ORIGINATION FORM
Proposed Revisions to the Specifications
(Please provide all information - incomplete forms will be returned)

Date: 05.03.2021

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Office: State Materials Office

Specification Section: 916

Article/Subarticle: -2.1; Table 916-1; -3.2 ; -4.2

Associated Section(s) Revisions: None.

Will the proposed revision require changes to:

Publication	Yes	No	Office Staff Contacted
Standard Plans Index	○	◉	Rick Jenkins; Andre Pavlov
Traffic Engineering Manual	○	◉	Javier Ponce, 05.03.2021
FDOT Design Manual	○	◉	Bobby Bull, 05.03.2021
Construction Project Administration Manual	○	◉	Scott Arnold, 05.03.2021
Basis of Estimate/Pay Items	○	◉	Melissa Hollis, 05.03.2021
Structures Design Guidelines	○	◉	Ben Goldsberry, 05.03.2021
Approved Product List	○	◉	Karen Byram, 05.03.2021
Materials Manual	○	◉	Tim Counts, 05.03.2021

Will this revision necessitate any of the following:

Design Bulletin ☐ **Construction Bulletin** ☐ **Estimates Bulletin** ☐ **Materials Bulletin** ☐

Are all references to external publications current? **Yes** ◉ **No** ○

If not, what references need to be updated? (Please include changes in the redline document.)
None.

Why does the existing language need to be changed?

Update Table 916-1 and footnotes to conform with AASHTO T 315-20
Update AASHTO references.
Tack samples from the distributor shall be tested by the Department.

Summary of the changes:

Update Table 916-1.
Update AASHTO references, -2.1, Table 916-1, and -3.2. Minor change in -4.2.
-3.2: Tack samples from the distributor shall be tested by the Department.

Are these changes applicable to all Department jobs? **Yes** ◉ **No** ○
If not, what are the restrictions?

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GOVERNOR

KEVIN J. THIBAULT, P.E.
SECRETARY

M E M O R A N D U M

DATE: June 10, 2021

TO: Specification Review Distribution List

FROM: Daniel Strickland, P.E., State Specifications Engineer

SUBJECT: Proposed Specification: **9160201 BITUMINOUS MATERIALS.**

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

The changes are proposed by Wayne Rilko to update language to conform to AASHTO tests and references, and to clarify tack samples from the distributor shall be tested by the Department.

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 online at http://fdotewp1.dot.state.fl.us/programmanagement/development/industryreview.aspx . Comments received after **July 8, 2021,** may not be considered. Your input is encouraged.

DS/dh

Attachment

BITUMINOUS MATERIALS.
(REV 5-3-21)

SUBARTICLE 916-2.1 is deleted and the following substituted:

916-2 Superpave PG Asphalt Binder~~:~~.

916-2.1 Requirements: Superpave Performance Graded (PG) asphalt binders, identified as PG 52-28, PG 58-22, PG 67-22, polymer modified asphalt (PMA) binders, PG 76-22 (PMA) and High Polymer, and asphalt rubber binders (ARB), PG 76-22 (ARB), shall meet the requirements of 916-2 and AASHTO M 332-~~19~~20. When the Contract Documents specify either a PG 76-22 (PMA), PG 76-22 (ARB), or PG 76-22 binder, either binder can be used interchangeably at no additional cost to the Department. All PG asphalt binders shall meet the following additional requirements:

1. The intermediate test temperature at 10 rad/sec. for the Dynamic Shear Rheometer (DSR) test (AASHTO T 315-~~19~~20 shall be 26.5ºC for PG grades PG 67 and higher.

2. An additional high temperature grade of PG 67 is added for which the high test temperature at 10 rad/sec for the DSR test (AASHTO T 315-~~19~~20 shall be 67ºC.

3. All PG asphalt binders having a high temperature designation of PG 67 or lower shall be prepared without modification.

4. All PMA binders having a high temperature designation higher than PG 67 shall only be produced with a styrene-butadiene-styrene (SBS) or styrene-butadiene (SB) elastomeric polymer modifier and the resultant binder shall meet all requirements of this Section.

5. Polyphosphoric acid may be used as a modifier not exceeding 0.75% by weight of asphalt binder for PG 76-22 (PMA) and PG 76-22 (ARB) binders. Polyphosphoric acid may not be used in High Polymer binder.

6. PG 76-22 (ARB) shall meet the additional requirements of 916-2.1.1.

7. All PG asphalt binders having a high temperature designation of PG 67 or lower shall not have a high temperature true grade more than 5.9°C higher than the specified PG grade, (for example, if a PG 58-22 is specified, do not supply a PG 64-22 or higher).

8. The use of waste oil is prohibited in the modification of any PG binder grade. Waste oil shall be defined as recycled oil products that have not been processed through a vacuum tower and have an initial boiling point of 385°C (725°F) or lower when tested in accordance with ASTM D6352-19.

9. Re-refined engine oil bottoms (REOB)/vacuum tower asphalt extenders (VTAE) may be used as a modifier not exceeding 8.0% by weight of asphalt binder. REOB/VTAE are materials as defined in Asphalt Institute document IS-235.

For all PG binder used in all hot mix asphalt, silicone may be added to the PG binder at the rate of 25 cubic centimeters of silicone mixed to each 5,000 gallons of PG binder. If a disbursing fluid is used in conjunction with the silicone, the resultant mixture containing the full 25 cubic centimeters 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. When the asphalt binder will be used with a foaming warm mix technology, refer to the technology supplier's guidance on the addition of silicone.

Where an anti-strip additive is required, the anti-strip additive shall meet the requirements of 916-4. The anti-strip additive shall be introduced into the PG binder by the supplier during loading.

916-2.1.1 Additional Requirements for PG 76-22 (ARB): The following additional requirements apply only to PG 76-22 (ARB):

1. The asphalt binder shall contain a minimum of 7.0% ground tire rubber (GTR) by weight of asphalt binder.
2. The GTR shall meet the requirements of Section 919.
3. Polymer modification is optional for PG 76-22 (ARB).

916-2.1.2 High Polymer Binder Blending: Existing high polymer binder may be blended in an asphalt producer's storage tank to make a PG 76-22 binder provided the following requirements are met:

1. Notify the State Materials Office (SMO) and the local District Materials Office prior to blending.
2. Follow the blending instructions of the high polymer binder supplier.
3. Submit a sample of the blended binder to a SMO approved laboratory for testing. Provide test results to the SMO.
4. Use the newly blended binder only after approval from the SMO.

SUBARTICLE 916-2.3 is deleted and the following substituted:

916-2.3 Reporting: Specification compliance testing results shall be reported for the tests in Table 916-1 below, unless noted otherwise. Quality control (QC) testing results shall be reported for original binder DSR (G/sin δ and phase angle, as applicable).

Table 916-1
SUPERPAVE PG ASPHALT BINDER

~~SUPERPAVE PG ASPHALT BINDER~~

Test and Method	Conditions	Specification Minimum/Maximum Value
Superpave PG Asphalt Binder Grade		Report
APL Number		Report
Modifier (name and type)	Polymer, Ground Tire Rubber with Approved Product List (APL) number, Sulfur, PPA, REOB, and any Rejuvenating Agents	Report
Original Binder		
Solubility, AASHTO T 44-14 (2018)	in Trichloroethylene	Minimum 99.0% (Not applicable for PG 76-22 (ARB))
Flash Point, AASHTO T 48-18	Cleveland Open Cup	Minimum 450ºF
Rotational Viscosity, AASHTO T 316-19	275ºF	Maximum 3 Pa·s[(a)]

Table 916-1 SUPERPAVE PG ASPHALT BINDER		
Dynamic Shear Rheometer [(b)], AASHTO T-315-~~19~~20	$G^*/\sin\delta$	Minimum 1.00 kPa
	Phase Angle, δ[(c)] PG 76-22 (PMA) and PG 76-22 (ARB)[(d)]	Maximum 75 degrees
Separation Test, ASTM D7173-20 and Softening Point, AASHTO T-53-09 (2018)	163±5°C 48 hours	Maximum 15°F (PG 76-22 (ARB) only)
Rolling Thin Film Oven Test Residue (AASHTO T 240-13 (2017))		
Rolling Thin Film Oven, AASHTO T240-13 (2017)	Mass Change %	Maximum 1.00
Multiple Stress Creep Recovery, $J_{nr,\ 3.2}$ AASHTO T-350-19	Grade Temperature (Unmodified binders only)	"S" = 4.50 kPa^{-1} max
Multiple Stress Creep Recovery, $J_{nr,\ 3.2}$[(d, e, f)] AASHTO T-350-19	67°C (Modified binders only) 76°C (High Polymer binder only)	"V" = 1.00 kPa^{-1} max Maximum $J_{nr,diff}$ = 75% 0.10 kPa^{-1} max
Multiple Stress Creep Recovery, %Recovery[(d, e)] AASHTO T-350-19	67°C (Modified binders only) 76°C (High Polymer binder only)	$\%R_{3.2} \geq 29.371\ (J_{nr,\ 3.2})^{-0.2633}$ $\%R_{3.2} \geq 90.0$
Pressure Aging Vessel Residue (AASHTO R-28-12 (2016))		
Dynamic Shear Rheometer, AASHTO T-315-~~19~~20	$G^*\sin\delta$, 10 rad/sec.	~~Maximum 5,000 kPa[(g)]~~ Maximum 6,000 kPa [(g,h)]
Creep Stiffness, AASHTO T-313-~~19~~20	S (Stiffness), @ 60 sec. m-value, @ 60 sec.	Maximum 300 MPa Minimum 0.300
ΔTc, ASTM D7643-16	20 hours PAV aging S (Stiffness), @ 60 sec. m-value, @ 60 sec.	$\Delta Tc \geq -5.0°C$

(a) Binders with values higher than 3 Pa·s should be used with caution and only after consulting with the supplier as to any special handling procedures, including pumping capabilities.
(b) Dynamic Shear Rheometer (AASHTO T 315-~~19~~20) shall be performed on original binders for the purposes of QC testing only. The original binder G*/sin δ shall be performed at grade temperature. Grade temperature for High Polymer binder is 76°C.
(c) The original binder phase angle (AASHTO T 315-~~19)~~20 shall be performed at grade temperature.
(d) AASHTO T 315-19 and AASHTO T 350-~~19~~20 will be performed at a 2-mm gap for PG 76-22 (ARB).
(e) All binders with a high temperature designation >67 will be tested at 67°C. PG 76-22 (PMA) and PG 76-22 (ARB) shall pass a "V" grade per AASHTO M 332-~~19.~~20
(f) A maximum Jnr diff = 75% does not apply for any Jnr value ≤ 0.50 kPa-1.
(g) For 5000 kPa ≤ G*sin δ ≤~~PG 67, perform the PAV residue testing at 26.5°C with a maximum of 5~~6,000 kPa, the phase angle, δ, shall be a minimum of 42°.
(h) For PG ~~76~~67 or higher grades, perform the PAV residue testing at 26.5°C ~~with a maximum of 6,000 kPa~~.

SUBARTICLE 916-3.2 is deleted and the following substituted:

916-3.2 Requirements: Use a prime coat meeting the requirements of AASHTO M 140~~-18~~20 for anionic emulsions, AASHTO M 208-18 or AASHTO M 316~~-18~~9 for cationic emulsions, or as specified in the Producer's QC Plan. For anionic emulsions, the cement mixing test will be waived. For tack products, the minimum testing requirements shall include percent residue, naphtha content (as needed), one-day storage stability, sieve test, Saybolt Furol viscosity, original DSR, and solubility (on an annual basis). Residue testing shall be performed on residue obtained from distillation, ~~(~~AASHTO T 59-16~~)~~ or low~~-~~temperature evaporation (AASHTO R 78-16) (2020).

At the direction of the Engineer, sample tack from the distributor used on the project at a minimum frequency of once per project per product. The sample shall be tested by the Department for the following specified material properties: percent residue, contaminants, and the residue property G*/sin δ. Should any of the test results fail the specification requirements, the tack material will be considered defective and shall not to be used on Department projects unless waived by the Engineer. The Engineer may require the Contractor to obtain roadway cores for bond strength testing (FM 5-599).