

**COMBINED STATE BINDER  
GROUP**

Method of Acceptance for Asphalt Binders

**PERFORMANCE GRADED BINDER SPECIFICATIONS & TEST METHOD TOLERANCES**  
(IOWA, MINNESOTA, NORTH DAKOTA, SOUTH DAKOTA & WISCONSIN DOT'S & NEBRASKA DOR)  
**EFFECTIVE MARCH 2001**

PERFORMANCE GRADE	PG 46-			PG 52-					PG 58-					PG 64-					PG 70-					PG 76-					PG 82-																									
AVERAGE 7 DAY MAXIMUM PAVEMENT DESIGN TEMP, C	34	40	46	10	16	22	28	34	40	46	16	22	28	34	40	10	16	22	28	34	40	10	16	22	28	34	40	10	16	22	28	34	10	16	22	28	34	10	16	22	28	34												
MINIMUM PAVEMENT DESIGN TEMPERATURE, C (a)	-34	-40	-46	-10	-16	-22	-28	-34	-40	-46	-16	-22	-28	-34	-40	-10	-16	-22	-28	-34	-40	-10	-16	-22	-28	-34	-40	-10	-16	-22	-28	-34	-10	-16	-22	-28	-34	-10	-16	-22	-28	-34												
<b>TESTS ORIGINAL BINDER</b>	<b>SPEC BASE</b>	<b>SPEC W/TOL</b>	<b>TOL</b>																																																			
AASHTO T44 SOLUBILITY % MINIMUM	99.00	98.87	0.13																																																			
AASHTO T48 FLASH POINT TEMP, C, MINIMUM	230	221	9	230							230					230						230						230																										
ASTM D4402 VISCOSITY (b) Pa.s MAXIMUM TEST TEMP, C	3.0	3.2	7.3%								135					135						135						135																										
AASHTO TP5 DYNAMIC SHEAR G'SIN (DELTA), kPa, MINIMUM TEST TEMP @ 10 rad/sec, C	1.00	0.93	7%	46							52					58						64					70																											
<b>TESTS RTFO RESIDUE</b>																																																						
AASHTO T240 MASS LOSS, % MAX	1.00	1.20	20%																																																			
AASHTO TP5 DYNAMIC SHEAR G'SIN (DELTA), kPa, MINIMUM TEST TEMP @ 10 rad/sec, C	2.20	1.98	10%	46							52					58						64					70																											
<b>TESTS PAV RESIDUE</b>																																																						
AASHTO PP1 PAV AGING TEMP, C (d)				90							90					100						100					100 (110)																											
AASHTO TP5 DYNAMIC SHEAR G'SIN (DELTA), kPa, MAXIMUM TEST TEMP @ 10 rad/sec, C	5000	5600	12%	10	7	4	25	22	19	16	13	10	7	25	22	19	16	13	31	28	25	22	19	16	34	31	28	25	22	19	37	34	31	28	25	40	37	34	31	28														
PHYSICAL HARDENING (e)	REPORT																																																					
AASHTO TP1 CREEP STIFFNESS (f) [S] MAXIMUM, MPa m VALUE, MINIMUM TEST TEMP @ 60s, C	300	324	8%	0.300	0.285	5%	-24	-30	-36	0	-6	-12	-18	-24	-30	-36	-6	-12	-18	-24	-30	0	-6	-12	-18	-24	-30	0	-6	-12	-18	-24	-30	0	-6	-12	-18	-24	-30	0	-6	-12	-18	-24	-30	0	-6	-12	-18	-24	-30			
AASHTO TP3 DIRECT TENSION (f) FAILURE STRAIN, MINIMUM % TEST TEMP @ 0.1 mm/min, C	1.0	0.8	20%	-24	-30	-36	0	-6	-12	-18	-24	-30	-36	-6	-12	-18	-24	-30	0	-6	-12	-18	-24	-30	0	-6	-12	-18	-24	-30	0	-6	-12	-18	-24	-30	0	-6	-12	-18	-24	-30	0	-6	-12	-18	-24	-30	0	-6	-12	-18	-24	-30

- a PAVEMENT TEMPERATURES CAN BE ESTIMATED FROM AIR TEMPERATURES USING AN ALGORITHM CONTAINED IN THE SUPERPAVE SOFTWARE PROGRAM OR MAY BE PROVIDED BY THE SPECIFYING AGENCY, OR BY FOLLOWING THE PROCEDURES AS OUTLINED IN PPX.
- b THIS REQUIREMENT MAY BE WAIVED AT THE DISCRETION OF THE SPECIFYING AGENCY IF THE SUPPLIER WARRANTS THAT THE ASPHALT BINDER CAN BE ADEQUATELY PUMPED AND MIXED AT TEMPERATURES THAT MEET ALL APPLICABLE STANDARDS.
- c FOR QUALITY CONTROL OF UNMODIFIED ASPHALT CEMENT PRODUCTION, MEASUREMENT OF THE VISCOSITY OF THE ORIGINAL ASPHALT CEMENT MAY BE SUBSTITUTED FOR DYNAMIC SHEAR MEASUREMENTS OF G'SIN DELTA AT TEST TEMPERATURES WHERE THE ASPHALT IS A NEWTONIAN FLUID. ANY SUITABLE STANDARD MEANS OF VISCOSITY MEASUREMENT MAY BE USED, INCLUDING CAPILLARY OR ROTATIONAL VISCOSITY.
- d THE PAV AGING TEMPERATURE IS BASED ON SIMULATED CLIMATIC CONDITIONS AND IS ONE OF THREE TEMPERATURES 90C, 100C, OR 110C. THE PAV AGING TEMPERATURE IS 100C FOR PG 58 AND ABOVE, EXCEPT IN DESERT CLIMATES (110C).
- e PHYSICAL HARDENING TP1 IS PERFORMED ON A SET OF ASPHALT BEAMS ACCORDING TO SECTION 13.1 OF TP1, EXCEPT THE CONDITIONING TIME IS EXTENDED TO 24 HRS +- 10 MINUTES AT 10C ABOVE THE MINIMUM PERFORMANCE TEMPERATURE. THE 24 HOUR STIFFNESS AND m VALUE ARE REPORTED FOR INFORMATION PURPOSES ONLY.
- f IF THE CREEP STIFFNESS IS BELOW 300 MPa, THE DIRECT TENSION TEST IS NOT REQUIRED. IF THE CREEP STIFFNESS IS BETWEEN 300 AND 600 MPa, THE DIRECT TENSION FAILURE STRAIN REQUIREMENT CAN BE USED IN LIEU OF THE CREEP STIFFNESS REQUIREMENT. THE m VALUE REQUIREMENT MUST BE SATISFIED IN BOTH CASES.