



# Why Recipe Specifications Fail “The Plus Specifications”

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# Introduction

- Recipe Specifications
- Asphalt Issues
- Solutions?



# Example of Recipe Specifications

- Mandated Ground Tire Rubber
  - size & amount
- Specified Anti-strip additive dosage rate
  - X additive at Y dosage
- Hydrated Lime
  - Shaken not stirred
- Restricted Zone,
  - bye bye
- Coarse Graded Superpave Mixes
  - Fine mixes perform and can be built
- Specified material types
  - PG64/67-22+SBS



# Why do we have Recipe Spec's

- History of successful use
- Persuaded by Special Interest
- Fear that new product won't work
- Because They Can



# What do we mean by fails

- Stifles Innovation
- Can eliminate competition
- Can drive up cost
- Not performance based



# Asphalt Issues

- Pre-PG!
- Post PG!
- Plus Specifications!
- Solutions?



# Problems with Pre-PG System

- Viscosity
  - viscous effects only
- Penetration
  - empirical measure of viscous and elastic effects
- No Low Temperature Properties Measured
- Problems with Modified Asphalt Characterization
- Specification Proliferation
- Long Term Aging not Considered



# Problems with Post-PG System

- Problems with Modified Asphalt Characterization!
- Specification Proliferation!
- Expensive and time consuming testing!



PG Plus Specifications  
Almost every state has one  
There all different



# Plus Specification

- Separation Test, 163C/171C
- Ring & Ball Softening Point
- Elastic Recovery, 25C/10C
- Forced Ductility, 4C
- Toughness and Tenacity
- FTIR Scan



Specification	PG 76-22*
<b>Tests on Original Binder</b>	
Specific Gravity, 15.6°C (60°F) (ASTM D70)	Report
Flash Point, °C, COC, Min. (AASHTO T48)	230
Viscosity, 135°C, Pa.s, Max. (ASTM D4402)	3
Dynamic Shear, 76°C, G*/sin delta, kPa, Min. (AASHTO TP5)	1.00
<b>Tests on Residue from Rolling Thin Film Oven (AASHTO T240)</b>	
Mass Loss, %, Max. (AASHTO T240)	1.00
Dynamic Shear, 76°C, G*/sin delta, kPa, Min. (AASHTO TP5)	2.20
<b>Tests on Residue from Pressure Aging Vessel (AASHTO PP1)</b>	
PAV Aging Temperature, °C (AASHTO PP1)	100
Dynamic Shear, 31°C, G*/sin delta, kPa, Max. (AASHTO TP5)	5000
Bending Beam Creep Stiffness, -12°C, MPa, Max. (AASHTO TP1)	300
Bending Beam m-Value, -12°C, Min. (AASHTO TP1)	0.300
*A sample and infrared trace using AASHTO T302 test method to determine the styrene and butadiene peaks of the asphalt materials at the appropriate polymer loading shall be submitted to the Materials and Tests Engineer for laboratory evaluation prior to use.	
All binders used to produce PG76-22 shall be made by the addition of polymer to refined grades of PG64-22 or PG67-22 without using air blown asphalt.	
All Polymers shall conform to Section 811 for polymer additives in the AL Standard Specification.	



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Flash Point, °C, COC, Min. (AASHTO T48)	230
Viscosity, 135°C, Pa.s, Max. (ASTM D4402)	3
Dynamic Shear, 76°C, G*/sin delta, kPa, Min. (AASHTO TP5)	1.00
Dynamic Shear, 76°C, Phase Angle, Max. deg. (AASHTO TP5)	75
<b>Tests on Residue from Rolling Thin Film Oven (AASHTO T240)</b>	
Mass Loss, %, Max. (AASHTO T240)	0.50
Dynamic Shear, 76°C, G*/sin delta, kPa, Min. (AASHTO TP5)	2.20
<b>Tests on Residue from Pressure Aging Vessel (AASHTO PP1)</b>	
PAV Aging Temperature, °C (AASHTO PP1)	100
Dynamic Shear, 25°C, G*/sin delta, kPa, Max. (AASHTO TP5)	5000
Bending Beam Creep Stiffness, -12°C, MPa, Max. (AASHTO TP1)	300
Bending Beam m-Value, -12°C, Min. (AASHTO TP1)	0.300



Specification	PG 76-22
<b>Tests on Original Binder</b>	
Specific Gravity, 15.6°C (60°F) (ASTM D70)	Report
Flash Point, °C, COC, Min. (AASHTO T48)	230
Viscosity, 135°C, Pa.s, Max. (ASTM D4402)	3
Viscosity, 135°C, cP, (ASTM D4402), Contractor Plant Testing	1000-3000
Dynamic Shear, 76°C, G*/sin delta, kPa, Min. (AASHTO TP5)	1.00
Ring and Ball Softening Point, °C (°F) Min.	57(135)
Elastic Recovery, 10°C, 20cm, cut 5 min., 1 hr, %, Min.	58
Screen Test, 1000gram, No.10 Sieve, 135 °C (275°F), lumps/particles	0
<b>Tests on Residue from Rolling Thin Film Oven (AASHTO T240)</b>	
Mass Loss, %, Max. (AASHTO T240)	1.00
Dynamic Shear, 76°C, G*/sin delta, kPa, Min. (AASHTO TP5)	2.20
<b>Tests on Residue from Pressure Aging Vessel (AASHTO PP1)</b>	
PAV Aging Temperature, °C (AASHTO PP1)	100
Dynamic Shear, 31°C, G*/sin delta, kPa, Max. (AASHTO TP5)	5000
Bending Beam Creep Stiffness, -12°C, MPa, Max. (AASHTO TP1)	300
Bending Beam m-Value, -12°C, Min. (AASHTO TP1)	0.300





# What is the solution

- Performance Based Test?
- Performance Based Specification?
- Warranties?
- States consolidate criteria?



# Words of Wisdom!

- If you want a good tasting cake,
- Don't tell the cook how to make it!
- They may surprise you with the how good it can taste!



# Thank You AMAP

## Questions

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