

ITEM 402.06810118	6.3-mm F1 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06811118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06810118
ITEM 402.06820118	6.3-mm F2 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06821118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06820118
ITEM 402.06830118	6.3-mm F3 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06831118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06830118

DESCRIPTION

This work shall consist of developing a Polymer-Modified HMA mixture and constructing it in accordance with the contract documents and as directed by the Engineer. This mixture requires the use Straight *Tack Coat*, as a tack coat.

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%.

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

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

ITEM 402.06810118	6.3-mm F1 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06811118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06810118
ITEM 402.06820118	6.3-mm F2 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06821118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06820118
ITEM 402.06830118	6.3-mm F3 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06831118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06830118

6.3-mm Polymer-Modified HMA Volumetric Design Criteria			
% Gmm @ N_{initial}	% Voids Filled with Binder		% Voids in the Mineral Aggregate, minimum
	minimum	maximum	
< 90.5	70	78	16

6.3-mm Polymer-Modified HMA Design Number of Gyration			
Compactive Effort	N_{initial}	N_{design}	N_{maximum}
Number of Gyration	7	75	115

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

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 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 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

ITEM 402.06810118	6.3-mm F1 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06811118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06810118
ITEM 402.06820118	6.3-mm F2 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06821118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06820118
ITEM 402.06830118	6.3-mm F3 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06831118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06830118

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 the PG Binder Selection table below, in the production of these mixtures that meets AASHTO M 320 - Standard Specification for Performance-Graded Asphalt Binder. Elastic Recovery testing is to be performed in accordance with ASTM D6084-04, Testing Procedure A, at 25°C on Rolling Thin Film Oven (RTFO) Binder Sample.

In addition, the PG Binder must 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. "Upstate" is defined as all other counties not listed in "Downstate".

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. "Downstate" is defined as the counties of Orange, Rockland, Putnam, Westchester, Nassau, Suffolk, and the City of New York.

PG Binder Selection	
Location	PG Binder
Upstate ¹	PG 64-22 with a minimum of 60% Elastic Recovery
Downstate	PG 76-22 with a minimum of 60% Elastic Recovery

NOTES:

1. For Dutchess County "High Volume" roadways use the "Downstate" requirements. "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.

Other PG Binder grades allowed only with the approval of the Director of the Materials Bureau.

ITEM 402.06810118	6.3-mm F1 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06811118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06810118
ITEM 402.06820118	6.3-mm F2 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06821118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06820118
ITEM 402.06830118	6.3-mm F3 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06831118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06830118

Reclaimed Asphalt Pavement (RAP). The maximum RAP blend portion is 20% by mass of the total mixture.

CONSTRUCTION DETAILS

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

Use *Straight Tack Coat*, as a tack coat.

Required Number of Passes by the Compaction Train ¹				
Pavement Course	Option 1 Three Roller Train (Static)		Option 2 Vibratory Rollers	
	Steel Wheel Roller Passes	Pneumatic Roller Passes	Vibratory Roller Passes	Static Roller Passes
6.3-mm Polymer-Modified HMA	4	2	2	2

¹-These are recommended number of roller passes. Engineer-in-Charge may change the number of passes as needed.

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.

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

ITEM 402.06810118	6.3-mm F1 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06811118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06810118
ITEM 402.06820118	6.3-mm F2 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06821118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06820118
ITEM 402.06830118	6.3-mm F3 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06831118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06830118

AIR VOIDS IN PLANT MIXTURE (Volumetric Designs)	
Average Absolute Value (Test Value - 4.0)	Quality Adjustment Factor (QAF)
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

Delivery Ticket Mix Coding²								
Mix Type	Code	Code¹	Design ESAL	Code	Consensus Properties	Code	PG Binder Type	Code
6.3-mm	06	F1	<30.0 million	2	<100 mm	Y	PG 64-22	B
----	----	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 64-22 with a minimum of 60% Elastic Recovery - Mix Coding on Delivery Ticket: **06F22YB**.

ITEM 402.06810118	6.3-mm F1 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06811118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06810118
ITEM 402.06820118	6.3-mm F2 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06821118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06820118
ITEM 402.06830118	6.3-mm F3 POLYMER-MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06831118	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06830118

BASIS OF PAYMENT

The provisions of §402-5 Basis of Payment shall apply. The tack coat would be paid separately.

Payment will be made under:

ITEM NO.	ITEM	PAY UNIT
402.06810118	6.3-mm F1 Polymer-Modified HMA, 80 Series Compaction	Metric Ton
402.06811118	Plant Production Quality Adjustment to 402.06810118	Quality Unit
402.06820118	6.3-mm F2 Polymer-Modified HMA, 80 Series Compaction	Metric Ton
402.06821118	Plant Production Quality Adjustment to 402.06820118	Quality Unit
402.06830118	6.3-mm F3 Polymer-Modified HMA, 80 Series Compaction	Metric Ton
402.06831118	Plant Production Quality Adjustment to 402.06830118	Quality Unit

DISAPPROVED EI 14-008