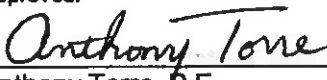


SUPERSEDED BY EB 15-031 EFFECTIVE 9/28/15		New York State Department of Transportation ENGINEERING INSTRUCTION	EI 12-022
Title: REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT AND 702 – BITUMINOUS MATERIALS			
Target Audience: ☐ Manufacturers (18) ☒ Local Govt. (31) ☒ Agencies (32) ☐ Surveyors (33) ☒ Consultants (34) ☒ Contractors (39) ☐ _____ ()		Approved:  Anthony Torre, P.E. Acting Deputy Chief Engineer (Research) 09-11-2012 Date	

ADMINISTRATIVE INFORMATION:

- This Engineering Instruction (EI) is effective beginning with projects submitted for the letting of January 10, 2013.
- This EI Supersedes EI 07-020.
- The revisions issued with this EI will be incorporated into the next update of the Standard Specifications.

PURPOSE: The purpose of this EI is to transmit revised Standard Specifications for Sections 407 - Tack Coat, 702 - Bituminous Materials, and minor revisions to Sections 302, 609, 633, and 705.

TECHNICAL INFORMATION:

Section 407 – Tack Coat

Tack coats traditionally have been supplied as diluted asphalt emulsions for conventional hot mix asphalt (HMA) paving, and non-diluted asphalt emulsions for Polymer-Modified 6.3 mm HMA paving. Tack material will now consist of two items: “diluted tack coat” will be supplied as a diluted asphalt emulsion; “straight tack coat” will be supplied as a non-diluted asphalt emulsion.

- Diluted Tack Coat changes.
 - Diluted tack coat is an asphalt emulsion further diluted with water. This dilution previously had 38% to 45% residual asphalt content. The revised specification increases the maximum residual asphalt content to 50%.
 - Rapid Set emulsions are no longer allowed to be diluted.
- Straight Tack Coat.
 - Straight tack coat is a standard rapid-setting grade of asphalt emulsion that is not further diluted with water. Rapid Set emulsions used for straight tack coat will be either RS-1h or CRS-1h with a minimum residual asphalt content of 55% to 60%, respectively.
 - The Department requires straight tack coat when applying a Polymer-Modified 6.3 mm HMA overlay Item 402.068XXX18. Designers should now use the Standard Specification Item 407.0103 when specifying 402.068XXX18.
 - Designers may choose straight tack coat for conventional HMA overlays as well. Designers should consult their Regional Materials Engineer before selecting this item for conventional HMA overlays.
- Sampling.

The Engineer is directed by the specification to consult Materials Method 702-2, Asphalt Emulsion Quality Assurance. Documenting the area paved on the day when the sample is taken becomes very important due to a reduced payment for failing quality assurance test results.

Some samples submitted to the Main Office Laboratories may not be tested. When a sample is not tested by the Main Office Laboratories, the quantity placed will be accepted based on the material certification.

- **Application Rates.**
Diluted tack coat application rates have been raised slightly. Residual asphalt amounts now more closely reflect rates used by other State's DOTs.
- **Cost Impact.**
The cost impact is expected to be minimal.

Section 702 - Bituminous Material

- **Rapid Curing and Medium Curing Liquid Asphalts.**
These products are being removed from the section. These asphalts are made by blending asphalt cement with a solvent. These products are primarily used for stockpile patching material.
- **Fundamental change in assigning material codes.**
The current numbering system for asphalt emulsions can be confusing to both producer/suppliers and NYSDOT staff. Base asphalt emulsion, emulsion used as tack coat, and polymer modified asphalt emulsions all had different item numbers. This EI will eliminate all but the number for the base asphalt emulsion. A suffix will be attached to this number to designate modification and/or use.
- **Creates a material item for Chip Seals.**
This item is a variation on the traditional emulsion used for chip seals. The new item will be used for higher traffic volume chip seal applications. This material is intended to reduce the risk of bleeding in high traffic areas.
- **Creates a separate section of 702, Straight Tack Coat.**
See Section 407 changes for information.
- **Creates a separate section of 702, Asphalt Rejuvenating Agent.**
Asphalt Rejuvenating Agent is used with Heater Scarification and Hot-In-Place recycling applications. Previously, material requirements for this product were provided in special specifications.
- **Cost Impact.**
The cost impact is expected to be negligible.

Miscellaneous Sections

- Due to Section 702 revisions, references in Sections 302, 609, 633 and 705 have been updated.

IMPLEMENTATION:

- Designers should use the new items and estimate tack coat quantities according to the new application rates in Section 407 beginning with projects submitted for the letting of January 10, 2013.
- Main Office Design Quality Assurance Bureau will insert the standard specification revision into contract proposals beginning with projects submitted for the letting of January 10, 2013.
- **Disapproved Specifications.**

407.0101	Tack Coat
407.0101—99	Tack Coat
407.02010018	Tack Coat for 6.3 Polymer-Modified HMA
407.0201----18	Tack Coat for 6.3-mm Polymer-Modified HMA
402.0179--04	Reflective Crack Relief HMA Interlayer

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- Specifications disapproved due to obsolete references.
407.0101XX63 Tack Coat, Emergency Standby Contract Work Quantity Range XX
407.01110101 Asphalt Emulsion Fog Sealing For Shoulders and Median Strips
- New approved Specifications.
407.0102 Diluted Tack Coat
407.0103 Straight Tack Coat

TRANSMITTED MATERIALS: This EI transmits revised Standard Specifications for Sections 407 – Tack Coat, and 702 – Bituminous Materials. Both Metric and U.S. Customary revisions are attached.

CONTACT: Direct questions regarding this issuance to David Smith David.L.Smith@dot.ny.gov, 518-485-5276, or Tom Kane Thomas.Kane@dot.ny.gov, 518-457-4287, of the Materials Bureau.

REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND 702 – BITUMINOUS MATERIALS

Make the following changes to the Standard Specifications dated May 1, 2008:

Page 207, **Delete** “§302-3.04, Mixing for Option A” Fifth Paragraph. **Replace** it with “The application temperature of the bituminous material shall be designated by the Engineer and be within the range of 130°F to 170°F.”

Page 269, **Delete** Section 407 in its entirety, and **Replace** it with the following:

“SECTION 407 - TACK COAT

407-1 DESCRIPTION. This work shall consist of preparing and treating an existing Portland cement concrete surface or hot mix asphalt surface with tack coat in accordance with the Contract documents and as directed by the Engineer.

407-2 MATERIALS. The tack coat shall meet the applicable requirements of §702. Use of alternative tack coat material requires prior approval by the Director, Materials Bureau.

407-3 CONSTRUCTION DETAILS.

407-3.01 Equipment. A distributor shall be used for applying tack coat. The distributor shall be capable of applying the tack coat uniformly on variable widths of surface up to 15 feet.

The distributor equipment shall include a quantity measuring system and a thermometer for measuring temperature of tank contents. Prior to being used on a project, this equipment shall be calibrated in accordance with ASTM D 2995 *Standard Practice for Estimating Application Rate of Bituminous Distributors* or an equivalent calibration procedure acceptable to the Engineer. The Engineer will witness the equipment calibration or require the Contractor to provide documentation certifying the calibration.

Distributors shall be equipped with circulation spray bars which shall be adjustable both laterally and vertically. An attached bristle broom that drags on the pavement behind the spray bars may be attached to the distributor. If the broom is used, it shall be adjustable laterally and vertically so that the full width of the applied tack coat is bristled uniformly into the pavement surface.

A bituminous material sampling valve shall be attached to the distributor. The distributor tank shall be equipped with an agitator that is capable of ensuring the tack coat remains homogeneous.

Tack coat stored in the distributor tank shall be heated and maintained at a temperature between 85°F and 160°F.

Hand operated spray units will be permitted only in areas where the use of a distributor is impractical.

The Engineer will determine the final acceptance of all equipment used for applying the tack coat.

407-3.02 Application of Tack Coat. The tack coat contained in the distributor tank shall be homogeneous.

The tack coat shall be applied to a prepared clean pavement. Material shall be applied uniformly across the width of the designated area.

The tack coat shall not be applied on a wet pavement surface or when the pavement surface temperature is below 40°F.

REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND 702 – BITUMINOUS MATERIALS

The application rate shall be as determined in Table 407-1 *Tack Coat Application Rates*. These are recommended application rates for tack coat on various surface types and may be modified by the Engineer.

TABLE 407-1 – TACK COAT APPLICATION RATES		
Surface Type	Application Rate (gal/yd ²)	
	Diluted Tack Coat	Straight Tack Coat
New Hot Mix Asphalt	0.05 - 0.06	0.03 - 0.04
Milled Surfaces and Existing Hot Mix Asphalt	0.08 - 0.10	0.05 - 0.06
Portland Cement Concrete	0.08 - 0.10	0.05 - 0.06
Vertical Surfaces (curbs, drainage structures, and appurtenances)	0.09 - 0.11	0.06 - 0.07

407-3.03 Sampling. The Engineer will request samples from the Contractor at the frequency listed in Materials Method 702-2 *Asphalt Emulsion - Quality Assurance*. The Engineer will witness the Contractor sampling the material. The sample will represent all material from the same certified lot, placed that day.

407-4 METHOD OF MEASUREMENT. The quantity to be measured for payment will be in gallons of tack coat measured at 60°F to the nearest gallon. The following formula will be used to calculate material quantity at 60°F:

$$\text{Volume @ 60°F} = \text{Volume}_D \times [1 - (\Delta T \times 0.00025)]$$

$$\Delta T = \text{Delivered Temperature (°F)} - 60$$

$$\text{Volume}_D = \text{Quantity at Delivered Temperature (gallons)}$$

407-5 BASIS OF PAYMENT. The unit price bid per gallon for tack coat shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete the work.

The Regional Materials Engineer will evaluate material represented by failing samples. If the Engineer elects to leave the material in place, the Contractor shall receive a pay reduction of 75% of the tack bid price, for the pavement section represented by the failing sample.

Payment will be made under:

Item No.	Item	Pay Unit
407.0102	Diluted Tack Coat	Gallon
407.0103	Straight Tack Coat	Gallon"

REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND 702 – BITUMINOUS MATERIALS

Page 539, **Delete** “§609-3.07 Preparation of Surface” **Replace** in its entirety with “**B. Preparation of Surface.** When hot mix asphalt curb is constructed on a freshly laid hot mix asphalt surface, the surface shall be clean. When curb is to be laid on a cured or aged concrete base, hot mix asphalt pavement, or performance graded binder treated base, the surface shall be thoroughly swept and cleaned by compressed air.

The surface shall be thoroughly dried and, immediately prior to placing of the hot mix asphalt mixture, shall receive a tack coat meeting the requirements of Table 702-8. The tack coat shall be applied at a rate of 0.05 to 0.15 gallons per square yard. The tack coat shall be prevented from spreading to areas outside of the area to be occupied by the curb.

Page 618, **Delete** “§633-2 Materials” Line 5 beginning with “Asphalt Emulsions,” and **Replace** with “Anionic or Cationic Asphalt Emulsion 702”

Page 808, **Delete** “705-14 Material Requirements D” Bullet 1. **Replace** with “Medium setting asphalt emulsion meeting Table 702-4 or Table 702-5.”

Page 763, **Delete** §702 in its entirety, and **Replace** it with the following:

“SECTION 702 - BITUMINOUS MATERIALS

SCOPE. These specifications cover the material requirements and testing methods of bituminous materials:

1. Performance-Graded (PG) Binders for Paving.
2. Miscellaneous Asphalt Cements.
3. Synthetic Resins.
4. Anionic and Cationic Asphalt Emulsions.
5. Polymer-Modified Asphalt Emulsions.
6. Asphalt Emulsion Diluted Tack Coat.
7. Asphalt Emulsion Straight Tack Coat.
8. High Volume Chip Seal Emulsions.
9. Asphalt Rejuvenating Agent.

GENERAL. The bituminous material volume shall be measured at 60°F. The specific gravity at 60°F shall be included with each shipment of bituminous material to a plant or project site.

MATERIAL REQUIREMENTS. Bituminous materials shall meet the following requirements.

1. Performance-Graded (PG) Binders for Paving. PG binder, designated PG XX-YY, is defined as the range of pavement temperatures expressed in degrees Celsius, maximum to minimum, over which the PG binder can be expected to provide acceptable performance. The PG binder shall be manufactured by refining crude petroleum and blending with a modifier, if necessary, to meet the required performance grade. PG binders shall meet the requirements of Table 702-1 *Performance-Graded Binders for Paving*. The PG binder supplier shall certify that the PG binder meets NYSDOT requirements. If the PG binder is modified, the supplier shall include type of modification and any special handling instructions in the certification. The PG binder supplier shall provide the design mixing and compaction temperatures on Form BR 320, *SUPERPAVE Performance Graded Binder Temperature Viscosity Data*. Also, the supplier shall provide AASHTO M 320 test data and all necessary shipping documents in accordance with the Department’s Materials Method 702-1 *Quality Assurance Procedure for Performance-Graded (PG) Asphalt Binders*.

REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND 702 – BITUMINOUS MATERIALS

TABLE 702-1 PERFORMANCE-GRADED BINDERS FOR PAVING						
MATERIAL DESIGNATION	702-5828	702-5834	702-6422	702-6428	702-7022	702-7622
PERFORMANCE-GRADE	PG 58		PG 64		PG 70	PG 76
	-28	-34	-22	-28	-22	-22
Test Requirements	AASHTO M 320					

Silicone additives will be permitted in paving binders. Silicone may be introduced into the PG binder in accordance with the manufacturer's recommendations either at the refinery, terminal, or at a mixing plant storage tank. PG binder treated with silicone shall conform to the specifications for untreated PG binder.

Any PG binder previously approved that has been stored in the mixing plant tank over the winter shall be re-sampled and accepted by the Department before it is used.

2. Miscellaneous Asphalt Cements. Asphalt cements shall meet the requirements in Table 702-2 *Miscellaneous Asphalt Cements*. The asphalt cement shall be homogeneous, free from water, and shall not foam when heated to 350°F. The supplier shall provide material test results and shipping documents that state the volume of material certified.

TABLE 702-2 MISCELLANEOUS ASPHALT CEMENTS		
MATERIAL DESIGNATION	702-0700	
Test Requirements	Minimum	Maximum
Penetration, 77°F (25°C), 100 g, 5 second (AASHTO T 49)	18	60
Flash Point, COC, °F (AASHTO T 48)	393	-
Solubility in trichloroethylene, % (AASHTO T 44)	99.5	-
Softening Point, °F (AASHTO T 53)	130	167
Loss on Heating, 325°F (163°C), 5 hour, % (AASHTO T 47)	-	1.0
Penetration of Residue, % of Original (AASHTO T 49)	60	-
Ductility, 77°F (25°C), 5 cm/minute, cm (AASHTO T 51)	5	-

3. Synthetic Resins. The synthetic resins covered under these specifications are two types: synthetic resin binder and rapid curing synthetic resin liquid. The synthetic resin binder is a light insensitive liquid used in colored synthetic resin binder concrete. The rapid curing synthetic resin liquid is a tack coat for the resin binder concrete and shall be light colored and compatible with the resin binder concrete placed over it. The synthetic resin shall be homogeneous and shall meet the requirements in Table 702-3 *Synthetic Resins*.

**REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND
702 – BITUMINOUS MATERIALS**

TABLE 702-3 SYNTHETIC RESINS					
TYPE	Resin Binder		Rapid Curing Resin Liquid		
MATERIAL DESIGNATION	702-7000		702-7100		
Test Requirements	Min.	Max.	Min.	Max.	
Penetration, 77°F (25°C), 100 g, 5 second	75	100	-	-	
Viscosity, 140°F (60°C), m ² /s (x 10 ⁻⁶)	-	-	8	30	
Flash Point, COC, °F	400	-	-	-	
Solubility in trichloroethylene, %	99.5	-	99.5	-	
Loss of Heating, 325°F (163°C), 5 hr., %	-	1.0	-	-	
Water, %	-	0.0	-	0.2	
Color, (30% binder/70% toluene) Gardner Standard Color Scale, (ASTM D 1544)	-	16	-	-	
Test on Residue from Thin Film Oven Test, (AASHTO T 179)	47	-	-	-	
Residue from Evaporation, 221°F (105°C), 3 hr., (ASTM D 1644), %	-	-	50	-	
Suggested Spraying Temperature, °F	-	-	50	120	
Typical Uses	Hot Plant Mix		Tack Coat		

4. Anionic and Cationic Asphalt Emulsions. The emulsion shall be homogeneous and show no separation of asphalt, after thoroughly mixing, within 30 days after delivery. The asphalt emulsion shall be agitated or circulated to ensure a homogeneous emulsion prior to sampling or application of material. Material that has separated due to freezing is unacceptable at any time.

Asphalt emulsions shall meet the requirements shown in Table 702-4 *Anionic Asphalt Emulsions*, or Table 702-5 *Cationic Asphalt Emulsions*. Test data and shipping documents shall be provided by the supplier in accordance with the Department's Materials Method 702-2 *Asphalt Emulsion – Quality Assurance*.

TABLE 702-4 ANIONIC ASPHALT EMULSIONS																				
TYPE	RAPID SETTING								MEDIUM SETTING								SLOW SETTING			
MATERIAL DESIGNATION	702-3001		702-3002		702-3101		702-3102		702-3201		702-3301		702-3401		702-3402		702-3501		702-3601	
GRADE	RS-1		RS-1h		RS-2		HFRS-2		MS-2		HFMS-2		HFMS-2h		HFMS-2s		SS-1		SS-1h	
Test Requirements	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Emulsion ⁽¹⁾ :																				
Viscosity, Saybolt Furol, 77°F (25°C) second	20	100	20	100	-	-	-	-	100	-	100	-	100	-	50	-	20	100	20	100
Viscosity, Saybolt Furol, 122°F (50°C) second	-	-	-	-	75	400	75	400	100	400	100	400	-	-	-	-	-	-	-	-
Storage Stability Test, 1 Day (Difference in % Residue)	-	1	-	1	-	1	-	1	-	1	-	1	-	1	-	1	-	1	-	1
Demulsibility, 35 mL, 0.02 N, CaCl ₂ , %	60	-	60	-	60	-	60	-	-	-	-	-	-	-	-	-	-	-	-	-
Cement Mixing Test ⁽²⁾ , %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sieve Test, %	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10
Residue by Distillation, %	55	-	55	-	63	-	63	-	65	-	65	-	65	-	65	-	57	-	57	-
Oil Distillate, Volume Total Emulsion, %	-	1.5	-	1.5	-	2.5	-	2.5	-	8	-	8	-	8	-	8	-	1.5	-	1.5
Residue from Distillation Test ⁽³⁾ :																				
Penetration, 77°F (25°C) 100 g, 5 second	100	200	40	90	100	200	100	200	100	200	100	200	40	90	200	-	100	200	40	90
Ductility, 77°F (25°C), 5 cm/minute, cm	40	-	40	-	40	-	40	-	40	-	40	-	40	-	40	-	40	-	40	-
Solubility in trichloroethylene, %	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-
Float Test ⁽³⁾ , 140°F (60°C), second	-	-	-	-	-	-	1200	-	-	-	1200	-	1200	-	1200	-	-	-	-	-

1. All tests performed per AASHTO T 59 unless otherwise noted.

1. All tests performed per AASHTO T 59 unless otherwise noted.

2. The Cement Mixing test is waived if the emulsion will be used for soil stabilization.

3. Float Test AASHTO T 50, except that the residue from distillation shall be poured immediately into the float collar at 500°F (260°C)

REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND 702 – BITUMINOUS MATERIALS

TABLE 702-5 CATIONIC ASPHALT EMULSIONS

TABLE 702-5 CATIONIC ASPHALT EMULSIONS																
TYPE	RAPID SETTING						MEDIUM SETTING				SLOW SETTING				QUICK SETTING	
MATERIAL DESIGNATION	702-4001		702-4002		702-4101		702-4201		702-4301		702-4401		702-4501		702-4601	
GRADE	CRS-1		CRS-1h		CRS-2		CMS-2		CMS-2h		CSS-1		CSS-1h		COS-1h	
Test Requirements	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Emulsion ⁽¹⁾ :																
Viscosity, Saybolt Furol, 77°F (25°C), second	20	100	20	100	-	-	-	-	-	-	20	100	20	100	20	100
Viscosity, Saybolt Furol, 122°F (50°C), second	-	-	-	-	100	400	50	450	50	450	-	-	-	-	-	-
Storage Stability Test, 1 Day (Difference in % Residue)	-	1	-	1	-	1	-	1	-	1	-	1	-	1	-	1
Classification Test	Passes		Passes		Passes		—		—		—		—		—	
Particle Charge Test ⁽²⁾	Positive		Positive		Positive		Positive		Positive		Positive		Positive		Positive	
Sieve Test, %	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10
Cement Mixing Test ⁽³⁾ , %	-	-	-	-	-	-	-	-	-	-	-	2.0	-	2.0	-	-
Residue by Distillation, %	60	-	60	-	65	-	65	-	65	-	57	-	57	-	62	-
Oil Distillate, Volume Total Emulsion, %	-	1.5	-	1.5	-	2.5	-	10	-	10	-	1.5	-	1.5	-	-
Residue from Distillation Test ⁽¹⁾ :																
Penetration, 77°F (25°C), 100 g, 5 second	100	250	40	90	100	250	100	250	40	90	100	250	40	90	40	90
Ductility, 77°F (25°C), 5 cm/minute, cm	40	-	40	-	40	-	40	-	40	-	40	-	40	-	40	-
Solubility in trichloroethylene, %	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-

1. All tests performed per AASHTO T 59 unless otherwise noted.

2. If the Particle Charge test is inconclusive, material having a maximum pH value of 6.7 will be accepted.

3. The Cement Mixing test is waived if the emulsion will be used for soil stabilization.

5. Polymer-Modified Asphalt Emulsions. Polymer-modified asphalt emulsions shall meet the requirements of Table 702-4 and 702-5 except as modified in Table 702-6 *Polymer Modified Asphalt Emulsions*.

The polymer modifier shall be milled or blended into the base asphalt or emulsifying agent prior to the emulsification process.

TABLE 702-6 POLYMER MODIFIED ASPHALT EMULSIONS

MATERIAL DESIGNATION		702-XXXXP ⁽¹⁾
Emulsion Grade	Test Requirement	Minimum
CQS-1h – 702-4601	Elastic Recovery at 50°F (10°C) ^(2,3) , %	40
	Softening Point, °F ⁽⁴⁾	140
All Other Polymer Modified Emulsions	Elastic Recovery at 50°F (10°C) ^(2,3) , %	50
	Softening Point, °F ⁽⁴⁾	140

1. XXXX shall be the four digit code matching the appropriate emulsion grade listed in table 702-4 & 702-5

2. Elastic Recovery procedure: Use ASTM D 6084 Testing Procedure "A." Samples will be tested at 50°F (10°C).

3. Recover emulsion's asphalt residue according to ASTM D 6997 except as modified herein, when the lower temperature reaches approximately 275°F (135°C), move the ring burner approximately level with the bottom of the still. Increase the temperature to a maximum 350°F +/- 10°F (177°C +/- 5°C), maintaining this temperature for 15 minutes.

4. According to AASHTO T 53

6. Asphalt Emulsion – Diluted Tack Coat. Diluted tack coat emulsion shall be agitated or circulated to ensure a homogeneous emulsion prior to sampling or application of material. The consistency of the diluted tack coat shall be appropriate for pumping and uniform application.

Only the grades of emulsions meeting the requirements of Table 702-7 *Diluted Tack Coat* shall be allowed. These diluted tack coats may be produced by diluting the base asphalt emulsion grade with an emulsifier and/or water and thoroughly mixing into a homogeneous liquid.

**REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND
702 – BITUMINOUS MATERIALS**

TABLE 702-7 DILUTED TACK COAT			
MATERIAL DESIGNATION		702-XXXXT ⁽¹⁾	
Emulsion Grades	Test Requirements ⁽²⁾	Min.	Max.
702-3401 702-3601 702-4501	Sieve Test	-	0.10
	Residue by Distillation, %	38	50
	Oil Distillate, Volume of Total Emulsion, %	-	2
	Test on Residue from Distillation:		
	Penetration, 77°F (25°C), 100 g, 5 seconds	40	90

1. XXXX = 3401, 3601 or 4501

2. All tests performed per AASTHO T59

7. Asphalt Emulsion – Straight Tack Coat. Straight tack coat emulsion shall be agitated or circulated to ensure a homogeneous emulsion prior to sampling or application of material. The consistency of the straight tack coat shall be appropriate for pumping and uniform application.

Only the grades of emulsions meeting the requirements of Table 702-8 *Straight Tack Coat* shall be allowed in straight tack coat applications. These tack coats shall not be further diluted with water.

TABLE 702-8 STRAIGHT TACK COAT			
MATERIAL DESIGNATION		702-XXXXT ⁽¹⁾	
Emulsion Grades	Test Requirements ⁽²⁾	Min.	Max.
702-3002 702-4002	Sieve Test, %	-	0.10
	Residue by Distillation – Grade 702-3002, %	55	-
	Residue by Distillation – Grade 702-4002, %	60	-
	Oil Distillate, Volume of Total Emulsion, %	-	2
	Test on Residue from Distillation:		
	Penetration, 77°F (25°C), 100 g, 5 seconds	40	90

1. XXXX = 3002 or 4002

2. All tests performed per AASTHO T59

8. High Volume Chip Seal Emulsions. The following emulsion grades are modified when used in certain Chip Seal applications. The material shall meet the requirements of Table 702-4, Table 702-5 and Table 702-6 except as modified in Table 702-9 *High Volume Chip Seal Emulsions*.

TABLE 702-9 HIGH VOLUME CHIP SEAL EMULSIONS			
MATERIAL DESIGNATION		702-XXXXC ⁽¹⁾	
Emulsion Grades	Test Requirements	Min.	Max.
702-3101 702-3102 702-4101	Penetration 77°F (25°C) ⁽²⁾	80	150

1. XXXX = 3101, 3102 or 4101

2. Perform penetration per AASTHO T59.

REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND 702 – BITUMINOUS MATERIALS

9. Asphalt Rejuvenating Agent – Asphalt rejuvenating agents are used for heater scarification or hot in-place recycling projects.

Use ASTM D 4552, *Standard Practice for Classifying Hot-Mix Recycling Agents*, grades RA25 and RA75 petroleum-based recycling agents specifically designed as a rejuvenator meeting the requirements in Table 702-10 *Recycling Agent*. Use *Emulsified Recycling Agents*, grades ERA25 (an emulsified RA25) and ERA75 (an emulsified RA75) petroleum-based recycling agents specifically designed as a rejuvenator meeting the requirements in Table 702-11 *Emulsified Recycling Agent*.

TABLE 702-10 RECYCLING AGENT					
MATERIAL DESIGNATION (GRADE)		702-5030 (RA25)		702-5050 (RA75)	
Test Requirements	Test Method	Min	Max	Min	Max
Tests on Residue from Distillation: Viscosity, 140°F (60°C), c St Flash Point, CSC, °F	T 201 T 48	901 426	4500 --	4501 426	12500 --
Test on Residue from RTFO, 325° F (163° C): Viscosity Ratio Weight Change, ±, %	T 240	-- --	3 3	-- --	3 3
Specific Gravity	T 228	Report		Report	

TABLE 702-11 EMULSIFIED RECYCLING AGENT					
MATERIAL DESIGNATION (GRADE)		702-5031 (ERA25)		702-5051 (ERA75)	
Test Requirements	Test Method	Min	Max	Min	Max
Tests on Residue from Distillation: Viscosity, 140° F (60°C), cSt Flash Point, CSC, °F	T 201 T 48	901 426	4500 --	4501 426	12500 --
Test on Residue from RTFO, 325°F (163° C): Viscosity Ratio Weight Change, ±, %	T 240	-- --	3 4	-- --	3 4
Specific Gravity	T 228	Report		Report	
Saybolt Furol Viscosity @ 77°F (25° C), sec.	T 59	20	100	20	100
Storage Stability, 24 hrs, %		--	1.5	--	1.5
Sieve, %		--	0.1	--	0.1
Residue, by distillation, %		65	--	65	--

REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND 702 – BITUMINOUS MATERIALS

BASIS OF APPROVAL. The procedural directives for sampling, testing, and certifying the bituminous material, and for achieving and maintaining Approved List status, are available from the Materials Bureau.

BASIS OF ACCEPTANCE. PG binder will be accepted based on the Primary Source appearing on the approved list and the source's certification and satisfactory test results from samples taken where the material is incorporated into the work.

Miscellaneous asphalt cements and synthetic resins will be accepted based on the manufacturer's certification.

Asphalt Emulsions, including Tack Coat, will be accepted based on the Primary Source appearing on the approved list, the source's certification, and satisfactory test results from samples taken where the material is incorporated into the work.

Asphalt Rejuvenating Agent will be accepted based on the manufacturer's certification. The use of any other grade of recycling agent requires prior approval from the Director, Materials Bureau."

REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND 702 – BITUMINOUS MATERIALS

Make the following changes to the Standard Specifications dated May 4, 2006:

Page 203, **Delete** “§302-3.04, Mixing for Option A” Fifth Paragraph. **Replace** with “The application temperature of the bituminous material shall be designated by the Engineer and within the range of 55°C to 75°C.

Page 264, **Delete** Section 407 in its entirety, and **Replace** it with the following:

“SECTION 407 - TACK COAT

407-1 DESCRIPTION. This work shall consist of preparing and treating an existing portland cement concrete surface or hot mix asphalt surface with tack coat in accordance with the Contract documents and as directed by the Engineer.

407-2 MATERIALS. The tack coat shall meet the applicable requirements of §702. Use of alternative tack coat material requires prior approval by the Director, Materials Bureau.

407-3 CONSTRUCTION DETAILS.

407-3.01 Equipment. A distributor shall be used for applying tack coat. The distributor shall be capable of applying the tack coat uniformly on variable widths of surface up to 4.6 meters.

The distributor equipment shall include a quantity measuring system and a thermometer for measuring temperature of tank contents. Prior to being used on a project, this equipment shall be calibrated in accordance with ASTM D 2995 *Standard Practice for Estimating Application Rate of Bituminous Distributors* or an equivalent calibration procedure acceptable to the Engineer. The Engineer will witness the equipment calibration or require the Contractor to provide documentation certifying the calibration.

Distributors shall be equipped with circulation spray bars which shall be adjustable both laterally and vertically. An attached bristle broom that drags on the pavement behind the spray bars may be attached to the distributor. If the broom is used, it shall be adjustable laterally and vertically so that the full width of the applied tack coat is bristled uniformly into the pavement surface.

A bituminous material sampling valve shall be attached to the distributor. The distributor tank shall be equipped with an agitator that is capable of ensuring the tack coat remains homogeneous.

Tack coat stored in the distributor tank shall be heated and maintained at a temperature between 29°C and 71°C.

Hand operated spray units will be permitted only in areas where the use of a distributor is impractical.

The Engineer will determine the final acceptance of all equipment used for applying the tack coat.

407-3.02 Application of Tack Coat. The tack coat contained in the distributor tank shall be homogeneous.

The tack coat shall be applied to a prepared clean pavement. Material shall be applied uniformly across the width of the designated area.

The tack coat shall not be applied on a wet pavement surface or when the pavement surface temperature is below 4°C.

REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND 702 – BITUMINOUS MATERIALS

The application rate shall be as determined in Table 407-1 *Tack Coat Application Rates*. These are recommended application rates for tack coat on various surface types and may be modified by the Engineer.

TABLE 407-1 – TACK COAT APPLICATION RATES		
Surface Type	Application Rate (L/m ²)	
	Diluted Tack Coat	Straight Tack Coat
New Hot Mix Asphalt	0.23 - 0.27	0.14 - 0.18
Milled Surfaces and Existing Hot Mix Asphalt	0.36 - 0.45	0.23 - 0.27
Portland Cement Concrete	0.36 - 0.45	0.23 - 0.27
Vertical Surfaces (curbs, drainage structures, and appurtenances)	0.41 - 0.50	0.27 - 0.32

407-3.03 Sampling. The Engineer will request samples from the Contractor at the frequency listed in Materials Method 702-2 *Asphalt Emulsion - Quality Assurance*. The Engineer will witness the Contractor sampling the material. The sample will represent all material from the same certified lot, placed that day.

407-4 METHOD OF MEASUREMENT. The quantity to be measured for payment will be in liters of tack coat measured at 15.6°C to the nearest liter. The following formula will be used to calculate material quantity at 15.6°C:

$$\text{Volume @ 15.6°C} = \text{Volume}_D \times [1 - (\Delta T \times 0.00045)]$$

$$\Delta T = \text{Delivered Temperature (°C)} - 15.6$$

$$\text{Volume}_D = \text{Quantity at Delivered Temperature (liters)}$$

407-5 BASIS OF PAYMENT. The unit price bid per liter for tack coat shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete the work.

The Regional Materials Engineer will evaluate material represented by failing samples. If the Engineer elects to leave the material in place, the Contractor shall receive a pay reduction of 75% of the tack bid price, for the pavement section represented by the failing sample.

Payment will be made under:

Item No.	Item	Pay Unit
407.0102	Diluted Tack Coat	Liter
407.0103	Straight Tack Coat	Liter"

REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 -- TACK COAT, AND 702 -- BITUMINOUS MATERIALS

Page 533, Delete "§609-3.07 Preparation of Surface" Replace in its entirety with "B. Preparation of Surface. When hot mix asphalt curb is constructed on a freshly laid hot mix asphalt surface, the surface shall be clean. When curb is to be laid on a cured or aged concrete base, hot mix asphalt pavement, or performance graded binder treated base, the surface shall be thoroughly swept and cleaned by compressed air.

The surface shall be thoroughly dried and, immediately prior to placing of the hot mix asphalt mixture, shall receive a tack coat meeting the requirements of Table 702-8. The tack coat shall be applied at a rate of 0.20 to 0.70 L/m². The tack coat shall be prevented from spreading to areas outside of the area to be occupied by the curb.

Page 599, Delete "§633-2 Materials" Line 5 beginning with "Asphalt Emulsions," and Replace with "Anionic or Cationic Asphalt Emulsion 702"

Page 767, Delete "705-14 Material Requirements D" Bullet 1. Replace with "Medium setting asphalt emulsion meeting Table 702-4 or Table 702-5."

Page 727, Delete §702 in its entirety, and Replace it with the following:

"SECTION 702 - BITUMINOUS MATERIALS

SCOPE. These specifications cover the material requirements and testing methods of bituminous materials:

1. Performance-Graded (PG) Binders for Paving.
2. Miscellaneous Asphalt Cements.
3. Synthetic Resins.
4. Anionic and Cationic Asphalt Emulsions.
5. Polymer-Modified Asphalt Emulsions.
6. Asphalt Emulsion Diluted Tack Coat.
7. Asphalt Emulsion Straight Tack Coat.
8. High Volume Chip Seal Emulsions.
9. Asphalt Rejuvenating Agent.

GENERAL. The bituminous material volume shall be measured at 15.6°C. The specific gravity at 15.6°C shall be included with each shipment of bituminous material to a plant or project site.

MATERIAL REQUIREMENTS. Bituminous materials shall meet the following requirements.

1. Performance-Graded (PG) Binders for Paving. PG binder, designated PG XX-YY, is defined as the range of pavement temperatures expressed in degrees Celsius, maximum to minimum, over which the PG binder can be expected to provide acceptable performance. The PG binder shall be manufactured by refining crude petroleum and blending with a modifier, if necessary, to meet the required performance grade. PG binders shall meet the requirements of Table 702-1 *Performance-Graded Binders for Paving*. The PG binder supplier shall certify that the PG binder meets NYSDOT requirements. If the PG binder is modified, the supplier shall include type of modification and any special handling instructions in the certification. The PG binder supplier shall provide the design mixing and compaction temperatures on Form BR 320, *SUPERPAVE Performance Graded Binder Temperature Viscosity Data*. Also, the supplier shall provide AASHTO M 320 test data and all necessary shipping documents in accordance with the Department's Materials Method 702-1 *Quality Assurance Procedure for Performance-Graded (PG) Asphalt Binders*.

**REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND
702 – BITUMINOUS MATERIALS**

TABLE 702-1 PERFORMANCE-GRADED BINDERS FOR PAVING						
MATERIAL DESIGNATION	702-5828	702-5834	702-6422	702-6428	702-7022	702-7622
PERFORMANCE-GRADE	PG 58		PG 64		PG 70	PG 76
	-28	-34	-22	-28	-22	-22
Test Requirements	AASHTO M 320					

Silicone additives will be permitted in paving binders. Silicone may be introduced into the PG binder in accordance with the manufacturer's recommendations either at the refinery, terminal, or at a mixing plant storage tank. PG binder treated with silicone shall conform to the specifications for untreated PG binder.

Any PG binder previously approved that has been stored in the mixing plant tank over the winter shall be re-sampled and accepted by the Department before it is used.

2. Miscellaneous Asphalt Cements. Asphalt cements shall meet the requirements in Table 702-2 *Miscellaneous Asphalt Cements*. The asphalt cement shall be homogeneous, free from water, and shall not foam when heated to 175°C. The supplier shall provide material test results and shipping documents that state the volume of material certified.

TABLE 702-2 MISCELLANEOUS ASPHALT CEMENTS		
MATERIAL DESIGNATION	702-0700	
Test Requirements	Minimum	Maximum
Penetration, 77°F (25°C) 100 g, 5 second (AASHTO T 49)	18	60
Flash Point, COC, °C (AASHTO T 48)	200	-
Solubility in trichloroethylene, % (AASHTO T 44)	99.5	-
Softening Point, °C (AASHTO T 53)	55	75
Loss on Heating, 325°F (163°C) 5 hour, % (AASHTO T 47)	-	1.0
Penetration of Residue, % of Original (AASHTO T 49)	60	-
Ductility, 77°F (25°C) 5 cm/minute, cm (AASHTO T 51)	5	-

3. Synthetic Resins. The synthetic resins covered under these specifications are two types: synthetic resin binder and rapid curing synthetic resin liquid. The synthetic resin binder is a light insensitive liquid used in colored synthetic resin binder concrete. The rapid curing synthetic resin liquid is a tack coat for the resin binder concrete and shall be light colored and compatible with the resin binder concrete placed over it. The synthetic resin shall be homogeneous and shall meet the requirements in Table 702-3 *Synthetic Resins*.

REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND 702 – BITUMINOUS MATERIALS

TABLE 702-3 SYNTHETIC RESINS				
TYPE	Resin Binder		Rapid Curing Resin Liquid	
MATERIAL DESIGNATION	702-7000		702-7100	
Test Requirements	Min.	Max.	Min.	Max.
Penetration, 77°F (25°C) 100 g, 5 second	75	100	-	-
Viscosity, 140°F (60°C), m ² /s (x 10 ⁻⁶)	-	-	8	30
Flash Point, COC, °C	204	-	-	-
Solubility in trichloroethylene, %	99.5	-	99.5	-
Loss of Heating, 325°F (163°C) 5 hr., %	-	1.0	-	-
Water, %	-	0.0	-	0.2
Color, (30% binder/70% toluene) Gardner Standard Color Scale, (ASTM D 1544)	-	16	-	-
Test on Residue from Thin Film Oven Test, (AASHTO T 179)	47	-	-	-
Residue from Evaporation, 221°F (105°C) 3 hr., (ASTM D 1644), %	-	-	50	-
Suggested Spraying Temperature, °C	-	-	10	50
Typical Uses	Hot Plant Mix		Tack Coat	

4. Anionic and Cationic Asphalt Emulsions. The emulsion shall be homogeneous and show no separation of asphalt, after thoroughly mixing, within 30 days after delivery. The asphalt emulsion shall be agitated or circulated to ensure a homogeneous emulsion prior to sampling or application of material. Material that has separated due to freezing is unacceptable at any time.

Asphalt emulsions shall meet the requirements shown in Table 702-4 *Anionic Asphalt Emulsions*, or Table 702-5 *Cationic Asphalt Emulsions*. Test data and shipping documents shall be provided by the supplier in accordance with the Department's Materials Method 702-2 *Asphalt Emulsion – Quality Assurance*.

TABLE 702-4 ANIONIC ASPHALT EMULSIONS																				
TYPE	RAPID SETTING								MEDIUM SETTING								SLOW SETTING			
MATERIAL DESIGNATION	702-3001		702-3002		702-3101		702-3102		702-3201		702-3301		702-3401		702-3402		702-3501		702-3601	
GRADE	RS-1		RS-1h		RS-2		HFRS-2		MS-2		HFMS-2		HFMS-2h		HFMS-2s		SS-1		SS-1h	
Test Requirements	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Emulsion ⁽¹⁾ :																				
Viscosity, Saybolt Furl, 77°F (25°C) second	20	100	20	100	-	-	-	-	100	-	100	-	100	-	50	-	20	100	20	100
Viscosity, Saybolt Furl, 122°F (50°C) second	-	-	-	-	75	400	75	400	100	400	100	400	-	-	-	-	-	-	-	-
Storage Stability Test, 1 Day (Difference in % Residue)	-	1	-	1	-	1	-	1	-	1	-	1	-	1	-	1	-	1	-	1
Demulsibility, 35 mL, 0.02 N, CaCl ₂ , %	60	-	60	-	60	-	60	-	-	-	-	-	-	-	-	-	-	2.0	-	2.0
Cement Mixing Test ⁽²⁾ , %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sieve Test, %	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10
Residue by Distillation, %	55	-	55	-	63	-	63	-	65	-	65	-	65	-	65	-	57	-	57	-
Oil Distillate, Volume Total Emulsion, %	-	1.5	-	1.5	-	2.5	-	2.5	-	8	-	8	-	8	-	8	-	1.5	-	1.5
Residue from Distillation Test ⁽³⁾ :																				
Penetration, 77°F (25°C) 100 g, 5 second	100	200	40	90	100	200	100	200	100	200	100	200	40	90	200	-	100	200	40	90
Ductility, 77°F (25°C), 5 cm/minute, cm	40	-	40	-	40	-	40	-	40	-	40	-	40	-	40	-	40	-	40	-
Solubility in trichloroethylene, %	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-
Float Test ⁽³⁾ , 140°F (60°C), second	-	-	-	-	-	-	1200	-	-	-	1200	-	1200	-	1200	-	-	-	-	-

1. All tests performed per AASHTO T 59 unless otherwise noted.

2. The Cement Mixing test is waived if the emulsion will be used for soil stabilization.

3. Float Test AASHTO T 50, except that the residue from distillation shall be poured immediately into the float collar at 500°F (260°C)

REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND 702 – BITUMINOUS MATERIALS

TABLE 702-5 CATIONIC ASPHALT EMULSIONS																
TYPE	RAPID SETTING						MEDIUM SETTING				SLOW SETTING				QUICK SETTING	
MATERIAL DESIGNATION	702-4001		702-4002		702-4101		702-4201		702-4301		702-4401		702-4501		702-4601	
GRADE	CRS-1		CRS-1h		CRS-2		CMS-2		CMS-2h		CSS-1		CSS-1h		CQS-1h	
Test Requirements	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Emulsion ⁽¹⁾ :																
Viscosity, Saybolt Furol, 77°F (25°C), second	20	100	20	100	-	-	-	-	-	-	20	100	20	100	20	100
Viscosity, Saybolt Furol, 122°F (50°C), second	-	-	-	-	100	400	50	450	50	450	-	-	-	-	-	-
Storage Stability Test, 1 Day (Difference in % Residue)	-	1	-	1	-	1	-	1	-	1	-	1	-	1	-	1
Classification Test	Passes		Passes		Passes		---		---		---		---		---	
Particle Charge Test ⁽²⁾	Positive		Positive		Positive		Positive		Positive		Positive		Positive		Positive	
Sieve Test, %	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10
Cement Mixing Test ⁽³⁾ , %	-	-	-	-	-	-	-	-	-	-	-	2.0	-	2.0	-	-
Residue by Distillation, %	60	-	60	-	65	-	65	-	65	-	57	-	57	-	62	-
Oil Distillate, Volume Total Emulsion, %	-	1.5	-	1.5	-	2.5	-	10	-	10	-	1.5	-	1.5	-	-
Residue from Distillation Test ⁽¹⁾ :																
Penetration, 77°F (25°C), 100 g, 5 second	100	250	40	90	100	250	100	250	40	90	100	250	40	90	40	90
Ductility, 77°F (25°C), 5 cm/minute, cm	40	-	40	-	40	-	40	-	40	-	40	-	40	-	40	-
Solubility in trichloroethylene, %	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-	97.5	-

1. All tests performed per AASHTO T 59 unless otherwise noted.

2. If the Particle Charge test is inconclusive, material having a maximum pH value of 6.7 will be accepted.

3. The Cement Mixing test is waived if the emulsion will be used for soil stabilization.

5. Polymer-Modified Asphalt Emulsions. Polymer-modified asphalt emulsions shall meet the requirements of Table 702-4 and 702-5 except as modified in Table 702-6 *Polymer Modified Asphalt Emulsions*.

The polymer modifier shall be milled or blended into the base asphalt or emulsifying agent prior to the emulsification process.

TABLE 702-6 POLYMER MODIFIED ASPHALT EMULSIONS		
MATERIAL DESIGNATION		702-XXXXP ⁽¹⁾
Emulsion Grade	Test Requirement	Minimum
CQS-1h – 702-4601	Elastic Recovery at 50°F (10°C) ^(2,3) , %	40
	Softening Point, °C ⁽⁴⁾	60
All Other Polymer Modified Emulsions	Elastic Recovery at 50°F (10°C) ^(2,3) , %	50
	Softening Point, °C ⁽⁴⁾	60

1. XXXX shall be the four digit code matching the appropriate emulsion grade listed in table 702-4 & 702-5.

2. Elastic Recovery procedure: Use ASTM D 6084 Testing Procedure "A." Samples will be tested at 50°F (10°C).

3. Recover emulsion's asphalt residue according to ASTM D 6997 except as modified herein, when the lower temperature reaches approximately 275°F (135°C), move the ring burner approximately level with the bottom of the still. Increase the temperature to a maximum 350°F +/- 10°F (177°C +/- 5°C), maintaining this temperature for 15 minutes.

4. According to AASHTO T 53

6. Asphalt Emulsion – Diluted Tack Coat. Diluted tack coat emulsion shall be agitated or circulated to ensure a homogeneous emulsion prior to sampling or application of material. The consistency of the diluted tack coat shall be appropriate for pumping and uniform application.

Only the grades of emulsions meeting the requirements of Table 702-7 *Diluted Tack Coat* shall be allowed. These diluted tack coats may be produced by diluting the base asphalt emulsion grade with an emulsifier and/or water and thoroughly mixing into a homogeneous liquid.

**REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND
702 – BITUMINOUS MATERIALS**

TABLE 702-7 DILUTED TACK COAT			
MATERIAL DESIGNATION		702-XXXXT⁽¹⁾	
Emulsion Grades	Test Requirements⁽²⁾	Min.	Max.
702-3401 702-3601 702-4501	Sieve Test	-	0.10
	Residue by Distillation, %	38	50
	Oil Distillate, Volume of Total Emulsion, %	-	2
	Test on Residue from Distillation:		
	Penetration, 77°F (25°C) 100 g, 5 seconds	40	90

1. XXXX = 3401, 3601 or 4501

2. All tests performed per AASTHO T59

7. Asphalt Emulsion – Straight Tack Coat. Straight tack coat emulsion shall be agitated or circulated to ensure a homogeneous emulsion prior to sampling or application of material. The consistency of the straight tack coat shall be appropriate for pumping and uniform application.

Only the grades of emulsions meeting the requirements of Table 702-8 *Straight Tack Coat* shall be allowed in straight tack coat applications. These tack coats shall not be further diluted with water.

TABLE 702-8 STRAIGHT TACK COAT			
MATERIAL DESIGNATION		702-XXXXT⁽¹⁾	
Emulsion Grades	Test Requirements⁽²⁾	Min.	Max.
702-3002 702-4002	Sieve Test, %	-	0.10
	Residue by Distillation – Grade 702-3002, %	55	-
	Residue by Distillation – Grade 702-4002, %	60	-
	Oil Distillate, Volume of Total Emulsion, %	-	2
	Test on Residue from Distillation:		
	Penetration, 77°F (25°C) 100 g, 5 seconds	40	90

1. XXXX = 3002 or 4002

2. All tests performed per AASTHO T59

8. High Volume Chip Seal Emulsions. The following emulsion grades are modified when used in certain Chip Seal applications. The material shall meet the requirements of Table 702-4, Table 702-5 and Table 702-6 except as modified in Table 702-9 *High Volume Chip Seal Emulsions*.

TABLE 702-9 HIGH VOLUME CHIP SEAL EMULSIONS			
MATERIAL DESIGNATION		702-XXXXC⁽¹⁾	
Emulsion Grades	Test Requirements	Min.	Max.
702-3101 702-3102 702-4101	Penetration 77°F (25°C) ⁽²⁾	80	150

1. XXXX = 3101, 3102 or 4101

2. Perform penetration per AASTHO T59.

REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND 702 – BITUMINOUS MATERIALS

9. Asphalt Rejuvenating Agent – Asphalt rejuvenating agents are used for heater scarification or hot in-place recycling projects.

Use ASTM D 4552, *Standard Practice for Classifying Hot-Mix Recycling Agents*, grades RA25 and RA75 petroleum-based recycling agents specifically designed as a rejuvenator meeting the requirements in Table 702-10 *Recycling Agent*. Use *Emulsified Recycling Agents*, grades ERA25 (an emulsified RA25) and ERA75 (an emulsified RA75) petroleum-based recycling agents specifically designed as a rejuvenator meeting the requirements in Table 702-11 *Emulsified Recycling Agent*.

TABLE 702-10 RECYCLING AGENT					
MATERIAL DESIGNATION (GRADE)		702-5030 (RA25)		702-5050 (RA75)	
Test Requirements	Test Method	Min	Max	Min	Max
Tests on Residue from Distillation: Viscosity, 140°F (60° C), cSt Flash Point, CSC, ° C	T 201 T 48	901 219	4500 --	4501 219	12500 --
Test on Residue from RTFO, 325° F (163° C): Viscosity Ratio Weight Change, ±, %	T 240	-- --	3 3	-- --	3 3
Specific Gravity	T 228	Report		Report	

TABLE 702-11 EMULSIFIED RECYCLING AGENT					
MATERIAL DESIGNATION (GRADE)		702-5031 (ERA25)		702-5051 (ERA75)	
Test Requirements	Test Method	Min	Max	Min	Max
Tests on Residue from Distillation: Viscosity, 140°F (60°C) , cSt Flash Point, CSC, ° C	T 201 T 48	901 219	4500 --	4501 219	12500 --
Test on Residue from RTFO, 325° F (163° C): Viscosity Ratio Weight Change, ±, %	T 240	-- --	3 4	-- --	3 4
Specific Gravity	T 228	Report		Report	
Saybolt Furol Viscosity @ 77° F (25° C), sec.	T 59	20	100	20	100
Storage Stability, 24 hrs, %		--	1.5	--	1.5
Sieve, %		--	0.1	--	0.1
Residue, by distillation, %		65	--	65	--

REVISED STANDARD SPECIFICATIONS FOR SECTIONS 407 – TACK COAT, AND 702 – BITUMINOUS MATERIALS

BASIS OF APPROVAL. The procedural directives for sampling, testing, and certifying the bituminous material, and for achieving and maintaining Approved List status, are available from the Materials Bureau.

BASIS OF ACCEPTANCE. PG binder will be accepted based on the Primary Source appearing on the approved list and the source's certification and satisfactory test results from samples taken where the material is incorporated into the work.

Miscellaneous asphalt cements and synthetic resins will be accepted based on the manufacturer's certification.

Asphalt Emulsions, including Tack Coat, will be accepted based on the Primary Source appearing on the approved list, the source's certification, and satisfactory test results from samples taken where the material is incorporated into the work.

Asphalt Rejuvenating Agent will be accepted based on the manufacturer's certification. The use of any other grade of recycling agent requires prior approval from the Director, Materials Bureau."