ORIGINATION FORM

√ Modify Specification _____9160000SS_____.
Section/File number

☐ New Section _____.
Section number

Subject: Bituminous Materials

Origination date: February 8, 2006

Originator: Tom Malerk
Office/Phone: State Materials Office/352-955-6620
Email address/ Userid: tom.malerk@dot.state.fl.us rt820tm

Problem statement: The proposed changes are for additional changes that were recently identified by comments from Industry after changes to the specification went through the review process.

Information source: For more information, please contact Gale Page at 352-955-2903 (SC 625-2903)

Background data: These changes are needed for clarification, as well as to simplify test specification criteria and test equipment.

1. Reword the 2nd last paragraph of 916-1.1 to make sure that FC-5 using Oolitic Limestone with PG76-22 has anti-strip added. Current wording could be interpreted differently.

2. Change the Test Method in the Table in 916-1.3.4 Reporting under Original Binder to reflect the current AASHTO Test Method being used.

3. Change requirement in 916-2.1 that RA binders be tested using RTFOT rather than TFOT since RTFOT is now being used for PG binders and this would simplify test equipment requirements for the suppliers as well as the Department. Test Method references need to be added to Table for clarity. Solubility requirement for RA binders made the same as for PG binders.

Recommended Usage Note:

Desired implementation date: Beginning with the January 2007 lettings. 916 was just changed for January 2006 workbook. These changes should go into the next workbook.

Florida Department of Transportation

JEB BUSH
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

DENVER J. STUTLER, JR.
SECRETARY

M E M O R A N D U M

DATE: May 2, 2006

TO: Specification Review Distribution List

FROM: Duane F. Brautigam, P.E., State Specifications Engineer

SUBJECT: Proposed Specifications Change: **9160000 Bituminous Materials**

In accordance with Specification Development Procedures, we are sending you a copy of a proposed specification change to Bituminous Materials.

This change was proposed by Tom Malerk of the State Materials Office to simplify test specification criteria and test equipment.

Please share this proposal with others within your responsibility. Review comments are due within four weeks and should be sent to Mail Station 75 or to my attention via e-mail at SP965DB or duane.brautigam@dot.state.fl.us. Comments received after May 30, 2006 may not be considered. Your input is encouraged.

DFB/bd

Attachment

COMMENTS: _____

_____

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_____

Submitted by: _____ Phone #: _____

BITUMINOUS MATERIALS.
(REV 3-13-06)

SECTION 916 (Pages 785-797) is deleted and the following substituted:

SECTION 916

BITUMINOUS MATERIALS

916-1 Superpave PG Asphalt Binder:

916-1.1 Requirements: Superpave PG asphalt binders, identified as PG 64-22, PG 67-22, and PG 76-22, shall meet the requirements of 916-1.2, AASHTO M-320 and the following additional requirements:

1. The mass loss AASHTO T-240 shall be a maximum of 0.5% for all grades.
2. The spot test AASHTO T-102 with standard naphtha shall be negative for all grades. As an exception, a positive spot will be accepted if the PAV Residue (AASHTO R-28) at 110 ºC meets all the requirements for the particular grade.
3. The smoke point FM 5-519 shall be a minimum of 125ºC for all grades.
4. The intermediate test temperature at 10 rad/s. for the Dynamic Shear Rheometer test AASHTO T-315 shall be 25ºC for all grades.
5. An additional high temperature grade of PG 67 is added for which the high test temperature at 10 rad/sec for the Dynamic Shear Rheometer test AASHTO T-315 shall be 67ºC.
6. All PG asphalt binders having a high temperature designation of PG 67 or lower shall be prepared without modification.
7. All PG asphalt binders having a high temperature designation higher than PG 67 shall be produced with a styrene-butadiene-styrene (SBS) or styrene-butadiene (SB) elastomer polymer modifier and resultant binder shall meet all requirements of this Specification; in addition the phase angle at 76ºC (AASHTO T-315) shall be less than or equal to 75 degrees.
8. The maximum viscosity AASHTO T-202 shall be 2400 poises for PG 64-22 and 3600 poises for PG 67-22.

All hot mix asphalt (except hot mix asphalt containing 20% RAP or greater) shall contain Superpave PG asphalt binder grade PG 67-22 unless otherwise specified in the plans and/or Specifications for the hot mix asphalt product.

For all PG binder used in all hot mix asphalt, silicone shall be added to the PG binder at the rate of 25 cm^3 of silicone mixed to each 5,000 gal. of PG binder. If a disbursing fluid is used in conjunction with the silicone the resultant mixture containing the full 25 cm^3 of silicone shall be added in accordance with the manufacturer's recommendation. The blending of the silicone with the PG binder shall be done by the supplier prior to the shipment.

All PG binder ~~to be used in~~*and* asphalt rubber binder for Friction Course mixes and *for* other hot mix asphalt products containing RAP shall contain 0.5% heat stable anti-strip additive by weight of PG binder unless specifications for the hot mix asphalt product requires testing by FM 1-T 283 and the test results indicate it is not required, or the mixture contains hydrated lime. Where FM 1-T 283 indicates an anti-strip additive is required, it shall be from 0.25 to 0.75%. The anti-strip additive shall meet the requirements of 916-5. The anti-strip additive shall be introduced into the PG binder by the supplier during loading.

Where PG binder is used in mixes containing reclaimed asphalt pavement (RAP), the requirements of 334-2.3.4 must also be met.

916-1.2 Qualified Products List: The Superpave PG asphalt binders supplied under this Specification shall be one of the products included on the Qualified Products List as specified in 6-1. Any marked variation from the original test values for a material below the established limits or evidence of inadequate quality control or field performance of a material will be considered to be sufficient evidence that the properties of the material have changed, and the material will be removed from the Qualified Products List.

For each binder grade, the supplier may be required to submit to the State Materials Office a split sample of material representative of test results submitted with the Product Evaluation Application. In addition, for modified binders, the original PG binder grade, the modifier product designation, and amount added shall be indicated. Suppliers shall not ship any PG binder until notified that the product is on the Qualified Products List and an approved Quality Control Program meeting the requirements of 916-1.3 has been implemented.

916-1.3 Quality Control Program: The supplier of Superpave PG asphalt binder shall at a minimum have a Quality Control Program meeting the requirements of this Specification which is based on AASHTO R-26. The Quality Control Program shall be submitted in electronic format to the State Materials Office for approval.

The requirements for the Quality Control program apply to the supply location of PG binders for the use on Florida Department of Transportation projects. The supply location of PG binder may represent refinery production, terminal distribution, blending, processing and/or modification location. Rack blending (blending from two tank sources) will be permitted to meet the requirements for a PG asphalt binder product. Any special handling requirements such as rack blending and manufacture of polymer modified asphalt shall be described in the Quality Control program. The requirements of these Specifications for a Quality Control Program do not apply to Recycle Agents at this time.

916-1.3.1 Identification of Personnel and Supply Locations: The supplier's primary and secondary representatives responsible for Quality Control shall be identified by name, title, address, telephone, fax and e-mail address. At least one of the representatives shall be located at the supply location. The supply locations shall be identified by name, address and telephone.

916-1.3.2 Specification Compliance and Quality Control Testing: Specification Compliance Testing shall consist of complete testing of each PG binder shipped in accordance with AASHTO M-320 and 916-1.1 of these Specifications. Results of Specification Compliance Testing shall be available to the supplier within five working days of sampling. Specification Compliance Testing shall be conducted by a testing laboratory that participates at least annually in the AMRL Reference Sample Testing Program. The primary testing lab and any other labs to be used for Specification Compliance Testing shall be identified in the suppliers Quality Control Program. The results from each AMRL proficiency Sample for each testing laboratory shall be forwarded by the supplier for each supply location in electronic format to the State Materials Office. Acceptable performance in the AMRL proficiency Sample Testing Program shall be a minimum of 3 for each test. A rating of less than 3 shall require identification of appropriate action on the part of the supplier and be acceptable to the State Materials Engineer.

Quality Control testing as a minimum shall consist of testing a representative sample of each PG binder shipped by the supplier in accordance with either:

(1) AASHTO T-202 Standard Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer or

(2) AASHTO T-315 Test Method for Determining Rheological Properties of Asphalt Binder using a Dynamic Shear Rheometer (DSR).

Results of Quality Control Testing shall be available to the supplier within five hours of sampling. The Quality Control testing and location where the test will be done shall be identified in the suppliers Quality Control Program.

916-1.3.3 Frequency of Sampling and Testing: Sampling of PG binders shall be done in accordance with AASHTO T-40. Initial Specification Compliance test results shall be required for each PG binder grade for each new LOT of material which will be further subjected to Quality Control Testing in accordance with 916-1.3.2. A new LOT will occur when the material in a tank changes and the Specification Compliance Test may no longer be representative of the material in the tank. This may be due to an incoming bulk shipment of material, change in refinery run, the manufacture of a product, or a blend of material in a tank. Additional testing is as follows:

(1) Any PG binder shipped to a Department project during any one calendar month shall be tested at least once during that month for Specification Compliance in accordance with 916-1.3.2.

(2) When being shipped to Department projects, samples shall be obtained by the supplier and tested for Quality Control testing in accordance with 916-1.3.2. A single one quart representative sample of each PG binder shall be obtained and tested by the supplier each calendar week; for each rack blended PG binder, additional representative samples shall be obtained daily. Each Quality Control sample and additional daily rack blended samples shall be adequately identified and retained not less than eight weeks at the supply location. Any PG binder not shipped to Department projects is not required to be sampled or tested.

(3) Split samples of any PG binder will be provided when requested by a representative of the Department. In this situation three representative one quart samples will be obtained by the supplier under the direction of the Department. One sample will be submitted to the State Materials Office, one will be tested by the supplier for Specification Compliance and one will be tested by the supplier for Quality Control. The method of obtaining the three representative one quart samples is to obtain a single gallon sample, which is then stirred and poured into three one quart cans. When split samples are requested by the Department, the results from both parties will be made available within ten working days.

(4) For each rack blended PG binder, identify minimum daily Process Control Testing in the QC Plan.

916-1.3.4 Reporting: A monthly report by the supplier containing Specification Compliance and Quality Control Test results for each PG binder LOT shall be submitted by the supplier in electronic format using the form provided by the Department to the State Materials Office within seven days following the end of the calendar month. Test results for split samples shall also be included. Process Control Test results shall not be included. Copies of these monthly reports and supporting test reports shall be available at the supply location for a minimum of 3 years.

The report shall consist of the Specification compliance testing and Quality Control Testing of the following as applicable by these Specifications.

SUPERPAVE PG ASPHALT BINDER		
Test and Method	Conditions	Specification Minimum/Maximum Value
Original Binder		

Superpave PG Asphalt Binder Grade		Report
Qualified Products List Number		Report
Polymer Modifier Type	(PG 76-22 Only)	Report
Spot Test, AASHTO T102	Standard with Naphtha Solvent	Negative for all grades
Solubility, AASHTO T44	in Trichlorethylene	Minimum 99.0%
Smoke Point, FM 5-519	COC	Minimum 260ºF (125ºC)
Flash Point, AASHTO T48	COC	Minimum 450ºF (230°C)
Rotational Viscosity, *AASHTO T316*~~ASTM D4402~~	275ºF (135°C)	Maximum 3 Pa-s
Absolute Viscosity, AASHTO T202	140ºF (60ºC)	As Required for Quality Control Testing
Dynamic Shear Rheometer, AASHTO T315	$G^*/\sin\delta$, Test Temperature @ 10 rad/sec, °C Phase Angle, δ, (PG 76-22 Only)	Minimum 1.00 kPa Maximum 75 degrees
Rolling Thin Film Oven Test Residue (AASHTO T240)		
Rolling Thin Film Oven, AASHTO T240	Mass Loss%	Maximum 0.50
Dynamic Shear Rheometer, AASHTO T315	$G^*/\sin\delta$, Test Temperature @ 10 rad/sec, °C	Minimum 2.20 kPa
Pressure Aging Vessel Residue (AASHTO R-28) at 100ºC		
Dynamic Shear Rheometer, AASHTO T315	$G^*\sin\delta$, 10 rad/sec. @ 25°C	Maximum 5000 kPa
Creep Stiffness, AASHTO T313	S (Stiffness), @ 60 sec. @ -12°C M-value, @ 60 sec. @ -12°C	Maximum 300 Mpa Minimum 0.300
Pressure Aging Vessel Residue (AASHTO R-28) at 110ºC (Positive Spot Only)		
Dynamic Shear Rheometer, AASHTO T315	$G^*\sin\delta$, 10 rad/sec. @ 25°C	Maximum 5,000 kPa
Creep Stiffness, AASHTO T313	S (Stiffness), @ 60 sec. @ -12°C M-value, @ 60 sec. @ -12°C	Maximum 300 Mpa Minimum 0.300

916-1.3.5 Notification and Evaluation: In the event that a Specification Compliance test is outside specification requirements or a Quality Control test is outside limits established by the supplier as part of his Quality Control Program shipments of that product to Department projects will cease immediately and the Contractor and the State Materials Office

will be notified and the product retested for Specification Compliance (resampling as appropriate). Where the retest for Specification Compliance meets all requirements, shipments of that product may resume. Where off-specification material has been shipped and the retest confirms the original test, the Contractor and State Materials Office will be informed of the steps taken to achieve specification compliance on the product shipped.

Where off-specification materials has been shipped, further shipment of that product to Department projects shall remain suspended until the cause of the problem is evaluated and corrected by the supplier to the satisfaction of the State Materials Engineer.

916-1.3.6 Certification and Verification:

The supplier shall furnish certification on the bill of lading for each shipment of PG binder delivered to a Department project that includes: the quantity, the Superpave PG asphalt binder grade (including QPL number), PG binder LOT, a statement that the binder is in conformance with 916-1 and the suppliers Quality Control Program, and the quantity of silicone and anti-strip agent addition as applicable, including product designation (QPL number as applicable). Any special handling or temperature requirements shall be indicated on the certification and are solely the responsibility of the Contractor to follow.

The Department may sample and test PG binder from the suppliers storage tank, the delivery vehicle, and/or Contractors storage tank to verify and determine compliance with this and other specification requirements. Where these tests identify material outside specification requirements, the State Materials Engineer may require the supplier to cease shipment of that PG binder product. Further shipment of that PG binder product to Department projects may remain suspended until the cause of the problem is evaluated and corrected by the supplier as necessary to the satisfaction of the State Materials Engineer.

916-2 Recycling Agents.

916-2.1 Requirements: The asphalt recycling agent (RA) shall be an asphalt cement (PG asphalt binder) or an asphalt cement blended (as necessary) with a softening agent or flux oil, and shall meet the following requirements:

RECYCLING AGENTS		
Test	Conditions	Recycling Agent Minimum/Maximum Value
Absolute Viscosity – *AASHTO T202*~~P (Pa·s)~~	140ºF [60ºC]	Target Viscosity ± 20%
Viscosity Ratio ~~(Residue from Thin Film Oven Test)~~ *After AASHTO T240*	Visc. 140ºF [60ºC] after *R*TFOT Visc. 140ºF [60ºC] before *R*TFOT	maximum 3
Smoke Point *FM 5-519*	COC	minimum 260ºF [125ºC]
Flash Point *AASHTO T48*	COC	minimum 400ºF [205ºC]
Solubility *AASHTO T44*	in Trichlorethylene	minimum 9~~7.5~~*9.0*%

Rack blending of recycling agents (blending from two RA tank sources) will be permitted to meet a required target viscosity value.

Silicone shall be added to the recycling agent at a rate of 25 cm^3 for each 5,000 gallons [19 m^3] of recycling agent. If a dispersing fluid is used in conjunction with the silicone, the resultant mixture containing the full 25 cm^3 shall be added, in accordance with the manufacturer's recommendation. The blending of silicone mixture with the residue shall be done by the supplier prior to shipment.

The recycling agent shall contain 0.5% heat-stable anti-strip additive by weight of asphalt from an approved source. The anti-strip additive shall meet the requirements of 916-5. The anti-strip additive shall be introduced and mixed into the recycling agent at the terminal.

Where a recycling agent is used in mixes containing reclaimed asphalt pavement (RAP), the requirements of 334-2.3.4 must also be met.

916-2.2 Sampling and Reporting: Sampling of recycling agents shall be done in accordance with AASHTO T-40. Initial Specification Compliance test results shall be required for each new LOT of material. A new LOT will occur when the material in a tank changes and the Specification Compliance Test may not be representative of the material in the tank. This may be due to an incoming bulk shipment of material, change in refinery run, the manufacture of a product, or a blend of material in a tank.

A monthly report by the supplier containing Specification Compliance Test results for each RA LOT shall be submitted by the supplier in electronic format using the form provided by the Department to the State Materials Office within seven days following the end of the calendar month. Copies of these monthly reports and supporting test reports shall be available at the supply location for a minimum of three years.

916-2.3 Certification and Verification: The supplier shall furnish certification on the bill of lading for each shipment of recycling agent delivered to a Department project that includes: the quantity, the RA target viscosity, the RA LOT(s), a statement that the RA is in conformance with 916-2, and the quantity of silicone and anti-strip agent addition, including product designation (QPL number as applicable).

The Department may sample and test recycling agents from the suppliers storage tank, the delivery vehicle, and/or Contractors storage tank to verify and determine compliance with this and other specification requirements. Where these tests identify material outside specification requirements, the State Materials Engineer may require the supplier to cease shipment of RA binder from that RA LOT(s). Further shipment of RA binder from that RA LOT(s) to Department projects may remain suspended until the cause of the problem is evaluated and corrected by the supplier as necessary to the satisfaction of the State Materials Engineer.