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LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SPECIFICATIONS

ASPHALTIC MIXTURES FOR COLD APPLICATION

DESCRIPTION:

This material consists of a mixture of aggregates and asphaltic materials. The mixture shall be one of the following types, as specified:

Type A - Stone
Type B - Expanded Clay
Type C - Crushed Gravel with Sand
Type HP - High Performance Cold Mix

To obtain equivalent volumes of mixtures, the required tonnage of Types A, C, or HP mixtures will be 225 percent higher than the required tonnage of Type B mixture.

GENERAL REQUIREMENTS:

The material shall:

(a) Be workable at a minimum temperature of -17.8° C (0° F) [-26° C (-15° F) for Type HP] without being heated.

(b) Adhere to both concrete and asphaltic surfaces which are damp or wet.

(c) Be unaffected by salt or deicing compounds.

(d) Be noncaustic, nontoxic, and nonflammable.

(e) Be shipped in small containers [19 liter (5 gallon), 208 liter (55 gallon)], bags, or in bulk for stockpiling, as specified.

(f) Remain usable in uncovered stockpiles for at least 6 months (12 months for Type HP).

(g) Be uniform and not require re-mixing prior to use.

PERFORMANCE TESTING:

The mixture of aggregates and asphaltic materials will be subjected to Water Susceptibility of Asphaltic Concrete Materials [DOTD TR 317, Step 5(e) thru 5(h)]. Mixtures which exhibit stripping of asphaltic material on more than 5 percent of the aggregate surface will be rejected.

COMPOSITION:

Aggregate and asphaltic material shall be combined in such proportions that the mixture meets the following requirements:

	% By Weight			
	Type A	**Type B**	**Type C**	**Type HP**
Aggregate	94 - 96	85 - 92	93 - 96	92 - 96
Residual Asphalt	4 - 6	8 - 15	4 - 7	4 - 8

MATERIALS:

Test methods shall be the latest in effect.

(a) Aggregates: Aggregates shall conform to Subsection 1003.06 of the Standard Specifications, shall be from an approved source listed on the Qualified Products List No. 2, and shall conform to the following gradation when tested in accordance with DOTD TR-113.

	% Passing by Weight			
Metric (U.S) Sieve	**Type A**	**Type B**	**Type C[2]**	**Type HP[3]**
19 mm (3/4")	---	100	100	---
12.5mm (1/2")	---	90 - 100	95 - 100	100
9.5 mm (3/8")	100	---	---	90 - 100
4.75 mm (No. 4)	50 - 100	35 - 70	60 - 90	20 - 55
2.36 mm (No. 8)	---	---	---	5 - 30
2.00 mm (No. 10)	5 - 25	18 - 40	40 - 70	---
1.18 mm (No. 16)	---	---	---	0 - 10
600 μm (No. 30)	---	---	---	0 - 7
425 μm (No. 40)	2 - 10	0 - 20	15 - 40	---
300 μm (No. 50)	---	---	---	0 - 5
75 μm (No. 200)[1]	0 - 5	0 - 10	0 - 10	0 - 2.5

[1]Hydrated lime conforming to ASTM C-207, Type N may be used.

[2]Crushed Aggregate shall have 70 percent minimum crushed faces as determined in accordance with DOTD TR-306. Mixture shall have a minimum of 50 percent crushed aggregate.

[3]Crushed Aggregate shall have 70 percent minimum crushed faces as determined in accordance with DOTD TR-306. Mixture shall have a minimum of 100 percent crushed aggregate.

(b) Binder:

(1) Type A Mixture: Binder shall be either RC-250 cutback asphalt, MC-250 cutback asphalt, or AE 300 S polymerized emulsion. RC-250 cutback asphalt and MC-250 cutback asphalt shall conform to Section 1002 with or without additives; additives may include approved anti-strip additives listed on Qualified Products List No. 57 and/or approved plasticizers. AE 300 S polymerized emulsion shall conform to the following requirements.

The base asphaltic material shall be polymerized prior to emulsification.

Tests on Emulsion:	Test Method	Specification
Viscosity, 25° C (77° F), SSF, Min.	AASHTO T-59	50
Sieve Test [Retained on 850 μm (No. 20)] %, Max.	AASHTO T-59	0.10
Residue by Distillation, % by Wt., Min. [Max. Distillation Temperature 205° ± 5° C (400° ± 10° F)	AASHTO T-59	65
Oil Distillate, ml Oil/100 g Emulsion, Max.	AASHTO T-59	7.0
Water by Distillation, % by Wt., Max.	AASHTO T-59	30
Tests on Residue:	**Test Method**	**Specification**
Float Test @ 60° C (140° F), Sec., Min.	AASHTO T-50	1200
Penetration, 25° C (77° F), 50 g, 5 Sec., Min.	AASHTO T-49	300
Solubility, %, Min.	AASHTO T-44	97.5
Tensile Stress, -10° C (14° F), 500 mm/Min. Rate of Elongation, @ 800% Elongation, kb/cm^2, Min.	ASTM D-412[1]	0.05

[1]The residue asphalt for running tensile stress test shall be obtained by means of residue by evaporation (oven) rather than residue by distillation (Aluminum-alloy Still). The material supplier shall certify by independent testing that the Tensile Stress requirements have been obtained.

(2) Type B Mixture: Binder shall be either AE 300 S polymerized emulsion conforming to Heading (1) above, or CMS-2M emulsified asphalt conforming to Section 1002 with the following modifications conforming to the following requirements.

	Test Method	Percent of Contract Unit Price/Shipment		
		Specifications	Deviations	
		100	80	50 or Reject[1]
Viscosity, 50° C (122° F), SSF	AASHTO T-59	50 - 450	26 - 49 451 - 499	25- 500+
Residue by Distillation, % by Wt, Min.	AASHTO T-59	65	61 - 64	60-
Oil Distillate by Volume, %, Max.	AASHTO T-59	12	---	---
Particle Charge	AASHTO T-59	Pos	---	Neg.
Sieve Test [Retained on 850 μm (No. 20)], %, Max.	AASHTO T-59	0.1	---	---
Settlement, 5 Days, %, Max.	AASHTO T-59	5	---	---
Tests on Residue:				
Solubility, %, Min.	AASHTO T-44	97.5	---	---
Float Test @ 50° C (122° F), s	AASHTO T-50	100 - 250	---	---
Penetration, 25° C (77° F), 50 g, 5 s	AASHTO T-49	300+	299 - 250	249-

[1]At the option of the Department.

(3) Type C Mixture: Binder shall be either AE 300 S polymerized emulsion conforming to Heading (1) above, RC-250 cutback asphalt, or MC-250 cutback asphalt conforming to Section 1002 with an anti-strip additive conforming to Heading (c) and listed on Qualified Products List No. 57 added at the approximate rate of 0.5 percent by weight of RC-250 or MC-250 and thoroughly mixed with the cutback asphalt.

(4) Type HP Mixture: Type HP Mixture shall be any of the following mixtures:

a. Binder shall be a liquid asphalt blend. When prepared from a base asphalt stock of either 85-100 pen, 120-150 pen, AC-10, AC-20, AR-2000, or AR-4000, it shall conform to the following requirements:

	Test Method	**Specification**
Flash Point (TOC), Min.	AASHTO T-48	94°C (201°F)
Kinematic Viscosity, 60° C (140° F)	AASHTO T-201	500 - 2000
Water, %, Max.	AASHTO T-55	0.2
Distillate Test, (Vol. of Original Sample)	AASHTO T-78	
To 225° C (437° F), %		None
To 260° C (500° F), %		0 - 5
To 315° C (599° F), %		0 - 25
Residue from Distillate, 360°C (680°F), %		72 - 95

Residue Tests	**Test Method**	**Specification**
Abs. Viscosity, 60° C (140° F), Poises	AASHTO T-202	125 - 425
Penetration[1] (Using Cone Method), Min.	AASHTO T-49	180
Ductility, 4° C (39° F), 1 cm/min., Min.	AASHTO T-51	100
Solubility, %, Min.	AASHTO T-44	99

[1]This test shall be performed in accordance with (AASHTO T 49), except that a penetration cone conforming to ASTM D-217 shall be used in place of the standard penetration needle. The total moving weight of the cone and attachments shall be 150 + 0.1 gram. The transfer dish water level shall be lowered to less than the height of the sample, and then water from the top of the sample shall be decanted before transferring from the bath to the penetrometer.

b. The binder shall be an asphalt emulsion and meet the following specification requirements. The asphalt shall be polymer modified prior to emulsification. The emulsion should be classified as a high-float, mixing grade type utilizing a polymer modified asphalt base.

Tests on Emulsion:	**Min.**	**Max.**
Viscosity @ 25° C (77° F), SSF	75	400
Sieve Test %; [Retained on 850 μm (No. 20), %	---	0.1
24-Hour Storage Stability, % (Note 1)	---	1
Stone Coating	Pass	---
Residue from Distillation @ 121° C (250° F), %	65	---
Oil Portion from Distillation, ml of Oil per 100g Emulsion	---	7
Tests on Residue from Distillation:		
Solubility, %	97.5	---
Float @ 60° C (140°F), s	1200	---
Penetration @ 25°C (77° F), 0.1mm	300	---
Test on Cured Residue:[1]		
Elastic Recover @ 10° C (50° F), %	30	---

[1] Method of Curing: Two rolling thin film containers of as-received cutback shall be poured and tested in accordance with AASHTO T 240 with the following exceptions: 1. The oven shall be operated at 111° C ± 0.5° C (231.8 ± 1.0° F) as measured in the plenum, 2. The oven shall be leveled so that the horizontal axes of the glass containers are tilted 1.06° (approximately 1 cm rise in 54 cm), higher in the front (door opening) of the oven when in position in the carriage and 3. The time of test shall be 4 hours ± 15 minutes. Note 1: The undisturbed emulsion shall show no white, milky substance at either the top or bottom of the test cylinder after the 24-hour period.

c. The binder shall be a multigrade asphalt cement conforming to the following requirements.

	Test Method	Minimum	Maximum
Viscosity @ 25° C (77° F), s^{-1}, P	AASHTO T-202	1,000	10,000
Flash Point, ° C (° F)	AASHTO T-48	66° (151°)	---
Distillate Tests:			
Volume % of Total Distillate to 360° C (680° F) To 225° C (436° F) To 260° C (500° F) To 316° C (601° F)	ASTM D-402	 0 0 40	 3 5 80
Residue from Distillate to 360° C (680° F), % Volume by Difference	---	78	---
Tests on Residue from Distillate:			
Penetration @ 25° C (77° F), 100g, 5s, dmm	AASHTO T-49	100	250
Float Test @ 60° C (140° F), s	AASHTO T-50	1,200	---
Solubility, %	AASHTO T-44	99.0	---
Water, %	ASTM D-95	---	1.0

(c) Anti-Strip Additives: Anti-strip additives shall be approved products listed on QPL-57. One or more asphalt additives to prevent stripping of the asphalt from the aggregate in the presence of water and promote bonding to damp or wet surfaces shall be incorporated into the mixture. The additive(s) shall be incorporated into the emulsion at the point of origin or be metered in at the mix plant to provide a uniform concentration of the agent(s).

PREPARATION OF MIXTURE:

The approved aggregate shall be surface dried. When heat is applied, the mixed temperature shall not exceed 82° C (180° F). The asphalt blend shall be heated to a temperature of between 66° C (150° F) and 121° C (250° F). The mixture shall be mixed until all of the ingredients are uniformly coated.

PLANT AND EQUIPMENT:

Storage facilities and all equipment used in the preparation of the mixture shall be approved by the Department. The materials for individual batches shall be measured accurately either by volume or by weight, using approved methods and equipment.

A batch-type mixer, drum mixer, continuous mixer, or pug mill of approved design and capacity shall be used in mixing the ingredient materials. An approved dryer shall be available for surface drying the aggregate.

SAMPLING:

All materials will be sampled in accordance with the Materials Sampling Manual.

MEASUREMENT AND PAYMENT:

Measurement and payment will be by the ton of 2000 pounds. When Type HP is specified the supplier shall have the option of furnishing any of the mixtures listed unless otherwise specified by the Department. If the asphaltic material does not conform to specifications, the mixture shall be replaced at no additional cost to the Department.