

TRANSPORT FOR NSW (TfNSW)

QA SPECIFICATION R107

SPRAYED BITUMINOUS SURFACING (WITH POLYMER MODIFIED BINDER)

NOTICE

This document is a Transport for NSW QA Specification. It has been developed for use with roadworks and bridgeworks contracts let by Transport for NSW or by local councils in NSW. It is not suitable for any other purpose and must not be used for any other purpose or in any other context.

Copyright in this document belongs to Transport for NSW.

REVISION REGISTER

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 1/Rev 1		First issued	GM, CMS	Feb 91
Ed 2/Rev 0		This document has been converted to MS Word 6.0c. Editorial changes, Hold Points redefined. New RTA Forms applied. Specification Number changed from R46 to R107.	GM, RNIC (W Ho)	07.04.97
	1.1	Seal type descriptions changed.		
	1.2	New references included.		
	1.3	New clause on PROJECT QUALITY PLAN		
	2.1	Bitumen requirements changed.		
	2.2	RTA 3268 and 3269 changed from RTA 3262 and 3263		
	2.3, 2.5	New clauses for cutter oil and geotextile		
	3	Extra details to be submitted.		
	5.3	Extent of sweeping defined		
	1.2, 5.5	Added reference to Austroads Bitumen Sealing Safety Guide.		
	5.5, 5.6	Temperature requirements for scrap rubber bitumen		
	5.7	Table R107.1 added.		
	5.8	Primer seal not to be covered for 12 months. Tolerances changed		
	5.8.5	New clause - Geotextile sealing		
	5.11	Aggregate must be precoated		
	6.2	New clause on accepting nonconformances		
	7	New pay items for cutter oil and geotextile		

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 2/Rev 0 (cont'd)	Annexure R107/1 Annexure R107/2	(a) Provision to nominate geotextile. (b) PMB requirements added New minimum frequencies of testing		
Ed 2/Rev 1	1.2 1.3 2.1.1 2.5 3 5.2 5.3 5.7 Table R107.1 5.11 5.11 Annexure R107/1 Annexure R107/2 Annexure R107/3	Polymer Modified Bitumen changed to Polymer Modified Binder Include MBT 31 Additional information to be supplied by the Contractor PMB class/grade must be specified Min mass of geotextile changed Include geotextile details. Include the use of other types of rollers Thermoplastic lines must be masked Use a compatible cutter oil Grades of PMB updated Require to determine the actual aggregate spread rate Additional requirement to sweep and remove loose aggregate The required properties of PMB at the point of delivery has been changed Minimum frequencies of testing for AS 1141.22 and AS 1141.41 has been changed Schedule of Identified Records added	GM, RNIC	31.08.01
Ed 2/Rev 2	1.1 Global 4.5 5.2 5.3 5.5	General sealing requirements Changed description to High Stress Seal (HSS) Removed references to "mechanical" spreaders and sprayers Replaced references to AS1141.12 with RTA T203 Maximum allowable limits for loose aggregates after final sweeping and before opening to traffic Added box spreaders Thermoplastic lines must be masked Modified storage requirements for PMBs	GM, RNIC	03.04.03

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 2/Rev 2 (cont'd)	5.6	Provision added for extra liability period for work at less than 25°C Alternative temperature measurement may be proposed		
	5.7	Table R107.1: Clarified field produced and other PMBs		
	5.8.4	Expanded information		
	5.11	Added information about wet cover aggregates. Expanded rolling instructions. Measure spread rate using T274		
	5.12	WITNESS POINT Final sweeping and loose aggregate measurement prior to opening to the traffic.		
	6.2.2	Removed deductions for consistency		
	6.2.3	Added deductions for deviations from target spray rate Tables R107.4 and R107.5: Deductions for incorrect binder application		
	7	Design target application rate used for aggregate payment		
	Annexure R107/2	Loose aggregate spread rate frequency test of RTA T277 Fractured faces requirement changed for 'drill and blasted' rocks		
	Annexure R107/3	Schedule of Hold and Witness Points		
Annexure R107/4	Supplementary information for maximum loose aggregate particles.			
Annexure R107/5	Added PMB Cutting Practice table based on Austroads report			
Ed 3/Rev 0	Various	Formatting changed "Contractor" replaced by "you" "Superintendent" replaced by "Principal" Grammatical and minor changes.	GM, RNIC	20.09.06
	Foreword	Foreword added Notes on "Revisions" and "Project Specific Changes" moved to the Foreword		
	1.1	Defects liability period replaced by 12 months Surface texture measurement defined		

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 3/Rev 0 (cont'd)	Various	Clauses renumbered (old/new): 1.4 /1.2.4, 2.6,/4.1, 4/5.1, 5.1/4.2, 5.2/6.1, 5.3/5.2, 5.4/3.3, 5.5/6.3, 5.6/6.3, 5.7/6.7, 5.8.1/7.1, 5.8.2/7.2, 5.8.3/7.3, 5.8.4/6.2, 5.8.5/6.5, 5.9/4.4, 5.10/6.5, 5.11/8, 5.12/9, 5.13/5.4, 6/B2.		
	1.2	New clause explaining format. References transferred to Annexure R107/M.		
	1.3	Transferred to Annexure R107/D.		
	1.4	Transferred to transferred to Cl 1.2.4		
	2.1.2	Evidence of conformity and samples of materials required		
	2.1.2, 3.2, 6.2, 6.3, 8, 9, Annex A2, B, M	Minor editorial changes or changed to align with RTA R106		
	2.4.1	Samples of materials required		
	2.4.2	New subclause		
	3.2.3	Hold Point: submit 7 days prior and include planning documents		
	4.1	Sample to AS 2008		
	5.2, Annex A	Mask thermoplastic pavement markings when specified		
	5	Surface monitoring period redefined		
	6.1	Avoid crushing aggregate		
	7	Transferred to Annexure R107/B		
	8	Report spread rates on Form 500E		
	9	Show reporting system in PQP		
	Annexures	Identified with letters		
	Annex B	Sub-pay items to deductions added		
	Annex D	New items in accordance with changes to requirements in R107		
	Annex M	AS 1141.6.1, Test Methods T240 and T271 added		
Ed 3/Rev 1	Annex B	Payment for sprayed bituminous waterproofing membrane, including primer, over concrete bridge decks to be made under pay item in Spec B344 clarified.	GM, IC	24.10.12
	Annex M	Referenced documents updated.		
Ed 3/Rev 2	Global	References to "Roads and Maritime Services" or "RMS" changed to "Transport for NSW" or "TfNSW" respectively.	DCS	22.06.20

GUIDE NOTES

(Not Part of Contract Document)

Using Specification TfNSW R107

Specification TfNSW R107 is a QA Specification and the use of QA Specifications requires the Contractor to implement a quality management system that meets the quality management system requirements specified in TfNSW Q. To comply with the intention of government policy as well as TfNSW R107, sprayed bituminous surfacing works carried out using TfNSW R107 require adequate surveillance and audit by the Principal.

TfNSW R107 requires the TfNSW Project Manager to select appropriate parameters identified in TfNSW R107 and nominate them in Annexure R107/A.

Seals should not be applied over a primed surface unless it has been cured for a period of at least forty-eight hours or such longer period as is necessary for the primer to become completely dry.

Masking should be considered for large thermoplastic pavement markings such as pedestrian crossings prior to application of a sprayed seal or reseal.

For a primersealed surface, a period of at least twelve months must elapse, or the hardness of the primersealed surface measured using Test Method TfNSW T271 must be less than 2.5 mm, before the subsequent seal is applied. Primes and primerseals should be performed in accordance with Specification TfNSW R106 Sprayed Bituminous Surfacing (With Cutback Bitumen). Limits on loose aggregate particles, after final sweeping and prior to the work being opened to the traffic, have been included.

Where Electric Arc Furnace Slag (also known as EAF Slag) aggregate is to be used in a double/double seal, the second application may be delayed for about 14 days.

The aggregate spread rate must be determined using 1 m² mats in accordance with TfNSW Test Method T274 along the length being sealed or by other appropriate means approved by the Principal and in accordance with the Project Quality Plan.

The following document has been developed for use in sprayed sealing works but is not mandated under this Specification:

- TfNSW Form 501E – Conventional SAM and SAMI – Sprayer Loading Slip.

Information on test certificates and test results should be forwarded to Road Pavement & Geotechnical Engineering Section when requested or where important design and performance issues have arisen.



SPRAYED BITUMINOUS SURFACING (WITH POLYMER MODIFIED BINDER)

Copyright – Transport for NSW
IC-QA-R107

VERSION FOR: DATE:

CONTENTS

CLAUSE	PAGE
FOREWORD	III
TfNSW Copyright and Use of this Document.....	iii
Revisions to Previous Version.....	iii
Project Specific Changes	iii
1 GENERAL.....	1
1.1 Scope	1
1.2 Structure of the Specification.....	2
1.3 Definitions	2
2 MATERIALS	3
2.1 Bituminous Materials	3
2.2 Aggregate Precoating Agent and Bitumen Adhesion Agent.....	4
2.3 Oils for Reducing Viscosity of Bitumen.....	4
2.4 Aggregate	4
2.5 Geotextile	4
3 NOMINATED MATERIALS AND DESIGN OF BITUMINOUS SURFACING.....	5
3.1 General	5
3.2 Submission of Nominated Design.....	5
3.3 Review of Nominated Application Rates.....	6
4 PROCESS CONTROL	6
4.1 Sampling and Testing.....	6
4.2 Application of Sprayed Bituminous Surfacing	7
4.3 (Not Used).....	7
4.4 Work Records.....	7
5 CONDITION FOR COMMENCEMENT	7
5.1 Precoating of Aggregate.....	7
5.2 Preparation of Pavement Surface	7
5.3 Pavement Temperature and Weather Conditions.....	8
5.4 Protection of Services and Road Fixtures	8
6 APPLICATION OF SPRAYED BITUMINOUS SURFACING	8
6.1 Plant.....	8
6.2 Operation of the Sprayer	9
6.3 Polymer Modified Binder Temperature Requirements	9
6.4 Geotextile	10
6.5 Traffic Management.....	10
6.6 (Not Used).....	11
6.7 Incorporation of Cutter Oil and Adhesion Agent.....	11
7 APPLICATION OF POLYMER MODIFIED BINDER.....	11
7.1 General	11
7.2 Spraying onto Primed and Primersealed Surfaces	11
7.3 Binder	11
8 APPLICATION AND INCORPORATION OF AGGREGATE	12

9	SWEEPING AND LOOSE AGGREGATE REMOVAL (10 mm AND 14 mm SEALS/RESEALS ONLY)	12
	ANNEXURE R107/A – PROJECT SPECIFIC REQUIREMENTS	14
	A1 Details of Work	14
	ANNEXURE R107/B – MEASUREMENT AND PAYMENT AND RESOLUTION OF NONCONFORMITIES	16
	B1 Measurement and Payment.....	16
	B2 Resolution of Nonconformities	17
	ANNEXURE R107/C – SCHEDULES OF HOLD POINTS, WITNESS POINTS AND IDENTIFIED RECORDS	20
	C1 Schedule of Hold Points	20
	C2 Schedule of Witness Points	20
	C3 Schedule of Identified Records.....	20
	ANNEXURE R107/D – SCHEDULE OF KEY QUALITY PLANNING ACTION POINTS	21
	ANNEXURES R107/E TO R107/K – (NOT USED).....	22
	ANNEXURE R107/L – MINIMUM FREQUENCY OF TESTING	23
	ANNEXURE R107/M – REFERENCED DOCUMENTS.....	25
	LAST PAGE OF THIS DOCUMENT IS	26

FOREWORD

TfNSW COPYRIGHT AND USE OF THIS DOCUMENT

Copyright in this document belongs to Transport for NSW.

When this document forms part of a contract

This document should be read with all the documents forming the Contract.

When this document does not form part of a contract

This copy is not a controlled document. Observe the Notice that appears on the first page of the copy controlled by TfNSW. A full copy of the latest version of the document is available on the TfNSW Internet website: <http://www.rms.nsw.gov.au/business-industry/partners-suppliers/specifications/index.html>

REVISIONS TO PREVIOUS VERSION

This document has been revised from Specification TfNSW R107 Edition 3 Revision 1.

All revisions to the previous version (other than minor editorial and project specific changes) are indicated by a vertical line in the margin as shown here, except when it is a new edition and the text has been extensively rewritten.

PROJECT SPECIFIC CHANGES

Any project specific changes are indicated in the following manner:

- (a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. *Additional Text*.
- (b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. ~~Deleted Text~~.

TfNSW QA SPECIFICATION R107

SPRAYED BITUMINOUS SURFACING (WITH POLYMER MODIFIED BINDER)

1 GENERAL

1.1 SCOPE

Take responsibility for the design, supply of all materials and the application of the following type of sprayed bituminous surfacing as required under the Contract:

Seal or Reseal incorporating polymer modified binders

The scope of this Specification excludes surfacing using emulsion binders and binders that are not polymer modified.

The work to be executed under this Specification includes all of the following:

- (i) Supply and delivery of all materials.
- (ii) Storage and handling of raw materials.
- (iii) Precoating of aggregate.
- (iv) Preparation of pavement surfaces.
- (v) Preparation of bitumen binder.
- (vi) Application of prime, primerbinder and binder.
- (vii) Application and incorporation of aggregate.
- (viii) Removal of loose aggregate.

Polymer modified binder includes, among others, the following types of bitumen:

- (i) SBS modified bitumen;
- (ii) EVA modified bitumen;
- (iii) PBD modified bitumen; and
- (iv) Scrap rubber modified bitumen.

The seal/ reseal must not peel, pluck, strip, flush or bleed and aggregate must not crush during the period of 12 months after Completion. The seal/ reseal must be uniform in colour and texture.

The locations and required types of sprayed bituminous surfacings, including types of binders and aggregate sizes, must be as shown on the Drawings and as detailed in Annexure R107/A.

For multiple application treatments, the binder and aggregate may be required to be laid in one or more separate applications.

Measure Surface Texture, for the purposes of design (refer to Clause 3.1), in accordance with Test Method TfNSW T240. Minimum frequency of testing is shown in Annexure R107/L.

1.2 STRUCTURE OF THE SPECIFICATION

This Specification includes a series of annexures that detail additional requirements.

1.2.1 Project Specific Requirements

Project specific details of work are shown in Annexure R107/A.

1.2.2 Measurement and Payment and Resolution of Nonconformities

The method of measurement and payment is detailed in Annexure R107/B.

Acceptance of materials and work must be in accordance with Annexure R107/B.

1.2.3 Schedules of HOLD POINTS, WITNESS POINTS and Identified Records

The schedules in Annexure R107/C list the **HOLD POINTS** and **WITNESS POINTS** that must be observed. Refer to Specification TfNSW Q for the definitions of **HOLD POINTS** and **WITNESS POINTS**.

The records listed in Annexure R107/C are **Identified Records** for the purposes of TfNSW Q Annexure Q/E.

1.2.4 Planning Documents

The PROJECT QUALITY PLAN must include each of the documents and requirements listed in Annexure R107/D and must be implemented. Where appropriate, use the TfNSW Sprayed Sealing Guide when planning and carrying out work under this Specification. The TfNSW Sprayed Sealing Guide must be regarded as a guide and not a specification.

In all cases where this Specification refers to the manufacturer's recommendations, these must be included in the PROJECT QUALITY PLAN.

1.2.5 Referenced Documents

Unless specified otherwise or is specifically supplied by the Principal, the applicable issue of a referenced document, is the issue current at the date one week before the closing date for tenders, or where no issue is current at that date, the most recent issue.

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 1152). For convenience, the full titles are given in Annexure R107/M.

1.3 DEFINITIONS

The terms "you" and "your" mean "the Contractor" and "the Contractor's" respectively.

For the purpose of this Specification, the following definitions apply:

"Prime": An application of a primer to a prepared base, without cover aggregate, to provide penetration of the surface (preferably from 5 mm to 10 mm), temporary waterproofing and to obtain a bond between the pavement and the subsequent seal or asphalt.

"Primer": A bituminous material of low viscosity and low surface tension used in priming.

“Primerbinder”: A material more viscous than a primer and required to act both as a primer and binder, and used in primersealing.

“Primerseal”: An application of a primerbinder with a cover aggregate to a prepared base to provide penetration of the surface (preferably from 2 mm to 5 mm) and retain a light cover of aggregate.

“Seal”: A thin layer of bituminous material into which aggregate is incorporated.

“Reseal”: A seal applied to an existing sealed, asphalt, timber or concrete surface.

“High Stress Seal or Reseal (HSS)”: Consisting of the application of a polymer modified binder into which aggregate is incorporated to provide a durable wearing surface.

“Strain Alleviating Membrane (SAM)”: Consisting of the application of polymer modified binder into which aggregate is incorporated to provide a durable wearing surface with strain alleviating or other desirable properties.

“Strain Alleviating Membrane Interlayer (SAMI)”: Consisting of the application of polymer modified binder into which aggregate is incorporated. A SAMI is used as an interlayer between an asphalt wearing surface and underlying layers to provide alleviation from tensile strains developed beneath it.

“Geotextile Reinforced Seal (GRS)”: Consisting of applications of C170 tack coat, geotextile and polymer modified binder into which aggregate is incorporated to provide a durable wearing surface with strain alleviating or other desirable properties.

For all other descriptions, definitions in Section 9 of the TfNSW Sprayed Sealing Guide will apply.

2 MATERIALS

2.1 BITUMINOUS MATERIALS

Provide documentary evidence of the binder conformity for each delivery used in the work. Also sample at the point of delivery and provide a representative sample of the delivered binder to the Principal.

2.1.1 Polymer Modified Binder

The binder for seals and reseals must be in accordance with Annexure R107/A1 and must conform to Specification TfNSW 3252.

Torsional recovery and softening point must also conform to the requirements of Annexure R107/A1.2 at the point of delivery.

2.1.2 Binder

Unless specified otherwise in Annexure R107/A1, the binder for use as a tack coat under geotextiles must be Class 170 bitumen and must conform to Specification TfNSW 3253.

Refinery cutback bitumen must conform to Specification TfNSW 3261.

2.1.3 Storage and Handling

Do not heat binder above the manufacturer's written recommendations. Do not use in the Works:

- (a) any bituminous material that has been overheated; or
- (b) binder stored in violation of the temperature and time combinations specified in the manufacturer's written recommendations.

Implement procedures for storage and handling of binder that ensure prevention of segregation and contamination of the binder by flushing liquids or other materials.

2.2 AGGREGATE PRECOATING AGENT AND BITUMEN ADHESION AGENT

Aggregate precoating agents must conform to Specification TfNSW 3268 for the grade of polymer modified binder specified in Annexure R107/A.

Bitumen adhesion agents must conform to Specification TfNSW 3269 for the grade of polymer modified binder specified in Annexure R107/A.

2.3 OILS FOR REDUCING VISCOSITY OF BITUMEN

The oils for reducing the viscosity of bitumen must conform to AS 3568.

2.4 AGGREGATE

2.4.1 Properties

The supply and delivery of aggregate must conform to Specification TfNSW 3151.

Obtain test results for each Lot of aggregate, in accordance with TfNSW 3151, before aggregate from the Lot is incorporated in the Works. If requested, provide a sample to the Principal from the same Lot by riffing or quartering your own samples. The amount of material obtained for each sample must be in accordance with the nominal size of the aggregate as per AS 1141.3.

2.4.2 Stockpiles

Arrange and manage aggregate stockpiles in accordance with the following requirements:

- (a) The maximum Lot size is limited to 250 m³;
- (b) Each stockpile must be located on firm level ground and effectively separated from other stockpiles to prevent cross-contamination and interference with loading and/or precoating operations;
- (c) The quantity and type of each stockpile must be clearly signposted on the stockpile at all times;
- (d) Recovery from stockpiles must be such as to minimise segregation and contamination.

Rectify or replace stockpiles that exhibit visible segregation, contamination or weathering.

2.5 GEOTEXTILE

The geotextile must be a nonwoven needle punched fabric with a minimum melting point of 165°C, minimum mass of 130 g/m² and a minimum bitumen saturation of 0.9 L/m².

3 NOMINATED MATERIALS AND DESIGN OF BITUMINOUS SURFACING

3.1 GENERAL

Carry out the design of bituminous surfacing in accordance with TfNSW Form 395K and submit the design details including all results from texture testing for reseals and ball embedment tests for seals. Design application rates are the “nominated application rates” and materials used for the design are the “nominated materials”.

3.2 SUBMISSION OF NOMINATED DESIGN

Submit to the Principal the nominated design together with certification for the nominated materials at least seven days prior to the commencement of sprayed bituminous surfacing works.

Include the following details in the submission:

- (a) Each constituent material;
- (b) Verification of conformity of the nominated materials;
- (c) Endorsement.

3.2.1 Each Constituent Material

Include the following details in the submission:

- (a) Test results for all nominated materials, including stripping and initial adhesion for the combination of nominated materials;
- (b) Aggregates - source, geological type, particle size distribution, nominated average least dimension (ALD);
- (c) Precoating agent and bitumen adhesion agent - types and proportions;
- (d) Polymer Modified Binder - type, grade, supplier and manufacturer’s recommendations;
- (e) Cutter Oil - source and type;
- (f) Bitumen for geotextile tack coat (if applicable) - refinery source; and
- (g) Geotextile - source, type and properties.

If you propose to change the source of supply of any constituent material or to vary the Polymer Modified Binder formulation, submit a new nominated design and details of the change to constituent material.

3.2.2 Verification of Conformity of the Nominated Materials

- (a) Submit test results to verify conformity to Clauses 2 and 3 of each constituent material proposed for the use in the Contract, including stripping and initial adhesion for the combination of nominated materials.
- (b) Carry out the sampling and testing of a nominated material within the six months period prior to the date of submission to the Principal. Perform all phases of any particular test at one laboratory.

3.2.3 Endorsement

Submit a statement signed by you stating that each design and its constituent materials meet the requirements of Clauses 2 and 3. The statement must include NATA endorsed test results for all specified tests. Attach a copy of your completed verification checklist.

HOLD POINT

Process Held:	Sealing operation using the proposed design.
Submission Details:	Documents referred to in Clause 1.2.4 and the proposed bituminous surfacing design together with certification for the nominated materials and design verification documentation at least seven days prior to the commencement of sprayed bituminous surfacing work.
Release of Hold Point:	The Principal will consider the submitted documents prior to authorising the release of the Hold Point.

3.3 REVIEW OF NOMINATED APPLICATION RATES

Select the locations where each Lot of aggregate is to be incorporated in the Works.

Review the bituminous surfacing design at each location based on the actual ALD test result for the actual aggregate to be used instead of the ALD value of the nominated aggregate and using TfNSW Form 395K. The revised application rates are "target application rates".

HOLD POINT

Process Held:	Sprayed sealing work for each work location.
Submission Details:	Aggregate Lot details and target application rates.
Release of Hold Point:	The Principal will consider the submitted documents prior to authorising the release of the Hold Point.

4 PROCESS CONTROL

4.1 SAMPLING AND TESTING

Carry out sampling and testing of materials in accordance with the relevant material specifications in Clause 2 and AS 2008. Testing must comply with Annexure R107/L. Nominate in the PROJECT QUALITY PLAN the proposed testing frequency, which must not be less than that specified in Annexure R107/L. Where a minimum frequency is not specified, nominate an appropriate frequency.

The Principal may conditionally agree to your proposal to reduce the specified minimum frequency of testing. The proposal must be supported by a statistical analysis verifying consistent process capability and product characteristics. The Principal may vary or restore the specified minimum frequency of testing, either selectively or permanently, at any time.

4.2 APPLICATION OF SPRAYED BITUMINOUS SURFACING

Carry out sprayed bituminous surfacing so as to:

- (a) provide a uniform application of binder with adequate adhesion to the underlying surface;
- (b) provide a complete cover of interlocking aggregate particles; and
- (c) achieve effective bond between binder and aggregate.

Include in the PROJECT QUALITY PLAN details of the plant and equipment and methods to be used for sprayed bituminous surfacing and the spraying and storing temperatures recommended by the manufacturer of the polymer modified binder.

4.3 (NOT USED)

4.4 WORK RECORDS

Record the particulars of the work performed on TfNSW Form 500E. Details of binder and aggregate applied must be recorded immediately after every sprayer run. Each form must be signed by your representative as a true record of the work performed. Supply the Principal with a copy of each completed form.

5 CONDITION FOR COMMENCEMENT

5.1 PRECOATING OF AGGREGATE

Apply the aggregate precoating agent to the aggregate in a manner and at a rate and time that provides a complete, light, uniform, effective cover of all aggregate particles at the time of spreading.

Do not carry out precoating of aggregate when rain is imminent. If aggregate has been precoated and rain appears imminent, adequately cover the aggregate to prevent the precoating material being washed from the aggregate particles.

Take precautions, such as covering stockpiles, to prevent settlement of dust, penetration of moisture or drying out of the precoating agent on the stockpiled aggregate. Include in the PROJECT QUALITY PLAN details of the precautions to be taken to protect aggregates.

5.2 PREPARATION OF PAVEMENT SURFACE

Before the application of binder, sweep the pavement surface by the use of a rotary road broom or suction broom to provide a uniformly clean surface. If necessary, carry out additional sweeping by hand, using stiff bass or similar brooms. Sweeping must extend at least 300 mm beyond each edge of the area to be sprayed.

Where sealing work is carried out on localised areas and/or half pavement widths, remove remaining loose material from the pavement surface immediately adjacent to the swept areas. Include in the PROJECT QUALITY PLAN details of the arrangements for the removal of loose foreign materials.

Remove adherent patches of foreign material from the surface of the pavement. Mask or remove raised pavement markers. Mask large thermoplastic pavement markings if indicated in Annexure R107/A.

5.3 PAVEMENT TEMPERATURE AND WEATHER CONDITIONS

Measure and record pavement temperatures at regular intervals during the course of work. For this purpose, place a spirit or mercury-in-glass thermometer or other suitable type of thermometer in direct contact with the pavement and allow it to remain in position until the reading becomes steady. Other certifiable means of temperature measurement may be used subject to the approval of the Principal. When a spirit or mercury-in-glass thermometer is used to measure pavement temperature, cover the bulb of the thermometer from direct sunlight with a small heap of grit or similar material.

If the pavement is partly in sun and partly in shade, take and record the temperatures for both conditions.

Undertake spraying of polymer modified binders only if the pavement temperature has been at or above 20oC for at least one hour before commencement of spraying and does not fall below the specified minimum pavement temperature for spraying during the period of spraying.

If sprayed bituminous surfacing work is proposed using polymer modified binders containing other than scrap rubber and when spraying at pavement temperatures between 20oC and 25oC, include in the PROJECT QUALITY PLAN details of the monitoring to be carried out of the surface for a period of 12 months after Completion and if defects occur, the method of rectification (at no additional cost to the Principal).

Do not spray wet pavement or when rain appears imminent or during strong winds or dust storms.

5.4 PROTECTION OF SERVICES AND ROAD FIXTURES

Take all necessary precautions to prevent binder, aggregate or other material used on the work from entering or adhering to gratings, hydrants or valve boxes, manhole covers, bridge or culvert decks and other road fixtures.

Immediately after aggregate has been spread over the binder, clean off or remove any sprayed surfacing material and leave the services and road fixtures in a condition equivalent to that existing when you commenced the sprayed surfacing work.

6 APPLICATION OF SPRAYED BITUMINOUS SURFACING

6.1 PLANT

Apply the binder by using a sprayer. The sprayer must have a current Sprayer Certificate (TfNSW Form 354) issued or accepted by Transport for NSW.

The spray nozzles must be of the make and type endorsed on the Sprayer Certificate. Any nozzles that are damaged or become unduly worn or defective must be replaced by new nozzles of the same type and size. A sufficient number of nozzles for this purpose must be available at all times.

Spreading equipment (including box spreaders) must be used to spread aggregate and must be capable of achieving a uniform spreading rate.

Rollers must be in accordance with Clause 8. Use of other types of rollers will be considered subject to you demonstrating by way of an onsite trial that the proposed roller can effectively embed the aggregate into the binder while achieving mechanical interlock between the aggregate without

breaking down/crushing the aggregate with the combinations of the relevant materials to be used and actual pavement conditions.

Remove from the work any plant or equipment not fully operational or not in a satisfactory condition for carrying out work in accordance with this Specification.

6.2 OPERATION OF THE SPRAYER

The type of spray nozzles to be used on the spray bar of the sprayer must be compatible with the nature of the binder to be sprayed and its application rate.

Where the longitudinal edges of spray runs are not required to overlap, either special type end nozzles or intermediate nozzles set with a jig as end nozzles may be used. Where an overlap is required, the overlap of spray between adjacent longitudinal runs must be about 50 mm for special type end nozzles or intermediate nozzles set with a jig. If intermediate nozzles are to be used to overlap adjacent longitudinal sprays, set the nozzles in the normal manner for intermediate nozzles and the overlap must be 300 mm.

Each run of the sprayer must commence on a protective strip of heavy paper weighing not less than 120 grams per square metre laid across and held securely to the pavement surface before spraying commences. The sprayer must commence moving at a sufficient distance in advance of the protective strip to ensure that the road speed for correct application is attained at the commencement of spraying.

The sprayer must maintain a constant road speed throughout the length of each sprayer run.

Terminate each spraying run on a protective strip of paper laid across and held securely to the pavement surface beforehand spraying commences. The width of paper at the commencement and/or termination of each run must not be less than that endorsed on the Sprayer Certificate.

Cease spraying immediately when any defect develops in the spraying equipment and do not recommence spraying until the fault has been rectified.

Where any blockage or partial blockage of nozzles occurs, cease spraying immediately. If the blockage is due to the condition of the binder being sprayed, do not use that load together with any binder from the same bulk tanker or supply unit.

The specified tolerance for spraying of polymer modified binders is $\pm 10\%$ where the PMB contains scrap rubber and $\pm 5\%$ otherwise. Areas sprayed outside these tolerances constitute a 'Nonconformity' under the Contract.

Where a sprayer is not able to satisfactorily spray small areas or areas of irregular shape, spray such areas by means of the hand spray equipment attached to the sprayer.

After each sprayer run, check the quantity of binder sprayed against the area covered and make any necessary adjustments to ensure that the target application rate is achieved in subsequent runs. If the actual application rate of binder for each of three consecutive runs differs by more than the specified tolerance from the target application rate, do not use the sprayer until a new Sprayer Certificate has been obtained.

6.3 POLYMER MODIFIED BINDER TEMPERATURE REQUIREMENTS

Measure and record the temperature of the polymer modified binder using a thermometer or other suitable means, accurate to within 2.5% over the range 100°-240°C.

If the temperature of the binder is below the minimum temperature recommended by the manufacturer of the polymer modified binder, the binder may be heated providing safe heating practices are adopted. Do not use burners unless the level of the material in the heating tank is at least 250 mm above the tops of the heating tubes. Comply with the Rural Fires Act, 1997 and the Local Government Act 1993.

Place two or more suitable fully-charged pressurised chemical fire extinguishers conveniently to the heaters at all times while heating is in progress. Refer to the Austroads Bitumen Sealing Safety Guide.

During heating, the temperature of the binder must not exceed the maximum temperature recommended by the manufacturer of the polymer modified binder. Check the temperature of the binder just above the heating tubes at regular intervals to ensure that there is no local overheating.

Do not use any binder that has been overheated in the work.

If polymer modified binder cannot be sprayed due to wet weather, sprayer breakdown or other reason, and no cutter oil or bitumen adhesion agent has been added, it may be stored at the manufacturer's recommended storage temperatures for up to three days.

Notwithstanding the storage period, the binder must conform to TfNSW 3252. Include in the PROJECT QUALITY PLAN the method of verifying the properties of the binder after storage.

6.4 GEOTEXTILE

Apply geotextile fabric where nominated in Annexure R107/A1 or as directed. Fix the fabric to the pavement smoothly and without wrinkles using a tack coat of up to 0.6 L/m² (cold) of Class 170 bitumen conforming to TfNSW 3253.

Joins in geotextile fabric must have 200 mm minimum overlaps. Joining fabric in the longitudinal direction under wheel paths must be minimised. Add the difference in binder content between the rate used in the tack coat and the bitumen saturation of the fabric to the seal design application rate for inclusion in the target application rate. Where applicable, make an additional binder allowance for the existing surface texture.

6.5 TRAFFIC MANAGEMENT

Provide for traffic in accordance with the requirements of Specification TfNSW G10 while undertaking the work and take all necessary precautions to protect the work from damage until such time as the new seal coat has developed sufficient strength to carry normal traffic without disturbance of the aggregate. Where early use of the new seal is needed to facilitate the movement of traffic, vehicles may be allowed to run on the work after initial rolling has taken place provided that vehicles are controlled to such slow speeds that no displacement of aggregate occurs. Where necessary, use escort vehicles to ensure that traffic travels at an acceptable speed.

Take all necessary steps to avoid or minimise delays and inconvenience to road users during the course of the work. Where adequate detours or side tracks are included in the Contract or are otherwise available, temporarily divert traffic while the work is in progress.

If facilities for the diversion of traffic are not available, spray part width of the pavement in the one operation and make available to traffic the adjacent strip of roadway, except during the actual spraying operation when all traffic movement through the work must cease. Traffic must not be

permitted to encroach upon the edge of the sprayed bituminous material until such time as it is covered with aggregate.

6.6 (NOT USED)

6.7 INCORPORATION OF CUTTER OIL AND ADHESION AGENT

Where bitumen adhesion agent, cutter oil or flux oil is to be included, add it to the polymer modified binder in the sprayer and circulate the mixture at a rate of at least 700 litres per minute for fifteen minutes before spraying.

Cut back polymer modified binders with a compatible cutter oil. Refer to TfNSW Sprayed Sealing Guide and Austroads Work Tip No 27 for guidelines on cutting practice.

Refer to the Austroads Bitumen Sealing Safety Guide for guidance on safe handling procedures.

7 APPLICATION OF POLYMER MODIFIED BINDER

7.1 GENERAL

Limit the area to be sprayed to the area that can be covered with aggregate at the target application rate and rolled initially within five minutes of spraying polymer modified binder.

7.2 SPRAYING ONTO PRIMED AND PRIMERSEALED SURFACES

Do not spray polymer modified binder over a prime until at least 48 hours after spraying the primer or such longer period as required for the primer to become completely dry.

Do not spray polymer modified binder over a primerseal until at least twelve months after spraying the primerbinder unless the hardness of the primerseal measured using Test Method TfNSW T271 is less than 2.5 mm.

7.3 BINDER

The type of polymer modified binder must be as specified in Annexure R107/A1.

Base nominated and target application rates and quantities of polymer modified binder on the volumes of polymer modified binder measured at a temperature of 15°C and do not include any bitumen adhesion agent or added oils.

Where bitumen adhesion agent and/or cutter oil has been added to the polymer modified binder, adjust the application rate of the total binder at 15°C to allow for the quantity of additives in the mixture.

Determine the hot application rate of total polymer modified binder, including bitumen adhesion agent and cutter oil, using the appropriate multiplier from TfNSW Form 500E.

8 APPLICATION AND INCORPORATION OF AGGREGATE

Use only pre-coated aggregate.

The application of aggregate must proceed after spraying is commenced and must be completed and rolled initially within five minutes of spraying the binder.

Do not use aggregate containing surface moisture or free surface water.

Apply the aggregate of the specified nominal size and at the target aggregate application rate. The method to determine the actual aggregate spread rate must conform to Test Method TfNSW T274 or a method approved by the Principal and must be detailed in the PROJECT QUALITY PLAN. Report the aggregate spread rate as actual rate using TfNSW Form 500E. Sufficient loaded and measured trucks of dry aggregate must be at the site to provide full cover for the area sprayed.

Spread the aggregate uniformly over the sprayed surface by means of suitable spreading equipment (including box spreaders). Payment is at the target application rate.

Any bare or insufficiently covered areas must be re-run by the spreader or covered by hand as necessary to give a uniform coverage at the target application rate. After the aggregate has been applied to each section of the work, carry out initial rolling with two or more dual axle smooth pneumatic tyred multi-wheel rollers of minimum load of one tonne per tyre and minimum tyre pressure of 550 kPa. Continue initial rolling until the aggregate is firmly embedded in the binder.

Roll the cover aggregate with pneumatic tyred multi-wheel rollers at not less than eight passes within one hour of spraying at every point on the surface. There must be sufficient rollers on site and in use to complete the specified minimum amount of rolling as a continuous operation with successive spray runs.

If the aggregate is not evenly distributed over the surface of the pavement, traverse the surface with a light drag broom after the initial rolling. If the broom has any tendency to dislodge aggregate particles bedded in the primer/binder or binder, defer or eliminate the drag brooming. Substitute light hand brooming where drag brooming is eliminated.

When the aggregate has been evenly spread and embedded in the binder, remove any remaining loose particles of aggregate from the pavement. Include in the PROJECT QUALITY PLAN details of the method and timing of removal of loose aggregate and traffic control to protect persons and property.

9 SWEEPING AND LOOSE AGGREGATE REMOVAL (10 mm AND 14 mm SEALS/RESEALS ONLY)

After final sweeping and prior to the work being opened to traffic at the pre-existing signposted speed, the number of loose aggregate particles (per m²), not including aggregate particles from scatter coat, determined in accordance with Test Method TfNSW T277 must not exceed the values shown in Annexure R107/A. The test location must be representative of the section and as agreed by the Principal. Include in the PROJECT QUALITY PLAN the reporting system to be used to record test results of loose aggregate after final brooming. If values are not specified in Annexure R107/A, the values shown in Table R107.2 apply.

Areas where speed limits exceed 60 km/h and that are opened to traffic prior to final sweeping must have temporary speed zone 'loose stones' and 'slippery' warning signs and temporary 60 km/h speed zoning in place until the maximum allowable loose aggregate requirement is met.

Table R107.1 – Maximum Allowable Loose Aggregate Particles

Urban areas	20 particles/m ²
Other medium to high traffic (>250 v/l/d)	30 particles/m ²
Low traffic (\leq 250 v/l/d)	40 particles/m ²

WITNESS POINT

Process Witnessed: Final sweeping and loose aggregate measurement prior to opening to traffic.

Submission Details: Notification of the time and location prior to commencement.

ANNEXURE R107/A – PROJECT SPECIFIC REQUIREMENTS

NOTES TO TENDER DOCUMENTER: (Delete this boxed text after customising Annexure R107/A)

Complete the tables below by filling in the required details.

Where “Yes / No” option is shown below, delete whichever is not applicable.

A1 DETAILS OF WORK**A1.1 Clauses 1.1, 2.1.1, 2.1.2, 2.2, 6.5: Locations and Types of Surfacings**

Section		Geotextile	Binder	Aggregate Nominal Size
From	To		Grade/Class	

Clause	Description	Requirement
5.2	Masking of thermoplastic pavement markings required	Yes / No
9	Maximum Allowable Loose Aggregate Particles	
	Nominal Aggregate Size	_____ mm
	Maximum Loose Aggregate after final sweeping	_____ / m ²
	Nominal Aggregate Size	_____ mm
	Maximum Loose Aggregate after final sweeping	_____ / m ²

A1.2 Clause 2.1.1: Properties of Polymer Modified Binder**Table R107/A.1 – Properties of Polymer Modified Binder at the point of delivery**

Property	Test Method	Type of Binder				
		S20E	S25E	S35E	S45R	S55R
Softening Point (minimum) (°C)	MBT 31	65	80	48	55	62
Torsional Recovery at 25°C (minimum) (%)	MBT 22	50	52	16	25	30

ANNEXURE R107/B – MEASUREMENT AND PAYMENT AND RESOLUTION OF NONCONFORMITIES

B1 MEASUREMENT AND PAYMENT

Payment will be made for all costs associated with completing the work detailed in this Specification in accordance with the following Pay Items.

Payment for work associated with the sprayed bituminous waterproofing membrane, including primer, over concrete bridge decks, will be made under the pay item in Specification TfNSW B344.

Where no specific pay items are provided for a particular item of work, the costs associated with that item of work are deemed to be included in the rates and prices generally for the Work Under the Contract.

Unless specified otherwise, a lump sum price for any of these items will not be accepted.

Work measured and paid under the following Pay Items must not be included in the measurement under Pay Items specified in TfNSW R106.

Pay Item R107P1 - Supply and Spray Polymer Modified Binder (including Adhesion Agent where required and Preparation of Surface)

The unit of measurement is the litre of polymer modified binder at 15°C.

The quantities (in litres) must be determined by multiplying the target application rate of polymer modified binder at 15°C by the area of road surface sprayed for each sprayer run (in square metres).

A separate unit rate must be given for each grade of polymer modified binder specified.

Pay Item R107P2 - Supply, Incorporate and Spray Cutter Oil in Binder

The unit of measurement is the cold litre.

The quantities (in cold litres) must be determined from the target percentage of cutter oil added in the field to produce the binder for each sprayer run.

Pay Item R107P3 - Supply and Spray Binder - Class 170 Bitumen (including Adhesion Agent where required and Preparation of Surface)

Bitumen used is for the tack coat under specified geotextile.

The unit of measurement is the litre of Class 170 bitumen at 15°C.

The quantities (in litres) must be determined by multiplying the target application rate of Class 170 bitumen at 15°C (in litres per square metre) by the area of road surface sprayed for each sprayer run (in square metres).

Pay Item R107P4 - Supply, Precoat, Apply and Incorporate Aggregate

R107P4.1 5 mm Aggregate (precoated)

R107P4.2 7 mm Aggregate (precoated)

R107P4.3 10 mm Aggregate (precoated)

R107P4.4 14 mm Aggregate (precoated)

The unit of measurement is the cubic metre.

The quantity of aggregate (in cubic metres) must be determined by dividing the area of road surface to be covered for each sprayer run (in square metres) by the target application rate (in square metres per cubic metre).

Aggregate application rate is paid at the design target rate and any additional aggregate applied is at no cost to the Principal.

A separate unit rate must be given for each nominal size of aggregate precoated as specified.

Pay Item R107P5 - Supply and Incorporate Geotextile

The unit of measurement is the square metre. Measurement must exclude laps.

Payment excludes supply and incorporation of binder and aggregate.

Pay Item R107P6 - Deductions in accordance with Annexure R107/B2

R107P6.1 Bitumen

R107P6.2 Polymer Modified Binder

Deductions must be made on the target application rate and must not be subject to adjustment for rise and fall in costs.

B2 RESOLUTION OF NONCONFORMITIES

B2.1 General

If the nonconformity is not acceptable in accordance with Annexure R107/B2, the nonconforming material must be replaced or the nonconforming section of sprayed bituminous surfacing work must be either replaced or corrected.

The cost of rectifying nonconformities, including any restoration work to any underlying or adjacent surface or structure, which becomes necessary as a result of such replacement or correction, must be borne by you. Replace materials removed from the site by you with materials that conform to this Specification.

B2.2 Acceptance of Nonconformities

Nonconformities may be accepted by the Principal subject to deductions to the schedule rate, as specified hereunder, applied to the quantity of material represented by the failed sample.

B2.2.1 Class 170 Bitumen Tack Coat for Geotextile Sealing

In the case of Class 170 bitumen tack coat having a viscosity at 60°C within the specified limits but having any other property outside the limits specified in Specification TfNSW 3253, a deduction of 2% of the schedule rate for the supply and spraying of bitumen tack coat applies.

In the case of Class 170 bitumen tack coat having a viscosity at 60°C outside the limits specified in TfNSW 3253, the deductions shown in Table R107/B.1 apply.

Table R107/B.1 - Class 170 Bitumen Tack Coat - Deduction for Actual Viscosity at 60°C

Actual Viscosity at 60°C (Pa.s)	Deduction (% of Schedule Rate)	Actual Viscosity at 60°C (Pa.s)	Deduction (% of Schedule Rate)
Under 120	50	201 – 210	2
120 – 124	25	211 – 220	5
125 – 129	10	221 – 230	10
130 – 134	5	231 – 240	25
135 – 139	2	Over 240	50
140 – 200	Nil		

Calculate viscosity to the nearest whole number.

B2.2.2 Polymer Modified Binder

In the case of polymer modified binder having a viscosity at 60°C within the specified limits but having any property outside the range specified by TfNSW 3252, a deduction of 5 percent of the schedule rate for the supply and spraying of polymer modified binder applies.

In the case of polymer modified binder having a Torsional Recovery outside the range specified by TfNSW 3252, a deduction in the schedule rate for the supply and spraying of polymer modified binder applies as follows:

For Torsional Recovery:

1 to 3% points lower than specified	-	2% deduction
4 to 6% points lower than specified	-	10% deduction
over 6% points lower than specified	-	20% deduction

Where the Torsional Recovery is nonconforming, the appropriate higher deduction must apply. If any other property is nonconforming, the Principal may accept the work subject to a deduction of 5% of the schedule rate for the supply and spraying of polymer modified binder.

The above deductions are all cumulative. If the total of the calculated deductions exceeds 25 %, remove and replace the work.

B2.2.3 Sprayed Binder

The deductions shown in Table R107/B.2 apply where the amount of actual binder sprayed (not containing scrap rubber) differs from the target spray rate by more than 5%.

Table R107/B.2 - Deduction for Sprayed Binder (Not Containing Scrap Rubber)

Difference from Target Spray Rate (%)	Deduction (% of value)
±6	4
±7	8
±8	12
±9	16
±10	20

The deductions shown in Table R107/B.3 apply where the amount of actual binder sprayed (containing scrap rubber) differs from the target spray rate by more than 10%.

Table R107/B.3 - Deduction for Sprayed Binder (Containing Scrap Rubber)

Difference from Target Spray Rate (%)	Deduction (% of value)
±12	4
±14	8
±16	12
±18	16
±20	20

ANNEXURE R107/C – SCHEDULES OF HOLD POINTS, WITNESS POINTS AND IDENTIFIED RECORDS

Refer to Clause 1.2.3.

C1 SCHEDULE OF HOLD POINTS

Clause	Description
3.2.3	Submission of planning documents and the details for nominated materials and sprayed surfacing design.
3.3	Submission of details for target application rates for each work location.

C2 SCHEDULE OF WITNESS POINTS

Clause	Description
9	Final sweeping and loose aggregate measurement prior to opening to traffic.

C3 SCHEDULE OF IDENTIFIED RECORDS

The records listed below are Identified Records for the purposes of TfNSW Q Annexure Q/E.

Clause	Description of Identified Record
3.2	Proposed bituminous surfacing design together with certification for the nominated materials and design verification documentation
3.3	Aggregate Lot details and target application rates
4.4	Copy of completed forms showing details of binder and aggregate applied for every sprayer run, signed by your representative as a true record of the work performed.

ANNEXURE R107/D – SCHEDULE OF KEY QUALITY PLANNING ACTION POINTS

Key Points to be shown in the Inspection and Test Plan/Checklists and implemented, and also additional requirements which are to be included in your quality planning documents:

H = Hold Point Release

I = Inspection Point

J = Joint Inspection Point

M = Measurement Point for payment

N = Notice to Principal

T = Test Point

R = Additional requirements to be shown in the PROJECT QUALITY PLAN

W = Witness Point

Clause	Description	Action Point (ISO 9001)
TfNSW Q	Quality management system fully complying and functional	R
1.2	List of all documents to be held on site	I
	Materials:	
2	Proposed materials properties conforming to Specification	I, T
2	Risks to consistent supply quality identified, discussed with subcontractor/Supplier, addressed and documented	T
1.2.4	Manufacturer's written recommendations attached to PROJECT QUALITY PLAN	R
	Procedures and ITP's for:	
	Management and traceability of each materials Lot to its incorporation into bituminous surfacing	R
	On-going verification of materials conformity	R
	Assessment and audit of subcontractor/Supplier quality management systems	R
	Design:	
3.3	Full design details submitted to Principal in agreed format	R
3.2	Constituent proportions established and conforming	R
3.3	Submission of planning documents and nominated design together with certification for the nominated materials at least 7 days prior to the commencement of sprayed bituminous surfacing work	N
3.3	Hold Point on submitted nominated design has been released before work proceed	I, H
3.4	Submission of aggregate Lot details and target application rates	N
3.4	Hold Point on aggregate Lot details and target application rates released before work proceeds	I, H
	Process Control:	
2.1.2	Manufacturer's written recommendations for temperatures of binder attached to PROJECT QUALITY PLAN	R
Annexure R107/L	Minimum frequency of testing included in PROJECT QUALITY PLAN	R

Clause	Description	Action Point (ISO 9001)
6.3	Verification of binder properties after storage	R
6.6	Process temperature conforming	R
9	Reporting system for recording test results of loose aggregate after final brooming.	R
9	Final sweeping and loose aggregate measurement prior to opening to the traffic	W
1.2.4	Procedures and ITP's for:	
	Management and traceability of each Lot to its incorporation into the pavement	R
	Calibration and NATA certification of laboratory equipment and procedures	R, T
	Submission of test results including timeframe constraints	R
	Management of stockpiles	R, I
	Handling, storage and transporting of binder	R
	Calibration of sprayer and precoating equipment	R, T
	Spraying small areas or areas of irregular shape	R
	Joints	R
	Calibration of thermometers	R, T
	Details of work performed must be recorded in the appropriate TfNSW Forms	R
	Procedure for precoating of aggregate	R
	Preparation of pavement surface	R
	Preparation of bitumen binder	R, T
	Spraying of bituminous surfacing	R, I
	Protection of services and road fixtures	R
	Removal of loose aggregate	R, T
	End Product Criteria:	
	Procedure and ITP's for	
	Aggregate spread rate	R, T
	Binder sprayed rate	R, T
	Loose aggregate	R, T
	Surface texture	R

ANNEXURES R107/E TO R107/K – (NOT USED)

ANNEXURE R107/L – MINIMUM FREQUENCY OF TESTING

Clause	Characteristic Analysed	Test Method	Minimum Frequency of Testing
1.1	Surface Texture	TfNSW T240	Five measurements every 250 m and at changes in aggregate size or heavy patches (shoulder, wheelpaths, between wheelpaths and centre line) per lane of sprayed bituminous surfacing work ⁽¹⁾
At Point of Manufacture or Delivery			
2.1	Physical Properties of Polymer Modified Binder	MBT 11 MBT 22 MBT 23 MBT 27 TfNSW T511 TfNSW T741 TfNSW T742 AS 2341	As set out in TfNSW 3252 Table 3252.2
At Point of Delivery			
2.2	Resistance to Stripping	TfNSW T230	As set out in TfNSW 3269
2.2	Initial Adhesion	TfNSW T238	As set out in TfNSW 3268
2.4	Aggregate Properties	TfNSW T203 TfNSW T230 TfNSW T238 TfNSW T239 AS 1141.11 AS 1141.6.1 AS 1141.14 AS 1141.20.1 AS 1141.20.2 AS 1141.22 AS 1141.41	1 per 250 m ³ of aggregate ⁽¹⁾ 1 per 6 months and at change of quarry face 1 per 6 months and at change of quarry face 1 per 250 m ³ of aggregate ^(1,3) 1 per 250 m ³ of aggregate ⁽¹⁾ 1 per 6 months and at change of quarry face 1 per 250 m ³ of aggregate ⁽¹⁾ 1 per 250 m ³ of aggregate ⁽¹⁾ 1 per 250 m ³ of aggregate ⁽¹⁾ 1 per 500 m ³ of aggregate ^(1,2) 1 per 6 months and at change of quarry face
8	Measurement of Aggregate Spread Rate	TfNSW T274	2 per day
9	Measurement of Loose Aggregate on Sprayed Seals	TfNSW T277	1 per 500 m lane length or part thereof

Notes:

- (1) Frequency of testing may be reduced in accordance with TfNSW Q subject to the Principal's agreement.
- (2) Provided that all of the six previous tests have met specification requirements for both wet strength and wet/dry strength variation then the following reduced frequencies apply:
 - where all wet/dry variation results < 25% : 1 per 6,500 m³
 - where all wet/dry variation results < 30% : 1 per 2,500 m³
 - where all wet/dry variation results < 35% : 1 per 1,250 m³
- (3) Aggregate sourced from 'drill and blast' quarries may be exempted providing that all other tests have met Specification requirements.

ANNEXURE R107/M – REFERENCED DOCUMENTS

Refer to Clause 1.2.5.

TfNSW Specifications

TfNSW G10	Traffic Management
TfNSW Q	Quality Management System
TfNSW R106	Sprayed Bituminous Surfacing with Cutback Bitumen
TfNSW B344	Sprayed Bituminous Waterproofing Membranes
TfNSW 3151	Aggregate for Sprayed Bituminous Surfacing
TfNSW 3252	Polymer Modified Binder for Pavements
TfNSW 3253	Bitumen for Pavements
TfNSW 3268	Aggregate Precoating Agent (for Polymer Modified Binder)
TfNSW 3269	Bitumen Adhesion Agent (for Polymer Modified Binder)

TfNSW Test Methods

TfNSW T103	Pretreatment of Road Materials by Artificial Weathering
TfNSW T203	Materials Finer than 75 µm in Aggregates (by washing)
TfNSW T230	Resistance to Stripping of Cover Aggregates and Binders
TfNSW T238	Initial Adhesion of Cover Aggregates and Binders
TfNSW T239	Fractured Faces of Coarse Aggregate
TfNSW T271	Ball Penetration Test
TfNSW T240	Texture Depth of Coarse Textured Road Surfaces
TfNSW T271	Ball Penetration Test
TfNSW T274	Measurement of Aggregate Spread Rate During Sealing (Field method)
TfNSW T277	Measurement of Loose Aggregate on Sprayed Seals
TfNSW T506	Penetration of Bituminous Material
TfNSW T511	Thin Film Oven Test of Bitumen
TfNSW T590	Homogeneity of Liquid Bituminous Additives
TfNSW T703	Flash Point by Pensky-Martens Closed Tester
TfNSW T737	Recovery and Determination of Rubber Content of Scrap Rubber Mixes
TfNSW T741	Determination of Elastic Recovery and Viscosity of Polymer Modified Binders
TfNSW T742	Plastic Limit of Modified Binders
TfNSW T1005	Qualitative Analysis using The Infra-Red Spectrophotometer

TfNSW Forms

TfNSW 354	Sprayer Certificate
-----------	---------------------

TfNSW 382	Sprayed Bituminous Surfacing Cutback Chart
TfNSW 395K	Seal and Reseal Design Calculation Sheet
TfNSW 500E	Conventional SAM and SAMI – Daily Record

TfNSW Guides

TfNSW Sprayed Sealing Guide

Australian Standards

AS 1141	Methods for sampling and testing aggregates:
AS 1141.6.1	Particle density and water absorption of coarse aggregate – Weighing-in-water method
AS 1141.11	Particle size distribution by sieving
AS 1141.14	Particle shape, by proportional calliper
AS 1141.20.1	Average least dimension – Direct measurement (nominal size 10 mm and greater)
AS 1141.20.2	Average least dimension – Direct measurement (nominal sizes 5 mm and 7 mm)
AS 1141.22	Wet/dry strength variation
AS 1141.41	Polished aggregate friction value – Horizontal bed machine
AS 1152	Test sieves
AS 2008	Residual bitumen for pavements
AS 2341	Methods of testing bitumen and related roadmaking products
AS 3568	Oils for reducing the viscosity of residual bitumen for pavements

Austroads Test Methods

MBT 11	Handling Viscosity of Polymer Modified Binders (Thermosel)
MBT 22	Torsional Recovery of Polymer Modified Binders
MBT 23	Force Ductility
MBT 27	Brittle Point by Fast Fraass
MBT 31	Softening Point of Polymer Modified Binders

Austroads Guides

Austroads Bitumen Sealing Safety Guide