

ITEM 402.06810218	6.3 F1 POLYMER MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06811218	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06810218
ITEM 402.06820218	6.3 F2 POLYMER MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06821218	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06820218
ITEM 402.06830218	6.3 F3 POLYMER MODIFIED HMA, 80 SERIES COMPACTION
ITEM 402.06831218	PLANT PRODUCTION QUALITY ADJUSTMENT TO 402.06830218

DESCRIPTION

This work shall consist of mixture design and placement of 6.3 Polymer Modified Hot Mix Asphalt (HMA) in accordance with Section 401, Section 402, the contract documents and as directed by the Engineer.

MATERIALS

The materials and composition for Polymer Modified HMA mixture shall meet the requirements specified in §401-2, *Materials* and Material Method (MM) 5.16, *Hot Mix Asphalt (HMA) Mixture Design and Mixture Verification Procedures*, except as noted herein.

The 6.3 Polymer Modified HMA shall be designed and produced in accordance with the procedures outlined in this specification and MM 5.16. The mixture shall be designed to meet the following requirements:

- <30 million ESALs,
- 96% of the mixture’s maximum theoretical density
- Minimum PG Binder content of 6.0% by the total weight of the mixture.

The design shall be submitted to the Regional Materials Engineer (RME) which satisfies the design criteria outlined as modified below.

Table 1 - Design Aggregate Control Points

Standard Sieves (mm)	Percent Passing Criteria	
	Maximum	Minimum
9.5		100
6.3	100	90
4.75	90	---
2.36	70	37
0.075	10	2

Table 2 - 6.3 Polymer Modified HMA Volumetric Design Criteria

% G _{mm} @ N _{initial}	% Voids Filled with Binder		% Voids in the Mineral Aggregate, Minimum
	Minimum	Maximum	
< 90.5	70	78	16

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Table 3 - 6.3 Polymer Modified HMA Design Number of Gyration

Compactive Effort	N_{initial}	N_{design}	N_{maximum}
Number of Gyration	7	75	115

Table 4 - JMF Gradation Target Tolerances

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

Aggregate. The aggregate shall meet the requirements of Section 703, MM 5.16, and the following:

A. 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 non-carbonated 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 non-carbonate 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 non-carbonate.

B. 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 non-carbonated 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 non-carbonate 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 non-carbonate.

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C. 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 non-carbonate 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 non-carbonate 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 non-carbonated.

PG Binder. The Performance Graded Binder (PG Binder) grades are listed in Table 5, *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:

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%

Location	Location by Counties	PG Binder Grades (Material Designation)
Upstate	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.

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- 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.

Tack Coat. The tack coat used for this mixture shall meet the requirements of 702.3002T or 702.4002T Asphalt Emulsion Straight Tack Coat.

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

CONSTRUCTION DETAILS

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

Tack Coat. The Straight Tack shall be applied and paid for in accordance with Section 407 of the Standard Specifications.

The Provisions of 402-3.07 Compaction, D. 80 Series Compaction Method, apply except as modified.

Table 6 - Number of Passes¹

Option 1 Three Roller Train (Static)		Option 2 Vibratory Rollers	
Steel-Wheel Roller Passes	Pneumatic Roller Passes	Vibratory Roller Passes	Static Roller Passes
4	2	2	2

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

METHOD OF MEASUREMENT

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The provisions of §401-4 and §402-4, Method of Measurement, shall apply.

BASIS OF PAYMENT

The provisions of §402-5 Basis of Payment shall apply.
 Payment will be made under:

ITEM NO.	ITEM	PAY UNIT
402.06810218	6.3 F1 Polymer Modified HMA, 80 Series Compaction	Metric Ton
402.06811218	Plant Production Quality Adjustment to 402.06810218	Quality Unit
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402.06821218	Plant Production Quality Adjustment to 402.06820218	Quality Unit
402.06830218	6.3 F3 Polymer Modified HMA, 80 Series Compaction	Metric Ton
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