Technical Specification

Transport and Main Roads Specifications MRTS18 Polymer Modified Binder (including Crumb Rubber)

March 2025

(ATS 3110 Supply of Polymer Modified Binders, Ed 2.0 June 2023)

Queensland Government

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About this document

The document adopts and modifies Austroads Technical Specification ATS 3110 *Supply of Polymer Modified Binders* as part of national harmonisation. It sets out the requirements for the supply (including transport and storage), sampling and testing of polymer modified binders (PMBs) and crumb rubber modified binders for use in both sprayed sealing and asphalt applications.

How to use this document

This document includes the national guidance and Queensland-specific advice while following the structure established in Austroads Technical Specifications.

Queensland-specific advice includes practices which vary from national practice because of local environmental conditions (such as geography, soil types, climate); different funding practices; local research; local legislation requirements; and to expand instruction on particular issues.

This document:

- sets out how the Austroads Technical Specification ATS 3110 *Supply of Polymer Modified Binders* applies in Queensland
- has precedence over the Austroads Technical Specification ATS 3110 *Supply of Polymer Modified Binders* when applied in Queensland
- has the same clause numbering and headings as the Austroads Technical Specification ATS 3110 *Supply of Polymer Modified Binders*.

Transport and Mains Roads provides an ancillary document which outlines adopted national and modified Queensland-specific content with tracked changes. To access a copy click on the below link: Ancillary documents for harmonised Technical Specifications.

Terminology

The following general amended definitions apply when reading this document.

Reference to…	Means
Shall	Denotes mandatory requirements.
Must	Denotes mandatory requirements.
Principal	The State of Queensland acting through the Department of Transport and Main Roads.
Administrator	The Administrator will be responsible for the overall administration of this Contract.

Contents

1 Scope

1.1 This Technical Specification defines the requirements for the supply (including transport and storage) of polymer modified binders (PMBs) and crumb rubber modified binders for use in both sprayed sealing and asphalt applications.

1.2 This Technical Specification shall be read in conjunction with MRTS01 *Introduction to Technical Specifications*, MRTS50 *Specific Quality System Requirements* and other Technical Specifications as appropriate.

1.3 This Technical Specification forms part of the Transport and Main Roads Specifications Manual.

2 Referenced documents

2.1 The requirements of the referenced documents listed in Table 2.1 below apply to this Technical Specification. Where there are inconsistencies between this Technical Specification and the referenced documents, the requirements in this Technical Specification shall take precedence.

Table 2.1 – Reference documents

Reference	Title
Australian / New Zealand Standards	
AS 2341.18	*Methods of testing bitumen and related roadmaking products: determination of softening point (ring and ball method)*
AS/NZS 2341.4	*Methods of testing bitumen and related roadmaking products: determination of dynamic viscosity by rotational viscometer*
AS/NZS ISO 9001	*Quality Management Systems: Requirements*
Austroads	
AGPT/T108	*Segregation of polymer modified binders*
AGPT/T121	*Shear properties of polymer modified binders (ARRB elastometer)*
AGPT/T125	*Stress ratio of bituminous binders using the Dynamic Shear Rheometer (DSR)*
AGPT/T142	*Rubber content of crumb rubber modified bitumen – Soxhlet method*
AGPT/T143	*Particle size and properties of crumb rubber*
AGPT/T144	*Morphology of crumb rubber – bulk density test*
AGPT04F	*Guide to Pavement Technology Part 4F: Bituminous Binders*
AP-C87-15	*Austroads glossary of terms (2015 edition)*
AP-G41-15	*Bituminous Materials Safety Guide*
ATM-101	*Method of sampling polymer modified binders, polymers and crumb rubber*
ATM-102	*Protocol for handling modified binders in preparation for laboratory testing*
ATM-103	*Mass change or loss on heating of polymer modified binders after rolling thin film oven (RTFO) treatment*
ATM-111	*Handling viscosity of polymer modified binders (Brookfield Thermosel)*
ATM-112	*Flash point of polymer modified binders*
ATM-122	*Torsional recovery of polymer modified binders*
ATM-132	*Compressive limit of polymer modified binders*

Reference	Title
ATS 3110	*Supply of Polymer Modified Binders*
Australian Flexible Pavement Association (AfPA)	
AAPA Advisory Note 7	*Guide to the heating and storage of binders for sprayed sealing and asphalt manufacture*
Transport and Main Roads Technical Documents	
MRTS01	*Introduction to Technical Specifications*
MRTS11	*Sprayed Bituminous Treatment*
MRTS30	*Asphalt Pavements*
MRTS50	*Specific Quality System Requirements*

3 Definitions

3.1 The terms used in this Technical Specification shall be defined in Clause 2 of MRTS01 *Introduction to Technical Specifications*. Additionally terminology relevant to this Technical Specification is defined in Table 3.1 below.

Table 3.1 – Definition of terms

Term	Definition
Batch	The quantity of polymer modified binder stored in a single tank by the manufacturer at any particular time. The binder in the storage tank is deemed to be a new batch whenever new material is added to the storage tank.
Field-produced crumb rubber modified binders	Those binders that are simple blends of bitumen and crumb rubber which are blended close to the application site and are used within a short time frame (in no case more than 2 hours travelling time from the blend site).
Manufacturer	An organisation which has the necessary plant and equipment to manufacture polymer modified binder to this Technical Specification.
Point of delivery	The point in the delivery process where the polymer modified binder is: a) transferred to the sprayer for sprayed sealing work, or b) located in the storage tank at the asphalt plant immediately prior to asphalt production.

The nearest equivalent Austroads PMB class (ATS 3110) to the PMB class defined in MRTS18 (November 2011) is listed in the table below.

Austroads PMB Class (ATS 3110)	PMB Class as per MRTS18 (November 2011)
Sprayed Sealing Application	
S10E	S0.25S
S15E	S0.7S
S20E	–
S25E	S4.5S
S35E	S0.3B
S9R	–
S15R (previously designated S45R)	S1.8R
S9RF	–
S15RF	S15RF
S18RF	S18RF
Asphalt Applications	
A5E	–
A10E	A10S
A15E	A5S
A20E	A0.6S
A35P	A2V

4 Quality system requirements

4.1 The PMB must be manufactured under a quality management system which is certified to AS/NZS ISO9001 by a JAS-ANZ accredited certifier (or accredited by another Accreditation Body Member of the International Accreditation Forum).

4.2 General requirements for Hold Points, Witness Points. Milestones and Records are specified in Clause 5.2 of MRTS01 *Introduction to Technical Specifications.* Hold Points, Witness Points, Milestones and Records specific to this Technical Specification can be found in Appendix A.

Binder quality procedures

4.3 The Contractor shall prepare documented procedures for all required processes as defined in Clause 6 of MRTS50 *Specific Quality System Requirements* and be consistent with the requirements of this Technical Specification and MRTS11 *Sprayed Bituminous Treatments*, and the binder manufacturer's recommendations, as appropriate. These procedures shall be included in the respective asphalt quality plan or construction procedure specified in MRTS30 *Asphalt Pavements* or MRTS11 *Sprayed Bituminous Treatments*, as appropriate.

4.4 For field or plant blended crumb rubber modified binders, the procedures shall address the following specific issues:

- the management of crumb rubber blending, digestion, and storage times and temperatures
- the maximum time / temperature conditions that field produced / plant blended product can be stored and / or transported without loss of properties
- circulation of the product during transportation and storage
- method for achieving a homogeneous product that can be sprayed to achieve a uniform application of binder across the pavement during sealing operations, free of streaking, and
- requirements for spraying plant and spraying practices including adjustments to nozzles (if required).

5 Manufacture and handling of binders

Manufacture

5.1 The manufacturer must implement a documented process control system to produce PMBs of a consistent quality conforming to the requirements of this Technical Specification.

5.2 Polymer modified binders shall be manufactured using the polymer types listed in Table 5.2.

Table 5.2 – Polymer type to be used in binder

Polymer Type	Polymer Modified Binder Class
Styrene-butadiene-styrene (SBS)	S10E, S15E, S20E, S25E, A10E, A15E, A20E
Polybutadiene (PBD)	S35E, A25E
Ethylene vinyl acetate (EVA)	A35P
Crumb rubber (CR)	S9R, S15R, S9RF, S15RF, S18RF

5.3 As a minimum, the process controls must include:

a) a method for determining and controlling the formulation during the production process

b) keeping records of the composition of the constituent materials for each batch, and

c) recording sampling frequencies and test results.

5.4 The manufacturer must:

a) operate an Inspection and Test Plan (ITP) which demonstrates that the PMB complies with this Technical Specification and includes testing of the PMB, analysis of results (including control charts)

b) ensure that all PMB supplied can be traced to the production batch and associated test report, and

c) ensure that procedures / guidelines for the handling, storing, and transport of the binders that ensures homogeneity and conformity at the time of incorporation into the works are readily available to the Administrator and Contractor.

Binder handling

5.5 The handling, storage, transport, heating and transfer of polymer modified binder shall comply with the requirements and practices outlined in the latest versions of the following documents:

a) Austroads – *Bituminous Materials Safety Guide*, AP-G41

b) Austroads – *Guide to Pavement Technology Part 4F: Bituminous Binders*, AGPT04F, and

c) AAPA – *Guide to the Heating and Storage of Binders for Sprayed Sealing and Asphalt Manufacture*, Advisory Note 7.

5.6 Polymer modified binder shall not be heated to temperatures greater than the maximum values listed in the latest version of AAPA Advisory Note 7 – *Guide to the Heating and Storage of Binders for Sprayed Sealing and Asphalt Manufacture* and the binder manufacturer's recommendations. The rate of increase in temperature shall not exceed 15°C per hour.

Binder contamination

5.7 Polymer modified binder shall be heated, stored and transported in purpose-built containers and transferred between containers in such a way that contamination does not occur. The resultant product complies with this Technical Specification and the performance of the product is not adversely affected.

5.8 As necessary, storage and delivery vessels, sprayers and hoses shall be flushed or cleaned with appropriate solvents before transfer of binder has commenced. Residues from flushing and cleaning shall be removed before transfer.

5.9 If contamination of the binder is suspected, additional sampling and testing may be ordered by the Administrator to confirm compliance of the binder with the requirements of this Technical Specification.

Foaming

5.10 Polymer modified binder shall not foam at any time when heated to a temperature of 200°C. The formation of a thin layer of bubbles on the surface of the binder is not regarded as foaming.

6 Sampling and testing of binders

6.1 Representative samples of PMBs must be obtained in accordance with ATM-101. PMB samples must be prepared for testing using ATM-102.

6.2 Binders must be tested in accordance with the Test Methods specified in Tables 8.1(a), 8.1(b) and 8.1(c). Crumb rubber used in the production of crumb rubber binders must be tested in accordance with the Test Methods specified in Table 8.2.

6.3 The minimum frequency of testing must be in accordance with Tables 9.1, 9.6(a) and 9.6(b).

6.4 Sampling must be undertaken by a person who is competent in that sampling procedure. If requested, the Contractor must provide training records demonstrating evidence of that person's competency.

6.5 The manufacturer must nominate in its Quality Management System the tests to be carried out prior to batch release of factory blended binders. At a minimum, this must include the requirements set out in Table 8.1(a) and 8.1(b).

6.6 Further details of test method numbers and test descriptions are given in Clause 4 of MRTS01 *Introduction to Technical Specifications*. Polymer modified binders shall be sampled and tested as follows:

a) prior to release from the manufacturer, and

b) at the point of delivery.

Sampling and testing prior to release from the manufacturer

6.7 The minimum frequency for sampling and testing prior to release from the manufacturer shall be in accordance with Clause 9.

Sampling at the point of delivery

6.8 The Contractor shall take two samples of binder at the point of delivery. Each sample shall contain a minimum of one litre (1 L) of polymer modified binder. The binder sample containers shall be labelled at the time the binder is sampled.

Samples should be securely packed for transport to the testing laboratory and clearly identified by markings on the body of the container. The following information should be shown on the container, or label:

- designation or classification of the binder
- identifying mark
- date and time of sampling, and
- sampling temperature.

Further information required for identification of samples should be supplied on a separate sampling form. The additional information should include the following:

- name of binder supplier
- name of sealing Contractor
- place and date of sampling
- quantity of material represented by the sample
- type, batch number and identifying number of the container or vehicle, from which the sample was taken
- name of sampler
- if the sampling procedure (especially temperature) was contrary to the manufacturer's recommended procedure and/or industry guidelines, and
- project name or number.

6.9 Unless otherwise directed by the Administrator, one sample shall be retained by the Contractor while the other sample shall be forwarded to the Administrator. These samples shall be either tested for conformance or stored for a minimum of 12 months, or for the duration of the project's defect liability / correction period, whichever is greater.

6.10 For asphalt work, the Contractor shall provide a sample for each work shift that is representative of the binder being used to make the asphalt. The sample shall be taken during asphalt production from a binder in-line sampling point or from the binder storage tank immediately prior to the commencement of asphalt production.

6.11 For sprayed sealing work, the samples shall be taken immediately prior to transfer or during each transfer of binder from the tanker / storage tank to the sprayer. **Witness Point 1** Where a single tanker / storage tank load of binder is being transferred multiple times to the sprayer during the same work shift, only one pair of samples need be obtained.

WITNESS POINT 1	
Process Held	Sampling of binder.
Submission Details	Administrator to be notified prior to sampling.

Testing at the point of delivery

6.12 In the event of a test result nonconformance, additional tests shall be performed on the same sample so that the one sample is tested for the following additional properties:

a) consistency 6% at 60°C

b) stress ratio

c) segregation, and

d) viscosity.

6.13 For the purpose of undertaking these tests, reheating of binder samples shall be minimised as much as possible.

7 Records

7.1 The Contractor must ensure that the following records are made available prior to, or with, the delivery of the PMB:

a) Test results, from a NATA accredited laboratory, demonstrating that the PMB has been sampled and tested in accordance with Tables 8.1(a) to 8.1(c) and complies with the properties specified in those tables. **Record**

b) A delivery docket giving at least the following information:

i. name and address of the manufacturer

ii. location and date of manufacture

iii. polymer modified binder class

iv. production batch number

v. storage and heating information (i.e. location, date, time, temperature), and

vi. certification that the PMB has been sampled prior to release from the manufacturer and complies with this Technical Specification. **Record**

7.2 The following additional requirements shall also apply (as relevant):

a) all test results obtained from each manufactured batch shall be included in the relevant construction lot record

b) dates, times, production batch numbers, polymer modified binder classes and volumes of transfers into and out of each container used in the supply chain

c) date, time and amount of any additives (e.g. cutter oil and/or adhesion agent) incorporated into the binder

d) duration of storage, temperature over time, and degree of agitation during any period of storage, and

e) delivery dockets shall be made available for inspection by the Administrator and shall be included in the quality records for each relevant construction lot.

8 Properties of Binders

8.1 PMB properties must comply with the values specified in the following tables:

Sealing Class Binders:	Table 8.1(a)
Asphalt Class Binders:	Table 8.1(b)
Field-Produced Crumb Rubber Modified Binders:	Table 8.1(c)

Table 8.1(a) – Properties of Polymer Modified Binders for Sprayed Sealing Applications

Test method	**Class** / **Binder property**	**S10E**	**S15E**	**S20E**	**S25E**	**S35E**	**S9R(1)**	**S15R(1,6)**
AS/NZS 2341.4 or ATM-111(2)	Viscosity at 165°C (Pa.s) max.(2)	0.55	0.55	0.6	0.9	0.55	1.5	4.5(2)
ATM-122	Torsional recovery at 25°C, 30 s (%) – Point of Manufacture	22-50	32-62	38-70	55-80	16-32	15-45	25-55
ATM-122	Torsional recovery at 25°C, 30 s (%) – Point of Delivery	14-50	20-62	25-70	45-80	15-32	14-45	23-55
AS 2341.18	Softening point (°C) – Point of Manufacture	48-64	55-75	65-95	82-105	48-56	50-60	55-65
AS 2341.18	Softening point (°C) – Point of Delivery	48-64	52-75	59-95	76-105	48-56	48-60	53-65
AGPT/T125	Stress ratio at 10°C min.	TBR(3)	TBR	TBR	TBR	TBR	TBR	TBR
AGPT/T121	Consistency 6% at 60°C (Pa.s) min.(4)	300	400	500	900	250	400	800
AGPT/T121	Stiffness at 15°C (kPa) max.	140	140	NA(5)	NA	180	NA	180
AGPT/T121	Stiffness at 25°C (kPa) max.	NA	NA	35	30	NA	NA	NA
ATM-132	Compressive limit at 70°C, 2 kg (mm) min.	NA	NA	NA	NA	NA	0.1	0.2

Test method	Class / Binder property	S10E	S15E	S20E	S25E	S35E	S9R[(1)]	S15R[(1,6)]
AGPT/T108	Segregation (%) max.	-8 to +8	-8 to +8	-8 to +8	-8 to +8	-8 to +8	-8 to +8	-8 to +8
ATM-112	Flash point (°C) min.	250	250	250	250	250	250	250
ATM-103	Mass Change (%)	-0.6 to +0.6	-0.6 to +0.6	-0.6 to +0.6	-0.6 to +0.6	-0.6 to +0.6	-0.6 to +0.6	-0.6 to +0.6

Notes:

(1) Class S9R and S15R binders must be manufactured by the incorporation of crumb rubber derived from used vehicle tyres.

(2) L series Brookfield is recommended together with spindle SC4-31, except in the case of S9R and S15R classes where spindle SC4-29 is recommended. The shear rate involved in determining viscosity by AS/NZS 2341.4 and ATM-111 must be calculated and recorded. ATM-111 has been retained in Table 8.1(a) to allow laboratories sufficient time to adopt AS/NZS 2341.4.

(3) 'TBR' throughout = to be reported.

(4) Consistency 6% at 60°C of S10E and S35E must be determined using mould B (breakpoint of 5 mm and a test speed of 1.5 mm/s). Other grades must be tested using mould A (breakpoint of 10 mm and a test speed of 1 mm/s).

(5) 'NA' throughout indicates that the property is considered not applicable for that PMB class.

(6) S45R has been renamed to S15R.

Variation of binder properties prior to release from the manufacturer and at the point of delivery

A reduction in torsional recovery and softening point can occur with some binder grades over time due to ageing, particularly for moderately to heavily modified SBS binder grades. Such changes do not have a significant detrimental effect on the performance of the binder and have been accounted for in the lower point of delivery requirements. However, reductions in torsional recovery and softening point caused by other means (such as nonconforming binder properties at the point of release from the manufacturer, contamination or mishandling) can have a detrimental effect on the performance of the binder.

All properties, other than softening point, torsional recovery and consistency 6% at 60°C should not change between the point of manufacture and the point of delivery.

Acceptance of nonconforming binder

For binder that does not conform with the requirements at the point of delivery but has been assessed by the Administrator as being suitable to remain in the Works, the reduction in value of the binder used in sprayed bituminous treatments would typically be determined in accordance with Clause 3.2.2 of MRS11 *Sprayed Bituminous Treatments*. Additionally, the project's defect liability / correction period for sprayed seals and asphalt containing nonconforming binder would typically be extended to a period of at least 24 months after the date of installation, as the performance implications associated with the nonconformance cannot be fully evaluated until it has been subject to a period of sustained hot weather.

Audit testing undertaken by the Administrator

When audit testing is undertaken by the Administrator, samples are typically tested for the following properties:

- softening point
- torsional recovery
- consistency 6% at 60°C, and
- segregation.

Table 8.1(b) – Properties of Polymer Modified Binders for Asphalt Applications

Test method	Class / Binder property	A35P	A20E	A15E	A10E	A5E
AS/NZS 2341.4 or ATM-111(1)	Viscosity at 165°C (Pa.s) max.(1)	1.1	0.6	0.9	1.1	0.9
ATM-122	Torsional recovery at 25°C, 30 s (%) – Point of Manufacture	6-30	38-70	55-80	60-86	25-40
ATM-122	Torsional recovery at 25°C, 30 s (%) – Point of Delivery	6-21	25-70	45-80	49-86	25-40
AS 2341.18	Softening point (°C) – Point of Manufacture	62-74	65-95	82-105	88-110	82-105
AS 2341.18	Softening point (°C) – Point of Delivery	62-74	59-95	76-105	81-110	82-105
AGPT/T125	Stress ratio at 10°C min.	TBR(2)	TBR	TBR	TBR	TBR
AGPT/T121	Consistency 6% at 60 °C (Pa.s) min.(3)	1000	500	900	1000	2500
AGPT/T121	Stiffness at 25°C (kPa) max.	120	35	30	30	NA(4)
AGPT/T121	Stiffness at 25°C (kPa) min.	NA	NA	NA	NA	90
ATM-132	Compressive limit at 70°C, 2 kg (mm) min.	NA	NA	NA	NA	NA
AGPT/T108	Segregation (%) max.	-8 to +8	-8 to +8	-8 to +8	-8 to +8	-8 to +8
ATM-112	Flash point (°C) min.	250	250	250	250	250
ATM-103	Mass Change (%)	-0.6 to +0.6	-0.6 to +0.6	-0.6 to +0.6	-0.6 to +0.6	-0.6 to +0.6

Notes:

(1) L series Brookfield is recommended together with spindle SC4-31. The shear rate involved in determining viscosity by AS/NZS 2341.4 and ATM-111 must be calculated and recorded. ATM-111 has been retained in Table 8.1(b) to allow laboratories sufficient time to adopt AS/NZS 2341.4.

(2) 'TBR' throughout = to be reported.

(3) Consistency 6% at 60°C of all grades must be tested using mould A (breakpoint of 10 mm and a test speed of 1 m/s).

(4) 'NA' throughout indicates that the property is considered not applicable for that PMB class.

Table 8.1(c) – Properties of Field-Produced Crumb Rubber Binders

Property	Method	S9RF[1,2]	S15RF[1,2]	S18RF[1,2]
Nominal rubber concentration (%)		9	15	18
Rubber content by analysis (%) min.	AGPT/T142	7	13	16
Torsional recovery (%) min.	ATM-122	15	25	30
Softening point (°C) min.	AS 2341.18	50	55	62
Consistency 6% at 60°C (Pa.s)[3]	AGPT/T121	Report	Report	Report

Notes:

[1] Specification for two grades of crumb rubber (see Table 8.2) available for either of the sealing classes.

[2] For sealing grade field produced crumb rubber binders, sampling is to be untaken from the mixing vessel after digestion but prior to the addition of cutter oil. Samples must be free of diluents for subsequent testing to be meaningful. The agreed digestion period (at mixing temperature) must be completed before sampling.

[3] Consistency 6% at 60°C of all field produced crumb rubber binder grades must be tested using mould A (breakpoint of 10 mm and a test speed of 1 mm/s).

8.2 Crumb rubber used to the manufacture of crumb rubber binders must be:

a) processed from waste tyres generated in Australia

b) processed by a supplier accredited with Tyre Stewardship Australia or another organisation approved by the Administrator

c) free from cord, wire, fluff and other deleterious material, and

d) meet the properties included in Table 8.2.

Table 8.2 – Properties of Crumb Rubber

Test	Method	Size 16	Size 30
Grading	AGPT/T143		
passing 2.36 mm		100	100
passing 1.18 mm		80 min.	100
passing 600 µm		10 max.	60 min.
passing 300 µm		–	30 max.
Particle length (mm) max.	AGPT/T143	3	3
Bulk density (kg/m³)	AGPT/T144	Report	Report
Water content (%) max.	AGPT/T143	1	1
Foreign materials – metallic iron (%) max.	AGPT/T143	0.1	0.1

9 Frequency of Testing

9.1 The frequency of testing of PMBs and field produced crumb rubber binders must comply with the values specified in the following tables:

Polymer Modified Binders:	Table 9.1
Minimum Testing Frequencies	Table 9.6(a)
Field-Produced Crumb Rubber Modified Binders:	Table 9.6(b)

Table 9.1 – Minimum Frequency of Testing of Polymer Modified Binders

Binder property	Polymer Modified Binders for Sprayed Sealing Applications	Polymer Modified Binders for Asphalt Applications
Viscosity at 165°C (Pa.s)	Each batch	Each batch
Torsional recovery at 25°C, 30 s (%)	Each batch	Each batch
Softening point (°C)	Each batch	Each batch
Stress ratio at 10°C	Monthly	Monthly
Consistency 6% at 60°C (Pa.s)	3-monthly(1)	3-monthly
Stiffness at 15°C (kPa) or Stiffness at 25°C (kPa)	3-monthly(1)	3-monthly
Compressive limit at 70°C, 2 kg (mm)	3-monthly	3-monthly
Segregation (%)	3-monthly	3-monthly
Flash point (°C)	Annually	Annually
Mass change (%)	Annually	Annually

Notes:

(1) For classes S10E, S15E and S20E, the minimum testing frequency is 1-monthly.

9.2 The minimum testing frequencies at the point of delivery are provided in Table 9.6(a) of this Technical Specification.

9.3 Where the Contractor is able to provide suitable, traceable and auditable records to the Administrator that demonstrate the binder has been handled, stored, transported, heated and transferred in accordance with this Technical Specification and the latest version of AAPA Advisory Note 7 – *Guide to the Heating and Storage of Binders for Sprayed Sealing and Asphalt Manufacture*, the frequency of compliance testing for each class of polymer modified binder from each manufacturer shall be at the 'normal frequency'. If the Contractor is unable to demonstrate compliance with the above requirements, an 'increased frequency' shall be adopted.

9.4 A 'normal frequency' shall immediately change to an 'increased frequency' if a nonconforming sample has been detected. The frequency may return to the 'normal frequency' after no nonconformances have occurred in four consecutive compliance testing samples.

9.5 Where the binder has not been stored in accordance with the latest version of AAPA Advisory Note 7 – *Guide to the Heating and Storage of Binders for Sprayed Sealing and Asphalt Manufacture*, the 'increased frequency' shall apply.

9.6 In addition to the requirements of MRTS50 *Specific Quality System Requirements*, and unless otherwise specified or agreed with the Administrator, the extents of conforming and nonconforming works shall be determined based on the midpoint between adjacent binder tests.

Table 9.6(a) – Minimum testing frequencies

Frequency	Normal Frequency	Increased Frequency
Testing of samples required	The first compliance testing sample and then every 10th compliance testing sample thereafter for a particular binder class (that is compliance testing sample 1, 11, 21, etc)	Each compliance testing sample

Table 9.6(b) – Minimum testing frequency for Field-Produced Crumb Rubber Binders

Property	Minimum testing frequency
Rubber content by analysis (%)	Weekly
Torsional recovery (%)	Weekly
Softening point (°C)	Weekly
Consistency 6% at 60°C (Pa.s)	Weekly

Appendix A: Summary of Hold Points, Witness Points, Milestones and Records

General requirements for Hold Points, Witness Points, Milestones and Records, are specified in Clause 5.2 of MRTS01 *Introduction to Technical Specifications*.

The Hold Points, Witness Points, Milestones and Records that the Contractor must submit to the Administrator to demonstrate compliance with this Technical Specification, are summarised in Table A. There are no Hold Points or Milestones defined.

Table A – Hold Points, Witness Points, Milestones and Records

Clause	Hold Point	Witness Point	Milestone	Record
6.11		1. Sampling at the point of delivery		
7.1(a)				Test results
7.1(b)				Delivery docket