State: NEBRASKA	**Materials:** Re: Section 503 Performance Graded Binder
Date Last Reviewed: 4/25/11	**Web Address:** www.nebraskatransportation.org
Materials Engineer: Moe Jamshidi	**Contact Info:** moe.jamshidi@nebraska.gov

ASPHALT BINDER:

Section 503 503.6.e.2	**Description:**	Performance graded binder, as specified in the contract items shall be in accordance with the PG+ specifications as noted and AASHTO M 320 with the exception of Direct Tension. Mix & Compaction temperatures required.
	PMA's:	SBS, SB & SBR permitted. Type used required in Certification. Blending binders with different types not allowed. Must be heat and storage stable and shall not separate when handled and stored per suppliers recommendations.
	Exclusions:	Acid Treatment, if Air Blown / Oxidized (statement required on Certifications).

Table 1:[2]

PROPERTY		Test Method AASHTO or Other	Requirements[2] by Performance Grade, PG (Common Grade)		
			64-28	70-28	76-28
ORIGINAL:					
Specific Gravity	15.6°C	ASTM D 70	Report		
Flash Point, °C		T 48	230 min.		
Rotational Viscosity, Pa Xs	135°C	T 316	3.0 max.		
Dynamic Shear, kPa (G* / sin δ, 10 rad./sec.)	At grade temperature	T 315	1.0 min.		
RTFOT RESIDUE:					
Mass Loss, %		T 240	1.0 max.		
Dynamic Shear, kPa (G* / sin δ, 10 rad./sec.)	At grade temperature	T 315	2.2 min.		
PAV RESIDUE:		R 28	100°C; 20 hrs; 300 psi		
Dynamic Shear, kPa (G* • sin δ, 10 rad./sec.)	At test temperature	T 315	5,000 max.		
			22°C	25°C	28°C
Creep Stiffness	At test temperature	T 313	Stiffness 300 max. MPa & m Value 0.300 min.		
			-18°C		
Direct Tension, (1mm/min.), % Strain		T 314	No Requirement		
PG PLUS REQUIREMENTS: YES					
ORIGINAL:					
Dynamic Shear, Phase Angle, °	At grade temperature	T 315	77 max.	75 max.	73 max.
RTFOT RESIDUE:					
Elastic Recovery, %	25°C	T 301	65 min.		

NOTES:

1. Anti-Strip added at 0.5%, can not result in G*/sinδ drop of more than 25%, if > 25% reduction, material is rejected. Mix and Compaction Temperature required.
2. Material not meeting Table 1 specifications, Tables 2, 3, 4, and 5 will apply, depending on the grade of binder.

Table 2: Single Sample Tolerance and Pay Factor

PROPERTY		Test Method AASHTO or Other	Requirements by Performance Grade, PG	
			PG 64-28	
			Pay Factor of 0.75	Pay Factor of 0.50 or Removal
ORIGINAL:				
Phase Angle, °		T 315	78.5 – 79	Greater than 81
RTFOT:				
Elastic Recovery, %		T 301	54 – 57.5	Less than 54

Table 3: Single Sample Tolerance and Pay Factor

PROPERTY		Test Method AASHTO or Other	Requirements by Performance Grade, PG	
			PG 70-28	
			Pay Factor of 0.75	Pay Factor of 0.50 or Removal
ORIGINAL:				
Phase Angle, °		T 315	78.5 – 79	Greater than 79
RTFOT:				
Elastic Recovery, %		T 301	64 – 67.5	Less than 64

Table 4: Single Sample Tolerance and Pay Factor

PROPERTY		Test Method AASHTO or Other	Requirements by Performance Grade, PG	
			PG 76-28	
			Pay Factor of 0.75	Pay Factor of 0.50 or Removal
ORIGINAL:				
Phase Angle, °		T 315	71.5 – 75	Greater than 75
RTFOT:				
Elastic Recovery, %		AASHTO T 301	65 – 70	Less than 65

Table 5: Single Sample Tolerance and Price Factor

PROPERTY		Test Method AASHTO or Other	Requirements by Performance Grade, PG	
			Pay Factor of 0.75	Pay Factor of 0.50 or Removal
ORIGINAL:				
Dynamic Shear, kPa (G* / sin δ, 10 rad./sec.)	At grade temperature	T 315	0.86 – 0.92	< 0.86
RTFOT:				
Dynamic Shear, kPa (G* / sin δ, 10 rad./sec.)	At grade temperature	T 315	1.76 – 1.97	< 1.76
PAV RESIDUE:				
Dynamic Shear, kPa (G* • sin δ, 10 rad./sec.)	At grade temperature	T 315	5,601 – 6,200	> 6,200
Creep Stiffness, Stiffness, MPa	At grade temperature	T 313	325 – 348	> 348
m Value			0.270 – 0.284	< 0.270