

Date: July 15, 2011

To: MAG Specification and Detail Committee members

From: Jeff Benedict

RE: case 11-08 section 711 "Paving Asphalt

Purpose: To bring section into compliance with ASTM and AASHTO current specifications into this section.

Revisions: Two binders were added to the table, one heavier (PG76-16) and one softer, (PG 58-22) minor revisions to test procedures due to typos not caught in the original or current specification. The PAV test temperatures are clear and not open to interpretation.

Minor revisions. The title is changed to conform to current practices.

## SECTION 711

### PAVING ASPHALT

#### 711.1 GENERAL:

The asphalt shall be produced from crude asphalt petroleum or a mixture of refined liquid asphalt and refined solid asphalt. It shall be free from admixture with any residues obtained by the artificial distillation of coal, coal tar, or paraffin oil and shall be homogeneous and free from water.

Asphalt shall not be heated during the process of its manufacture, storage, or during construction so as to cause injury as evidenced by the formation of carbonized particles.

#### 711.2 TESTING REQUIREMENTS:

Paving asphalt shall be classified by the Performance Grading System and shall conform to the requirements set forth in Table 711-1 and AASHTO M320 with the PAV temperature changes noted herein in this table.

TABLE 711-1				
PERFORMANCE GRADING SYSTEM				
	PG 58-22	PG 64-16	PG 70-10	PG-76-16
<b>Original Asphalt</b>				
Viscosity, ASTM D4402 (Note 1) Max. 3 Pa·s, Test Temp, °C	135	135	135	135
Dynamic Shear (Note 2) G*/sinδ, Min., 1.0 kPa Test Temp. @ 10 rad/s, °C	58	64	70	76
Rolling Thin Film Oven Residue (AASHTO T240)				
Mass Loss, Maximum % Dynamic Shear G*/sinδ, Min., 2.20 kPa Test Temp. @ 10 rad/s, °C	1.0 58	1.0 64	1.0 70	1.0 76
Pressure Aging Vessel Residue (AASHTO R28)				
PAV Aging Temperature, °C	100	100	110	110
Dynamic Shear G*·sinδ, Max., 5000 kPa Test Temp. @ 10 rad/s, °C	22	28	34	34
Creep Stiffness, AASHTO T313 S, Maximum, 300 MPa m-value, Minimum, 0.300 Test Temp. @ 60s, °C	-12	-6	0	-6
Direct Tension, (Note 3) Failure Strain, Minimum 1.0% Test Temp. @ 1.0 mm/min. °C	-12	-6	0	-6

On all Grades Flash Point Temperature T48: Minimum 230 °C and Mass Loss, Maximum 1.00 percent.

#### NOTES:

- (1) This requirement may be waived at the discretion of the specifying agency if the supplier warrants that the asphalt binder can be adequately pumped and mixed at temperatures that meet all applicable safety standards.

(2) For quality control of unmodified asphalt cement production, measurement of the viscosity of the original asphalt cement may be substituted for dynamic shear measurements of  $G^*/\sin\delta$  at test temperatures when the asphalt is a Newtonian fluid. Any suitable standard means of viscosity measurement may be used, including vacuum capillary or rotational viscometer (T202 or T316).

(3) If the Creep Stiffness is below 300 MPa, the direct tension test is not required. If the Creep Stiffness is between 300 and 600 MPa, the direct tension failure strain requirement can be used in lieu of the Creep Stiffness requirement. The m-value requirement must be satisfied in all cases.

Design Note: Performance Grade Asphalts are selected for certain reliabilities with respect to high and low pavement temperatures. The specified characteristics are based upon a loading frequency that approximates vehicle speeds of approximately 90 km/hr. Since all binders are frequency dependent, the designer may consider increasing the high temperature requirement for slow transient and standing loads, such as intersection loading. The high temperature requirement may also be increased for excessive numbers of equivalent single axle loads.

**711.3 TEST REPORT AND CERTIFICATION:**

At the time of delivery of each shipment of asphalt, the supplier supplying the material shall deliver to the purchaser 3 certified copies of the test report which shall indicate the name of the refinery and supplier, type and grade of asphalt delivered, date and point of delivery, quantity delivered, delivery ticket number, purchase order number, and results of the above specified tests. The test report shall be signed by an authorized representative of the supplier certifying that the product delivered conforms to the specifications for the type and grade indicated.

Until the certified test reports and samples of the material have been checked by the Engineer, that material will be only tentatively accepted by the Contracting Agency. Final acceptance will be dependent upon the determination of the Engineer that the material involved fulfills the requirements prescribed. The certified test reports and the testing required in connection with the reports shall be at no additional cost to the Contracting Agency.

**711.4 TEMPERATURES:**

Unless otherwise specified in these specifications or in the special provisions, the various grades of paving asphalt shall not exceed 340°F, be applied within the temperature range indicated in Table 711-2. The exact temperature shall be determined by the Engineer.

At no time, after loading into a tank car or truck for transportation from the refinery to the purchaser, shall the temperature of the paving asphalt be raised above 400 degrees F.

TABLE 711-2				
APPLICATION TEMPERATURE OF PAVING ASPHALTS				
Grade of Material	Pug Mill Mixing Asphalt Temperature °F.		Distributor Application Temperature °F.	
	Min.	Max.	Min.	Max.
PG 58 22	275	325	300	390
PG 64 16	275	325	300	390
PG 70 10	275	325	300	390
PG 76 16	290	340	310	390

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

**711.5 DISTRIBUTING EQUIPMENT:**

Distributing Equipment shall meet the requirements of Section 330.

**711.6 CONVERSION OF QUANTITIES:**

When pay quantities of paving 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 711-3.

<b>TABLE 711-3</b>		
<b>PAVING ASPHALT QUANTITY CONVERSION</b>		
<b>Grade of Material</b>	<b>Gals. Per Ton of 60 °F.</b>	<b>Lbs. Per Gal at 60 °F.</b>
PG 58-22	235	8.5
PG 64-16	235	8.5
PG 70-10	235	8.5
PG 76-16	233	8.6