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ASPHALT MATERIALS**

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1201 - GENERAL REQUIREMENTS FOR DIVISION 1200 - ASPHALT MATERIALS

SECTION 1201

GENERAL REQUIREMENTS FOR DIVISION 1200 – ASPHALT MATERIALS

1201.1 DESCRIPTION

This specification covers general requirements for asphalt materials specified in **DIVISION 1200**.

1201.2 REQUIREMENTS

a. Storage and Heating. Provide storage tanks, pipelines and loading facilities for asphalt materials that are equipped with adequate heating equipment that will not damage the material.

b. Shipping Facilities. Provide shipping containers that are equipped with appropriate hoses and pumps, are insulated and are equipped for heating the contents when requested by the KDOT. Do not heat asphalt materials in transit by open flame heaters on tank trucks.

Before loading, examine the shipping container and remove all remnants of previous cargoes that might contaminate the material to be loaded.

For each shipment to KDOT projects, maintain a loading log showing the following items: contract or project number, date, time, ticket number, shipping container number, contractor, grade and quantity. Mail a copy of the log to the Engineer of Tests monthly during the shipping season.

c. Weighing Equipment. For quantities measured by weight, provide a scale having a platform of adequate length to weigh the longest truck or truck-trailer combination in one operation. Calibrate the scales through the range of use by an approved scale company as often as necessary to verify their accuracy, with intervals not greater than six months. For manufacturers not operating through the winter, calibrate the scales before the production season and thereafter at intervals not greater than 6 months for the duration of the production season. Provide a copy of the calibration report to the Engineer of Tests.

d. Sampling and Inspection.

(1) General. The Engineer will perform the sampling of asphalt materials. Permit inspection of all tanks, tank cars, tank trucks, blending units, loading lines and other items relating to the production and loading of asphalt materials being shipped to KDOT work.

(2) Tests by Producer. Provide a testing laboratory with laboratory and sampling equipment complying with the appropriate AASHTO or ASTM specifications to be available to all production and terminal facilities servicing KDOT projects. The laboratory must be staffed with competent personnel who can conduct tests to verify all asphalt material intended for shipment to KDOT projects complies with the specifications before it is shipped. Perform testing necessary to maintain continuous quality control.

The minimum quality control testing and reporting requirements for each product that is shipped to KDOT projects is described in the following sections.

e. Performance Graded Asphalt Binder (PGAB).

(1) Definition of testing levels.

Complete AASHTO Specification Compliance (SC) test for PGAB:

Original Binder:

Flash Point (COC)

Brookfield Viscosity, 275°F

Dynamic Shear

Separation Test, 325°F, 48 hours (Polymer modified only)

Rolling Thin Film Oven Residue:

Mass Loss

Dynamic Shear

Elastic Recovery, 77°F (Polymer modified only)

Pressure Aging Vessel Residue:

Dynamic Shear

Creep Stiffness, S, 60s

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Slope, m

Quality Control (QC) Tests for PGAB:

DSR on Original Binder

DSR after RTFO

Any other short-term test(s) the producer has found to provide useful information for quality control of the product.

(2) When shipping from Refineries and Blending Facilities, use the following guidelines:

(a) For a tank which is filled before beginning shipping, and then emptied before more material is added, perform 1 complete AASHTO SC test per tank when filled, and weekly QC tests.

(b) For a tank being continually filled while continuous shipping is made from the tank, perform 1 complete AASHTO SC test per week, and daily QC tests

(c) When blending directly into a tanker, sample every third truck for QC tests, and perform 1 complete AASHTO SC test per week.

(d) Under any of the operations described above, if the results of any of the QC tests indicate the product may be out of specification, stop shipment from that source immediately. Perform a complete AASHTO SC test to ascertain the product status and re-certify the source.

(3) When shipping from Terminals, use the following guidelines:

(a) For operations where a tank is filled before beginning shipping, and then emptied before more material is added, perform a complete AASHTO SC test at the refinery on the material being shipped. When the shipment arrives at the terminal, run the QC tests to verify the material as it is being unloaded. After that, perform the QC tests weekly until the tank is emptied.

(b) For operations where a tank is being continually filled while continuous shipping is being made from the tank, perform a complete AASHTO SC test at the refinery on the material being shipped. When the shipment arrives at the terminal, run the QC tests to verify the material as it is being unloaded. Perform the QC tests on the contents in the tank weekly. Perform a complete AASHTO SC test on the contents in the tank once per month.

(c) Under any of the operations described above, if the results of any of the QC tests indicate the product may be out of specification, stop shipment from that source immediately. Perform a complete AASHTO SC test to ascertain the product status and re-certify the source.

f. Emulsions and Asphalt Rejuvenating Agents.

(1) Perform 1 complete AASHTO test each time a batch of material is produced. A tank must be tested each time new material is added to it.

(2) A complete AASHTO test for Emulsions is defined as follows:

Saybolt Furol Viscosity, 77°F or 122°F

Residue by Distillation

Oil Distillate-**WHEN REQUIRED**

Storage Stability, 1 day-**WHEN REQUIRED**

Sieve Test

Demulsibility-**WHEN REQUIRED**

Tests on Distillation Residue:

Penetration, 77°F

Solubility-**WHEN REQUIRED**

Ductility, 39°F or 77°F-**WHEN REQUIRED**

Elastic Recovery - **EMULSIONS with a "P" DESIGNATION**

(3) A complete AASHTO test for asphalt rejuvenating agents is defined as follows:

Viscosity, Saybolt-Furol, 77°F

Residue by Distillation

Oil Distillate

Sieve Test

Storage Stability

Tests on Residue:

Penetration @39°F, 50g, 5 sec.

Asphaltenes

Elastic Recovery

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g. Cutbacks.

- (1) For a tank being filled and emptied before more material is added, perform 1 complete AASHTO test per tank, and weekly tests for 140°F viscosity.
- (2) For a tank being continually filled while continuous shipping is made from the tank, perform 1 complete AASHTO test per week, and daily tests for 140°F viscosity.
- (3) When blending directly into a tanker, sample every third truck for 140°F viscosity, and perform 1 complete AASHTO test per week.
- (4) A complete AASHTO test for cutback asphalt is defined as follows:
 - Kinematic Viscosity, 140°F
 - Flash Point, TOC
 - Distillation Test:
 - Distillates
 - Residue
 - Tests on Distillation Residue:
 - Vacuum Viscosity, 140°F and/or Penetration, 77°F
 - Ductility, 77°F or 60°F

h. Reports. For all types of products discussed above, prepare quarterly summary reports for all quality control and specification compliance testing performed during that period, including any statistical analysis associated with process control. Retain the reports for a minimum of 1 year. Submit them to KDOT if requested.

i. Asphalt Cement (AC).

- (1) Definition of testing levels.
 - Complete AASHTO Specification Compliance (SC) test for AC:
 - Viscosity, 140°F
 - Penetration, 77°F
 - Flash Point, COC
 - Solubility
 - Tests on Residue from TFOT
 - Loss on heating
 - Viscosity, 140°F
 - Ductility, 77°F
 - Quality Control (QC) Tests for AC:
 - Viscosity @ 140°F
 - Penetration @ 77°F
- (2) When shipping from Refineries and Blending Facilities, use the following guidelines:
 - (a) For a tank which is filled before beginning shipping, and then emptied before more material is added, perform 1 complete AASHTO SC test per tank when filled, and weekly QC tests.
 - (b) For a tank being continually filled while continuous shipping is made from the tank, perform 1 complete AASHTO SC test per week, and daily QC tests
 - (c) When blending directly into a tanker, sample every third truck for QC tests, and perform 1 complete AASHTO SC test per week.
 - (d) Under any of the operations described above, if the results of any of the QC tests indicate the product may be out of specification, stop shipment from that source immediately. Perform a complete AASHTO SC test to ascertain the product status and re-certify the source.
- (3) When shipping from Terminals, use the following guidelines:
 - (a) For operations where a tank is filled before beginning shipping, and then emptied before more material is added, perform a complete AASHTO SC test at the refinery on the material being shipped. When the shipment arrives at the terminal, run the QC tests to verify the material as it is being unloaded. After that, perform the QC tests weekly until the tank is emptied.
 - (b) For operations where a tank is being continually filled while continuous shipping is being made from the tank, perform a complete AASHTO SC test at the refinery on the material being shipped. When the shipment arrives at the terminal, run the QC tests to verify the material as it is being unloaded. Perform the QC tests on the contents in the tank weekly. Perform a complete AASHTO SC test on the contents in the tank once per month.

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(c) Under any of the operations described above, if the results of any of the QC tests indicate the product may be out of specification, stop shipment from that source immediately. Perform a complete AASHTO SC test to ascertain the product status and re-certify the source.

(4) Asphalt cement containing particulate modifiers may be susceptible to separation of the modifier. Provide appropriate circulation or agitation in storage if separation of the modifier is expected, suspected or if the modified asphalt will be stored at elevated temperature for more than one day before use.

1201.3 TEST METHODS

As described in the specification for each type of asphalt material.

1201.4 PREQUALIFICATION

a. Producers are required to submit qualification samples of any type or grade of material provided under this specification that has not previously been produced by them, or which has not been used on KDOT projects within the last 12 months. PGAB producers will also be required to submit material that complies with **SECTION 1202**. For each material being qualified or re-qualified, submit samples taken from a production batch, along with a copy of the producer's complete AASHTO test results on the same material to the Engineer of Tests. The Engineer will test the sample and compare the results. The producer will be notified of the results in writing.

b. Any change in formulation will require requalification. Changes in base stock or major components may require requalification. Contact the Engineer of Tests' Chief Chemist to determine if requalification is necessary.

c. All producers supplying material to KDOT projects must have a written quality control plan addressing the requirements of this specification. Producers of performance graded asphalt binder must also address any requirements in the latest edition of AASHTO R 26 that are not specifically covered here.

Submit a copy of the written quality control plan to the Bureau of Construction and Materials for review and approval. Quality control plans and the testing information contained therein will be maintained as confidential by KDOT. An approved plan is a required prerequisite to prequalification of any product.

In addition to the requirements specified in AASHTO R 26, include provisions in the QC plan for maintaining the mixing and compaction temperature ranges using the following guidelines:

(1) Unmodified PGAB Suppliers: Record the initial mixing and compaction temperature ranges on the certificate. Once 3 sets of tests for temperature ranges have been accumulated, then maintain a 3-point moving average. Maintain the mixing and compaction temperature ranges constant unless there is a change to any component (example: upper compaction temperature) of the 3-point moving averages by more than 40°F. If this occurs, then replace all of the old temperature ranges with the 3-point moving average temperature ranges.

Provide a monthly copy of all individual and 3-point moving average temperature ranges to the Chief Chemist at the Materials and Research Center. Provide the Contractor with the most current mixing and compaction temperature ranges as outlined above.

(2) Modified PGAB Suppliers: In addition to the requirements stated in (1) above, include a detailed description of the method used by your laboratory to determine the modified PGAB mixing and compaction temperature ranges in the QC Plan.

d. The Bureau of Construction and Materials will maintain a list of producers that are qualified to supply specific types and grades of materials. Qualified producers will be permitted to supply qualified materials on a certification basis. Monthly loading logs and results of the producer's quality control testing are required to be forwarded to the Engineer of Tests to maintain status on the prequalified list. In addition, suppliers of CRS-1HP and EBL are to submit up to two samples per year to the Engineer of Tests at the Materials and Research Center at the request of the Chief Chemist to maintain status on the prequalified list.

e. An annual split-sample testing program will be conducted for each producer on the Prequalified List. Producers must participate in this program for each type of material they have prequalified. When notified by KDOT, producers will be required to split a sample, test the material according to specifications, and send KDOT a portion to test along with their test results. The 2 sets of test results will be compared using the precision and bias guidelines outlined by AASHTO. If there are any discrepancies in the test results that cannot be resolved, a

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laboratory inspection may be necessary. Producer laboratories that are AMRL certified will be exempt from this program.

f. Results of the split sample testing program, producer quality control testing required by **subsection 1201.2d.(2)** and verification testing conducted by the KDOT will be used to determine the reliability of the producer's certifications. If any of these data indicate that the certifications are not reliable, permission granted to the producer to supply asphalt materials on the basis of certification will be withdrawn. The producer may still supply asphalt materials, but the contents of each shipping container must be sampled and tested by KDOT before acceptance for use. This procedure will be followed until the producer has provided to the Bureau Chief of Construction and Materials, adequate indication that future certifications will be reliable.

1201.5 BASIS OF ACCEPTANCE

a. For producers prequalified as required by **subsection 1201.4** above, asphalt materials covered by this specification will be accepted upon receipt and approval by the Field Engineer of a certification prepared by the producer to cover the quality and quantity of material in each shipping container. Certifications must be based on the results of the producer's quality control testing as required in **subsection 1201.2d.(2)**.

b. For producers who are not prequalified, asphalt materials covered by this specification will be accepted based on the results of tests by the Materials and Research Center on samples from each shipping container. Testing must be completed before incorporation of the product into the project.

1202 - PERFORMANCE GRADED ASPHALT BINDER

SECTION 1202

PERFORMANCE GRADED ASPHALT BINDER

1202.1 DESCRIPTION

This specification covers performance graded asphalt binder (PGAB).

1202.2 REQUIREMENTS

a. Provide material* that complies with the applicable requirements of **SECTION 1201** and AASHTO M 320. Polymer modified binders must meet the additional requirements shown in **TABLE 1202-1**.

*Perform all tests after adding 0.5% high molecular weight amine antistripping agent (by weight) to the PGAB. Contact the Chief Chemist, Bureau of Construction and Materials, for a list of acceptable high molecular weight amines.

TABLE 1202-1: ADDITIONAL REQUIREMENTS					
Temperature Spread¹, °C	86	92	98	104	110
Separation, ASTM D 5976, °C max. Run on Original Binder	2	2	2 ²	2	2
Elastic Recovery, ASTM D 6084, Procedure A, % min. Run on RTFO Residue	50	60	65	75	80
¹ Temperature Spread is determined by subtracting low temperature from high temperature; for example PG 64-28: 64-(-28) = 92 ² For PG 70-28 RCI, separation test requirement no greater than 6.					

b. Provide the grade of material designated in the Contract Documents. KDOT will not make changes in the grade of asphalt. The Contractor may substitute PGAB that complies with or exceeds the upper and lower grade designations for the grade specified. For example, if a maintenance overlay specifies a PG 58-22, a PG 64-22 or a PG 58-28 will also be accepted. Such substitutions require advance approval by the Engineer and a no-cost change order.

1202.3 TEST METHODS

Test according to the applicable provisions of ASTM D 5976, D 6084 and AASHTO T 48, T 240, T 313, T 315, T 316, and R 28.

1202.4 PREQUALIFICATION

Prequalify material according to **SECTION 1201**.

1202.5 BASIS OF ACCEPTANCE

See applicable requirements under **SECTION 1201**.

1203 - EMULSIFIED ASPHALT

SECTION 1203

EMULSIFIED ASPHALT

1203.1 DESCRIPTION

This specification covers emulsified asphalt used for asphalt mixes, surface sealing, microsurfacing and tack coats.

1203.2 REQUIREMENTS

a. General. Provide emulsified asphalt that is an intimate, homogenous mixture of base asphalt and emulsifying agent held suspended in water. Certain emulsified asphalt grades may contain petroleum distillates.

The grade of material is designated in the Contract Documents. The KDOT reserves the right to change the grade and class as necessary due to aggregate type, road surface or weather conditions. Make the required change after being notified in writing by the KDOT.

Provide emulsified asphalt that remains homogenous and stable during transportation, storage and distribution. Material that performs unsatisfactorily in any of the above situations will be rejected even if the material passes all laboratory tests.

b. Chemical and Physical Requirements. Provide emulsified asphalt that complies with TABLES 1203-1, 1203-2 and 1203-3.

TABLE 1203-1: SPECIFICATIONS FOR ANIONIC EMULSIFIED ASPHALT								
	RS-1H/ RS-1HP		SS-1H		MS-1		SS-1HP	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Viscosity, Saybolt Furol								
At 77°F, sec.	----	----	10	100	----	----	10	75
At 122°F, sec.	75	300	----	----	100	400	----	----
Residue by Distillation, (% by Mass).....	65	----	57	----	65	----	57	----
Oil Distillate, (% by Volume) . .	----	----	----	----	----	8	----	----
Storage Stability, % ¹	----	1	----	1	----	1	----	----
Demulsibility:								
35 ml of 0.02 N CaCl ₂ , % . .	60	----	----	----	----	----	----	----
50 ml of 0.1 N CaCl ₂ , % . . .	----	----	----	----	75	----	----	----
Sieve Test, % Retained.	----	0.50	----	0.50	----	0.50	----	0.1
Tests on Distillation Residue:								
Penetration, 77°F, 100g, 5 sec.	75	150	75	125	300	----	75	150
Solubility, %	97.5	----	97.5	----	97.5	----	----	----
Ductility, 77°F, mm.	800	----	800	----	----	----	----	----
Ductility, 39°F, mm	----	----	----	----	----	----	100	350
Elastic Recovery @ 50°F, 20 cm elongation, %	60 ²	----	----	----	----	----	25	----

¹ If the Contractor's storage tanks are equipped with a mechanical propeller type agitation device, and the entire contents of the tank are thoroughly mixed before each day's use, the requirement for satisfactory compliance with the storage stability test will be waived.

² RS-1HP only

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TABLE 1203-2: SPECIFICATIONS FOR CATIONIC EMULSIFIED ASPHALT								
	CRS-1H/ CRS-1HP		CSS-1H/ CSS-1HM		CMS-1		CSS-Special	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Viscosity, Saybolt-Furol:								
At 77°F, sec.	-----	-----	10	60	-----	-----	----	----
At 122°F, sec.	75	300	-----	-----	100	400	----	----
Residue by Distillation, (% by Mass).....	65	-----	57	-----	65	-----	64.0 ¹	66.0 ¹
Oil Distillate, (% by Volume).	-----	3	-----	-----	-----	8	----	0.5
Storage Stability, %	-----	1	-----	1	-----	1	----	----
Sieve Test, % Retained.	-----	0.50	-----	0.50	-----	0.50	----	0.1
Tests on Distillation Residue:								
Penetration, 77°F, 100g, 5 sec	75	150	50	100	300	-----	-25% ²	+25% ²
Solubility, %	97.5	-----	97.5	-----	97.5	-----	----	----
Ductility, 77°F, mm.	800	-----	800	-----	-----	-----	----	----
Viscosity, Saybolt-Furol, 180°F, sec.	-----	-----	-----	-----	300	700	----	----
Elastic Recovery @50°F, 20 cm elongation, %	60 ³	----	----	----	----	----	----	----

¹ Use modified AASHTO T 59 procedure – distillation temperature of 350°F with a 20 minute hold.

² Penetration will be determined by the producer and submitted to the Chief Chemist at the time of prequalification.

³ CRS-1HP only

TABLE 1203-3: SPECIFICATIONS FOR EMULSION BONDING LIQUID		
	EBL	
	Min.	Max.
Tests on Emulsion:		
Viscosity, Saybolt-Furol @ 122°F, sec	25	125
Storage Stability Test ¹ , 24 h, %		1
Sieve Test ² , % Retained		0.3
Residue by Distillation, %	63	
Oil Distillate by Distillation, %		2
Demulsibility, % (35 ml, 0.02 N CaCl ₂) (Anionic Version)	60	
Demulsibility, % (35 ml, 0.8% Dioctyl Sulfosuccinate) (Cationic Version)		
Tests on Distillation Residue:	Min.	Max.
Penetration, 77°F, 100g, 5 sec	90	150
Elastic Recovery ³ , %	60	

¹ After sitting undisturbed for 24 hours, the sample shall show no more than 5 ml of the white latex residue.

² The sieve test is waived if successful application of the material has been achieved in the field.

³ Elastic recovery, AASHTO T 301, 50°F, 20 cm elongation, 5 minute hold, % min., run on Distillation Residue.

c. Mixing Grade Emulsions. Formulate mixing emulsions (MS-1 and CMS-1) for use with regional aggregate types. In general, these will be crushed limestone and/or dolomite with sand for the eastern section of the state and sand-gravel with mineral filler for the central and western sections. Formulate emulsions for use by both windrow and plant mixing methods and for either damp or dry aggregates. Provide an emulsion formulated for the intended end use if these conditions cannot be met by a single formulation. Provide an emulsion that enables material in a stockpile to easily be removed at temperatures as low as 39°F for an extended period of time after mixing.

1203 - EMULSIFIED ASPHALT

d. Modified Emulsions, RS-1HP, CRS-1HP and CSS-1HM and CSS-Special

(1) Provide anionic emulsified asphalt (RS-1HP) that complies with **TABLE 1203-1** or cationic emulsified asphalt (CRS-1HP or CSS-1HM) that complies with **TABLE 1203-2**.

(2) Provide a modified emulsion that contains a minimum of 3.0 percent polymer solids by weight of asphalt.

(3) Provide a modified emulsion that shows no more than 5 ml of the white latex residue after sitting undisturbed for 24 hours.

(4) For use in Microsurfacing. Formulate the modified emulsified asphalt so that if the paving mixture is applied at a thickness of 1 inch, and the relative humidity is not more than 50 percent with the ambient air temperature at least 75°F, it will cure sufficiently so rolling traffic can be allowed on the pavement in 1 hour with no damage to the surface. It must show no separation after mixing.

1203.3 TEST METHODS

a. Test in accordance with the applicable provisions of AASHTO T 44, T 49, T 51, and T 59.

b. When testing modified emulsions, test the Elastic Recovery using AASHTO T 301. In addition, modify the distillation procedure of AASHTO T 59 as follows:

“Slowly bring the temperature of the lower thermometer to $350 \pm 9^\circ\text{F}$ and maintain for 20 minutes. Complete the distillation in 60 ± 15 minutes from the first application of heat.”

1203.4 PREQUALIFICATION

Prequalify material under this specification according to **SECTION 1201**.

1203.5 BASIS OF ACCEPTANCE

See applicable requirements under **SECTION 1201**.

1204 - CUTBACK ASPHALT

SECTION 1204

CUTBACK ASPHALT

1204.1 DESCRIPTION

This specification covers cutback asphalt used for bituminous mixes and surface sealing.

1204.2 REQUIREMENTS

a. General. Provide material that complies with the applicable requirements of **SECTION 1201**. Provide the grade of material designated in the Contract Documents. The KDOT reserves the right to change any grade of asphalt due to the characteristics of the roadbed, seasons of the year or weather conditions. This change will be to obtain a material having the characteristics of the next higher or lower grade of cutback asphalt of the same type (RC or MC). Make the required change after being notified in writing by the KDOT.

b. Rapid Curing Cutback Asphalt. Provide Rapid Curing Cutback Asphalt consisting of an asphaltic base fluxed with suitable petroleum distillates. Provide a material that shows no separation before use and complies with all requirements for the designated grade shown in AASHTO M 81, Table 1.

c. Medium Curing Cutback Asphalt. Provide Medium Curing Cutback Asphalt consisting of an asphaltic base fluxed with suitable petroleum distillates. Provide a material that shows no separation before use and complies with all requirements for the designated grade shown in AASHTO M 82, Table 1.

1204.3 TEST METHODS

Test according to the applicable provisions of AASHTO M 81 and M 82.

1204.4 PREQUALIFICATION

Prequalify material under this specification according to **SECTION 1201**.

1204.5 BASIS OF ACCEPTANCE

See applicable requirements under **SECTION 1201**.

1205 - ASPHALT REJUVENATING AGENT

SECTION 1205

ASPHALT REJUVENATING AGENT

1205.1 DESCRIPTION

This specification covers materials to be used as an emulsified polymer-modified asphalt rejuvenating agents for the use in hot in-place recycling of asphalt pavements.

1205.2 REQUIREMENTS

Provide material that has a record of satisfactory performance based on the capability of the material to increase the ductility and lower the viscosity of the asphalt binder in the pavement surface. Provide an asphalt rejuvenating agent composed of a polymer-modified asphalt emulsion. Modify the asphalt base stock with a minimum of 3.0% styrene-butadiene solution polymer. Blend the polymer modified base stock with process oils or other additives before emulsification to achieve the desired finished product properties. The material must comply with the following physical and chemical requirements in **TABLE 1205-1**:

TABLE 1205-1: ASPHALT REJUVENATING AGENT	
Property	Requirement
Viscosity, Saybolt-Furol at 25°C, sec	15 – 100
Residue, % min. ¹	60
Sieve Test, % max.	0.10
Oil Distillate, % max.	2
Storage Stability, 24 hrs., % max.	1
Tests on Residue from Distillation:	
Asphaltenes, % max.	25
Penetration @ 4°C, 100g, 5 sec.	50 – 150
Elastic Recovery, AASHTO T 301, 4°C, 20 cm elongation, % min. Run on Distillation Residue	60

¹ Use modified AASHTO T 59 procedure – distillation temperature of 350°F with a 20 minute hold.

1205.3 TEST METHODS

Test in accordance with the applicable provisions of AASHTO T 59, ASTM D 4402 and KT-MR20, “Chemical Analysis of Asphalt Rejuvenating Agents”.

1205.4 PREQUALIFICATION

Prequalify material under this specification according to **SECTION 1201**.

1205.5 BASIS OF ACCEPTANCE

See applicable requirements under **SECTION 1201**.

1206 - POLYMER MODIFIED ASPHALT CEMENT FOR CHIP SEALS

SECTION 1206

POLYMER MODIFIED ASPHALT CEMENT FOR CHIP SEALS

1206.1 DESCRIPTION

This specification covers polymer modified (tire rubber and/or SBS) asphalt cement for use in chip seals.

1206.2 REQUIREMENTS

Provide material that complies with the requirements shown in **TABLE 1206-1**.

TABLE 1206-1: ASPHALT CEMENT FOR CHIP SEALS				
	AC-20-5TR		AC-10-2TR	
	Min.	Max.	Min.	Max.
Polymer	TR & SBS ⁽¹⁾		TR & SBS ⁽²⁾	
Polymer Content, %	5	-----	3	-----
Dynamic shear, G*/sin δ, 64°C, 10 rad/s, kPa	1.0	-----	-----	-----
Dynamic shear, G*/sin δ, 58°C, 10 rad/s, kPa	-----	-----	1.0	-----
Viscosity, 140°F, Poise	2,000	-----	1,000	-----
Penetration, 77°F, 100g, 5sec	75	115	95	130
Elastic Recovery, ASTM D6084 50°F, % Recovery, 1 hour	55	-----	30	-----
Softening Point, °F	120	-----	110	-----
<u>Test of Residues from RTFO Aging and PAV</u>				
<u>Bending Beam Rheometer at - 18°C, MPa</u>				
Creep Stiffness	-----	300	-----	300
m-value	0.300	-----	0.300	-----

(1) Produce the AC-20-5TR with a minimum of 5% scrap, group, whole tire rubber.

(2) Produce the AC-10-2TR will a minimum of 3% polymers to include a combination of tire rubber and SBS.

1206.3 TEST METHODS

Test according to the applicable provisions of ASTM D 36 and D 6084 Procedure B, and AASHTO T 49, T 202, T 313, and T 315.

1206.4 PREQUALIFICATION

Prequalify material according to **SECTION 1201**.

1206.5 BASIS OF ACCEPTANCE

See applicable requirements under **SECTION 1201**.

1207 – WARM MIX ASPHALT ADDITIVES

SECTION 1207

WARM MIX ASPHALT ADDITIVES

1207.1 DESCRIPTION

This specification covers Warm Mix Asphalt (WMA) additives and processes.

1207.2 REQUIREMENTS

Provide prequalified WMA additives or processes.

1207.3 TEST METHODS

WMA additives and processes will be tested and evaluated by the Texas Department of Transportation following the procedures outlined in **subsection 1207.4**.

1207.4 PREQUALIFICATION

Obtain prequalification procedures by writing to the Texas Department of Transportation, Director of Construction and Maintenance, 125 East 11th Street, Austin, TX 78701-2483. A list of prequalified additives and processes based on the prequalification process for the Texas Department of Transportation and field performance within Kansas will be maintained by the Bureau of Construction and Materials. The KDOT prequalified list establishes the acceptable additives and processes to be incorporated into KDOT projects. Products will remain on the KDOT list provided field performance is satisfactory. Products may be removed from the KDOT list if the manufacturer requests the removal of their own product.

1207.5 BASIS OF ACCEPTANCE

a. WMA Foaming Processes.

- (1) Prequalification as specified in **subsection 1207.4**.
- (2) Field observation of WMA production.

b. WMA additives.

- (1) Prequalification as specified in **subsection 1207.4**.
- (2) Receipt and approval of a Type C certification as specified in **DIVISION 2600**.
- (3) Field observation of WMA production.