

<b>ITEM 402.06710218</b>	<b>6.3-mm F1 POLYMER-MODIFIED HMA, 70 SERIES COMPACTION</b>
<b>ITEM 402.06711218</b>	<b>PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06710218</b>
<b>ITEM 402.06720218</b>	<b>6.3-mm F2 POLYMER-MODIFIED HMA, 70 SERIES COMPACTION</b>
<b>ITEM 402.06721218</b>	<b>PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06720218</b>
<b>ITEM 402.06730218</b>	<b>6.3-mm F3 POLYMER-MODIFIED HMA, 70 SERIES COMPACTION</b>
<b>ITEM 402.06731218</b>	<b>PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06730218</b>

## DESCRIPTION

This work shall consist of developing Polymer-Modified HMA mixture and constructing it in accordance with these specifications and in reasonably close conformity with the required lines, grades, thicknesses, and typical sections shown on the plans or established by the Engineer. This mixture requires the use of *Tack Coat for 6.3mm Polymer-Modified HMA* as the tack coat. This is a performance-based specification in which the Contractor is responsible for compacting the pavement to a specified density requirement.

## MATERIALS

The materials and composition for Polymer-Modified mixtures shall meet the requirements specified in §401-2 Materials, except as noted herein.

Produce Polymer-Modified HMA in accordance with the procedures outlined in this specification and Material Method 5.16, Superpave Hot Mix Asphalt Mixture Design and Mixture Verification Procedures except as modified below:

Formulate and submit to the Regional Materials Engineer a Polymer-Modified HMA design, which satisfies design criteria outlined in this specification. The minimum PG Binder content shall not be less than 6.0%.

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**Table 1 – 6.3-mm Polymer-Modified HMA Design Control Points**

Standard Sieves (mm)	Percent Passing Criteria	
	Maximum	Minimum
9.5		100
6.30	100	90
4.75	90	
2.36	70	37
0.075	10	2

**Table 2 – 6.3-mm Polymer-Modified HMA Mixture Additional Aggregate Criteria**

Coarse Aggregate Angularity (Percent), minimum	Uncompacted Void Content of Fine Aggregate (Percent), minimum	Flat-and-elongated Particles (Percent), maximum	Sand Equivalent (Percent), minimum
95/90	43	10	45

**Table 3 – 6.3-mm Polymer-Modified HMA Volumetric Design Criteria**

% Gmm @ Ninitial	% Voids Filled with Binder		% Voids in the Mineral Aggregate, minimum
	Minimum	Maximum	
< 90.5	70	78	16

**Table 4 – 6.3-mm Polymer-Modified HMA Design Number of Gyration**

Compactive Effort Number of Gyration	Ninitial	Ndesign	Nmaximum
	7	75	115

**Table 5 – 6.3-mm Polymer-Modified HMA Production Gradation Tolerances**

Sieve Size (mm)	9.5	6.3	4.75	2.36	1.18	0.600	0.300	0.150	0.075
Tolerance	± 4	± 4	± 3	± 3	± 3	± 2	± 2	± 2	± 2

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### 1. Coarse Aggregate Type F1 Conditions

1. Limestone, dolomite, or a blend of the two having an acid insoluble residue content of not less than 20.0%.
2. Sandstone, granite, chert, traprock, ore tailings, slag, or other similar noncarbonated materials.
3. Use gravel or blend two or more of: gravel, limestone, dolomite, sandstone, granite, chert, traprock, ore tailings, or other similar materials to produce a final blend of which the noncarbonate plus 2.36-mm particles must comprise at least 30.0% of the total aggregate. In addition, at least 95.0% of the plus 4.75-mm particles must be noncarbonate.

### 2. Coarse Aggregate Type F2 Conditions

1. Limestone, dolomite, or a blend of the two having an acid insoluble residue content of not less than 20.0%.
2. Sandstone, granite, chert, traprock, ore tailings, slag, or other similar noncarbonate materials.
3. Use gravel or blend two or more of: gravel, limestone, dolomite, sandstone, granite, chert, traprock, ore tailings, or other similar materials to produce a final blend of which the noncarbonate plus 2.36-mm particles must comprise at least 10.0% of the total aggregate. In addition, at least 20.0% of the plus 4.75-mm particles must be noncarbonate.

### 3. Coarse Aggregate Type F3 Conditions

1. Limestone or a blend of limestone and dolomite having an acid insoluble residue content of not less than 20.0%.
2. Dolomite.
3. Sandstone, granite, chert, traprock, ore tailings, slag, or other similar noncarbonate materials.
4. Use gravel or blend two or more of: gravel, limestone, dolomite, sandstone, granite, chert, traprock, ore tailings, or other similar materials to produce a final blend of which the noncarbonate plus 2.36-mm particles must comprise at least 10.0% of the total aggregate. In addition, at least 20.0% of the plus 4.75-mm particles must be noncarbonated.

**PG Binder.** Use the appropriate Performance-Graded Binder (PG Binder), as listed in

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Table 6 below, in the production of these mixtures that meets the AASHTO M 320 - Standard Specification for Performance-Graded Asphalt Binder.

**Table 6 - PG Binder**

Location	PG Binder <sup>1</sup>
Downstate <sup>2</sup>	Polymer-Modified PG 76-22
Upstate <sup>3</sup>	PG 64-28 with an minimum of 60% Elastic Recovery <sup>4</sup>

**NOTES:**

1. Use of all other PG Binder grades allowed only by approval of the Director of the Materials Bureau. If allowed, use Table 401-7, Delivery Ticket Mix Coding, of the Standard Specifications to properly identify the PG Binder grade on the delivery ticket.
2. "Downstate" is defined as the counties of Orange, Rockland, Putnam, Westchester, Nassau, Suffolk, and the City of New York.
3. "Upstate" is defined as all other counties except as noted in Note 2.
4. Elastic Recovery, AASHTO T301-95, 100 mm elongation and cut immediately at 25°C.

**CONSTRUCTION DETAILS**

The provisions of §401-3 and §402-3, Construction Details, shall apply except as modified herein.

Use *Tack Coat for 6.3mm Polymer-Modified HMA* as a tack coat.

Report the air void test values to the nearest 0.01 of a percent and aggregate gradation test values to the nearest 0.1 of a percent. When determining test result acceptability, the air void test value is referenced to the mix design median of 4.00 percent and the gradation test value is referenced to the Job Mix Formula (JMF) target value.

**METHOD OF MEASUREMENT**

The provisions of §401-4 and §402-4, Method of Measurement, shall apply except as modified herein.

When any material with plant air voids of less than 2% or greater than 6% which results in daily QAF of 0.85, the Engineer will evaluate the subject material to determine if it will be left in-place. The considerations for determining whether the material in question is left in place are, but not limited to:

- Type of material produced.
- The layer in which the material was placed.
- The location of the project.

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Use Table 9, Air Voids in Plant Mixture to determine the Quality Adjustment Factor (QAF) in accordance with §401-4, Method of Measurement.

<b>Average Absolute Value (Test Value - 4.0)</b>	<b>Quality Adjustment Factor (QAF)</b>
0.00 - 0.17	1.05
0.18 - 0.33	1.04
0.34 - 0.50	1.03
0.51 - 0.67	1.02
0.68 - 0.83	1.01
0.84 - 1.00	1.00
1.01 - 1.10	0.99
1.11 - 1.20	0.98
1.21 - 1.30	0.97
1.31 - 1.40	0.96
1.41 - 1.50	0.95
1.51 - 1.60	0.94
1.61 - 1.70	0.93
1.71 - 1.80	0.92
1.81 - 1.90	0.91
1.91 - 2.00	0.90
over 2.00	0.85

<b>Mix Type</b>	<b>Code</b>	<b>Code<sup>1</sup></b>	<b>Design ESAL</b>	<b>Code</b>	<b>Consensus Properties</b>	<b>Code</b>	<b>PG Binder Type</b>	<b>Code</b>
6.3 mm	06	F1	<3.0 million	2	<100 mm	Y	PG 64-28	C
----	----	F2	----	----	----	----	PG 76-22	E
----	----	F3	----	----	----	----	----	----

Notes:

1. Friction Aggregate Classification Codes
2. Delivery Ticket Mix Coding Example: 6.3 mm, Type F2 friction requirements, PG 64-28 with a minimum of 60% Elastic Recovery - Mix Coding on Delivery Ticket: **06F22YC**.

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**BASIS OF PAYMENT**

The provisions of § 402-5 Basis of Payment shall apply.

Payment will be made under:

ITEM NO.	ITEM	PAY UNIT
402.06710218	6.3-mm F1 Polymer-Modified HMA, 70 Series Compaction	Metric Ton
402.06711218	Plant Production Quality Adjustment to 402.06710218	Quality Unit
402.06720218	6.3-mm F2 Polymer-Modified HMA, 70 Series Compaction	Metric Ton
402.06721218	Plant Production Quality Adjustment to 402.06720218	Quality Unit
402.06730218	6.3-mm F3 Polymer-Modified HMA, 70 Series Compaction	Metric Ton
402.06731218	Plant Production Quality Adjustment to 402.06730218	Quality Unit

DISAPPROVED BY EI 08-017

**DESCRIPTION**

This work shall consist of using an asphalt emulsion as a tack coat for the 6.3mm Polymer-Modified HMA mixture. Tack Coat for 6.3 mm Polymer-Modified HMA shall be constructed in accordance with these specifications and in reasonably close conformity with the required lines, grades, thicknesses, and typical sections shown on the plans or established by the Engineer. All necessary pavement repairs, crack sealing, joint sealing, pavement marking removal, utility grade adjustments, and milling of rebates will be paid under appropriate items.

**MATERIALS**

Use RS 1 (Material Designation 702-3001) or CRS 1 (Material Designation 702-4001) emulsion as a tack coat except that the base asphalt for these emulsions shall meet the requirements of Table 7 and the penetration test on the residue shall meet the requirements of Table 8 below. Other emulsions with similar set times as the above emulsions and meeting the requirements of Table 7 and 8 below may be used with the approval of the Director, Materials Bureau.

**Table 7 - Tests on Asphalt Base for Emulsion**

Test on Base Asphalt	Min.	Max.
Penetration, 25°C, 100 g, 5 s	60	100
Ductility, 25°C, 5 cm/min, cm	50	-

**Table 8 - Tests on Residue from Distillation Test**

Test on Residue	Min.	Max.
Penetration, 25°C, 100 g, 5 s	40	90

**CONSTRUCTION DETAILS**

The provisions of §407-3, Construction Details, shall apply.

**METHOD OF MEASUREMENT**

The quantity to be paid for will be to the nearest whole liter of asphalt emulsion for tack coat measured at 16°C.

**BASIS OF PAYMENT**

The unit price bid per liter for tack coat shall include the cost of furnishing all labor, materials and equipment necessary to complete the work.

Payment will be made under:

ITEM NO.	ITEM	PAY UNIT
407.02----18	Tack Coat for 6.3-mm Polymer-Modified HMA	Liter