EXPECTED IMPLEMENTATION JANUARY 2021

DRAFT

916 BITUMINOUS MATERIALS
(REV 7-16-20) (FA 7-29-20) (1-21)

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. 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 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 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.

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

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)]
Dynamic Shear Rheometer [(b)], AASHTO T 315-19	$G^*/\sin\delta$	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 T 240-13 (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	$G^*\sin\delta$, 10 rad/sec.	Maximum 5000 kPa[f, g]
Creep Stiffness, AASHTO T 313-19	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.	ΔTc ≥ -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) shall be performed on original binders for the purposes of QC testing only. The original binder $G^*/\sin\delta$ 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) shall be performed at grade temperature.
(d) AASHTO T 315-19 and AASHTO T 350-19 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.
(f) A maximum Jnr diff = 75% does not apply for any Jnr value ≤ 0.50 kPa-1.
(g) For all PG grades of a PG 67 or higher, perform the PAV residue testing at 26.5°C with a maximum of 5000 kPa.
(h) For all PG grades of a PG 76 or higher, perform the PAV residue testing at 26.5°C with a maximum of 6000 kPa.

SUBARTICLE 916-3.2 is deleted and the following substituted:

916-3 Asphalt Emulsions.

916-3.1 Compliance with Materials Manual: Producers of asphalt emulsions shall meet the requirements of Section 3.4, Volume II of the Department's Material Manual, which may be viewed at the following URL: https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section34V2.shtm .

916-3.2 Requirements: Use a prime coat meeting the requirements of AASHTO M140-18 for anionic emulsions, AASHTO M 208-18 or AASHTO M 316-18 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).