

- ITEM 402.96710002 - Rubber Modified Paver Placed Surface Treatment Type A, F1
- ITEM 402.96720002 - Rubber Modified Paver Placed Surface Treatment Type A, F2
- ITEM 402.96730002 - Rubber Modified Paver Placed Surface Treatment Type A, F3
- ITEM 402.96810002 - Rubber Modified Paver Placed Surface Treatment Type B, F1
- ITEM 402.96820002 - Rubber Modified Paver Placed Surface Treatment Type B, F2
- ITEM 402.96830002 - Rubber Modified Paver Placed Surface Treatment Type B, F3
- ITEM 402.96910002 - Rubber Modified Paver Placed Surface Treatment Type C, F1
- ITEM 402.96920002 - Rubber Modified Paver Placed Surface Treatment Type C, F2
- ITEM 402.96930002 - Rubber Modified Paver Placed Surface Treatment Type C, F3

DESCRIPTION

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

Initial pavement cleaning and all necessary pavement repairs, crack sealing, joint sealing, pavement marking removal, utility adjustments and milling of rebates will be paid for under the appropriate items. This specification is for use on highways of all traffic volumes.

MATERIALS

- A. **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. Quality Adjustment Factors do not apply for these items.

TABLE 1 - MIXTURE REQUIREMENTS ¹

Sieve Sizes	Type A		Type B		Type C	
	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 - 60	± 3	24 - 45	± 3	24 - 45	± 3
No.8	21 - 37	± 3	21 - 37	± 3	21 - 37	± 3
No.16	16 - 26	± 3	16 - 26	± 3	16 - 26	± 3
No.30	12 - 20	± 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	5.8 - 6.4		5.8 - 6.4		5.8 - 6.4	

(1) All aggregate percentages are based on total mass of aggregate.
(2) Gradation data for Design / Monitoring shall be determined by AASHTO T 27 and AASHTO T 11

- B. **Aggregate.** §401-2.02 except as modified herein. Use coarse aggregate with a minimum coarse aggregate angularity of 90% one fractured face and 85% two fractured faces.

Refer to Chapter 6 of the NYSDOT Comprehensive Pavement Design Manual for selection of appropriate friction requirements: F1, F2 or F3.

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MATERIALS (cont'd)

1. Coarse Aggregate Type F1 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 95.0% 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 95.0% 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 95.0% 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

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MATERIALS (cont'd)

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, 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 inches 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.

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MATERIALS (cont'd)

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
LA Abrasion Coefficient, maximum % loss	AASHTO T 96	25
Maximum Flakiness Index	NFP 18-561	20
Maximum Flakiness Coefficient (G/E) ⁽¹⁾	NFP 18-561	1.58
Maximum percent passing 600 µm, %	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.

It is recommended that the coarse aggregate portion (plus No. 8 material) meet the gradation requirements given in Table 3 - Recommended Coarse Aggregate Gradation.

TABLE 3 - RECOMMENDED COARSE AGGREGATE GRADATION

Screen Size (in)	Type A (% Passing)	Type B (% Passing)	Type C (% Passing)
3/4	–	–	100
1/2	–	100	85 - 100
3/8	100	85 - 100	25 - 50
1/4	85 - 100	0 - 15	0 - 15
No. 4	25 - 50	0 - 3	0 - 3
No. 8	0 - 3	0	0

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 equivalency of 60%, as determined by AASHTO T 176, “Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test.” It is recommended that the fine aggregate portion (minus No. 4 material) meet the gradation requirements given in Table 4 - Recommended Fine Aggregate Gradation.

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MATERIALS (cont'd)

TABLE 4 - RECOMMENDED FINE AGGREGATE GRADATION

Sieve Size	Percent Passing
No. 4	100
No. 8	90 - 100
No. 16	60 - 80
No. 30	45 - 60
No. 50	30 - 40
No. 100	20 - 30
No. 200	15 - 25

C. Mineral Filler. § 703-08, Mineral Filler.

D. Asphalt-Rubber Binder (ARB). The ARB shall consist of performance-graded binder and crumb rubber blended and interacted to conform to ASTM D6114, Standard Specification for Asphalt-Rubber Binder, Table 1, Type II with the following addition:

Minimum elastic recovery of 65% at 50°F using ASTM D6084, Elastic Recovery of Bituminous Material by Ductilometer, Procedure A.

1. Performance-Graded Binder (PGB). Use PGB meeting the requirements of §702 - Bituminous Materials, Item 702-5828, 702-6422 or 702-6428.

2. Crumb Rubber. Use crumb rubber conforming to ASTM D6114, section 3.2, Ground Recycled Tire Rubber, and meet the gradation requirements given in Table 5 – Crumb Rubber Gradation. The crumb rubber shall be accepted by certification from the rubber supplier.

Table 5 – Crumb Rubber Gradation

Sieve Size	% Passing
No. 30	100
No. 40	45-100

3. Anti-stripping Agent. If required, an anti-stripping agent that is heat stable and approved for use by the Department shall be incorporated into the ARB at the dosage required by the job-mix formula (up to 1.0% by weight of PGB). Add the anti-stripping agent to the PGB prior to blending with the crumb rubber.

E. Polymer Modified Asphalt Emulsion. § 702 -Bituminous Materials, CRS-1p, Item 702-4701.

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CONSTRUCTION DETAILS

A. Equipment.

- 1. Paving.** Use a self-priming paver appearing on the Department's Approved List. The self-priming paver must be capable of spraying the polymer modified asphalt emulsion, applying the hot mix asphalt overlay and smoothing the surface of the mat in one pass at a rate of at least 30 feet/minute. 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. Make equipment approval requests to the Director, Materials Bureau, at least 30 days before the start of work.
- 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.

- B. 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 must accompany each vehicle supplying HMA. Make one legible copy of the delivery ticket available to the State's paving inspector prior to placement of the mixture. Each delivery ticket shall show all of the following information:

1. Ticket number.
2. Plant identification.
3. Contract number.
4. Mix type (A, B, or C), friction requirement (F1, F2 or F3), and performance-graded binder.
5. Quantity of material in delivery vehicle.
6. Date and time.

- C. Surface Preparation.** Perform all surface preparation prior to applying the wearing course.

1. The Contractor shall remove any epoxy, thermoplastic, preformed tape or high built waterborne pavement markings. Other markings shall be removed as ordered by the Engineer.
2. Thoroughly clean the entire area to be overlaid. The surface of the area to be overlaid

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CONSTRUCTION DETAILS (cont'd)

must be free of dirt, oil, and other foreign materials. Remove all debris and standing water. A damp surface is acceptable if favorable weather conditions are expected during paving operations.

3. 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.

D. Application. The requirements of § 402-3.01, Weather and Seasonal Limitations apply, except as modified herein. Placement may begin if the surface temperature is at least 45° F and rising.

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 at a temperature of 290 - 325°F across the full width of the emulsion.
4. Apply the hot mix asphalt at a rate within the appropriate application range, listed in Table 6 - Wearing Course Application Ranges. The finished treatment has a minimum thickness of 1/2 inch for Type A, and 5/8 inch for Types B and 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 6 - Wearing Course Application Ranges

Type	Minimum (lbs/yd ²)	Maximum (lbs/yd ²)
A	55	65
B	60	70
C	65	75

E. 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.

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CONSTRUCTION DETAILS (cont'd)

- F. Paver and Equipment Cleaning.** The requirement of § 402-3.12, Paver and Equipment Cleaning apply.
- G. Coring.** The Engineer will require four cores from each section of compacted rubber modified paver placed surface treatment applied below the appropriate minimum application rate listed in Table 6. The Engineer will randomly locate the four core locations. The Engineer will determine the thickness of the rubber modified paver placed surface treatment and reject sections not meeting the required minimum thickness.

The Engineer may require four cores from each section of compacted rubber modified paver placed surface treatment exceeding the appropriate maximum application rate, listed in Table 6, to determine the thickness of the rubber modified paver placed surface treatment. The Engineer may stop paving operations immediately if the over application of the rubber modified paver placed surface treatment will create problems, such as, but not limited to, reducing overhead clearance, curb reveal or guide rail height. The Engineer and Vendor will agree upon and document a maximum application rate and maximum thickness to prevent problems created by over applying the rubber modified paver placed surface treatment. The Engineer will reject any additional rubber modified 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 6 – 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 Vendor's expense.

METHOD OF MEASUREMENT

This work will be measured as the number of square yards of pavement surface.

BASIS OF PAYMENT

The unit price bid shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work.