

## COMMITTEE ON MATERIALS AND PAVEMENTS

**2019 Annual Meeting**

**Monday, August 5, 2019**

**10:15am – 12:15pm**

**Technical Subcommittee 2a – Emulsified Asphalts**

**Chair, Brian Pfeifer (IL)**

**Vice Chair, Scott Nussbaum (UT)**

### I. Introduction and Housekeeping

### II. Call to Order and Opening Remarks

A. Brief Summary of Activities

### III. Roll Call of Voting Members

Present	Member Name	State	Present	Member Name	State
<input type="checkbox"/>	Scott George	AL	<input type="checkbox"/>	Matt Romero	OK
<input type="checkbox"/>	Peter Wu	GA	<input type="checkbox"/>	Becca Lane	Ontario
<input type="checkbox"/>	Mike Santi	ID	<input type="checkbox"/>	Timothy Ramirez	PA
<input type="checkbox"/>	Allen Myers	KY	<input type="checkbox"/>	Temple Short	SC
<input type="checkbox"/>	Jason Davis	LA	<input type="checkbox"/>	Joe Feller	SD
<input type="checkbox"/>	James Williams III	MS	<input type="checkbox"/>	Michael Doran	TN
<input type="checkbox"/>	Chuck Dusseault	NH	<input type="checkbox"/>	Robert Crandol	VA
<input type="checkbox"/>	Russell Thielke	NY	<input type="checkbox"/>	Scott Nussbaum	UT
<input type="checkbox"/>	Chris Peoples	NC	<input type="checkbox"/>	Brian Pfeifer	IL
<input type="checkbox"/>	Eric Biehl	OH	<input type="checkbox"/>		

A. Review of Membership

### IV. Approval of Technical Subcommittee Minutes (Attachment A)

### V. Old Business

A. Technical Subcommittee Ballots

TS Ballot #	Standard	Results (neg/affirm)	Comments	Action
2019-01	T 59	17 of 19 affirmative, 0 negative	<b>(SC)</b> Section 4.2.1 - Switch volume units to indicate SI first: 3.8L (1.0 gal). Section 9.1 - Added T72, needs to be added to referenced documents in Section 2.1. Section 12.4.4 - Add tolerances to the temperatures. Section 13.4.2 - Add tolerances to the temperatures.	

# A. Technical Subcommittee Ballots

TS Ballot #	Standard	Results (neg/affirm)	Comments	Action
			<p><b>(PA)</b></p> <p>1) In Section 2.1, revise from "T 382, Viscosity of" to "T 382, Determining the Viscosity of".</p> <p>2) In Section 4.1.1, revise from "the emulsified asphalt samples for testing" to "the emulsified asphalt for testing" since adding "how to sample".</p> <p>3) In Section 4.2.1, R 66 specifies the minimum sample size of "1 L (1 qt) of emulsified asphalt". Shouldn't the minimum sample size in T 59 agree with the minimum sample size in R 66? It is very common for emulsified asphalt to be sampled in 1 L (1 qt) containers.</p> <p>4) In Section 4.2.1, 3rd line, revise from "as determined by the agency" to "as specified by the agency".</p> <p>5) In Section 7.4.1, Note 11, end of 5th line, revise from "at 163°C (325°F)" to "at 163°C (325°F)" (i.e., add a space between "at" and "163°C (325°F)").</p> <p>6) In Section 9.1, suggest revising from "in accordance with test methods T 72 or T 382, representing the Saybolt Furol and Rotational Paddle viscometers to measure" to "in accordance with T 72 (Saybolt Viscometer) or T 382 (Rotational Paddle Viscometer) to measure" or "in accordance with T 72 or T 382 to measure" to simplify the text.</p> <p>7) In Section 13.3.6, suggest making this similar to revision in Section 7.3.4 to read "A convection oven that can maintain a temperature of...". Note that there are several locations in T 59 referencing an oven with most using the language "Capable of maintaining, which was specifically revised in Section 7.3.4, so shouldn't similar revisions be made to other locations specifying an oven apparatus (See Sections 8.3.6, 10.3.9, 12.3.6, 13.3.8, 16.4.5, and 25.3.4)?</p> <p><b>(LA)</b></p> <p>Need to add T 72 to the list of referenced AASHTO documents, as all the details are included in that document.</p> <p><b>(OH)</b></p> <p>New 30.1 has "miscibility" in keywords, which isn't needed now.</p>	

## A. Technical Subcommittee Ballots

TS Ballot #	Standard	Results (neg/affirm)	Comments	Action
2019-01	M 140	17 of 19 affirmative, 0 negative	No comments	
2019-01	T 382	17 of 19 affirmative, 0 negative	<p><b>(Ontario)</b>            Figure 2: Is the paddle thick enough to prevent bending and other damage during handling and cleaning? Uniform dimensions are essential for consistent measurements.            Figure 3: The drawing suggests that the thermometer probe is touching the paddle. Define the distance from paddle and minimum depth of immersion.            Section 8.1 Second sentence: replace with "The instrument should be on for a minimum of 30 minutes or as recommended by the manufacturer prior to testing."            Section 8.9: Define a clear time interval for testing. i.e. 5 minutes at 25°C and 20 min at 50°C.</p> <p><b>(SC)</b>            Section 6.2 - Figures 1 and 2 - Add tolerances for standard units to match the +/- 0.127 mm.</p> <p><b>(PA)</b>            1) In Figure 1, why wouldn't or shouldn't a tolerance apply to the dimension of the rod on the paddle with existing measurement of "20.32 mm (0.80 in.)"? Otherwise, manufacturers would need to specifically meet the dimension specified.            2) In Figure 1, will eliminating the tolerance for R be an issue with existing manufactured equipment or equipment after use (wear and tear)? If a tolerance for paddle width and height is permitted, why not for R?            3) In Figure 2, it is recommended to add a label for the dotted line to clearly indicate what this dotted line represents. It is assumed the dotted line represents the inside of the cup, but this should be clearly labeled.            4) In Figure 2, will eliminating the tolerance for R be an issue with existing manufactured equipment or equipment after use (wear and tear)?            5) In Figure 2, the R seems to be for the outside of the cup. Is this the intent or is the intent for the inside of the cup to have this R (radius)?            6) In Figure 3, for the bottom dimension labeled "1.150 mm ± 0.127 mm (0.0045 in. ± 0.0005)", the arrows show this dimension</p>	

# A. Technical Subcommittee Ballots

TS Ballot #	Standard	Results (neg/affirm)	Comments	Action
			<p>between the outside bottom of the cup and the bottom of the paddle. Is this the intent?</p> <p>7) In Section 8.1, 2nd line, revise from "should be on" to "should be turned on" or "should be powered on".</p> <p>8) In Section 10.1, revise from "nearest 0.1" to "nearest 0.1°C (0.2°F)".</p> <p><b>(GA)</b> Please look at Figure 3. The gap/space between the cup bottom and the paddle is only 1.15 mm. If large tolerance, <math>\pm 1.27</math> mm is allowed (currently 0.127 may be too small), could the paddle actually touch the bottom of the cup (<math>1.15\text{mm} - 1.27 = -0.12</math> mm)?</p> <p><b>(UT)</b> We wonder if it is still necessary to have the tolerances in Figures 2 and 3 that are still 0.005 inches so tight. Could that precision also be reduced practically?</p> <p><b>Pavement Preservation Systems</b> (Delmar Salomon) Recommending to add this sentence to section 8.1: "Heat the sample cup in an oven to test temperature. Heat viscometer to approximate the test temperature according to manufacturer's instructions prior to testing every sample." Salomon comments: we have worked with NDOT (Wayne Brinkmeyer) on the above steps and found it reduces testing variability. We have also worked with the Oregon Coop Test Group(OCTG) and made similar recommendations to the procedure.</p> <p><b>MTE Services</b> (Scott Veglahn) Section 9.1 is overly strict on the verification requirements for a viscosity standard. ASTM D7226 allows 11% difference from the certified value. Also, I have checked with Cannon Instruments who manufactures a rotational paddle viscometer and the certification tolerances they use are <math>\pm 5\%</math>. I believe the 11% tolerance for in lab verification I more realistic than the <math>\pm 2\%</math> added to this standard.</p>	
2019-01	PP 86	17 of 19 affirmative, 0 negative	No comments	

## B. Task Force Reports

Task Force #	Title	Members	Status/Update
2018-01	T 59 review	Kelly Morse, Sharon Taylor, Scott Andrus, Temple Short, Howard Anderson, Ben Sade, Sungho Kim, Jason Davis, Delmar Salomon, Eric Biehl, Brian Hunter, and Lyndi Blackburn	Changes to T 59 were drafted for TS 2a Ballot 2019-01 (see above)

## VI. New Business

- A. AASHTO re:source/CCRL/NTPEP
- B. Presentation by Industry/Academia
  - 1. NCHRP 09-63 study update (Dr. Adriana Vargas, NCAT)
  - 2. Emulsion Task Force update (**Attachment B, Draft Standard for Performance Graded Emulsified Asphalt**)
  - 3. Association of Modified Asphalt Producers (Skip Paul)
- C. Revisions/Work on Standards for Coming Year (**Attachment C, List of TS 2a Standards**)
  - 1. Reconfirmation Ballot Items
    - a. Seven standards: R 66, R 77, R 78, T 59, T 79, T 300, T 361
    - b. Two provisional standards: MP 36, PP 93
- D. Review of Stewardship List
- E. Proposed New Standards
- F. NCHRP Issues
- G. Correspondence, Calls, Meetings
- H. Proposed New Task Forces
- I. New TS Ballots

## VII. Open Discussion

## VIII. Adjourn



## COMMITTEE ON MATERIALS & PAVEMENTS

2019 Mid-Year Meeting (*Webinar*)

Tuesday, February 5, 2019

1:00 – 2:30 PM EST

### TECHNICAL SUBCOMMITTEE 2a

#### Emulsified Asphalt

#### I. Introduction and Housekeeping

#### II. Call to Order and Opening Remarks

*Scott Andrus left the role of VC and Scott Nussbaum (UT) has replaced him*

#### III. Roll Call

Brian	Pfeifer	IL	Chair
Scott	Nussbaum	UT	Vice Chair, w/ Howard Anderson, Roy Ulibarri, Dave Thomas, Bill Lawrence
Scott	George	AL	
Peter	Wu	GA	X
Michael	Santi	ID	
Allen	Myers	KY	X
Jason	Davis	LA	
James	Williams, III	MS	
Denis	Boisvert	NH	
Russell	Thielke	NY	
Brian	Hunter	NC	X
Eric	Biehl	OH	X w/ Jake Lautanen
Matt	Romero	OK	
Timothy	Ramirez	PA	X
Temple	Short	SC	X w/Merrill Zwanka
Joe	Feller	SD	
Michael	Doran	TN	X w/ Brian Egan, Joseph Kerstetter
William	Bailey	VA	
Becca	Lane	ON	
Dan	Speer	CA	X
Charlie	Pan	NV	X
Bob	Horan	AI	X
Oak	Metcalfe	MT	X
Mike	San Angelo	AK	X
Brian	Johnson	Re:source	Maria Knake, Steve Lenker
Greg	Sholar	FL	X
Brett	Trautman	MO	X
Michael	Benson	AR	X
Rick	Barezinsky	KS	X

#### IV. Approval of Technical Subcommittee Minutes

Minutes of the August 6, 2018, TS 2a meeting in Cincinnati, Ohio (**Attachment 1**)

*UT motion to approve minutes; NC second; motion passes*

#### V. Old Business

A. COMP Ballot Items (Including any ASTM Changes/equivalencies)

1. Outstanding items from Annual Meeting?

Brian Pfeifer will look to add HFMS-1 back into M140 now that a need is apparent and do this in coordination with Mike Voth. There is also an error in Table 1 that needs to be corrected. Oak Metcalfe (MT) had previously discussed the pen ranges in M 316 for CHFRS-2p and later talked to members of the Emulsion Task Force (ETF). The ETF is drafting changes to M 316 to provide additional pen ranges.

B. TS Ballots

TS subcommittee ballots in the upcoming months will include M140 and T59 with proposed and editorial changes.

C. Reconfirmation Ballots

1. T 72 (Saybolt Viscosity), T 78 (Distillation of Cutback Asphalt Products), and T 302 (Polymer Content), all votes affirmative: 16-Yes, 0-No, and 3-No Vote

Some clarification is needed. Michael Doran will work with Brian Pfeifer on this one as Brian had a related finding from AASHTO re:Source last year.

2. Comments from TN on T 72:

Section 6.2 figure 2 show very specific dimensions for the withdrawal tube yet mentions or other suitable device. What makes a tube suitable? Are there certain dimensions the tube needs to adhere to?

We have same question for Section 6.3 figure 3 very specific dimension yet references just one suitable design. Is this level of detail needed? Are there dimensions that need to be met?

Should table one in section 6.4 be updated to include electronic thermometers?

Section 6.6 has similar question as that for figure 2 and 3 that is specific dimensions yet makes reference of alternate design. Do we need to define critical dimensions for funnel?

Section 8.5 says that the stream of oil will just strike the neck of the flask. Do we need to define or point out on Figure 5 the location or point where the stream of oil should strike the neck?

Is there a small group or volunteers to work together to on updating T 72? Please get in touch with Brian P if you would like to

D. Task Force 2018-01: T 59 revisions

Kelly Morse provided a summary:

1. Editorial changes to spelling and formatting. Changing of numbering to reflect addition and deletion of methods
2. Clarification to the sampling and conditioning section 4  
Addition of sample quantity (1 gallon) and sampling method AASHTO R66
3. Addition of hot plate evaporation of water to section 7
4. Addition of Rotation Paddle Viscosity to section 9  
Reference to AASHTO T 382 (Rotational Paddle Viscometer)
5. Removal of full Saybolt Furol method from section 9.  
Reference to AASHTO T 72 (Saybolt Furol) added to section 9
6. Addition of drying time and lowering of drying temperature of the sieve to 110 C to avoid overheating of the new solder (used in modern sieves) in section 12
7. Lowered oven temperature in section 13 to reflect drying oven temperature change in section 12
8. Removal of miscibility with water section 15

9. Removal of freezing test section 16

This standard is currently with the ETF and they are awaiting response.

**VI. New Business**

- A. Research Proposals – none received
- B. AASHTO Re:source/CCRL/NTPEP - Observations from Assessments – nothing specific at this time but if there is anything re:source can look into on behalf of the TS let them know
- C. NCHRP Issues - none
- D. Correspondence, calls, meetings – PP 86 issue received from WV. There will be a balloted item with proposed edits to standards.
- E. Presentation by Industry/Academia
  - 1. AASHTO TSP2 Emulsion Task Force Update – Colin Franco, RIDOT (Shared by Brian Pfeifer).
    - 1. Presented on the work of the ETF and how TS 2a and 5b are related
    - 2. Emulsified Asphalt Performance Grading (EAPG)
    - 3. NCHRP work for getting performance specifications for emulsified asphalts
    - 4. Targeting the Fall 2020 Ballot
- F. Revisions/Work on Standards for Coming Year
  - 1. Full standards and provisional standards due for reconfirmation (**Attachment 2**) Would anyone like to be a steward for these standards. The Chair asked for volunteers to be stewards
  - 2. KY will take T 79
  - 3. IL will do T 300 and T 59
  - 4. If you would like to be stewards please reach out to Brian. Brian will follow up with the rest of the standards ahead of the annual meeting.
- G. Proposed New Standards
  - 1. Permission forms for drawings/photos
  - 2. For new and revised photos and drawings please try to send publications the native art file (the .jpg or CAD)
- H. Proposed New Task Forces - none
- I. New TS Ballots? - none
- J. Technical Subcommittee membership – if you would like to become a member or friend of the committee, please email Brian, Scott, and Casey.

**VII. Open Discussion**

TN: Is anyone using T 382 in comparison or in lieu of Saybolt?

- Illinois DOT did a comparison between Saybolt and paddle viscometer but they didn't necessarily correlate depending on the material type. The chemist in lab preferred paddle viscometer for ease of use and clean-up.
- NC just bought one but hasn't had a chance to really use it enough to have a strong opinion either way.
- OH: how are states implementing the transition? Seems like most are still in the very beginning phases of using their viscometers.

**VIII. Adjourn**

2 pm



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Proposed Specification for

Performance-Graded Emulsified  
Asphalt Used in Chip Seals

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**AASHTO Designation: MP XXX-XX**



**American Association of State Highway and Transportation Officials**  
**444 North Capitol Street N.W., Suite 249**  
**Washington, D.C. 20001**

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## Proposed Specification for

# Surface Grade Emulsified Asphalt and Cationic Emulsified Asphalt

**AASHTO Designation: MP XXX-XX**




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## 1. SCOPE

- 1.1. These specifications cover the performance grading of emulsified asphalt used in constructing chip seal surface treatments. Performance grading designations are related to the average seven-day maximum pavement surface design temperature, minimum pavement surface design temperature, and traffic level.

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## 2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standards:*
- M 140, Emulsified Asphalt
  - M 208, Cationic Emulsified Asphalt
  - M 316, Polymer-Modified Emulsified Asphalt
  - R 66, Sampling Asphalt Materials
  - R 78, Recovering Residue from Emulsified Asphalt Use Low-Temperature Evaporative Techniques
  - T 59, Emulsified Asphalts
  - T 315, Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer (DSR)
  - T 350, Multiple Stress Creep Recovery (MSCR) Test of Asphalt Binder Using a Dynamic Shear Rheometer
- 2.2. *ASTM Standards:*
- D8, Standard Terminology Relating to Materials for Roads and Pavements
- 2.3. *Other Standards:*
- NCHRP Report 837: Performance-Related Specifications for Emulsified Asphalt Binders Used in Preservation Surface Treatments
  - TXDOT Special Provision to Item 300, Surface Performance-Grade Emulsified Asphalt

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## 3. TERMINOLOGY

- 3.1. *Definitions:*
- 3.1.1. Definitions for many terms common to emulsified asphalt are found in ASTM D8

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**4. ORDERING INFORMATION**

- 4.1. The high and low temperature grades will be supplied by the specifying agency. To determine the temperature grades, the specifying agency may use the pavement surface temperatures estimated from air temperatures using an algorithm contained in the *LTPPBind* program.
- 4.2. When ordering under this specification, include in the purchase order the required performance grade of the emulsified asphalt, the traffic level, and the grade (type) according to M 140, M 208, or M 316 as applicable (some examples: (1) PG 67-25, high, CRS-2P; (2) PG 61-19, low, CRS-2).

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**5. REQUIREMENTS**

- 5.1. For the liquid emulsified asphalt requirements, conform to M 140, M 208, and M 316 for the type and grade specified with the following exception: recover residue and determine percent residue using R 78, Procedure B.
- 5.2. Upon receipt of sample, refer to T 59 for the proper protocol for conditioning the emulsified asphalt prior to mixing and testing. The emulsified asphalt should appear to be homogeneous after thorough mixing. Test the emulsified asphalt and residue within 14 days of delivery.
- 5.3. If the emulsified asphalt appears to be inhomogeneous after reconditioning and mixing according to T 59, discard and resample for testing if required by the buyer.
- 5.4. If the sample was subjected to freeze-thaw cycling prior to receipt, discard and resample for testing. If the emulsified asphalt was frozen at any time before testing, results for emulsified asphalt liquid properties such as viscosity, sieve, and settlement will be invalid.
- 5.5. Conform to the requirements in Table 1 for the performance grade specified.

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**6. SAMPLING**

- 6.1. Take samples of emulsified asphalt in accordance with AASHTO R 66.
- 6.2. Store samples in clean, airtight sealed containers as specified in AASHTO R 66 at a temperature of not less than 4°C until tested.

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**7. KEYWORDS**

- 7.1. Anionic; cationic; emulsified asphalt; emulsion; high float; rapid setting; surface grade.

**Table 1 - Performance Graded Emulsified Asphalt Specification**

Performance Grade	EPG 49				EPG 55					EPG 61				
	-25	-31	-37	-43	-19	-25	-31	-37	-43	-19	-25	-31	-37	-43
Average 7-day max pavement surface design temperature <sup>a</sup> , °C	< 49				< 55					< 61				
Min pavement surface design temperature <sup>a</sup> , °C	> -25	> -31	> -37	> -43	> -19	> -25	> -31	> -37	> -43	> -19	> -25	> -31	> -37	> -43
<b>Tests on Residue Recovered Using AASHTO R 78, Procedure B</b>														
High Temperature Performance Parameter														
Dynamic shear, T 315: G*/sinδ, min 0.65 kPa, test temp @ 10 rad/s, °C	49				55					61				
Low Temperature Performance Parameter														
Critical phase angle, δ <sub>C</sub> , degree	45	42	39	36	48	45	42	39	36	48	45	42	39	36
DSR Temperature Frequency Sweep, NCHRP Report 837	5°C, 15°C, and 25°C													
Low <sup>b</sup> traffic max G* at δ <sub>C</sub> , MPa	30	30	30	30	30	30	30	30	30	30	30	30	30	30
High <sup>c</sup> traffic max G* at δ <sub>C</sub> , MPa	20	20	20	20	15	20	20	20	20	15	20	20	20	20
OPTIONAL: polymer identification parameter														
Max. phase angled <sup>d</sup> (δ) @ temp. where G*/sin δ = 0.65 kPa	—	—	84 <sup>e</sup>	84 <sup>e</sup>	—	—	84 <sup>e</sup>	84 <sup>e</sup>	84 <sup>e</sup>	—	84 <sup>e</sup>	84 <sup>e</sup>	84 <sup>e</sup>	84 <sup>e</sup>

<sup>a</sup> Temperatures are at the surface of the pavement structure. These may be determined from experience or may be estimated using equations developed by SHRP or LTPP, but modified to represent surface temperatures. Surface-grade high temperatures are generally 3°C to 4°C greater than those determined for Superpave PG binders.

<sup>b</sup> Low traffic is defined as any roadway with an AADT between 0 and 1000 vehicles.

<sup>c</sup> High traffic is defined as any roadway with an AADT between 1001 and 20,000 vehicles.

<sup>d</sup> Phase angle is determined at the temperature where G\*/sin δ = 0.65 kPa. For routine testing and quality assurance, the phase angle can be interpolated from testing at two temperatures, one above and one below where G\*/sin δ = 0.65 kPa

<sup>e</sup> If required by the buyer, change to 80° for SBS/SB modified emulsions.

**Table 1 - Performance Graded Emulsified Asphalt Specification (continued)**

Performance Grade	EPG 67						EPG 73					EPG 79			
	-13	-19	-25	-31	-37	-43	-13	-19	-25	-31	-37	-13	-19	-25	-31
Average 7-day max pavement surface design temperature <sup>a</sup> , °C	< 67						< 73					< 79			
Min pavement surface design temperature <sup>a</sup> , °C	> -13	> -19	> -25	> -31	> -37	> -43	>-13	> -19	> -25	> -31	> -37	> -13	> -19	> -25	> -31
Tests on Residue Recovered Using AASHTO R 78, Procedure B															
High Temperature Performance Parameter															
Dynamic shear, T 315: G*/sinδ, min 0.65 kPa, test temp @ 10 rad/s, °C	67						73					79			
Low Temperature Performance Parameter															
Critical phase angle, δ <sub>C</sub> , degree	51	48	45	42	39	36	51	48	45	42	39	51	48	45	42
DSR Temperature Frequency Sweep, NCHRP Report 837	5°C, 15°C, and 25°C														
Low <sup>b</sup> traffic max G* at δ <sub>C</sub> , MPa	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
High <sup>c</sup> traffic max G* at δ <sub>C</sub> , MPa	10	15	20	20	20	20	10	15	20	20	20	10	15	20	20
OPTIONAL: polymer identification parameter															
Max. phase angled <sup>d</sup> (δ) @ temp. where G*/sin δ = 0.65 kPa	—	84 <sup>e</sup>	84 <sup>e</sup>	84 <sup>e</sup>	84 <sup>e</sup>	84 <sup>e</sup>	—	84 <sup>e</sup>	84 <sup>e</sup>	84 <sup>e</sup>	84 <sup>e</sup>	—	84 <sup>e</sup>	84 <sup>e</sup>	84 <sup>e</sup>
<p><sup>a</sup> Temperatures are at the surface of the pavement structure. These may be determined from experience or may be estimated using equations developed by SHRP or LTPP, but modified to represent surface temperatures. Surface-grade high temperatures are generally 3°C to 4°C greater than those determined for Superpave PG binders.</p> <p><sup>b</sup> Low traffic is defined as any roadway with an AADT between 0 and 1000 vehicles.</p> <p><sup>c</sup> High traffic is defined as any roadway with an AADT between 1001 and 20,000 vehicles.</p> <p><sup>d</sup> Phase angle is determined at the temperature where G*/sin δ =0.65 kPa. For routine testing and quality assurance, the phase angle can be interpolated from testing at two temperatures, one above and one below where G*/sin δ=0.65 kPa</p> <p><sup>e</sup> If required by the buyer, change to 80° for SBS/SB modified emulsions.</p>															

TS	Std Sort	Designation No	Title	ASTM Eq	Immediate Action Needed?
2a	M 081-92 (2017)	M 81-92 (2017)	Cutback Asphalt (Rapid-Curing Type)		No
2a	M 082-17	M 82-17	Cutback Asphalt (Medium-Curing Type)		No
2a	M 140-18	M 140-18	Emulsified Asphalt		No
2a	M 208-18	M 208-18	Cationic Emulsified Asphalt		No
2a	M 316-18	M 316-18	Polymer-Modified Emulsified Asphalt		No
2a	R 005-17	R 5-17	Selection and Use of Emulsified Asphalts		No
2a	R 066-16	R 66-16	Sampling Asphalt Materials		Revise or Reconfirm
2a	R 077-16	R 77-16	Certifying Suppliers of Emulsified Asphalt		Revise or Reconfirm
2a	R 078-16	R 78-16	Recovering Residue from Emulsified Asphalt Using Low-Temperature Evaporative Techniques		Revise or Reconfirm
2a	T 050-14 (2018)	T 50-14 (2018)	Float Test for Bituminous Materials	D139-12	No
2a	T 059-16	T 59-16	Emulsified Asphalts		Revise or Reconfirm
2a	T 072-10 (2019)	T 72-10 (2019)	Saybolt Viscosity		No
2a	T 078-15 (2019)	T 78-15 (2019)	Distillation of Cutback Asphalt Products		No
2a	T 079-12 (2016)	T 79-12 (2016)	Flash Point with Tag Open-Cup Apparatus for Use with Material Having a Flash Point Less Than 93°C (200°F)		Revise or Reconfirm
2a	T 295-13 (2017)	T 295-13 (2017)	Specific Gravity or API Gravity of Liquid Asphalts by Hydrometer Method	D3142/D3142M-11	No
2a	T 300-11 (2016)	T 300-11 (2016)	Force Ductility Test of Asphalt Materials		Revise or Reconfirm
2a	T 301-13 (2017)	T 301-13 (2017)	Elastic Recovery Test of Asphalt Materials by Means of a Ductilometer		No
2a	T 302-15 (2019)	T 302-15 (2019)	Polymer Content of Polymer-Modified Emulsified Asphalt Residue and Asphalt Binders		No
2a	T 361-16	T 361-16	Determining Asphalt Binder Bond Strength by Means of the Binder Bond Strength (BBS) Test		Revise or Reconfirm
2a	T 382-18	T 382-18	Determining the Viscosity of Emulsified Asphalt by a Rotational Paddle Viscometer		No

TS	Std Sort	Designation No	Title	Prov Yr 1	Immediate Action Needed?
2a	MP 031-17	MP 31-17	Materials for Cold Recycled Mixtures with Emulsified Asphalt	2017	No
2a	MP 036-18	MP 36-18	Materials for Asphalt Tack Coat	2018	Revise or 2-Yr. Reconfirm
2a	PP 086-17	PP 86-17	Emulsified Asphalt Content of Cold Recycled Mixture Designs	2017	No
2a	PP 093-18	PP 93-18	Asphalt Tack Coat Design	2018	Revise or 2-Yr. Reconfirm