State: Ohio	**Materials:** Re: Section 702-Asphalt Material
Date Last Reviewed: 5/6/2026	**Web Address:** www.transportation.ohio.gov
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Asphalt Binder		

702	Highlights	General: Asphalt Binders according to AASHTO M 320-23 Table 1 and Supplement 1105 and noted exclusions:
		PG Binders supplied from the refining crude petroleum;
		• PG Binders from the crude refining stream are considered neat
		• Combinations of
		  ○ Neat binders
		  ○ Binders and suitable liquid from the refining of crude petroleum
		  ○ Organic modifiers for performance enhancement
		• Shall be homogeneous, free from water and deleterious materials
		• Neat Asphalt Binder Temperature ranges: 350 (177) Max.325 (163) Max
		• Shall not foam when heated to 350 ºF (175 ºC)
		• Liquid from crude refining may be used for adjustments to PG Binders, but not used as a substitution for binder
		• Use of previously used(reclaimed/recycled) materials must be approved by the Department
		  ○ Limit approved reprocessed materials to 5.0 percent by PG Binder weight (may only be used in PG58-28 and PG64-28 grades.
		  ○ Detection of any unapproved previously used material will mean immediate de-certification
		• Before or after modification, if liquid modifier used,
		  ○ Fully compatible with a negative result by means of the Spot Test,
		  ▪ AASHTO T 102 using standard naphtha solvent
		  ▪ If a positive result, may retest using reagent grade 35 percent Xylene/ 65 percent Heptane (volume)
		Limited use of Polyphosphoric Acid (PPA) in the reefing process is allowed up to 1.0% of the weight of the neat binder. PPA may be used in PG 64-28 PPA only modified; it may also be used in PG 64-28M, PG 70-22M, or PG 76-22M SBS modified but would have to meet the elastic recovery and phase angle requirements. Typically PPA is used with SBS to bring the original/RTFO up to grade and occasionally as a crosslinking agent.

	PMA Notes	PG Binders with the suffix "M" (e.g., PG 70-22M, PG 76-22M) will meet the requirements of 702.01-1 (Table 2)
		• PG 64-28 made through modification must meet the requirements of Table 2
		• A modifier may be any organic material of suitable manufacture that is
		  ○ Temperature Range Binders modified with Polymer SB, SBR, SBS, or Elvaloy; 375 (190) Max, 350 (177) Max
		  ○ Proven compatible with asphalt binder and does not separate appreciably in routine storage
		  ○ Dissolves, disperses or reacts in asphalt binder to improve its performance
		  ○ Limit modifiers to no more than 6.0 percent by PG Binder weight
		  ○ Start with a non-oxidized, non-air blown, neat asphalt binder and meeting the requirements:
		  ▪ Approved modifiers
		  • Styrene butadiene latex rubber compound (SBR polymer)
		  • Styrene butadiene styrene polymer block copolymer (SB, SBS polymer)
		  • Ethylene/ nbutyl acrylate/ glycidyl methacrylate copolymer (Elvaloy)
		  • GTR (Ground Tire Rubber) for 70-22M and 76-22M (refer to SS-887 for GTR modification requirements)
		  ▪ For SB, SBS supplier will certify to refiner and Contractor the polymer meets a min 68% by weight butadiene content
		  ▪ Pre-blend GTR, SB, SBS or Elvaloy modification prior to shipment to the asphalt concrete mixing plant
		  ▪ Post-blend SBR modification at the asphalt concrete mixing plant or pre-blend prior to shipment
		  ▪ For each project, the PG Modified Binder supplier will give the Contractor a Handling Guide
		  • Specifying temperature, circulation, shelf life, and other requirements
		  • Provide a copies to the Monitoring Team, the plant control room and plant laboratory
		  ▪ Modified Binders retained at the asphalt concrete mixing plant for more than two weeks or beyond the supplier recommended shelf life, whichever is less, shall be sampled and tested
		  • Top and bottom sample test (material property difference between samples taken from the top and bottom of the storage tank)
		  • Performed by the Laboratory on samples retrieved by the Contractor at the Districts direction
		  • Do not use material on hand until approved

	Exclusions and Limits	Do not use paraffin wax, organic, or like materials (705.01.5.2) . Do not use recycled engine oil bottoms (REOB), vacuum tower asphalt extender (VTAE), or like materials as modifiers. (705.01.5.3)

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

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Ohio			Table 1: Requirements for Performance-Graded Asphalt Binders (Note 17)							
Property		Test Method: AASTHO (T), ASTM (D) or other	Requirements by Performance Grade (Final PG Binder Grade) (1)							
			Unmodified		Modified With SBR Polymer		Modified With Other Polymer (2)			
			58-28	64-22	64-28M (3)	70-22M (3,4,14)	64-28M(4)	70-22M (4,5,14)	76-22M (4,5)	88-22M (4)
ORIGINAL										
Flash Point, ° C		T48	260 min.							
Rotational Viscosity, Pa·s	135° C	T316	3.0 max.			3.0 max. (16)	3.0 max.	3.0 max. (17)		
Dynamic Shear, kPa (G*/sin δ, 10 rad./sec) (3)	At Grade Temperature	T315	1.00 min.							
Phase Angle, °	At Grade Temperature	T315	-		78 max.				74 max.	-
Ductility, cm (6)	4° C	T51	-		28 min.	28 min.	-			
Toughness and Tenacity (7)	Toughness, in-lbs. 25° C	D5801	-		105 min.	125 min.	-			
	Tenacity, in-lbs. 25° C		-		80 min.	70 min.	-			
	Elongation, in. 25° C		-		20 min.	20 min.	-			
Separation of Polymer, ° F (8, 13)		D7173	-		10 max.					
Solubility, % (19)		T44	99.0 min.							
Homogeneity (Screen Test) (9)		-	-				No visible lumps			
GTR, % (by weight of virgin binder)		-	-					7.0 min. (10)		-
Spot Test		T102	Negative							
RTFO RESIDUE		T240								
Mass Change, %		T240	0.75 max.							
Dynamic Shear, kPa (G*/sin δ, 10 rad./sec) (3)	At Grade Temperature	T315	2.20 min.							
Elastic Rec., % (11)	25° C	T301	-				65 min.	65 min. (12)	75 min. (12)	90 min.
PAV RESIDUE		R28	100° C							
Dynamic Shear, kPa (G* · sin δ, 10 rad./sec.)(18)	At Test Temperature	T315	19 °C	25 °C	22 °C	28 °C	22 °C	28 °C	31 °C	37 °C
			6,000 max.							
Creep Stiffness, MPa	At Test Temperature	T313	-18 °C	-12 °C	-18 °C	-12 °C	-18 °C	-12 °C	-12 °C	-12 °C
			300 max.							
M-Value			0.300 min.							

For Table 1 Notes, See Page 3

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TABLE 1 NOTES	1. Without Direct Tension, graded with actual pass temperatures. Actual high and low temperature achieved by PG Modified Binder beyond required grade, but will not grade out to the next standard PG Binder grade for low temperature. 2. SB, SBS, Elvaloy 3. Post-blended Binder made from neat Supplement 1032 certified or preapproved standard PG Binder grade and rubber solids amount equal to or above 3.5 percent by weight of total binder to achieve the PG grade. Ensure all listed properties are met. 4. Pre-blended Binder. Use a base binder of at least -22 grade or stiffer for 70-22M and 76-22M. Use a base neat asphalt binder that is -28 grade for 64-28. 64-28 can be neat, PPA modified, or modified with SB, SBS or Elvaloy. Ensure SB, SBS or Elvaloy modified 64-28 meets all requirements listed. 5. SB, SBS, Elvaloy or Supplemental Specification 887 GTR. 6. 1cm/min. 7. 50cm/min. 8. Follow ASTM D7173 for sample conditioning and perform Softening Point per AASHTO T 53 on the top and bottom of tube sample. 9. Heat a minimum 400 gram sample at 350 ºF (177 ºC) for 2.5-3 hours. Pour entire sample over a hot No 50 (300 µm) sieve at 340ºF (171 ºC). Look for retained polymer lumps. 10. Requirement applicable to GTR-modified 70-22M and 76-22M only. 11. Pull 10cm, hold 5 minutes before cutting specimen for GTR, SB, SBS, and Elvaloy. Note elongation after one hour to the nearest 0.01 cm and report elastic recovery to nearest 0.1%. 12. 60 min. for 70-22M and 70 min. for 76-22M binders modified with GTR. 13. Separation for GTR binders have a 10 degree C (18 degree F) max. 14. PG-70-22M may exceed the high temperature grade. 15. Use a 2 mm gap for GTR-modified binders. 16. For GTR modified (grades 70-22 and 76-22) or for PG 88-22M, where viscosity is greater than 3.0 and less than 10.0, the requirements may be waived by Department if the supplier warrants that the asphalt binder can be adequately pumped, mixed, and compacted at or below the temperature requirements in Table 702.00-1. 88-22M binders have a maximum viscosity of 10.0 using a #27 spindle. 17. Requirements in addition to M320-17 are shown in red. 18. If the intermediate temperature stiffness, G* sin d, is below 5000 kPa, the phase angle minimum limit is not required. If the intermediate temperature stiffness, G* sin d, is between 5000 and 6000 kPa, the intermediate phase angle minimum limit of 42 degrees is required. 19. In lieu of solubility test, ensure the PG binder meets a maximum of 1.0 percent ash content as determined by AASHTO T 111

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