



# Louisiana DOTD Crumb-Rubber Modified Asphalt Binder Specifications

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Sustainable Materials for Pavement Infrastructure  
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# CRM Specifications

- 1002.02.2 Crumb Rubber
- Tire rubber must be pre-qualified
- 30 Mesh maximum size
- No cryogenic crumb rubber

# CRM Specifications

Property	AASHTO Test Method	PG82-22rm <sup>1</sup>
		Spec.
<b>Tests on Original Binder:</b>		
Rotational Viscosity @ 135°C, Pa·s <sup>2</sup>	T 316	3.0
Dynamic Shear, 10 rad/s, G*/Sin Delta, kPa	T 315	1.00+ @ 82°C
Flash Point, °C	T 48	232+
Solubility, % <sup>3</sup>	T 44	N/A

- <sup>1</sup>Tank mixers are required. Submit written documentation of tank cleaning annually to the Materials Laboratory. Submit written certificates of analysis from the asphalt binder supplier confirming rubber source and size distribution of rubber used. Furnish to the Materials Laboratory.

# CRM Specifications

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		Spec.
Tests on Original Binder:		
<b>Rotational Viscosity @ 135°C, Pa-s<sup>2</sup></b>	<b>T 316</b>	<b>3.0</b>
Dynamic Shear, 10 rad/s, G*/Sin Delta, kPa	T 315	1.00+ @ 82°C
Flash Point, °C	T 48	232+
Solubility, % <sup>3</sup>	T 44	N/A

- Measured for product uniformity / pumpability
- Be aware of higher viscosities
- CR modification can easily exceed maximum

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<b>Tests on Original Binder:</b>		
Rotational Viscosity @ 135°C, Pa·s <sup>2</sup>	T 316	3.0
<b>Dynamic Shear, 10 rad/s, G*/Sin Delta, kPa</b>	<b>T 315</b>	<b>1.00+ @ 82°C</b>
Flash Point, °C	T 48	232+
Solubility, % <sup>3</sup>	T 44	N/A

- Rubber particles may separate
- Samples require adequate mixing
- May need to increase test gap



# CRM Specifications

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<b>Tests on Original Binder:</b>		
Rotational Viscosity @ 135°C, Pa·s <sup>2</sup>	T 316	3.0
Dynamic Shear, 10 rad/s, G*/Sin Delta, kPa	T 315	1.00+ @ 82°C
Flash Point, °C	T 48	232+
<b>Solubility, %<sup>3</sup></b>	<b>T 44</b>	<b>N/A</b>

- Rubber particles may not be soluble
- Require solubility of base asphalt

# CRM Specifications

Property	AASHTO Test Method	PG82-22rm <sup>1</sup>
		Spec.
Tests on Original Binder:		
Separation of Polymer, 163°C, 48 hours, degree C difference in R & B from top to bottom <sup>4</sup>	ASTM D7173 AASHTO T 53	---
Force Ductility Ratio ( $f_2/f_1$ , 4°C, 5 cm/min., $f_2$ @ 30 cm elongation) <sup>5</sup>	T 300	---
Force Ductility, (4°C, 5 cm/min, 30 cm elongation, kg)	T 300	---

- Rubber particles suspended, not cross-linked
- Typically will not pass these tests

# CRM Specifications

Property	AASHTO Test Method	PG82-22rm <sup>1</sup>
		Spec.
Tests on Rolling Thin Film Oven Residue:	T 240	
Mass Change, %	T 240	1.00-
<b>Dynamic Shear, 10 rad/s, G*/Sin Delta, kPa</b>	<b>T 315</b>	<b>2.20+ @ 82°C</b>
Elastic Recovery, 25°C, 10 cm elongation, % <sup>6</sup>	T 301	60+

- Material may separate
- Extract all material from jars



# CRM Specifications

Property	AASHTO Test Method	PG82-22rm <sup>1</sup>
		Spec.
Tests on Rolling Thin Film Oven Residue:	T 240	
Mass Change, %	T 240	1.00-
Dynamic Shear, 10 rad/s, G*/Sin Delta, kPa	T 315	2.20+ @ 82°C
<b>Elastic Recovery, 25°C, 10 cm elongation, %<sup>6</sup></b>	<b>T 301</b>	<b>60+</b>

- CR modification typically exceeds specification

# CRM Specifications

Property	AASHTO Test Method	PG82-22rm <sup>1</sup>
		Spec.
<b>Tests on Pressure Aging Vessel Residue:</b>	R 28	
Dynamic Shear, @ 25°C, 10 rad/s, G* Sin Delta, kPa	T 315	5000-
Bending Beam Creep Stiffness, S, MPa @ -12°C.	T 313	300-
<b>Bending Beam Creep Slope, m value, @ -12°C</b>	<b>T 313</b>	<b>0.300+</b>

- CR modification may affect low-temp. properties
- Limit kept to avoid brittleness

# Plant Blending Process

Plant Design Approval

Binder Design (Lab Blend)

Sampling & Testing  
(Production)

# Plant Design / Approval

Request approval / submit proposed design

Totalizing meter / suitable measurement devices

Plant inspection

# Asphalt Blend Design

Complete lab analysis for proposed blend

Verification of compatibility

Split sample for DOTD verification



# Sampling and Testing

Initial production samples  
for process verification /  
approval



Approval by Materials  
Engineer



Quality Control

# Contractor Quality Control

Additive measurement and visual observation twice daily



High-temp DSR daily



Full analysis 2 / month

- No major issues with testing
- Good experience with plant blending
- Plant and refinery blends used
- Materials meeting specifications



Thank you!

Questions?