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## DETAILED SPECIFICATIONS FOR UPM MIX

### GENERAL

These bituminous patching mixes are designed in various seasonal grades for use when the outside ambient temperature is in the range of -15°F (-26°C) to 100°F (38°C). Each grade shall be manufactured specifically to accommodate anticipated climatic conditions.

The bituminous patching mix shall consist of asphalt and aggregate within prescribed quantities to make a mixture, which will provide satisfactory coating, workability and adhesion characteristics. The patching mixture will be available in grades to function as a patch during cold and damp or during hot weather in bituminous and concrete pavement. The asphalt blend and aggregate shall conform to the following requirements.

### LIQUID ASPHALT

The bituminous material shall be UPM Liquid Asphalt Blend, from Unique Paving Materials Corporation. When prepared from a base stock of asphalt cement and blended in accordance with an approved UPM blending formula as prepared by Unique Paving Materials Corporation, the blend shall meet the following requirements:

Kinematic Viscosity @ 140°F (60°C)	ASTM D 2170	350 to 4000 cSt (mm <sup>2</sup> /s)
Flash Point, Tag Open Cup	ASTM D 1310	200°F (93°C) minimum
Percentage of Water	ASTM D 95	Less Than 0.2%
Distillation to 680°F (360°C)	ASTM D 402	See Values Below

Temperature	Volume % Total Distillate		Volume % Original Sample	
	Minimum	Maximum	Minimum	Maximum
to 437°F (225°C)	0	0	0	0
to 500°F (260°C)	0	0.5	0	0
to 600°F (316°C)	10	65	0	18
Residue from distillation to 680°F (360°C) % Volume by Difference			73	95

### TESTS ON RESIDUE FROM DISTILLATION

Absolute viscosity @ 140°F (60°C)	ASTM D 2171	75 to 425 Poise (10 <sup>-1</sup> Pa × s)
Penetration, Modified with Cone	ASTM D 5*	180 minimum
Ductility, 39°F (4°C), 1 cm/minute	ASTM D 113	100 minimum
Solubility in Trichloroethylene	ASTM D 2042	99.0% minimum

\* Make this test in accordance with ASTM Method D 5, except utilize a penetration cone in place of the standard penetration needle. The cone shall conform to the requirements given in ASTM Method D 217, except that the interior construction may be modified as one desires. The total moving weight of the cone and attachments must be 150 ± 0.1 gram. Also the level of water in the transfer dish shall be lowered to less than the height of the sample and decant water from the top of the sample before transferring from the bath to the penetrometer.

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## AGGREGATE

The aggregate shall be crushed stone and shall meet the following requirements:

### SIEVE ANALYSIS

### ASTM C 136

Sieve	#9 ASTM D 448 Percent Passing	COMBINATION #9 & #89 Percent Passing	#89 ASTM D 448 Percent Passing
1/2" (12.5 mm)	-	100	100
3/8" ( 9.5 mm)	100	55 - 85	20 - 55
# 8 (2.36 mm)	10 - 40	5 - 40	5 - 30
# 16 (1.18 mm)	0 - 10	0 - 10	0 - 10
# 50 (0.30 mm)	0 - 5	0 - 5	0 - 5

Soundness Loss (Sodium, 5 cycles)	ASTM C 88	12.0 maximum
Los Angeles Abrasion Loss	ASTM C 131	45.0% maximum
Specific Gravity	ASTM C 127	2.45-2.85
Absorption	& 128	3.0% maximum
Minus 200 Sieve (0.075 mm) Wash Loss	ASTM C 117	2.5% maximum

## PREPARATION OF MIXTURE

The producer will provide a paved stockpile pad or an established material base of the same product as bid in the specifications. The pad or material base shall be solely committed to this product during the contract period.

The asphalt shall be heated to a temperature between 185° - 265° F (85° - 130° C).

The mixture shall consist of an aggregate and asphalt combined in a pug mill in the following proportions:

Asphalt	5.0 to 6.5%
Aggregate	95.0 to 93.5%

The mixture may be prepared with no heat to the aggregate when determined as acceptable by laboratory testing.

Heat should be applied to the aggregate when determined as necessary by Unique Paving Materials' laboratory testing prior to production of the mixture or by a technical representative of Unique Paving Materials.

Under any of the above conditions the minimum amount of heat necessary to obtain coating or facilitate the operation of the plant may be utilized not to exceed under any circumstance 175° F (80° C).

When producing in a batch plant, wet mix time in the pug mill should be typically in the range of 30 to 45 seconds or until the aggregate is uniformly coated (greater than 95%) ASTM D 2489.

## PRODUCTION SUPERVISION

A technical representative from Unique Paving Materials Corporation will be present at every production for quality assurance of the mix. This supervision shall be at the expense of Unique Paving Materials Corporation.

# DETAILED SPECIFICATIONS FOR UPM MIX

## MIXTURE

The UPM asphalt cold mix shall meet the following requirements:

Coating	ASTM D 2489	Greater than 95%
Stripping in distilled water <sup>1</sup>	Visual	Less than 5%
Extraction of Bituminous Material	ASTM D 2172	3.5 min. 9.0% max.
Sieve Analysis of Extracted Aggregate	ASTM C 136	See Aggregate Specification
Minus 200 (0.075mm) Of Extracted Aggregate	ASTM C 117 & ASTM C 136	4.0% Maximum <sup>2</sup> One Year Minimum
Shelf Life of 100 Tons or more		

**Note 1:** Place approximately 100 grams in a 250 ml glass beaker and cover with distilled water for 24 hours before observation.

**Note 2:** This value shall not be confused with the 2.5% maximum allowed for the Minus 200 (0.075 mm) Wash Loss on the raw aggregate before the production of UPM. That value is necessary to minimize the effect of the plant when producing the finished UPM Cold Mix.

## CONTRACT

Before being awarded a contract, a successful bidder will be required to furnish an affidavit that this product meets or exceeds the above specifications. The affidavit shall have attached, an analysis done by an independent testing laboratory, certifying that the material conforms to these specifications. If the successful bidder does not submit the affidavit of the lab analysis, they will not be awarded the contract.

The material tested shall be obtained from a stockpile with a minimum 100-ton quantity.

## PERFORMANCE GUARANTEE

The supplier of the material shall guarantee the performance of the patching mix to meet the following requirements.

- A. The material shall remain workable to accommodate climatic conditions, in an uncovered stockpile of 100 tons or more, if applicable, for a period of not less than 12 months. Smaller quantities must be reasonably covered.
- B. Repaired potholes shall not show any significant signs of shoving, rutting, tracking, kick-up or ravel-out within a period of 12 months from the time of repair.

In the event the material furnished does not meet all of the above requirements, the supplier shall replace the unsatisfactory with acceptable material. The acceptable material shall be provided and delivered at no extra charge to the Department.