

Detailed Specifications for Bituminous Cold Patch Material UPM® Permanent Pavement Repair Material

GENERAL:

These UPM® 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. These grades shall consist of Winter Mix, Spring/Fall Mix and Summer Mix.

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 Corp. (UNIQUE), Cleveland, Ohio or from one of its approved blending facilities. The blend shall meet the following requirements:

Kinematic Viscosity @ 140°F (60°C)	ASTM D 2170	350 to 4000 cSt (mm ² /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

	Volume % Total Distillate Minimum/Maximum		Volume % Original Sample Minimum/Maximum	
Temperature				
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	50 to 425 Poise (10 ⁻¹ Pa × s)
Penetration, Modified with Cone	ASTM D 5*	180 minimum
Ductility, 39°F (4°C), 1 cm/minute	ASTM D 113	50 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 grams. 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.

AGGREGATE:

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

SIEVE ANALYSIS

ASTM C 136

	#9 ASTM D 448	COMBINATION #9 & #89	#89 ASTM D 448
Sieve	Percent Passing	Percent Passing	Percent Passing
1/2" (12.5 mm)	-	100	100
3/8" (9.5 mm)	100	90 - 100	90 - 100
# 4 (4.75 mm)	85 - 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 (0.075mm) 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	93.5 to 95%

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

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

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%) as outlined in ASTM D 2489.

PRODUCTION SUPERVISION:

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

MIXTURE:

The UPM® mix shall meet the following requirements:

Coating	ASTM D 2489	Greater than 95%
Stripping in distilled water ¹	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 ² 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 (0.075mm) Wash Loss on the raw aggregate before the production of UPM mix. That value is necessary to minimize the effect of the plant when producing the finished UPM cold mix.

PERFORMANCE GUARANTEE:

The supplier of the material shall guarantee the performance of the 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
- B. Smaller quantities must be reasonably covered.
- C. 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.

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