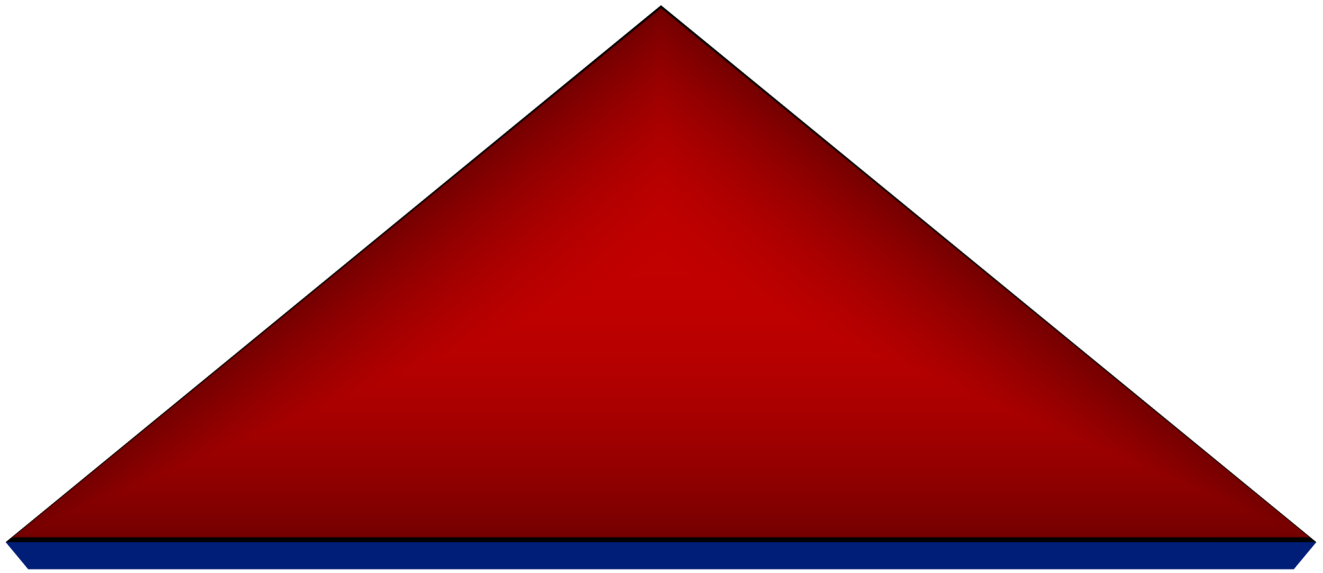


Combined State Binder Group

January 2021



Method of Acceptance for Asphalt Binders

Iowa Department of Transportation
Minnesota Department of Transportation
Nebraska Department of Transportation
North Dakota Department of Transportation
South Dakota Department of Transportation
Wisconsin Department of Transportation

Revisions to the 2021 edition of the Combined State Binder Group Method of Acceptance for Asphalt Binders are listed below.

Type	Page	Description
Add	1	D8078 - Standard Test Method for Ash Content of Asphalt and Emulsified Asphalt Residue
Add	1	D7553 - Standard Test Method for Solubility of Asphalt Materials in N-Propyl Bromide
Modify	2	A Supplier shall be defined as one who produces, stores with intent to sell or distribute, or supplies the final product or makes a blend or modification that alters the properties of the PGAB specified in M320 or M322 prior to final shipment to Department projects.
Modify	6	9.4.1 General. Combined State Binder Group will send a “Round Robin” PG-Binder sample to each supplier, with typically three (3) samples annually.
Modify	9	ATTN: Asad Sahak E-Mail: Asadullah.sahak@nebraska.gov
Add	18	ASTM D7553
Modify	19	From: Marathon Ashland Petroleum (Meredosia, IL) To: Marathon Petroleum Corporation (Meredosia, IL)
Modify	19	From: St. Paul Park Refining Co., LLC To: Marathon Petroleum Corporation (St. Paul Park, MN)
Add	19	Midwest Industrial Asphalt. Marshfield, WI.
Add	19	Owens Corning - Trumbull (Minneapolis, MN)
Add	19	Pitlik and Wick. Sugar Camp, WI.
Add	19	Senn Blacktop. Chippewa Falls, WI.
Add	19	04-07-21 For the latest supplier list, visit: https://engineering.purdue.edu/~csbg/method.html
Remove	20	Spec w/ Tolerance Column
Add	20	j ONLY TO BE USED FOR SECTION 6.4
Remove	21	Spec w/ Tolerance Column
Modify	21	i The asphalt binder shall be at least 99.0 percent soluble as determined by T 44 or D7553
Add	21	l Only to be used for section 6.4

**COMBINED STATE BINDER GROUP
CERTIFICATION METHOD OF ACCEPTANCE
FOR ASPHALT BINDERS**

1. SCOPE

- 1.1 Acceptance of asphalt binder by the **Certification Method** provides for acceptance of these materials for use on Iowa, Minnesota, Nebraska, North Dakota, South Dakota, and Wisconsin Department of Transportation (Department) projects. Upon the supplier's certification, the product as furnished to the contractor or purchasing agency, complies with the pertinent specification and/or contract requirements. Department projects include state, county and municipal federal aid, and authorized county and municipal state aid projects. To provide bituminous material to Department projects under the Certification Method, a supplier shall comply with the following procedures and requirements.

2. REFERENCED DOCUMENTS

2.1 AASHTO Standards

- M 320 - Performance-Graded Asphalt Binder
- M 332 -Performance-Graded Asphalt Binder Using Multiple Stress Creep Recovery (MSCR) Test
- R 28 - Accelerated Aging of Asphalt Binder Using a Pressure Aging Vessel (PAV)
- R 29 - Grading or Verifying the Performance-Grade (PG) of an Asphalt Binder
- R 66 - Sampling Asphalt Materials
- R 92 - Evaluating the Elastic Behavior of Asphalt Binders Using the Multiple Stress Creep Recovery (MSCR) Test
- T 44 - Solubility of Bituminous Material
- T 48 - Flash and Fire Points by Cleveland Open Cup
- T240 - Rolling Thin-Film Oven Test
- T 313 - Determining the Flexural Creep Stiffness of Asphalt Binder Using the Bending Beam Rheometer (BBR)
- T 315 - Standard Method of Test for Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer (DSR)
- T 316 - Viscosity Determination of Asphalt Binder Using Rotational Viscometer
- T 350 - Multiple Stress Creep Recovery (MSCR) Test of Asphalt Binder Using a Dynamic Shear Rheometer

2.2 ASTM Standards

- D8 - Standard Terminology Relating to Materials for Roads and Pavements
- D3665 - Standard Practice for Random Sampling of Construction Materials
- D7553 - Standard Test Method for Solubility of Asphalt Materials in N-Propyl Bromide
- D8078 - Standard Test Method for Ash Content of Asphalt and Emulsified Asphalt Residue

3. TERMINOLOGY

- 3.1 Additives - A material blended with the asphaltic binder (e.g., liquid anti-strip, warm mix additive, adhesion aid, etc.) or the aggregate (e.g., lime, hydrated lime, cement, etc.) to enhance the characteristics of the final blend of hot mix asphalt without altering the performance grade of the binder. Examples of additives are silicone, anti-strip additives, warm mix additives, and compaction aids.
- 3.2 Approved Quality Control Plan - A comprehensive program designed to verify, assess, and track the quality of asphalt binders delivered to department projects.
- 3.3 Department projects include any state, county or municipal project that is authorized and funded with federal aid. This additionally includes the point of placement and any production facility making mix for placement on Department projects.
- 3.4 Department Representatives – Combined State Binder Group member state representatives list in Section 18.
- 3.5 PGAB - Performance Graded Asphalt binder
- 3.6 PMAB - Polymer-modified asphalt binder
- 3.7 Hot Mix Asphalt Plant - See Plant definition
- 3.8 Plant - A hot mix asphalt (HMA) plant is the facility that is used to produce HMA. HMA paving materials are a mixture of size-graded, high quality aggregate (which can include reclaimed asphalt pavement (RAP), and liquid asphalt cement, which is heated and mixed in measured quantities to produce HMA. An HMA plant can be constructed as a permanent plant, a skid-mounted (easily relocated) plant, or a portable plant.
- 3.9 Modifiers - Modifiers (for the purposes of this document) are defined per M320 and M322 as organic materials of suitable manufacture that are used in virgin or recycled condition and that dissolve, disperse or react in asphalt binder to enhance its performance. This material is blended with the asphaltic binder to enhance the characteristics of the asphaltic binder by modifying the performance grade of the binder. Commonly used modifiers are polyphosphoric acid, styrene butadiene and elastomers, rejuvenators, bio-oils, ground tire rubber, extenders (such as Re-refined Engine Oil Bottoms (REOB)), and petroleum distillates. Polymer additives generally range from one to three percent, with increases to as much as seven percent for some applications. Crumb rubber (Ground Tire Rubber) can range from as little as five percent to as much as twenty percent by weight of the total binder, depending on the properties being targeted.
- 3.10 Supplier - A Supplier shall be defined as one who produces, stores with intent to sell or distribute, or supplies the final product or makes a blend or modification that alters the properties of the PGAB specified in M320 or M322 prior to final shipment to Department projects. A Supplier may be a refinery, terminal, secondary storage facility, or an HMA producer. For example, if any modification of PGAB is made at the terminal, the terminal shall be the supplier and must provide certification, or if any modification or blending of PGAB from different sources are made at the HMA plant, the HMA producer shall be the supplier and must provide certification.

4. SIGNIFICANCE AND USE

- 4.1 Certification of asphalt suppliers allows shipment to department projects without unnecessary delays. The certification method evaluates quality control plans and specification compliance tests performed on asphalt samples before shipping. 4.2 If one certified supplier sells to another certified supplier and material is delivered directly to a project, the supplier selling the material to the second supplier is responsible for submitting the daily and bi-weekly QC data to the DOT's as required by the CSBG document.

5. HAZARDS

- 5.1 All safety requirements of the field and/or laboratory organization and/or OSHA shall be observed.

6. GENERAL REQUIREMENTS

- 6.1 The supplier shall have laboratory facilities and qualified personnel available to perform all specification tests and maintain an acceptable quality control program. The supplier shall maintain records of all quality control testing completed in the production of asphaltic materials. These test records shall be available at all times for examination by the Departments' designated representatives and for a period of five (5) years after use on a project.
- 6.2 The supplier shall have a transport tank inspection procedure in place for the inspection of each transport tank prior to loading to ensure suitability for loading and freedom from contaminants. The transport tank inspection procedure shall be listed in the approved quality control plan. See Section 8 for QC Plan requirements.
- 6.3 Continuing acceptance of materials under this process is contingent upon satisfactory compliance with procedures and conformance of materials to requirements as determined by test results for refinery/terminal samples and verification field samples witnessed by project personnel.
- 6.4 The tolerances shown in the "Performance Graded Binder and Test Method Tolerances Table" on pages 20 and 21 are for use by the Department when comparing to supplier data. All data received from the supplier is expected to meet the base specification values shown in the Table, unless it is agreed upon that a bias exists, based on the results of the Combined State Binder Group Round Robins.
- 6.5 If a modifier (as defined in Terminology), is used in formulating a binder, the supplier shall assign the modifying process with a unique name and type of modification to be provided to the department for tracking and monitoring purposes. Each modified binder's unique name, along with its components, shall be listed in the Quality Control Plan. This information will be kept within the CSBG.
- 6.6 All non-bituminous components added to the binder prior to the sampling point for binder certification shall be included on the asphalt binder certificate of analysis. This will identify their presence but shall not include actual dosage. All non-bituminous components added after the certification sampling point, and prior to transport, shall be included on the bill of lading. All non-bituminous components added to the binder at the HMA plant shall be identified on the HMA plant documentation.

- 6.7 The department shall be notified of PG grade and/or supplier changes prior to use on Department projects.

7. QUALIFYING FOR CERTIFICATION

- 7.1 In order to provide asphaltic material to Department projects under the **Certification Method**, a supplier shall comply with the following procedures and requirements.
- 7.2 Application for Combined State Binder Group Certification Submittal Requirements:
- 7.2.1 Suppliers requesting certified status for supplying material from their individual facilities shall make application in writing to the Department's representative who will arrange for and authorize the use of the Certification Method of Acceptance. This request should present complete information regarding the supplier's quality control program and should include:
- 7.2.1.1 Cover letter indicating desire to become a Combined State Binder Group Certified Source
- 7.2.1.2 Manufacturer local contact name, address, phone number and email address
- 7.2.1.3 Safety Data Sheets for asphalt grades supplied
- 7.2.1.4 Review the following and provide the applicable information
- 7.3 A supplier's certification will remain in effect until denied by the certification program authority or until subsequent re-approval following another inspection. A yearly application in writing need not be made.
- 7.4 It is intended that facility inspections will be made annually by the Department. The inspections will include reviewing sampling and testing procedures, quality control, and facility changes. Identification and inspection of tanks will be done at this time, as well. Suppliers shall designate and identify tanks that will be used for supplying each grade of asphaltic material for Department projects. The Department inspector will verify that acceptable storage and sampling procedures will be adhered to.
- 7.5 Suppliers will have their requests for certification approved by the Department.
- 7.6 The Departments' Districts/Regions will be notified when suppliers become certified.
- 7.7 The Department inspector shall be permitted to visit asphalt facilities any time during working hours and in the company of appropriate supplier personnel.
- 7.8 Certification of a supplier by one of the Combined State Binder Group members will be accepted by all the member states. Once certified the supplier name will be added to the Combined State Binder Group Certified Supplier List and round robin mailing list.

8. QUALITY CONTROL PLAN MINIMUM REQUIREMENTS

Demonstration of Manufacturing Ability, Manufacturer Quality Control Program, Availability and Manufacturing/Testing/Service Capability requirements. Quality Control Plans will be reviewed annually.

8.1 QC plan shall identify the following:

- 8.1.1 Facility type: terminal, refinery, secondary storage or HMA plant
- 8.1.2 Facility Location; Street Address, State, Postal Zip Code
- 8.1.3 Contact information of person responsible for Quality Control at the facility
- 8.1.4 Contact information for suppliers Quality Control manager.
- 8.1.5 Name and location of Quality Control lab performing Quality Control testing
- 8.1.6 Quality Control Tests performed.
 - 8.1.6.1 Type of Quality control tests
 - 8.1.6.2 Testing frequencies
 - 8.1.6.3 Program for maintaining test and shipping records
 - 8.1.6.4 Process for the electronic transmittal of daily QC and bi-weekly test results to the Department(s) representative(s) at a frequency require by this document.
 - 8.1.6.5 QC plan shall have procedure to report and handle non-compliant material. The supplier shall:
 - 8.1.6.6 Immediately notify the agency effected of the shipment in question
 - 8.1.6.7 Identify PG grade and tanker, manifest number of the material
 - 8.1.6.8 Cease shipment until binder complies with CSBG specification
 - 8.1.6.9 Notify agency prior to resuming shipping
 - 8.1.6.10 Implement mutually agreed upon procedure for disposition of the binder. Agency affected will have ultimate authority in the decision of specification compliance.

9. SAMPLING AND TESTING BY SUPPLIER

9.1 Minimum Annual Requirements

- 9.1.1 Prior to the start of the shipping season, adequate testing shall be performed to identify characteristics of tank materials on-hand. Prior to shipping bi-weekly sample testing (see sub-section 9.3) shall be completed on a minimum of one sample for each grade of asphaltic material anticipated to be shipped to Department projects.
- 9.1.2 It is intended that facility annual inspections would be made at this time.
- 9.1.3 Participation in Combined State Binder Group “Round Robin” Program will be a requirement, as detailed in Subsection 9.4.
- 9.1.4 This testing will constitute the minimum annual requirements by the Certification method of Acceptance Program for continuation of a supplier certification.

9.2 Daily Requirements

- 9.2.1 Sampling. One sample from the tank or blender representing each grade of material shipped for Department work. For material shipped from tanks, the sample may be taken from the tank, from the line during loading, or from the loaded transport. Material produced from a blender may be sampled from the line during loading or from the loaded transport.
- 9.2.2 Required tests. **Performance graded binder**: Brookfield viscosity or dynamic shear rheometry. Dynamic shear testing will be required if material is modified.
- 9.2.3 Report. Send a record of daily quality control results to the Department central laboratory on an approximate bi-weekly basis unless otherwise directed by the department.

9.3 Bi-Weekly Requirements

- 9.3.1 Sampling. Sample as for 9.2 1.
- 9.3.2 Tests required. All of the tests listed in the attached schedule of tests for performance graded binder material.
- 9.3.3 Report. Send report of test results to the Department central laboratory when completed.

9.4 Combined State Binder Group “Round-Robins”

- 9.4.1 General. Combined State Binder Group will send a “Round Robin” PG-Binder sample to each supplier, with typically three (3) samples annually.
- 9.4.2 Purpose. To provide data about the repeatability and reproducibility of the applicable PG binder test methods.
- 9.4.3 Report. Send an Excel report of test results to the designated e-mail address when completed.
- 9.4.4 Summary. The Combined State Binder Group will compile a summary report and distribute to all participants. Each supplier’s data will remain confidential.
- 9.4.5 Notification of Outliers. The Combined State Binder Group will notify “Round-Robin” participants of any tests for which their data was determined to be a statistical outlier. An outlier is defined as that data which is outside of three standard deviations from the average. The determination of outliers is an iterative process. The notification will be sent in an e-mail to the participant. The participant shall have 30 days to provide MNDOT with a response as to the apparent cause of the outlier. This information will be shared with the other Departments.
- 9.4.6 Equipment Failures. Labs will be required to respond to the Combined State Binder Group in an e-mail to Chris B. Brakke at (Chris.Brakke@iowadot.us) with resolution to equipment failures. This information will be shared with the other Departments.

10. LOSS OF CERTIFICATION

- 10.1 Certification will be withdrawn from suppliers when one or more of the following conditions exist.
 - 10.1.1 Inability to consistently supply material meeting specifications as measured by non-compliance for three (3) consecutive project samples according to Department test results for a specific grade.
 - 10.1.2 Failure to participate in all Combined State Binder Group “Round-Robins” during any one year. Exceptions will be made for equipment failure. Labs will be required to respond with resolution of equipment failure(s), as detailed in Subsection 9.4.6.
 - 10.1.3 Failure to respond to notification of outlying labs in writing within the given timeframe, as detailed in Subsection 9.4.5.
 - 10.1.4 Lack of maintenance of required records.
 - 10.1.5 Improper documentation of shipments as defined in Section 14.
 - 10.1.6 Failure to maintain an acceptable quality control program.
 - 10.1.7 Failure to provide quality control testing data as required by the Combined State Binder Group Certification Method.
- 10.2 Decertification of suppliers will be by the Department. Notification will be in writing. Combined State Binder Group members will be copied on Decertification letter.
- 10.3 If a supplier loses certification materials may be accepted for a three-month period (see Section 12) while awaiting recertification. Procedures may require pre-testing and approval of materials before use and/or increasing the frequency of sampling and testing at the job site (refer to Section 9.2. of this procedure). The Department's costs for pre-testing and increasing sampling and testing of materials will be paid by the supplier/contractor or their agent unless other arrangements are agreed upon by the Department. Decertification by one Department will constitute decertification for the entire Combined State Binder Group.

11. DISPUTE RESOLUTION

- 11.1 If a supplier disputes test results by a Combined State Binder Group member state and testing difference cannot be resolved the supplier can request dispute resolution.
- 11.2 An investigation shall be completed on causes for dispute. Combined State Binder Group Round Robin data, AMRL PSP and individual verification sample test data will be reviewed to determine the cause of the discrepancy.
- 11.3 If investigation does not resolve the dispute, a written notification of dispute resolution by the supplier must be sent to the Department(s) Representative(s).
- 11.4 Supplier and Agency shall agree on a third-party lab to assist with dispute resolution.
- 11.5 Combined State Binder Group will provide a list of AMRL accredited laboratories to do third party testing or one of the Combined State Binder Group member labs may be selected.
- 11.6 A minimum of three split samples are recommended (results in three three-way comparisons.)
- 11.7 If testing costs are incurred the supplier will pay for lab testing initially.
- 11.8 The results from the third-party lab will determine the final outcome.

12. QUALIFYING FOR RECERTIFICATION

- 12.1 If a supplier has lost certification and seeks to be recertified the following is required:
 - 12.1.1 Fulfill the requirements of Section 7, "Qualifying for Certification", of this procedure.
 - 12.1.2 Submit documentation to the Department's Representative explaining why decertification occurred and the actions the supplier has taken to correct the problems identified by the Department.
- 12.2 A maximum of three months (of normal production) will be allowed for a supplier to regain certified status under this procedure. If, after that time, the Department determines that the supplier has not attained satisfactory status for certification, material from that source will not be accepted for use on Department projects. The Departments' Districts/Regions will be notified of this action. Decisions regarding the future qualification for certification of a supplier, affected by the above process, shall be at the Departments' discretion.

13. TEST REPORTS (required by Section 9)

13.1 The supplier chief chemist (or other representative) shall certify test reports for samples and submit them to the Department's Representative. This test information will be evaluated and filed for future reference. The reports shall be sent to:

IOWA:	Iowa Department of Transportation Office of Construction and Materials 800 Lincoln Way Ames, IA 50010 Attn: Chris B. Brakke E-Mail: Chris.Brakke@iowadot.us
MINNESOTA:	Minnesota Department of Transportation Office of Materials and Road Research 1400 Gervais Avenue Maplewood, MN 55109 Attn: Paul Lohmann, Transportation Specialist E-Mail: paul.lohmann@state.mn.us
NEBRASKA:	Nebraska Department of Transportation Materials and Tests Division 1400 NE Hwy 2 Lincoln, NE 68502 ATTN: Asad Sahak E-Mail: Asadullah.sahak@nebraska.gov
NORTH DAKOTA:	North Dakota Department of Transportation Materials and Research Division 300 Airport Road Bismarck, ND 58504 ATTN: Jeff Herman E-Mail: jherman@nd.gov
SOUTH DAKOTA:	South Dakota Department of Transportation Materials Laboratory 104 S. Garfield, Bldg B Pierre, SD 57501 ATTN: Rick Rowen E-Mail: rick.rowen@state.sd.us
WISCONSIN:	Wisconsin Department of Transportation Truax Center 3502 Kinsman Boulevard Madison, WI 53704 ATTN: Steven Hefel E-Mail: Steven.Hefel@dot.wi.gov

14. CERTIFICATION OF SHIPMENTS AND DOCUMENTATION

- 14.1 A shipping ticket (Bill of Lading) shall be prepared for each truck shipment identifying the supplier, location, grade of asphaltic material, unique name (as referenced in Subsection 6.5), additives (e.g. silicone, anti-strip etc.), truck number, supplier's tank number from which the truck was loaded, average unit weight, quantity, and date and time of loading. In addition, Iowa DOT requires contract or project number on the shipping ticket. A statement certifying that the material complies with Combined State Binder Group requirements and Department Specifications shall be on or accompany the shipping ticket. The company invoice or manifest form may be used for this purpose.
- 14.2 In addition to the usual contractor's copy of the shipping ticket, a copy (South Dakota DOT to receive two copies) of the shipping ticket containing the certification language for each truck shipment shall also be made available to the project engineer at the project site.
- 14.3 The Department's Representative will furnish a list of certified suppliers to the districts/regions.
- 14.4 Only material shipped from a certified supplier directly to the project site will be accepted as certified material. Material shipped to, and unloaded into, a secondary storage facility and subsequently shipped to state work will **not** be accepted as certified material unless that secondary facility has been certified and is operating in full compliance with these procedures. Modification at the HMA plant will not be accepted unless the plant is certified as a supplier.
- 14.5 If specification compliance testing shows the material does not conform to Combined State Binder Group specifications the non-compliant material shall not be shipped, and affected Department(s) shall be notified per QC Plan.

15. SAMPLES OBTAINED BY THE STATE

15.1 Refinery/Terminal Samples

- 15.1.1 The Department shall have the option to obtain random samples at the source of supply. Samples shall be taken by supplier personnel at the request and under observation of an authorized Department representative. The supplier shall have equipment and facilities available to obtain samples safely.

15.2 Verification Field Samples

15.2.1 IOWA:

The supplier or contractor personnel will obtain samples of Material at the project site under the observation of a Department representative. The sampling rate will be one per day. For contracts with less than approximately 40 Mg (45 tons) of asphalt, sampling may be waived.

Sampling shall be accomplished in accordance with Iowa Instructional Memorandum (I.M.) 323, "Method of Sampling Asphaltic Materials."

In addition, project personnel will obtain samples as directed by the project engineer to adequately monitor material quality at the plant for alterations made to the site storage, HMA plant handling process, or if modification is occurring at the HMA plant.

15.2.2 MINNESOTA:

The supplier or contractor personnel will obtain samples, under the observation of a Department representative, by random selection from shipments of material at the project site. The samples shall be taken from the first load and subsequently one sample per 900 Mg (1000 tons) for each supplier and grade of asphalt binder per contract. For contracts with less than approximately 23 Mg (25 tons) (one truck transport) of asphalt, sampling may be waived.

Sampling shall be accomplished by taking a one-liter (one-quart) sample of material from a transport in accordance with AASHTO Designation R66.

In addition, project personnel will obtain samples as directed by the project engineer to adequately monitor material quality at the plant for alterations made to the site storage, HMA plant handling process, or if modification is occurring at the HMA plant.

15.2.3 **NEBRASKA:**

The Contractors Certified Sampling Technician will obtain samples of material at the job site under the observation or assistance of the Department representative. The sampling rate will be a minimum of one (1) per each 200 tons of liquid binder grade per contract. A minimum of one (1) sample will be taken per project.

One sample will consist of one (1) two-liter (two-quart) can of material taken from the line between the storage tank and mixer or from the tank supplying material to the line, at a location at which material sampled is representative of the material in the line to the mixer. Sampling shall be accomplished in accordance with AASHTO R66.

In addition, project personnel will obtain samples as directed by the project engineer to adequately monitor material quality whenever blending of binders of different grades of binders from different suppliers is taking place. These samples will be taken at the start of production following the blending at locations defined above.

15.2.4 **NORTH DAKOTA:**

NDDOT project personnel will observe the contractor obtain samples from material delivered to the project site. The sampling rate will be a minimum of one sample for every 250 tons (225 Mg) for each supplier and grade of asphalt cement, or fraction thereof. The sample shall be taken randomly within each 250 tons (225 Mg) of material.

A sample will consist of taking two 1-liter (one-quart) samples from the designated transport. The first sample will be used for testing, the second sample will be a check. Both samples will be sent to the NDDOT Central Lab.

Samples will be identified with the following information written on the can:

Project Number-Field Sample Number

Manifest Number-PG Grade

Asphalt Supplier-Date

Original or Check

Project personnel will also obtain samples as directed by the project engineer at any time additional samples are determined to be necessary.

15.2.5 **SOUTH DAKOTA:**

The supplier or contractor personnel will obtain samples of material at the project site under the observation of a Department representative. The sampling rate will be in accordance to the South Dakota Department of Transportation Materials Manual, “Minimum Sample and Test Requirements”, section 1.1C (3).

The sampling method will be in accordance to SD 301 section 3.2C in the South Dakota Department of Transportation Materials Manual.

In addition, project personnel will obtain samples as directed by the project engineer to adequately monitor material quality at the plant for alterations made to the site storage, HMA plant handling process, or if modification is occurring at the HMA plant.

15.2.6 **WISCONSIN:**

The supplier or contractor personnel will obtain samples, under the observation of a project engineer, at the HMA plant site.

For contracts greater than 1,000 ton of mix, obtain an in-line sample at a rate of one, one-liter (one-quart) sample per 15,000 tons of mix for each supplier and grade of asphalt binder, or fraction thereof.

For contracts with 1,000 ton of mix or less, one, one-liter (one-quart) non-random in-line sample may be obtained at the discretion of the project engineer.

For all contracts, one, one-liter (one-quart) non-random truck transport sample may be obtained at the discretion of the project engineer.

In addition, obtain samples as directed by the project engineer at any time extra samples are deemed necessary.

15.2.6.1 **Truck Transport:** Sampling shall be accomplished by obtaining a one-liter (one-quart) sample of material representing the middle third of the load from a sample valve attached to the transport in accordance with AASHTO Designation R66, section 8 paragraph 8.1.

15.2.6.2 **In-Line:** Sampling shall be accomplished by obtaining a one-liter (one-quart) sample of material from an in-line sample port between the storage tank and mixer as described in AASHTO Designation R66, section 8 paragraph 8.2.2.

16. **ACCEPTANCE OF ASPHALT BINDER NOT ON THE APPROVED LIST**

16.1 It is the intention of the Departments to encourage suppliers to become certified according to this procedure. Procedures may require pretesting and approval of materials before use and/or increasing the frequency of sampling and testing at the job site (refer to Section 9.2. of this procedure). The Department's costs for pretesting and increased sampling and testing of materials will be paid by the supplier/contractor or their agent unless other arrangements are agreed upon by the Department.

17. SAMPLES TESTED BY THE STATE WITH NON-COMPLYING RESULTS

17.1 Should a sample tested by the Department show noncompliance actions will be taken to investigate the sample failure. The purpose of the investigation(s) will be to quickly obtain information to either substantiate the failure data or to provide conclusive evidence that the reported failure is unreliable. There are two types of samples to be considered:

17.1.1 Refinery/terminal random samples taken by the supplier under observation of an authorized Department representative at the shipping refinery or terminal.

17.1.2 Verification field samples taken under the direction of the Department's project personnel at the project site.

17.2 Refinery/Terminal Samples

17.2.1 If a sample obtained by an authorized Department representative at a supplier plant shows test results out of specification limits, the process of resolving the sample failure will include the following actions as appropriate:

17.2.1.1 The Department will notify the supplier.

17.2.1.2 The Department and supplier together will determine the quantity and location(s) of the material in question.

17.2.1.3 The Department will retest the sample as determined necessary to confirm or disaffirm the original test result(s).

17.2.1.4 If material is in transit to or at Department projects, the district/region(s) will be notified.

17.2.1.5 The Department will increase the frequency of sampling at the project site(s) involved.

17.2.1.6 The Department will investigate and review all pertinent test data.

17.2.1.7 The Department's Representative will collect and compile all information, including any from the supplier and district/region(s), and prepare a report with explanations to resolve the sample problem. A copy of the report will be distributed to the district/region, contractor, and supplier.

17.2.1.8 The supplier shall take corrective action, as warranted, and submit an explanation to the Department.

17.2.1.9 The Department will determine when the sample is adequately investigated and resolved and the supplier is consistently furnishing specification material.

17.3 Verification Field Samples

- 17.3.1 If a sample obtained by the Department at a project site shows test results out of specification limits, the process of resolving the sample failure will include the following actions as appropriate:
- 17.3.1.1 The Department will notify the District/Region and verify that all information sent with the sample is accurate. The District/Region will notify the contractor. The District/Region will arrange for project personnel to investigate all aspects of procuring, handling and submitting the sample for testing. The quantity and location of material in question will be determined. The District/Region will report findings to the Department's Representative.
 - 17.3.1.2 The Department will notify the supplier who will arrange to investigate all aspects of loading, handling, and delivery of the material in question. The supplier shall report findings to the Department's Representative.
 - 17.3.1.3 The Department will conduct retesting of the sample as determined necessary to confirm or disaffirm the original test result(s).
 - 17.3.1.4 The Department will increase the frequency of sampling at the project site.
 - 17.3.1.5 The Department's Representative will collect and compile all information from the District/Region and supplier investigations and prepare a report. The Department will determine when the sample has been adequately investigated. The report will contain data with an analysis of information and recommendations for the district/region to resolve the sample problem. A copy of the report will be distributed to the district/region, contractor, and supplier.
 - 17.3.1.6 The Department will issue the standard report of tests for the sample showing the failing test result(s).
 - 17.3.1.7 The District/Region will make the final decision for resolving the sample problem. Generally, the District/Region will accomplish this with input from the Department Representative and supplier. The Department's report of investigations (from step 5 above) will be used in the decision-making process. The District/Region will notify the contractor. Should the decision involve reduced payment for material(s) in question, standard Department practices will be followed and administered by the District/Region. The contractor will be notified in writing of reduced payments.
 - 17.3.1.8 The supplier shall implement corrective measures suggested by the investigation and notify the Department of actions taken.
 - 17.3.1.9 The Department will recommend changes based on the outcome of the completed investigation.

18. DEPARTMENT REPRESENTATIVES:

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**SCHEDULE OF TESTS
AS REQUIRED BY THE COMBINED STATE BINDER GROUP**

<u>TEST</u>	<u>TEST METHOD</u>
<u>PERFORMANCE GRADED BINDER</u>	
Solubility	AASHTO - T44 or ASTM D7553
Flash Point	AASHTO - T48
Brookfield Viscosity	AASHTO – T316
Dynamic Shear	AASHTO – T315
Rolling Thin Film Oven Test:	AASHTO - T240
a. Change of Mass	
b. Dynamic Shear	AASHTO – T315
Accelerated Aging (PAV)	AASHTO – R28
a. Dynamic Shear	AASHTO – T315
b. Creep Stiffness	AASHTO – T313
Multiple Stress Creep Recovery (MSCR) Test of Asphalt Binder Using a Dynamic Shear Rheometer	AASHTO – T 350
Direct Tension	AASHTO – T314

NOTES:

1. All testing shall be in accordance with the applicable standard methods of the American Association of State Highway and Transportation Officials (AASHTO).
2. Application for Combined State Binder Group Certification Submittal Requirements:

Submittal package should include:
 - Cover letter indicating desire to become a Combined State Binder Group Certified Source
 - Manufacturer local contact name, address, phone number and email address
 - Safety Data Sheets for asphalt grades supplied
 - Review the following and provide the applicable information
3. Copies of this document can be obtained from:
North Central Superpave Center Home Page: <http://bridge.ecn.purdue.edu/~spave/>
WISDOT's ftp site: <ftp://ftp.dot.wi.gov/dtsd/bts/quality/general>
Any Combined State Binder Group representative.

Combined State Binder Group Certified Supplier List

SUPPLIER	LOCATION	SUPPLIER	LOCATION
Asphalt Materials, Inc.	Cicero, IL	Husky Energy	Winnipeg, Manitoba
Barton Enterprises	Newport, MN	Husky Energy (Ponder Emulsions)	Yorkton, Sask
Bit Mat Products	South Bend, IN	Interstate Asphalt Corp-Ameripan	Chicago, IL
Bituminous Material & Supply	Des Moines, IA	Interstate Asphalt Corp-Bell Oil	Chicago, IL
Bituminous Material & Supply	Tama, IA	Interstate Asphalt Corp	Peoria, IL
Bituminous Roadways, Inc.	Inver Grove Hts., MN	Jebro, Inc	Cheyenne, WY
BKEP Materials, LLC	Grand Island, NE	Jebro, Inc.	Corson, SD
Blueknight Energy Partners	Commerce City, CO	Jebro, Inc.	Sioux City, IA
Border Chemical	Winnipeg, Manitoba	Marathon Petroleum Corporation	Meredosia, IL
BP Products North America, Inc.	Bartlett, IL	Marathon Petroleum Corporation	St. Paul Park, MN
BP Products North America, Inc.	Calumet, IL	McAsphalt Ind., Inc.	Thunder Bay, Ontario
BP Products North America, Inc.	Whiting, IN	McAsphalt Ind., Inc.	Winnipeg, Manitoba
Calumet Superior Specialty Products.	Grand Falls, MT	Midwest Industrial Asphalt	La Crosse, WI
CHS	Grand Forks, ND	Midwest Industrial Asphalt	Marshfield, WI
CHS	Harding, MT	Monarch Oil	Omaha, NE
CHS	Laurel, MT	Moose Jaw Refinery, Inc.	Moose Jaw, Sask
CHS	Mandan, ND	Owens Corning - Trumbull	Minneapolis, MN
Const. Resources Management, Inc.	Gladstone, MI	Phillips 66	Forestview, IL
Const. Resources Management, Inc.	Green Bay, WI	Phillips 66	Granite City, IL
Const. Resources Management, Inc.	Milwaukee, WI	Phillips 66	Kansas City, MO
Const. Resources Management, Inc.	Waukesha, WI	Pioneer Oil Co.	Billings, MT
Contanda, LLC (Leased by Bituminous Roadways, Inc.)	St. Paul, MN	Pitlik and Wick	Sugar Camp, WI
Flint Hills Resources Pine Bend, LLC	Algona, IA	Seneca Petroleum Co., Inc.	Lemont, IL
Flint Hills Resources Pine Bend, LLC	Davenport, IA	Seneca Petroleum Co., Inc.	Portage, IN
Flint Hills Resources Pine Bend, LLC	Dubuque, IA	Senn Blacktop	Chippewa Falls, WI
Flint Hills Resources Pine Bend, LLC	Green Bay, WI	Shamrock Industries.	Rosemount, MN
Flint Hills Resources Pine Bend, LLC	Marshall, MN	Stark Pavement Corp.	Milwaukee, WI
Flint Hills Resources Pine Bend, LLC	Omaha, NE	Superior Refining Co., LLC	Superior, WI
Flint Hills Resources Pine Bend, LLC	Rosemount, MN	Superior Refining Co., LLC	Rhineland, WI
Flint Hills Resources Pine Bend, LLC	Savage, MN	Superior Refining Co., LLC	Crookston, MN
Flint Hills Resources Pine Bend, LLC	Stevens Point, WI	Texpar Energy	Davenport, IA
Flint Hills Resources Pine Bend, LLC	West Fargo, ND	Texpar Energy	Rochester, MN
Frontier Refining, Inc.	Cheyenne, WY	Tri County Paving, Inc.	DeForest, WI
Gardner-Gibson, Inc.	Willow Springs, IL	Tri-State Asphalt, LLC	Morris, IL
MPM – Umore Park Terminal (Leased by Flint Hills Resources)	Rosemount, MN	Wolf Paving	Dousman, WI
Henry G. Meigs, LLC	Abbotsford, WI		
Henry G. Meigs, LLC	Portage, WI		
Husky Energy	Lloydminster, Alberta		

Updated: 04-07-21

For the latest supplier list, visit: <https://engineering.purdue.edu/~csbg/method.html>



PERFORMANCE GRADED BINDER SPECIFICATIONS & TEST METHOD TOLERANCES
 Combined State Binder Group; IOWA, MINNESOTA, NEBRASKA, NORTH DAKOTA, SOUTH DAKOTA & WISCONSIN

AASHTO M320
EFFECTIVE JANUARY 2021

	PERFORMANCE GRADE		PG 46-			PG 52-					PG 58-					PG 64-					PG 70-					PG 76-					PG 82-										
			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		
	AVERAGE 7 DAY MAXIMUM PAVEMENT DESIGN TEMP, °C		46			52					58					64					70					76					82										
	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		
TESTS ORIGINAL BINDER		SPEC	TOL ⁱ																																						
AASHTO T44 SOLUBILITY % MINIMUM		99.00	0.13																																						
AASHTO T48 FLASH POINT TEMP, °C, MINIMUM		230	9		230			230					230					230					230					230													
AASHTO T316 VISCOSITY ^b Pa.s MAXIMUM TEST TEMP, °C		3.0	7.3%					135					135					135					135					135													
AASHTO T315 DYNAMIC SHEAR ^c G*/SIN5 ^d , kPa, MINIMUM TEST TEMP @ 10 rad/sec, °C		1.00	7%		46			52					58					64					70					76					82								
TESTS RTFO RESIDUE																																									
AASHTO T240 MASS CHANGE ^e , % MAX		1.00	20%																																						
AASHTO T315 DYNAMIC SHEAR ^c G*/SIN5 ^d , kPa, MINIMUM TEST TEMP @ 10 rad/sec, °C		2.20	10%		46			52					58					64					70					76					82								
AASHTO T350 MSCR AASHTO TP 70 ^h % Recovery @ 3.2 kPa MIN																																									
Test Temperature @ 58°C ⁱ														30					30		55					55		75					75		75						
Test Temperature @ 64°C ⁱ														25					25		45					45		75					75		75						
TESTS PAV RESIDUE																																									
AASHTO R28 PAV AGING TEMP, C ^f				90			90					100					100					100 (110)					100 (110)					100 (110)									
AASHTO T315 DYNAMIC SHEAR G*/SIN5 ^d , kPa, MAXIMUM TEST TEMP @ 10 rad/sec, °C		5000	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
AASHTO T313 CREEP STIFFNESS ^g [S] MAXIMUM, MPa m-VALUE, MINIMUM TEST TEMP @ 60s, °C		300 0.300	8% 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	0	-6	-12	-18	-24
AASHTO T314 DIRECT TENSION ^g FAILURE STRAIN, MINIMUM % TEST TEMP @ 1.0 mm/min, °C		1.0	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	0	-6	-12	-18	-24

- a PAVEMENT TEMPERATURES ARE ESTIMATED FROM AIR TEMPERATURES USING AN ALGORITHM CONTAINED IN THE LTPP BIND PROGRAM, MAY BE PROVIDED BY THE SPECIFYING AGENCY, OR BY FOLLOWING THE PROCEDURES AS OUTLINED IN MP2 AND PP28.
- 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 SAFETY STANDARDS.
- c FOR QUALITY CONTROL OF UNMODIFIED ASPHALT CEMENT PRODUCTION, MEASUREMENT OF THE VISCOSITY OF THE ORIGINAL ASPHALT CEMENT MAY BE USED TO SUPPLEMENT DYNAMIC SHEAR MEASUREMENTS OF G*/sinδ AT TEST TEMPERATURES WHERE THE ASPHALT IS A NEWTONIAN FLUID.
- d G*/sinδ = HIGH TEMPERATURE STIFFNESS AND G*sinδ = INTERMEDIATE TEMPERATURE STIFFNESS.
- e THE MASS CHANGE SHALL BE LESS THAN 1.00 PERCENT FOR EITHER A POSITIVE (MASS GAIN) OR A NEGATIVE (MASS LOSS) CHANGE
- f THE PAV AGING TEMPERATURE IS BASED ON SIMULATED CLIMATIC CONDITIONS AND IS ONE OF THREE TEMPERATURES 90°C, 100°C, OR 110°C. NORMALLY THE PAV AGING TEMPERATURE IS 100°C FOR PG 58-XX AND ABOVE. HOWEVER, IN DESERT CLIMATES THE PAV AGING TEMPERATURE FOR PG 70-XX AND ABOVE MAY BE SPECIFIED AS 110°C.
- g 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.
- h BINDERS SIGNIFIED BY PG XX-XXP SHALL BE REQUIRED TO MEET OR EXCEED THE MSCR MINIMUM % RECOVERY IN ADDITION TO M320 SPECIFICATIONS.
- i TEST TEMPERATURE BASES ON ENVIRONMENTAL NOMINAL HIGH TEMPERATURE
- j ONLY TO BE USED FOR SECTION 6.4



SPECIFICATIONS & TEST METHOD
Combined State Binder Group
IOWA, MINNESOTA, NEBRASKA, NORTH DAKOTA, SOUTH DAKOTA, WISCONSIN
EFFECTIVE JANUARY 2021
AASHTO M332

Performance Grade ^a	Spec	Tol ⁱ	PG 46			PG 52							PG 58					PG 64					
Average 7-day max pavement design temp, °C ^b			46			52							58					64					
Min pavement design temp, °C ^b			-34	-40	-46	-10	-16	-22	-28	-34	-40	-46	-16	-22	-28	-34	-40	-10	-16	-22	-28	-34	-40
Solubility T44 (Minimum) (%) ⁱ	99.00	0.13	99.0			99.0							99.0					99.0					
Flash Point Temp, T 48, min °C	230	9	230			230							230					230					
Viscosity, T 316: ^c max 3 Pa•s test temp, °C	3.0	7.3%	135			135							135					135					
Dynamic Shear, T 315: ^d G*/sinδ, min. 1.00 kPa test temp @ 10 rad/s, °C	1.00	7%	46			52							58					64					
Rolling Thin Film Oven (T 240)																							
Mass change, max, percent ^f	1.00	20%																					
MSCR, T 350: (Test Temperature °C)																							
Standard Traffic “S” Jnr _{@3.2 kPa} , max 4.5 kPa ⁻¹ Jnr _{diff} , max 75% ^k	4.5	22%	46			52							58					64					
Heavy Traffic “H” Jnr _{@3.2 kPa} , max 2.0 kPa ⁻¹ Jnr _{diff} , max 75% ^k	2.0	22%	46			52							58					64					
Very Heavy Traffic “V” Jnr _{@3.2 kPa} , max 1.0 kPa ⁻¹ Jnr _{diff} , max 75% ^k	1.0	39%	46			52							58					64					
Extremely Heavy Traffic “E” Jnr _{@3.2 kPa} , max 0.5 kPa ⁻¹ Jnr _{diff} , max 75% ^k	0.5	39%	46			52							58					64					
% Recov. @3.2 kPa (Min). Heavy Traffic “H”	30	18%	46			52							58					64					
% Recov. @3.2 kPa (Min). Very Heavy Traffic “V”	55	18%	46			52							58					64					
% Recov. @3.2 kPa (Min). Extremely Heavy Traffic “E”	75	18%	46			52							58					64					
Pressure Aging Vessel Residue (R 28)																							
PAV Aging Temp ^g , °C			90			90							100					100					
Dynamic Shear, T 315: “S” G*(sinδ), max. 5000 kPa ^e test temp @ 10 rad/s, °C	5000	12%	10	7	4	25	22	19	16	13	10	7	25	22	19	16	13	31	28	25	22	19	16
Dynamic Shear, T 315: “H,” “V,” “E” G*(sinδ), max. 6000 kPa ^e test temp @ 10 rad/s, °C	6000	12%	10	7	4	25	22	19	16	13	10	7	25	22	19	16	13	31	28	25	22	19	16
Creep stiffness, T 313:h S, max. 300 MPa	300	8%																					
m-value, min 0.300 test temp @ 60 s, °C	0.300	5%	-24	-30	-36	0	-6	-12	-18	-24	-30	-36	-6	-12	-18	-24	-30	0	-6	-12	-18	-24	-30
Direct Tension, T 314: ^h Failure strain, min 1.0% test temp @ 1.0 mm/min, °C	1.0	20%	-24	-30	-36	0	-6	-12	-18	-24	-30	-36	-6	-12	-18	-24	-30	0	-6	-12	-18	-24	-30

a MSCR Test on RTFO residue should be performed at the PG grade based on the environmental high pavement temperature.

b Grade bumping is accomplished by requiring a lower Jnr value while testing at the environmental temperature

b Pavement temperatures are estimated from air temperatures using an algorithm contained in the LTPP Bind program, may be provided by the specifying agency or by following the procedures as outlined in M 323 and R 35, excluding the provisions for "grade bumping."

c 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 safety standards.

d For quality control of unmodified asphalt binder production, measurement of the viscosity of the original asphalt binder may be used to supplement dynamic shear measurements of G*/sinδ at the test temperatures where the asphalt is at Newtonian fluid.

e G*/sinδ = high temperature stiffness and G*sinδ = intermediate temperature stiffness.

f The mass change shall be less than 1.00 percent for either a positive (mass gain) or a negative (mass loss) change.

g The PAV aging temperature is based on simulated climatic conditions and is one of three temperatures, 90 °C, 100 °C, or 110 °C. Normally the PAV Aging temperature is 100 °C. However, in desert climates the PAV aging temperature for PG 70-XX and above may be specified as 110 °C.

h 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. The m-value requirement must be satisfied in both cases

i The asphalt binder shall be at least 99.0 percent soluble as determined by T 44 or D7553

k the Combined State Binder Group acknowledge the Jnr Diff spec of 75% max as Waived.

l Only to be used for section 6.4