mix asphalt
4. overlay across the full width of the emulsion at a temperature of 290 - 325° F.
5. Apply the hot mix asphalt at a rate within the appropriate application range, listed in Table 4 – Wearing Course Application Ranges. The finished treatment has a minimum thickness of 1/2 inch for Type A, and 5/8 inch for Type B and Type C.
6. Rubber Modified Paver Placed Surface Treatment shall not be applied to freshly placed concrete surfaces. Concrete surfaces must cure for a minimum of 90 days before being overlaid.

DETAILED SPECIFICATIONS – Paver Placed Surface Treatment - Modified (Cont'd)

TABLE 4 - WEARING COURSE APPLICATION RANGES

Type	Minimum (lb/yd ²)	Maximum (lb/yd ²)
A	60	70
B	65	75
C	70	80

Compaction: Begin compaction immediately after application of the wearing course. Use a minimum of two static passes. Avoid using vibratory compaction. The roller(s) will not be allowed to stop on the freshly placed wearing course. Use an adequate number of rollers to complete compaction before the pavement temperature falls below 185°F. Protect the wearing course from traffic until the rolling operation is complete and the material has cooled sufficiently to resist damage.

Paver and Equipment Cleaning: The requirement of § 402-3.12, Paver and Equipment Cleaning apply.

Coring: The Engineer will require four cores from each section of compacted paver placed surface treatment applied below the appropriate minimum application rate listed in Table 4. The Engineer will randomly locate the four core locations. The Engineer will determine the thickness of the paver placed surface treatment and reject sections not meeting the required minimum thickness.

The Engineer may require four cores from each section of compacted paver placed surface treatment exceeding the appropriate maximum application rate, listed in Table 4, to determine the thickness of the paver placed surface treatment. The Engineer may stop paving operations immediately if the over application of the paver placed surface treatment will create problems, such as, but not limited to, reducing overhead clearance, curb reveal or guiderail height. The Engineer and Contractor will agree upon and document a maximum application rate and maximum thickness to prevent problems created by over applying the paver placed surface treatment. The Engineer will reject any additional paver placed surface treatment sections determined to exceed the maximum agreed upon application rate and thickness.

Coring is not required for sections paved within the appropriate application range, listed in Table 4 - Wearing Course Application Ranges.

All labor, materials and equipment associated with required pavement coring, including maintenance and protection of traffic and filling core holes, will be done at the Contractor's expense.

METHOD OF MEASUREMENT

This work will be measured as the number of tons of Paver Placed Surface Treatment - Modified satisfactorily placed.

BASIS OF PAYMENT

The unit price bid shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work, including the application of Asphalt Pavement Joint Adhesive. All necessary pavement repairs, joint sealing, crack filling, pavement markings removal, milling of rebates and utility grade adjustments will be paid for under their appropriate items.

DETAILED SPECIFICATIONS – Paver Placed Surface Treatment - Modified (Cont'd)

Payment will be made under:

Item No.	Item	Pay Unit
415.11010218	Paver Placed Surface Treatment – Modified Type A, F1	Tons
415.11020218	Paver Placed Surface Treatment – Modified Type A, F2	Tons
415.11030218	Paver Placed Surface Treatment – Modified Type A, F3	Tons
415.12010218	Paver Placed Surface Treatment – Modified Type B, F1	Tons
415.12020218	Paver Placed Surface Treatment – Modified Type B, F2	Tons
415.12030218	Paver Placed Surface Treatment – Modified Type B, F3	Tons
415.13010218	Paver Placed Surface Treatment – Modified Type C, F1	Tons
415.13020218	Paver Placed Surface Treatment – Modified Type C, F2	Tons
415.13030218	Paver Placed Surface Treatment – Modified Type C, F3	Tons