

# **GEORGIA DOT STATE RUBBER ASPHALT SPECIFICATION**

Please note that if you are considering adopting a specification for application of this process, we would be willing to help in the development of such language, both with technical and operational data. Asphalt Plus has much shared experience in other state and agency specification development efforts, and is willing to assist you with the same.

The following specification is based on the desire to test modified binders rather than an asphalt rubber composite. Field work to date suggests that mix testing provides a more realistic evaluation of field performance

Standards obtained from GA DOT website. Please check website below for most current specification: [https://www.dot.ga.gov/doingbusiness/TheSource/special\\_provisions/shelf/sp820.pdf](https://www.dot.ga.gov/doingbusiness/TheSource/special_provisions/shelf/sp820.pdf)

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## **DEPARTMENT OF TRANSPORTATION**

### **STATE OF GEORGIA**

#### **SPECIAL PROVISION**

#### **Section 820—Asphalt Cement**

*Delete Section 820 and substitute the following:*

##### **820.1 General Description**

This section includes the requirements for asphalt cements prepared from crude petroleum.

###### **820.1.01 Related References**

###### **A. Standard Specifications**

General Provisions 101 through 150.

###### **B. Referenced Documents**

Standard Operating Procedure (SOP 4)

AASHTO R 28

AASHTO T 48

AASHTO T 179

AASHTO T 240

AASHTO T 313

AASHTO T 314

AASHTO T 315

AASHTO T 316

AASHTO TP70 / ASTM D7405

##### **820.2 Materials**

###### **820.2.01 Asphalt Cement**

###### **A. Requirements**

###### **1. Type**

Use a material homogenous and water-free and will not foam when heated to 347 °F (175 °C).

Ensure blend used to produce a specified performance grade meets the following requirements:

Is uniform and homogeneous without separation

Uses PG 64-22 or PG 67-22 described below for the base asphalt

Consists of production materials not being “air-blown”.

Contains < 0.5% acid (including Polyphosphoric Acid (PPA) modification, when approved by the Office of Materials and Research).

## 2. Grade

Use the various grades of asphalt cement meeting the requirements shown in the test requirements for Petroleum Asphalt Cements.

Add Styrene-Butadiene-Styrene (SBS) or Styrene-Butadiene (SB) to neat asphalt to produce a binder meeting requirements for PG 76-22 when roadway ADT is equal to or greater than 100,000 for Stone Matrix Asphalt and Porous European Mix (PEM) or Open Graded Friction Course (OGFC) Mixtures.

**Styrene Butadiene Rubber (SBS) or Crumb rubber modified PG 76-22 is an acceptable alternative to SBS or SB modified asphalt cement at contractor's discretion, when roadway ADT is less than 100,000, provided the SBR or crumb rubber modified asphalt cement meets the tests' requirements of PG 76-22. For SBR modified PG 64-22 or PG 67-22 to meet PG 76-22, use only SBR currently approved on QPL-65 "Georgia's List of Approved Latex Suppliers". For crumb rubber modified PG 64-22 or PG 67-22 to meet PG 76-22, use 30 mesh size ambient or cryogenic ground tire rubber at minimum 10% of weight of total asphalt cement content. Ensure Trans-Polyoctenamer is added at 4.5% of the weight of the crumb rubber to achieve better particle distribution. Varying percentage blends of crumb rubber and approved additives may be used, at the discretion of the Office of Materials and Research, provided the end product meets all specified requirements of PG76-22 including Phase Angle. Ensure the end product is homogenous and shows no separation or coagulation. Percentage of ambient or cryogenic ground tire rubber is neat asphalt source dependent to meet specification requirements for PG 76-22.**

The maximum Phase Angle requirement is not applicable to the crumb rubber modified PG 76-22 incorporating  $\geq 10\%$  crumb rubber with approved additive equivalent to 4.5% of crumb rubber (see notes f, g, i and j).

**Test Requirements for Petroleum Asphalt Cements**

Test And Method	Test Temperature				Original Binder	Residue Of Binder After:	
	PG 58-22 (Note e)	PG 64-22	PG 67-22	PG 76-22 (Note d)		Rolling Thin Film Oven, AASHTO: T 240	Pressure Aging AASHTO: R 28
Flash Point, Min., AASHTO T 48					448 °F (230 °C)		
Viscosity, Max., AASHTO T 316, (Note a)	275 °F (135 °C)				3Pa-S (3000CP)		
Mass Loss (%), Max., AASHTO T 240, (Note b)						0.5	
Dynamic Shear, G* <sub>sin</sub> δ, AASHTO T 315, 10 Rad/Sec	138 °F (58 °C)	147 °F (64 °C)	153 °F (67 °C)	169 °F (76 °C)	≥ 1.0 kPa	≥ 2.2 kPa	
Dissipated Energy, Dynamic Shear, G* <sub>sin</sub> δ, AASHTO T 315, 10 Rad/Sec	72 °F (22 °C)	77 °F (25 °C)	80 °F (26.5 °C)	88 °F (31 °C)			≤ 5000 kPa
Creep Stiffness, 60 sec., AASHTO T 313, (Note c)	10 ° F (- 12 °C)						S ≤ 300 000 kPa m ≥ 0.300
Direct Tension, 1.0 mm/min., AASHTO T314, Failure Strain	10 ° F (- 12 °C)						Report
Multiple Stress Creep & Recovery (MSCR) test, ASTM D7405, AASHTO TP70 (proposed), J <sub>vr</sub> 32 kPa, (Notes f, g, i and j)				64 °C		≤ 1.0	
Polymer Separation Test ASTM D7173 AASHTO T53 Softening Point (°F) (°C) [h]				(≤ 18 °F) (< 10 °C) Difference between top and bottom specimens			

Notes:

- a. The Department may waive this requirement if the supplier warrants the asphalt binder can be adequately pumped and mixed at temperatures meeting all applicable safety standards.
- b. Heat loss by AASHTO: T 179 may be accepted in lieu of mass loss by AASHTO: T 240.
- c. If the creep stiffness is below 300,000 kPa, the direct tension test is not required. If the creep stiffness is 300,000 kPa, report the Direct Tension Failure Strain value. Satisfy the m-value requirement in either case.
- d. Ensure the maximum Phase Angle measured by DSR is ≤ 75 degrees.
- e. The maximum Mass Loss shall be ≤ 1%, when used in conjunction with Bituminous Surface Treatment (Section 424).
- f. MSCR requirement is applicable to the SBR, Crumb Rubber & TOR (or other OMR approved additive) combination modified PG 76-22 asphalt cement. Additionally, ensure the materials meet all PG 76-22 requirements except for phase angle as detailed in sub-section 820.2.01.A.2.

g. Ensure MSCR requirement for Average Percent Recovery at 3.2 kPa is > 35% for laboratory or terminally blended PG 64-22 or PG 67-22 modified using SBR or GTR to meet PG 76-22 requirements.

h. Polymer Separation Test is performed by the Department for SBR and crumb rubber modified PG 76-22.

i. PG 64-22 or PG 67-22 modified to meet PG 76-22 using crumb rubber, via dry method, will be evaluated using complete analysis for compliance with PG 76-22 requirements prior to mixture production using laboratory blended materials. PG 64-22 or PG 67-22 modified to meet PG 76-22 using crumb rubber via dry method, will be evaluated for compliance with original DSR testing requirements for PG 76-22 during mixture production using abson recovery in accordance with GDT 119 in compliance with AC sampling frequencies established in GSP 21 sub-section A.9.

j. PG 64-22 or PG 67-22 modified to meet PG 76-22 using crumb rubber, via the dry method, will be evaluated for MSCR (Jnr @ 3.2 kPa) requirements, in accordance with GDT 119, on AC samples obtained for project assurance at frequencies established in GSP 21 sub-section A.9. Thoroughly blend the composite materials at the supply facility prior to being loaded into the transport vehicle if modification is required in accordance with 820.2.01. Ensure all blending procedures, formulation, and operations are approved by the Office of Materials and Research.

### 3. Certification:

Provide certified test results from an approved, certified laboratory of blends for proposed PG asphalt for each specification characteristic of the asphalt cement proposed for shipment. Provide the certified results to the State Materials and Research Engineer as required in Standard Operating Procedure (SOP 4).

The State Materials and Research Engineer may interrupt production until test results are known in the event there is reason to suspect a sample will be outside specification limits. Mixture placed incorporating modified binders determined to not meet specification requirements may be subject to removal at the recommendation of the State Materials and Research Engineer.

### **B. Materials Warranty**

General Provisions 101 through 150.

Office of Materials and Research

**The Georgia DOT is in the process of revising this specification. Under the new specification, rubber and binder combinations will no longer have to meet MSCR, m value or phase angle requirements.**