

Date: July 15, 2011

To: MAG Specification and Detail Committee members

From: Jeff Benedict

RE: case 11-25 section 713 "Emulsified Asphalt Materials "

Purpose: To updated this section with current specifications. The MAG section did not have a PMQSH product that is used in slurry applications. This was added. We had slurry producers review as well as the emulsion manufacturers reviewed it. Minor changes to the specification table to bring it in to current standards.

This reflects a minor change to the current MAG section.

SECTION 713

EMULSIFIED ASPHALTS MATERIALS

713.1 GENERAL:

Emulsified asphalts shall be composed of a paving asphalt base uniformly emulsified with water and an emulsifying or stabilizing agent. It shall be homogeneous throughout and if stored, shall show no separation of ingredients within 30 days after delivery. Emulsified asphalt shall be classified as quick setting, rapid setting, medium setting or slow setting type in either anionic or cationic emulsions.

Emulsified asphalt shall be specified as follows:

(A) Penetration type and high viscosity type emulsion shall be designated by the letters RS-Rapid Setting.

(B) Mixing type emulsion shall be designated by the letters SS-Slow Setting, MS-Medium Setting and QS-Quick Setting.

713.2 TESTING REQUIREMENTS:

The emulsified asphalt shall conform to the requirements set forth in Table 713-1.

713.3 TESTS REPORT AND CERTIFICATION:

Test reports and certifications shall be made in accordance with Section 711.

TABLE 713-1														
REQUIREMENTS FOR ANIONIC EMULSIFIED ASPHALT (Specification Designation)														
Type	Rapid-Setting				Medium-Setting				Slow-Setting					
	RS-1		RS-2h		MS-1		MS-2		MS-2h		SS-1		SS-1h	
Grade	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Tests on emulsions														
Viscosity, Saybolt Furol at 77°F (25°C.), sec	20	100			20	100	100		100		20	100	20	100
Viscosity, Saybolt Furol at 122°F (50°C.), sec			75	400										
Settlement, 24 hour day, percent		±		±		±		±		±		±		±
Demulsibility, 35 ml. 0.02 N. CaCl ₂ , percent	60		60											
Coating ability and water resistance														
Coating, dry and aggregate					good		good		good					
Coating, after spraying					fair		fair		fair					
Coating, wet aggregate					fair		fair		fair					
Coating, after spraying					fair		fair		fair					
Cement mixing test, percent											2		2	
Sieve test, percent		0.1		0.1		0.1		0.1		0.1		0.1		0.1
Residue by distillation, percent	55		63		55		65		65		57		57	
Tests on Residue from Distillation Test:														
Penetration 77°F (25°C), 100g, 5 s	100	200	40	90	100	200	100	200	40	90	100	200	40	90
Ductility, 77°F (25°C), 5 cm/min. cm.	40		40		40		40		40		40		40	
Solubility in trichloroethylene, %	97.5		97.5		97.5		97.5		97.5		97.5		97.5	

SECTION 713

TABLE 713-1 (continued)

REQUIREMENTS FOR ANIONIC/CATIONIC EMULSIFIED ASPHALT
(Specification Designation)

Type	Quick Setting		Rapid Setting		Medium Setting		Slow Setting		Quick Setting									
Grade	QSH		CQSH		CRS-1		CRS-2h		CMS-2		CMS-2h		CSS-1		CSS-1h		PMCQS-1h	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Tests on emulsions:																		
Visc., Saybolt Furol at 77°F., sec.	20	100	<u>20</u>	<u>100</u>									20	100	20	100	<u>20</u>	<u>100</u>
Visc., Saybolt Furol at 122°F., sec					20	100	100	400	50	450	50	450						
<u>Settlement, 24 hour day, percent</u> <u>Storage Stability Test, 1 day, %</u>	<u>1</u>		<u>1</u>		<u>1</u>	<u>±</u>	<u>1</u>	<u>±</u>	<u>1</u>	<u>±</u>	<u>1</u>	<u>±</u>	<u>1</u>	<u>±</u>	<u>1</u>	<u>±</u>	<u>1</u>	
Demulsibility, 35 ml 0.8% sodium dioctyl sulfosuccinate, %					40		40											
Coating ability and water resistance:																		
Dry aggregate after spraying									Good	Good								
wet aggregate after spraying									Fair	Fair								
Particle charge test	<u>Negative</u>		Positive		Positive		Positive		Positive	Positive		Positive		Positive		Positive		<u>Positive</u>
Sieve Test, %	<u>0.10</u>		0.10		0.10		0.10		0.10	0.10		0.10		0.10		0.10		
Cement Mixing test, %													2.0		2.0			
Distillation:																		
Oil distillate, by volume of emulsion, %					3		3		12	12								
Residue, %	57		57		60		65		65	65		65		57		57		<u>60</u>
Test on Residue from distillation test:																		
Penetration, 25°C (77°F), 100 g. 5 sec.	40	110	40	110	100	250	40	90	100	250	40	90	100	250	40	90	<u>55</u>	<u>75</u>
Ductility, 25°C (77°F.) 5 cm per min, cm.	40		40		40		40		40		40		40		40			<u>40</u>
<u>Ring and Ball Softening Point, AASHTO T53</u>																		<u>130</u>
<u>Elastic Recovery, % AASTHO T30</u>																		<u>55</u>
Solubility in trichloroethylene, %	98		98		98		98		98	98		98		97.5		97.5		<u>97.5</u>
<u>Storage Stability Test, 1 day, %</u>	<u>±</u>		<u>±</u>															

SECTION 713

* If the Particle Charge Test result is inconclusive for CSS-1 ~~and~~or CSS-1h, material having a maximum ~~pH~~ value of 6.7 will be accepted.

* If using PMCQS-1h the Residue from distillation shall be obtained from ARIZ 504.



SECTION 713

713.4 TEMPERATURES:

Unless otherwise specified, the various grades of emulsified asphalt shall be applied at temperatures within the limits specified in Table 713-2 the exact temperature to be determined by the Engineer. Emulsified asphalt shall be reheated if necessary. But at no time, after loading into a tank car or truck for transportation to the work site, shall the temperature of the emulsion be raised above the maximum temperature shown in Table 713-2. During all reheating operations, the emulsified asphalt shall be agitated to prevent localized overheating. Emulsified asphalt shall not be permitted to cool to a temperature of less than 40 degrees F.

TABLE 713-2		
APPLICATION TEMPERATURE OF EMULSIFIED ASPHALT		
Grade of Emulsified Asphalt	Minimum °F.	Maximum °F.
RS-1, MS-1, SS-1, SS-1h, CSS-1, CSS-1h	70°F.	140°F.
RS-2, MS-2, MS-2h, <u>CRSers-1</u> , <u>PMCQS-1h</u> CRS-1h, CRS-2h, CMS-2, CMS-2h, QSH, CQSH	125°F.	185°F.

Emulsified asphalt shall be heated in such a manner that steam or hot oils will not be introduced directly into the emulsified asphalt during heating.

713.5 CONVERSION OF QUANTITIES:

When pay quantities of emulsified asphalt are determined from volumetric measurements, the volumetric measurement at any temperature shall be reduced to the volume the material would occupy at 60 degrees F. in accordance with ASTM D-1250. In converting volume to weight, the computations shall be based on Table 713-3.

TABLE 713-3		
EMULSIFIED ASPHALTS QUANTITY CONVERSION		
Grade of Material	Gals Per Ton at 60°F.	Lbs Per Gal. at 60°F.
All grades	240	8.33