

<b>State:</b> Delaware	<b>Materials:</b> Re: Div 400 Bituminous Pavement, 401.05 - Div 1000 Materials, Section 1012 Asphalt Cement
<b>Date Last Reviewed:</b> 4/1/24	<b>Web Address:</b> <a href="https://deldot.gov/Publications/manuals/standard_specifications/">https://deldot.gov/Publications/manuals/standard_specifications/</a>
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Asphalt Binder		
Section 401 Section 1012	Highlights	In 2015 DeIDOT began allowing the substitution of AASHTO M332 (MSCR) modified grade PG 64E-22 for PG 76-22. DeIDOT currently allows substitution of M332 binders for all grades on all projects. MSCR recovery is specified using the curve in AASHTO R92.
	PMA Notes	Modified binder truck delivery tickets must state that the binder contains polymer and list the type of modifier.
	Exclusions and Limits	None stated.

Delaware		Table 1: Requirements for Performance-Graded Asphalt Binders					
Property	Test Method: AASHTO	Requirements by Performance Grade					
		58-28	64-22	76-22	58S-28 (Note 1)	64S-22 (Note 1)	64E-22 (Note 1)
<b>ORIGINAL</b>							
Flash Point, °C	T 48	230 min.					
Specific Gravity	15.6°C T 228	Report					
Rotational Viscosity, Pa·s	135°C	3.0 max.					
	165°C	T 316	Report (Note 2)		Report (Note 2)		
Dynamic Shear, kPa (G*/sin δ, 10 rad./sec)	At Grade Temp. T 315	1.00 min.					
<b>RTFO RESIDUE</b>		T 240					
Mass Change, %	T 240	1.00 max.					
MSCR Test temp., °C		58	64	76	58	64	
Dynamic Shear, kPa (G*/sin δ, 10 rad./sec)	T 315	2.20 min.					
MSCR J <sub>nr3.2</sub> , max., kPa <sup>-1</sup>	T 350				4.5		0.5
MSCR, J <sub>nr diff</sub> , max., %					75 max. (Note 3)		
MSCR, % recovery @ 3.2kPa, min.							(Note 4)
<b>PAV RESIDUE</b>		R 28					
DSR Test Temperature, °C	T 315	19	25	31	19	25	
Dynamic Shear, kPa (G* · sin δ, 10 rad./sec.)		6000 max. δ min. 42° (Note 5)					6000 max.
BBR Test Temperature, °C	T 313	-18	-12		-18	-12	
Creep Stiffness, MPa		300 max.					
M-Value		0.300 min.					
<b>NOTES</b>		<ol style="list-style-type: none"> <li>DeIDOT currently accepts M332 graded binders in lieu of M320 binders – PG 58S-28 substituted for PG 58-28; PG 64S-22 substituted for PG 64-22; and PG 64E-22 substituted for PG 76-22.</li> <li>2nd Rotational Viscosity required for Mix &amp; Compaction Temperatures for non-modified binders.</li> <li>Not applicable for binders with J<sub>nr3.2</sub> &lt; 0.5 kPa<sup>-1</sup>.</li> <li>&gt;29.371*(J<sub>nr3.2</sub><sup>0.263</sup>) - binder grade E must meet the requirements of AASHTO R 92.</li> <li>If G* sin δ is below 5000 the phase angle minimum limit is not required .</li> </ol>					

To ensure the most accurate and current information, the specific agency should be contacted.