Master Specification
Part RD-BP-D2

Design and Application of Sprayed Bituminous Surfacing

September 2024

Government of South Australia
Department for Infrastructure and Transport

Build.
Move.
Connect.

Document Information

Document Information	
K Net Number:	13506215
Document Version:	1
Document Date:	30/09/2024

Document Amendment Record

Version	Change Description	Date
0	Initial issue	31/08/2023
1	Updated cover page and general update	30/09/2024

Document Management

Contents

RD-BP-D2 Design and Application of Sprayed Bituminous Surfacing

1 General

a) This Master Specification Part sets out the requirements for the design and application of sprayed bituminous surfacing and resurfacing (sprayed seal coat treatment) including:

i) the documentation requirements, as set out in section 2;

ii) the requirements for seal design, as set out in section 3;

iii) the material requirements, as set out in section 4;

iv) the constraints to work, as set out in section 5;

v) the requirements for the protection of road fixtures, as set out in section 6;

vi) the requirements for cleaning of pavement, as set out in section 7;

vii) the requirements for the operation of sprayer, as set out in section 8;

viii) the requirements for the application of prime and initial seal, as set out in section 9;

ix) the requirements for the application of binder, as set out in section 10;

x) the requirements for the application of SAMI, as set out in section 11;

xi) the requirements for application of aggregate, as set out in section 12;

xii) the requirements for the removal of loose aggregate after rolling, as set out in section 13;

xiii) the requirements for paving fabric, as set out in section 14;

xiv) the requirements for surplus and waste materials, as set out in section 15;

xv) the requirements for records of work, as set out in section 16;

xvi) the requirements for application tolerances, as set out in section 17;

xvii) the acceptance criteria, as set out in section 18;

xviii) the test procedures, as set out in section 19;

xix) the Hold Point and Witness Point requirements, as set out in section 20;

xx) the verification requirements and records, as set out in section 21; and

xxi) the measurement requirements as set out in section 22.

b) The design and application of sprayed bituminous surfacing and resurfacing (sprayed seal coat treatment) must comply with the Reference Documents, including:

i) AAPA Advisory Note No. 7 Guide to the Heating and Storage of Binders for Sprayed Sealing;

ii) AAPA HSE Guide No.8 Environmental Management When Spraying Bituminous Materials;

iii) AGPT04K Guide to Pavement Technology Part 4K: Selection and Design of Sprayed Seals;

iv) AGPT-T101 Method of sampling polymer modified binders, polymers and crumb rubber;

v) AGPT-T254 Stripping of Aggregate from Spayed Seals;

vi) AGPT-T250 Modified Surface Texture Depth (Pestle method);

vii) AGPT-T530 Calibration of Bitumen Sprayers: General Introduction and List of Methods;

viii) AGPT-T531 Calibration of Bitumen Sprayers: Volumetric Calibration of Bitumen Pumps;

ix) AGPT-T532 Calibration of Bitumen Sprayers: Transverse Distribution by Fixed Pit Facility;

x) AGPT-T533 Calibration of Bitumen Sprayers: Transverse Distribution by Field Mat;

xi) AGPT-T534 Calibration of Bitumen Sprayers: Transverse Distribution by Portable Trough;

xii) AGPT-T535 Road Speed Calibration;

xiii) AGPT-T536 Viscosity of Calibration Fluid;

xiv) AP-G41 Bituminous Materials Safety Guide;

xv) AP-T262 Performance Requirements for Bitumen Sprayers;

xvi) AS 1141 Methods for sampling and testing aggregates;

xvii) AS 1160 Bituminous emulsions for the construction and maintenance of pavements;

xviii) AS 1289.2.1.1 Methods of testing soils for engineering purposes, Method 2.1.1: Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method);

xix) AS 1289.2.1.4 Methods of testing soils for engineering purposes, Method 2.1.4: Soil moisture content tests - Determination of the moisture content of a soil - Microwave-oven drying method (subsidiary method);

xx) AS 2008 Bitumen for pavements;

xxi) AS 2106.2 Methods for the determination of the flash point of flammable liquids (closed cup) Determination of flash point - Pensky-Martens closed cup method;

xxii) AS 2157 Cutback bitumen;

i) AS 3568 Oils for reducing the viscosity of residual bitumen for pavements;

ii) AS 3706 Geotextiles - Methods of test;

iii) AS/NZS 2106.1 Methods for the determination of the flash point of flammable liquids (closed cup) Abel closed cup method;

iv) ASTM D6140 Standard Test Method to Determine Asphalt Retention of Paving Fabrics Used in Asphalt Paving for Full-Width Applications;

v) ATS 3110 Supply of Polymer Modified Binders; and

vi) Australian Flexible Pavement Association: Code of Practice: Manufacture, Storage and Handling of Polymer Modified Binders.

c) Where stated in the Contract Documents, the Principal is responsible for the selection of treatment type, including aggregate size, binder type and geotextile grade.

d) Subject to section 1c), the Contractor is responsible for:

i) the design of the seal, including binder application rates, aggregate application rates, use of additives, rolling times and minimum and maximum pavement temperatures;

ii) any adjustment necessary to the design to account for site conditions at the time of application; and

iii) application of the seal treatment so that it complies with the requirements of section 3.1 and section 18 until at least the expiry of the Defects Liability Period.

e) Where the Contractor considers that an alternate treatment from that stipulated in the work summary (if provided in the Contract Documents) may be appropriate for the Site, and will

meet the requirements of section 3.1 and section 18, an alternate treatment design may be submitted in the Construction Documentation, stating the reasoning for the selection of the proposed treatment.

f) In addition to the glossary of terms included in PC-IN2 “Glossary of Terms”, the definitions set out in Table RD-BP-D2 1-1 apply to terms used in this Master Specification Part.

Table RD-BP-D2 1-1 Definitions

Term	Definition
Bond Coat	The binder layer applied prior to the application of a geotextile.
Sealing Defect	Includes emulsification, flushing, bleeding, fatty areas, significant areas of bitumen on kerb and channel, excess bitumen without aggregate cover at the start or finish of runs, aggregate stripping, loose aggregate in excess of the specified amounts, non-uniform aggregate spreading, streaking of aggregate and a failure to achieve the surface texture, design binder application or aggregate retention specified in section 18.
Sprayed Sealing Work	Includes primes, initial seals (formerly primer seals) and seals constructed using bituminous binders.
Surface Pre-treatments	Any sprayed bitumen, aggregate, combination of sprayed bitumen and aggregate, or other approved treatment.
Tack Coat	The binder layer applied prior to the application of an asphalt surfacing.

2 Documentation

2.1 Construction Documentation

In addition to the requirements of PC-CN3 “Construction Management”, the Construction Documentation must include:

a) alternative treatment from that stipulated in the Contract Documents, as required by section 1e);

b) seal design, as required by section 3.1e);

c) design of appropriate rates of application to achieve the desired surface characteristics;

d) methods to achieve cutter proportions;

e) methods to achieve a homogeneous binder mixture;

f) details of how tank contamination will be eliminated;

g) methods to control binder temperature;

h) methods to ensure even and accurate binder and aggregate applications;

i) methods to ensure adequate cure of the treatment prior to any subsequent treatment;

j) ITP or details of the sampling and testing of materials;

k) details of how to achieve a homogeneous product that can be sprayed as a uniform application of binder across the pavement, free of streaking and must include:

  i) recommended spray nozzle sizes;

  ii) maximum width of sprayer runs to ensure a uniform application of binder across the joints (longitudinal and transverse) between sprayer runs; and

  iii) a copy of the bitumen certificate as required by section 8e);

l) details of how a uniform application of binder across the joint between runs will be achieved as required by section 8d);

m) details of protection of road furniture and roadside facilities;

n) methods to mitigate the risk of bituminous material wash-off and environmental impacts in the event of rain or other events;

o) for emulsions, PMBs and crumbed rubber:

  i) details to manage the curing process for emulsion, including traffic management for emulsions as required in Table RD-BP-D2 5-1;

  ii) evidence of compatibility of emulsion primers with the pavement material, including any additives or modifiers and the achievement of stated curing times;

  iii) the manufacturer's recommendations regarding:

    A. handling instructions including storage and spraying temperature range;

    B. maximum storage time and temperatures; and

    C. maximum heating temperature and heating rate;

  iv) details of transportation of PMB, including storage times and temperatures;

  v) evidence that the field mixed crumbed rubber storage or blending vessel is suitable to maintain the properties of the binder greater than 12 hours as required in Table RD-BP-D2 5-1;

  vi) proposed field mixed crumbed rubber minimum circulation period as required in Table RD-BP-D2 5-1; and

  vii) proposed process of any trafficking of a SAMI seal as required by section 11a);

p) for aggregates:

  i) details of storage of aggregate to identify lots where there are varying characteristics, such as ALD, flakiness, quarry source changes;

  ii) methods for controlling loading to avoid contamination;

  iii) methods for the removal of dust and dirt;

  iv) methods for application of precoat as required in section 3.4a);

  v) methods to eliminate aggregate contamination from deleterious material and deterioration of the pre-coated aggregate as required in section 12.2d);

  vi) methods to monitor, manage, mitigate or eliminate pollution or environmental impacts of pre-coated aggregate sites as required in section 12.2e);

  vii) methods for the application of aggregate including the measurement and assessment of aggregate spread rates;

  viii) methods for rolling of aggregate including minimum rolling times, roller types and roller weights; and

  ix) methods for sweeping and removal of loose aggregate; and

q) suitable surface preparation requirements as required by section 9a)i).

2.2 Quality Management Records

In addition to the requirements of PC-QA1 “Quality Management Requirements” or PC-QA2 “Quality Management Requirements for Major Projects” (as applicable), the Quality Management Records must include:

a) application rates for the precoating of aggregates as required by section 3.4c);

b) surface verification records for prepared pavements, as required in section 9c);

c) certificate of compliance for the paving geotextile, as required in section 14b);

d) daily record sheets, as required in section 16a);

e) a completion report, as required by section 16c);

f) aggregate retention testing results, as required in section 18.2a)ix);

g) the seal condition report required by section 18.5c);

h) test results as required by section 19; and

i) the verification requirements and records required by section 21.

2.3 Program of work

a) Without limiting the requirements of PC-PM2 “Contract Program”, the Contractor must ensure that the Contract Program includes a detailed sub-program of Sprayed Sealing Work as follows:

   i) where the Sprayed Sealing Work forms part of a contract for periodic resurfacing, the Sprayed Sealing Work sub-program must be provided to the Principal at least 2 weeks prior to the commencement of the Sprayed Sealing Works; or

   ii) where the Sprayed Seal Works form part of a contract other than periodic resurfacing, the Sprayed Seal Works sub-program must be included as part of the Contract Program required by PC-PM2 “Contract Program”.

b) While the Contractor is performing the Sprayed Sealing Work, the Contractor must:

   i) prepare a weekly status update of the Sprayed Seal Work sub-program and provide it to the Principal prior to the execution of the Sprayed Seal Work in the following week; and

   ii) provide the Principal with written notice of any significant changes to the detailed Sprayed Seal Work sub-program within 24 hours of the delay occurring.

3 Seal design

3.1 Performance requirements

a) The Contractor must design and apply spray seal treatments required in the Contract Documents, including the work summary if supplied by the Principal, (including primes, initial seals, reseals and any surface texture regulation treatments) so that the finished seal achieves the following requirements:

   i) the parameters specified in section 18;

   ii) minimal loose aggregate after application;

   iii) retention of aggregate after application to provide a skid resistant surfacing and prevent water from entering and weakening the pavement;

   iv) surface texture to optimise contact between the road surface and tyres, and provide a skid resistant surface; and

   v) uniform colour and texture appearance.

b) The functional requirements set out in section 3.1a) also apply to the first application of a double application seal until the final treatment is applied.

c) The Contractor must:

   i) design the binder application rates and aggregate spread rates;

   ii) inspect each site and make any adjustment necessary to the design to account for site conditions at the time of application; and

   iii) apply the sprayed seal treatment.

d) The seal design must be in accordance with AGPT04K Guide to Pavement Technology Part 4K: Selection and Design of Sprayed Seals. The design calculation must clearly show how design rates have been determined, including all traffic volume data, supplied by the Principal, the Department or sourced from the Location SA Map Viewer https://location.sa.gov.au/viewer/, and Equivalent Heavy Vehicle (EHV) allocations to each lane, voids factors, allowances, assumptions and any supporting data.

e) The Contractor must provide all seal designs in the Construction Documentation.

3.2 Surface texture regulation

The Contractor must design and implement all activities, including Surface Pre-treatments, required to regulate the surface texture prior to resealing specified in the Contract Documents (including the work summary) in order to meet the surface texture and aggregate loss limits on the finished seal. The Contractor must undertake the surface texture regulation rectification works to the extent identified in the Contract Documents.

3.3 Application rate for binder and aggregate

a) The Contractor must calculate binder and aggregate application rates in accordance with AGPT04K Guide to Pavement Technology Part 4K: Selection and Design of Sprayed Seals. Existing site and pavement conditions including road geometry, pavement hardness and surface texture must be incorporated into the final binder and aggregate application rates.

b) When provided in the Contract Documents, traffic counts supplied by the Principal may not consider seasonal or temporary increases in traffic. The Contractor must allow in the seal design for such variations in calculating the binder and aggregate application rates pursuant to section 3.3a) including grain harvest, events, temporary staging, future land development and subdivisions.

c) Seal designs for each of the treatments must include:

i) design input data (including ALD, flakiness, pavement hardness, AADTs and EHVs);

ii) proposed additives to be used;

iii) aggregate source, type and design rates of application;

iv) proposed details of any surface regulation activities;

v) binder source and design rates of application;

vi) details of other necessary materials or products; and

vii) details of proposed NATA accredited laboratory able to undertake testing in accordance with RD-BP-S1 “Supply of Bituminous Material”.

d) Provision of this information is provided for contractual purposes only and does not represent Principal endorsement of the seal designs.

3.4 Precoating of aggregate

a) Aggregate precoating application rates must be determined by the Contractor and applied to aggregate using methods detailed in the Construction Documentation. Standard precoat ranges for sealing aggregates are:

i) 5 mm - 7 to 9 L/m^3;

ii) 7 mm - 5 to 8 L/m^3;

iii) 10 mm - 5 to 8 L/m^3;

iv) 14 mm - 5 to 7 L/m^3; and

v) 16 mm - 4 to 6 L/m^3.

b) The Contractor must increase precoat rates to include additional absorption by porous aggregates as required.

c) The Contractor must provide the aggregate precoating rates in the Quality Management Records.

4 Materials

4.1 Quality of materials

a) The Contractor must ensure that binder (including prime, initial seal binder, C170, C320, PMB, crumb rubber, multigrade and emulsion), flux and cutter comply with RD-BP-S1 “Supply of Bituminous Material”.

b) Except where the Contact Documents state that aggregate is to be supplied by the Principal, the Contractor must supply aggregate to comply with RD-PV-S1 “Supply of Pavement Materials”.

c) Aggregates supplied by the Contractor must be sampled in accordance with RD-PV-S1 “Supply of Pavement Materials”.

d) At least 5 days prior to the commencement of Sprayed Sealing Works, the Contractor must supply to the Principal a test certificate endorsed by a NATA accredited laboratory to show conformance with RD-PV-S1 “Supply of Pavement Materials”. Submission of the test certificate constitutes a **Hold Point** and the application of the sprayed bitumen must not commence until this Hold Point has been released.

e) Where the Contract Documents state that aggregate is to be supplied by the Principal:

   i) at least 7 days prior to the commencement of Sprayed Sealing Works, the Contractor will be supplied with test results for the average least dimension, flakiness index and grading of all sealing aggregates; and

   ii) the Contractor must ensure that that it has:

      A. examined and carefully checked the aggregate material and test results;

      B. taken into account the potential variability of material in stockpiles and made allowance for this variability in its design of the spray seal treatment; and

      C. made all allowances necessary to ensure that adhesion between aggregate and binder is achieved.

f) Aggregate being used on high skid resistant sites must comply with RD-PV-S1 “Supply of Pavement Materials”.

4.2 Measurement of materials

a) Unless otherwise stated in this Master Specification Part, all rates and quantities under this Master Specification Part relating to prime, primer binder, C170, C320, PMB, crumb rubber, multigrade, emulsion, and cutter must refer to measurement by volume at 15°C.

b) Where the volume of materials contemplated by section 4.2a) is measured at a higher temperature than 15°C, the volume conversion formulae must be used for converting the volume to equivalent volume at 15°C.

c) For the purposes of the volume conversion required by section 4.2b), the Contractor must apply the following:

   i) volume conversion table included as Appendix 1: Volume conversion table - bitumen emulsion;

   ii) volume conversion table included as Appendix 2: Volume conversion table - hot bitumen based binders; and

iii) for the purpose of sprayed bituminous surfacing, rates and quantities relating to volume of aggregate must refer to loose volume.

4.3 Binders for initial treatments

a) The binder to be used in an initial treatment must be a suitable cutback bitumen or a bitumen emulsion.

b) The binder used for a prime must be capable of penetrating into the pavement surface and when cured, be of uniform appearance and capable of providing a strong bond between the bituminous surface and the pavement.

c) An initial seal must be waterproof and capable of adhering to the pavement surface while retaining sufficient binder on the surface to hold the aggregate in place. The class of binder used must be suitable for the proposed application (including traffic loading, environmental conditions and pavement material porosity) and pavement construction methodology and program (including the curing time between bituminous treatments).

4.4 Binders for secondary treatments

a) Unless specified otherwise in the Contract Documents, one of the binder classes and seal sizes outlined in Table RD-BP-D2 4-1 must be used for the secondary treatment.

b) The Contractor may submit a proposal to the Principal for the use of bitumen emulsions for all treatment types as a **Hold Point**. The seal design required in section 3 must not commence until this Hold Point is released.

Table RD-BP-D2 4-1 Binder classes and seal sizes

Treatment type	Binder class	Seal type	Typical aggregate sizes (mm)
Conventional	C170, C240, C320	Single/single Double/double	7,10,14 10/5, 10/7, 14/7, 16/7, 16/10
HSS	S10E, S35E, S15E, S9R	Single/single Double/double	7, 10, 14 10/5, 10/7, 14/7, 16/7, 16/10
XSS	S20E, S15RF, S15R	Double/double	14/7, 16/7, 16/10
SAM	S15E, S20E, S15R, S15RF	Single/single Double/double	10, 14 10/5, 10/7, 14/7, 16/7, 16/10
SAMI	S25E, S18RF	Single/single	10, 14
GRS as SAM	C170, C240, C320, S35E, S10E, S20E, S9R, S15R, S15RF	Double/double	14/7, 16/7, 16/10
GRS as SAMI	C170, C240, C320, S35E, S10E, S20E, S9R, S15R, S15RF	Single/single	10, 14

5 Constraints to work

a) In performing the Sprayed Sealing Works, the Contractor must comply with the constraints regarding binder listed in Table RD-BP-D2 5-1.

b) In performing the Sprayed Sealing Works, the Contractor must comply with all traffic control constraints set out in PC-SM1 “Traffic and Pedestrian Management”.

Table RD-BP-D2 5-1 Binder constraints

Treatment	Constraint
Prime	a) Traffic must not be permitted on the surface within 24 hours of spraying or until the prime has dried sufficiently so as not to be damaged by vehicles. b) A binder must not be applied over a cutback prime within 72 hours or over an emulsion prime within 12 hours of spraying of the prime. These times may need to be increased in cold weather to allow the prime to cure and also in the case of cutback primes to permit the solvent cutters to have substantially evaporated.
Cutback initial seal	When cutback bitumen is used, the secondary treatment must not be applied until a reasonable period of curing has elapsed, as residual cutter oil can soften subsequent bituminous surfacings. The curing rate depends on binder grade, application rate and climatic conditions during the curing period. A minimum of 6 months of warm or hot weather is recommended, although 12 months may be beneficial in colder weather. The minimum curing period may be reduced to 3 months for relatively low cutter content initial seal binders (such as AMC7) when used in warm or hot conditions.
Emulsion initial seal	When emulsion binder is used, secondary treatment to be placed as per manufacturer's recommendations and after a reasonable curing time has elapsed to ensure adequate curing of the emulsion prior to further treatments being applied. A minimum of 3 months of warm or hot weather is recommended, although 6 months may be beneficial in colder weather. Where an emulsion initial seal is to be overlaid with asphalt, this period may be reduced to 24 hours.
Crumb rubber	a) Crumb rubber must not be stored longer than 12 hours unless sufficient evidence is provided in the Construction Documentation that demonstrates the ability of the storage or blending vessel to maintain the properties of the binder. In that case, an additional 12 hours of storage will be allowed provided that the temperature of the binder does not exceed 150ºC. If requested by the Principal, the Contractor must undertake additional sampling and testing of product that is stored for more than 24 hours. b) Both plant blended, and field blended crumb rubber must be transported and sprayed such that binder maintains conformance with the requirements in Table RD-BP-D2 4-1. c) Base binder must consist of C170 bitumen complying with AS 2008 Bitumen for pavements. d) For field blended crumb rubber, once rubber has been added to the base binder the contents must be circulated for the minimum period indicated in the Construction Documentation to provide a homogenous product of consistent quality.
Emulsion	In addition to the protective measures specified in the Construction Documentation, the Contractor must control traffic until the binder has cured sufficiently to retain the screenings.
All double/double seals	a) Both courses of a double seal must be laid on the same day. b) The top seal must overlap each finished edge of the bottom seal by 50 mm.

6 Protection of road fixtures

The Contractor must prevent primer, binder, aggregate or other material used on the Sprayed Sealing Works from entering or adhering to gratings, hydrants or valve boxes, inspection pit covers

kerbs and other road fixtures. Damage to roadside furniture must be recorded on the daily record sheets required in section 16a).

7 Cleaning of pavement

a) The Contractor must ensure that the pavement is cleaned free of loose material so that primer will be absorbed into the base, or binder adhere to the existing seal, without prilling or being absorbed onto loose material.

b) The Contractor must ensure that the method of cleaning prevents damage to the existing surface. Steel brooms must not be used on unsealed base.

c) The surface to be cleaned includes the surface to be sprayed plus either an area which is a minimum of 250 mm beyond the surface to be sprayed, or one which extends to the edge of the road formation, whichever is the lesser.

d) The Contractor must remove all raised pavement markers prior to sealing and undertake any necessary repair to the existing seal.

8 Operation of sprayer

a) Binder volumes must be determined by the Contractor in accordance with the sprayer truck's manufacturer's guidelines.

b) The Contractor must ensure that the application of prime, primer binder, overspray and binder is by means of sprayers certified as complying with:

   i) AGPT-T530 Calibration of Bitumen Sprayers: General Introduction and List of Methods;

   ii) AGPT-T531 Calibration of Bitumen Sprayers: Volumetric Calibration of Bitumen Pumps;

   iii) with respect to the calibration of bitumen sprayers:

      A. AGPT-T532 Calibration of Bitumen Sprayers: Transverse Distribution by Fixed Pit Facility;

      B. AGPT-T533 Calibration of Bitumen Sprayers: Transverse Distribution by Field Mat; or

      C. AGPT-T534 Calibration of Bitumen Sprayers: Transverse Distribution by Portable Trough;

   iv) AGPT-T535 Road Speed Calibration; and

   v) AGPT-T536 Viscosity of Calibration Fluid.

c) The Contractor must only use hand spraying when the use of a mechanical sprayer is not practicable.

d) The Contractor must include details of how a uniform application of binder across the joint between runs will be achieved in the Construction Documentation.

e) The Contractor must include a copy of the bitumen sprayer calibration certificate in the Construction Documentation.

9 Application of prime and initial seal

a) Prior to the application of the prime or initial seal, a **Hold Point** must apply to verify that:

   i) the surface to be primed or initial sealed is suitable and meets all surface preparation requirements of either:

      A. RD-PV-C1 "Construction of Unstabilised Granular Pavements";

      B. RD-PV-C2 "Construction of Shoulders";

C. RD-PV-C3 “Insitu Pavement Stabilisation”;

D. RD-PV-S2 “Plant Mixed Stabilised Pavement”;

E. RD-BP-C2 “Construction of Foamed Bitumen Stabilised Pavement”;

F. RD-BP-C3 “Construction of Asphalt Pavement”; or

G. ST-SC-C7 “Placement of Concrete”,

as relevant to the pavement material that is to be primed or initial sealed. Where a prime or sprayed seal is to be applied to a pavement type not covered in sections 9a)i)A to 9a)i)G, the Contractor must propose suitable surface preparation requirements as part of the Construction Documentation;

ii) marked guidelines have been set out correctly; and

iii) the Contractor is properly prepared to proceed.

b) The prime or initial seal must not be applied until the **Hold Point** set out in section 9a) has been released.

c) The Contractor must provide the surface verification records required in section 9a) as part of the Quality Management Records.

d) The Contractor must maintain the primed surface in a condition complying with this Master Specification Part until the secondary treatment is applied.

10 Application of binder

a) Prior to the application of binder, a **Hold Point** must apply to verify that the pavement surface is suitable for the application of binder and that the Contractor is properly prepared to proceed. Binder must not be applied until this Hold Point has been released.

b) The Contractor must ensure that application temperatures for primes and binders comply with Table RD-BP-D2 10-1. In addition, Table RD-BP-D2 10-2 is provided as a best practice guide for air and pavement temperatures, wind speed and surface moisture.

c) Air temperatures must be measured using a thermocouple based temperature device taken 1m from the pavement surface. The temperature device must be positioned:

i) away from any heat source;

ii) shaded from the sun; and

iii) not protected from the wind.

d) Adhesion agent may be added to the binder to promote adhesion to the cover aggregate or pavement surface. Where adhesion agent is added to the binder, the total volume of adhesion agent must not exceed 1% by mass of the binder. When adhesion agent is added, the Contractor must record the details on the daily record sheet as required by section 16a).

e) It is not recommended to add cutter oil to the Bond Coat for geotextile reinforced seals.

f) The Contractor must add the required amount of cutter to achieve the desired surface characteristics.

g) The Contractor must assess weather conditions prior to the application of binder in accordance with AAPA HSE Guide No.8 Environmental Management When Spraying Bituminous Materials. In addition to the limitations in Table RD-BP-D2 10-2, the Contractor must only undertake priming and initial sealing when the prevailing weather conditions have a risk rating of ‘low’ or less, and appropriate work practices to minimise risks are in place.

Table RD-BP-D2 10-1 Application temperatures

Product	Minimum spraying temp (ºC) un-cut	Maximum re-heating temp (°C) un-cut	Minimum spraying temp (°C) cut	Max re-heating temp (°C) cut
AMC 00	10	30	N/A	N/A
AMC 0	35	55	N/A	N/A
AMC 4(1)	120	135	N/A	N/A
AMC 5(1)	120	135	N/A	N/A
AMC 6	165	175	N/A	N/A
AMC 7	175	185	N/A	N/A
C170(2)	175	200	Resultant	185
C320(2)	175	200	Resultant	185
PMB	190	200	190	200
Crumb rubber	190	200	190	200
Emulsion	Manufacturer's recommendation	90	N/A	N/A

Table notes:

(1) High percentages of cutter, consideration to be given to the use of AMC6 and AMC7 where appropriate.

(2) The binder must be heated to 185°C, additive or cutter added and then sprayed at the resultant temperature.

Table RD-BP-D2 10-2 Best practice limits for temperature, wind and pavement condition prior to sealing

Product	Minimum air / pavement temperatures (°C)	Maximum air / pavement temperatures (°C)	Maximum wind speed (km/h)	Pavement surface moisture
Prime	10/10	None	20	Dry
Initial seal(2)	10/10	None	30	No free water present
C170(2)	15/15	None	30	Dry
C320(2)	15/15	None	30	Dry
PMB (SBS based)(2)	20/20(1)	None	30	Dry
PMB (PBD based)(2)	15/15	None	30	Dry
Crumb rubber(2)	15/20(1)	None	30	Dry
Multigrade(2)	15/15	None	30	Dry
Emulsion(2)	10/10	As per manufacturer's guidelines	30	No free water present

Table notes:
(1) 15/15 can be applied for SAMI in non-trafficked areas.
(2) Maximum wind speed reduced by 5 km/h where application rate less than 0.9 l/m^2.

11 Application of SAMI

a) Where the SAMI seal is covered with asphalt during the same day, the SAMI seal must not contain cutter. Where the SAMI seal is left exposed for at least 1 day, the amount of cutter in a SAMI binder is limited to a maximum of 2 parts.

b) If the temperature of the pavement surface on which the SAMI is to be placed is below 20°C, the Contractor must implement measures to ensure that there is no detrimental effect on the performance of the SAMI.

12 Application of aggregate

12.1 Stockpile sites

a) Any stockpile sites used by the Contractor must be cleaned and returned to their original condition in accordance with PC-SM2 “Site and Access Management” within four weeks of completion of the use of that stockpile site for Works.

b) The use of stockpile sites on other road reserves (such as municipal stockpile sites), or on other public or private land requires the approval of the relevant Authority or owner prior to use (in accordance with PC-SM2 “Site and Access Management”).

c) The following requirements apply to the placement of aggregate and materials:

   i) stockpiles must be so placed that they do not unduly reduce sight distance at locations such as intersections and curves;

   ii) stockpiles must not be placed under or immediately adjacent to power lines and must comply with all “No Go Zones” and the relevant requirements for spotters;

   iii) stockpiles must not be placed under trees; and

   iv) stockpiles must not be placed structures where the overhead clearance would interfere with aggregate loading and off-loading operations.

d) The Contractor must include management of road formation, drains, gateways and side tracks and the toes of the stockpiles in the Construction Management Plan as required by PC-CN3 “Construction Management”.

12.2 Precoating

a) Aggregate must be either plant precoated or field precoated. Aggregate precoating must be undertaken using a purpose-built item of plant to apply the precoating material in a controlled manner that produces a uniform coating.

b) Precoated aggregate may be stockpiled, provided that the Contractor implements measures to ensure that contamination does not occur.

c) The Contractor must select a precoat that is compatible with the aggregate source such that stripping meets the performance requirements set out in section 20.

d) The Contractor may choose, at its own risk, not to precoat SAMI aggregate, based on a risk assessment of aggregate cleanliness, sealing conditions, adopted spread rate, exposure to trafficking and other factors affecting the risk of damage to the SAMI. For the avoidance of doubt, any aggregate stripping resulting from the Contractor's election to not precoat SAMI aggregate will amount to a Sealing Defect.

e) The Contractor’s methods to monitor, manage, mitigate, or eliminate pollution or environmental impacts of pre-coated aggregate sites must be included in the Construction Documentation.

12.3 Aggregate spreading and rolling

a) Unless impracticable, aggregate must be spread in a single uniform layer at the target aggregate spread rate.

b) Rolling must:

   i) commence immediately after aggregate spreading has commenced;

   ii) be undertaken over the full width of the pavement being sealed including any untrafficked areas; and

   iii) be undertaken by rubber tyred rollers or rubber coated drum rollers.

13 Removal of loose aggregate after rolling

a) The Contractor must ensure that the removal of loose aggregate commences within 12 hours of the completion of rolling and applies to all seals, including the first coat of a double seal. All loose aggregate must be removed clear of the edge of the seal. Loose aggregate only must be removed, and without disturbance of the embedded aggregate. Damage to the seal resulting from the removal of loose aggregate must be rectified by the Contractor immediately.

b) Where the pavement has kerb and gutter, bridge decks or other areas where loose stone may be on the roadway, the loose aggregate must be picked up and removed from the Site.

c) The Contractor must ensure that loose aggregate does not present a traffic hazard. The number of loose aggregate particles in any square metre during the Defects Liability Period must not exceed the limits in Table RD-BP-D2 13-1.

d) Where the number of loose aggregate particles exceeds the maximum values set out in Table RD-BP-D2 13-1, the Contractor must erect warning signs within 12 hours of becoming aware and the surface swept within 48 hours.

Table RD-BP-D2 13-1 Maximum loose aggregate count

Aggregate size	Maximum loose aggregate count per square metre
7 mm	60
10 mm and larger	40

14 Paving fabric

a) Where the use of paving fabric is specified in the Design Documentation, the Contractor must comply with RD-EW-S1 “Supply of Geotextiles” and the paving fabric must be placed in accordance with the manufacturer's instructions and the following:

i) traffic must not be permitted to travel on the paving geotextile where this will cause damage to or pick up of the paving fabric;

ii) any folds, creases or wrinkles in the paving geotextile that will impact the performance of the seal must be removed;

iii) overlap of the paving geotextile on longitudinal joints must be between 100 mm and 150 mm;

iv) longitudinal overlap of the paving geotextile must be placed within 200 mm of the centreline or lane line;

v) binder must be applied at the longitudinal overlap;

vi) the paving geotextile must be bonded to the pavement with a Bond Coat sprayed wide enough to ensure the full Bond Coat application is achieved over the entire width of the fabric;

vii) appropriate jets must be used to ensure the specified Bond Coat rate is applied across the entire width of paving geotextile; and

viii) the construction methodology used to place the paving geotextile must not cause undue migration of the underlying Bond Coat into the paving geotextile.

b) A certificate of compliance for the paving geotextile must be included with each Work Lot in the Quality Management Records.

c) Seal dimensions specified in the Contract Documents Documentation do not allow for the overlap of binder and/or fabric. The Contractor must make due allowance for overlap of the binder and/or fabric in accordance with this Master Specification Part and the manufacturer’s requirements.

15 Surplus and waste materials

a) Waste, including unused Contractor supplied aggregate, bitumen, empty containers or other materials remaining after completion of the Sprayed Sealing Works must be removed from the Site by the Contractor and the Site must be left in a neat and tidy condition. Disposal of all waste must be in accordance with:

   i) PC-ENV2 “Environmental Protection Requirements”; and

   ii) the *Environment Protection Act 1993* (SA).

b) All Sprayed Sealing Works must be conducted in accordance with:

   i) the Department Environmental and Heritage Technical Manual; and

   ii) PC-ENV2 “Environmental Protection Requirements”.

c) The site must be kept in a neat and tidy condition at all times.

16 Records of work

a) The Contractor must complete the daily record sheet included in Appendix 3: Daily record sheet - Seal coat treatment, which must be certified correct by the Contractor and provided as part of the Quality Management Records. Details of all materials applied as part of the Sprayed Sealing Works must be recorded immediately after each spraying run.

b) Without limiting the Contractor’s obligation to comply with the Contract Documents, including the Master Specification, the Contractor must submit documentation in accordance with RD-BP-S1 “Supply of Bituminous Material” and RD-PV-S1 “Supply of Pavement Materials” to demonstrate compliance with this Master Specification Part.

c) The Contractor must submit a completion report outlining surface condition, Sealing Defects present and remediation methods in the Quality Management Records.

17 Application tolerances

a) The Contractor must ensure that materials are applied, or added to, within the following tolerances of the final design rate:

   i) the application of primer, primer binder, binder and overspray must be within ±20% for short bar runs and hand spray work; and

   ii) the spreading of aggregate must be within ±5%.

b) The Contractor must ensure that the longitudinal line followed is within 50 mm of that specified for straight runs and 100 mm on curved alignments.

18 Acceptance criteria

18.1 Binder application

Where actual binder application rates vary from the design binder application rates, the deductions outlined in

a) Table RD-BP-D2 18-1 must apply. Deductions will not apply to the areas where deductions or rectification works are required to conform to the aggregate retention and surface texture requirements in sections 18.3 and 18.4.

For double seals and geotextile seals the tolerances in

b) Table RD-BP-D2 18-1 must be applied to the individual sprayer rates for the Bond Coat, bottom and top binder applications.

Table RD-BP-D2 18-1 Binder rate variations

Variations from design binder application rate	Action
>+5%	No payment for additional binder
0% to +5%	Payment for additional binder
<0%	Proportionate deduction

18.2 Testing requirements

a) For the purposes of texture and aggregate retention testing the following requirements must apply:

i) testing must be undertaken using the test procedures outlined in section 19;

ii) texture measurements must be performed in the wheel paths where surface texture is considered to be at its lowest;

iii) aggregate retention measurements may be performed across the lane but where aggregate loss is considered to be most severe;

iv) Work Lots for the purposes of this section 18.2 must be limited to individual lanes;

v) Work Lots must be selected to encompass visually uniform sections of seal;

vi) Work Lots must be no less than 100 m and no more than 1 km in length;

vii) testing must be performed at the frequency specified in Table RD-BP-D2 18-2;

viii) areas outside of the traffic lanes Work Lot sizes must be no less than 500 m^2 and no more than 1000 m^2 with 3 tests being required per Work Lot; and

ix) the following information must be supplied by the Contractor as part of the Quality Management Records in support of surface related test results:

A. date and time of testing;

B. test site offset and chainage;

C. surface condition noting the presence of moisture; and

D. individual test results and mean values per Work Lot.

b) The Contractor must provide the Principal with 48 hours' notice of when testing will be undertaken, which constitutes a **Witness Point**.

Table RD-BP-D2 18-2 Texture and aggregate testing frequency

Work Lot size (m^2)	Testing frequency
100 - 500	3
501 - 1000	5

18.3 Texture

a) The Contractor must ensure that the mean surface texture for each Work Lot conforms to the requirements in Table RD-BP-D2 18-3 at the times specified in section 18.3b) and 18.3d).

b) Initial surface texture measurements must be undertaken by the Contractor no sooner than 10 weeks after placement, and no later than 15 weeks after placement.

c) Initial mean surface texture is for information purposes and must be considered in combination with conforming aggregate retention.

d) The Contractor must test final surface texture in conjunction with section 18.4, within one month prior to the end of the Defects Liability Period.

e) The Contractor must ensure that the final mean surface texture for each Work Lot conforms to the requirements in Table RD-BP-D2 18-3.

f) Where the texture does not comply to the requirements of this Master Specification Part, the Contractor must submit a Non-Conformance Notice and must undertake such additional testing as may be requested by the Principal. Such additional testing must be performed within 14 days of the Non-Conformance Notice being issued. Test results must be supplied to the Principal within 5 days of testing.

g) Sections less than 1 m^2 must be excluded from the requirements of this section 18.3 unless the accumulated area of the seal outside of the acceptable range is more than 5 m^2 per Work Lot.

Table RD-BP-D2 18-3 Surface texture

Treatment	Texture depth (mm)				Action required
	5 mm	7 mm, 10/5mm	10 mm, 14/5mm, 14/7mm, 16/7mm	14 mm and 16 mm	
Seals (all types)	1.0 - 1.6	1.2 - 1.8	1.4 - 3.0	1.8 - 4.5	Accept
	0.8 - 1.0 or 1.6 - 1.8	1.0 - 1.2 or 1.8 - 2.0	1.2 - 1.4 or 3.0 - 3.5	1.6 - 1.8 or 4.5-5.5	Rectify or reduce payment for the Work Lot by 10%
	<0.8 or >1.8	<1.0 or >2.0	<1.2 or >3.5	<1.6 or >5.5	Work to be rectified
Initial seals	Not applicable	1.0 - 2.0	1.2 - 3.0	Not applicable	Accept
	Not applicable	<1.0 or >2.0	<1.2 or >3.0	Not applicable	Work to be rectified

18.4 Aggregate retention

a) An initial assessment of the degree of stripping will be made visually by the Contractor no sooner than 10 weeks after placement, and no later than 15 weeks after placement. The Principal may direct that nominated areas be tested using AGPT-T254 - Stripping of Aggregate from Sprayed Seals (or an equivalent test method specified in the Contract Documents).

b) The values specified in Table RD-BP-D2 18-4 must be used to determine whether the degree of aggregate stripping is a Sealing Defect in accordance with AGPT-T254 - Stripping of Aggregate from Sprayed Seals.

c) Sections less than 0.5 m^2 may be excluded from testing for aggregate stripping unless the accumulated area of the seal outside of the acceptable range is more than 3 m^2 per Work Lot.

d) The surface must have a uniform colour and texture to provide a consistent appearance. Aggregate for each job item (including aggregate used for repairs and remedial works) must be supplied from the same source.

Table RD-BP-D2 18-4 Texture and aggregate testing frequency

Degree of aggregate retention	Action required
0 - 2	Accept
3 - 5	Work to be re-tested within one month prior to the end of the Defects Liability Period. If the degree of aggregate stripping has increased since it was last tested, a Non-Conformance Notice must be issued and the work must be rectified before the end of the Defects Liability Period.
Greater than 5	A Non-Conformance Notice must be issued and the Works must be rectified within 5 days.

18.5 Rectification and exclusions

a) Assessment and testing of seals can be undertaken at any time. Within 24 hours of becoming aware of any Sealing Defects, the Contractor must put in place temporary traffic control measures to make the road safe and minimise damage to the seal.

b) The Contractor must submit a Non-Conformance Notice and within 5 days submit to the Principal for review the proposed method of remediation together with the schedule for the works. All Sealing Defects must be rectified when conditions are conducive to the repair being carried out successfully but must be completed no later than 6 months from the end of the Defects Liability Period.

c) The Contractor must submit a report as part of the Quality Management Records 20 days before the end of the Defects Liability Period outlining the seal condition (including aggregate retention and texture), the presence of any Sealing Defects and measures to rectify those Sealing Defects.

d) The Contractor will not be held responsible for pavement failures or damage to the seal from events outside of their control including oil spills, accidents, fires, heavy vehicles braking and turning and mechanical damage from farm equipment.

19 Test procedures

The Contractor must carry out testing in accordance with the requirements of this Master Specification Part, including the Reference Documents and the test procedures listed in Table RD-BP-D2 19-1. Results of the testing must be provided as part of the Quality Management Records.

Table RD-BP-D2 19-1 Test procedures

Test		Test procedure
Moisture content:	Oven drying method	AS 1289.2.1.1 Methods of testing soils for engineering purposes, Method 2.1.1: Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method)
	Microwave method	AS 1289.2.1.4 Methods of testing soils for engineering purposes, Method 2.1.4: Soil moisture content tests - Determination of the moisture content of a soil - Microwave-oven drying method (subsidiary method)
Sampling of soil, aggregates and rocks		As set out in RD-PV-S1 “Supply of Pavement Materials”
Determination of average texture depth of a pavement surface using the sand patch method		AGPT-T250 Modified Surface Texture Depth (Pestle method)
Determination of aggregate retention		AGPT-T254 Stripping of Aggregate from Sprayed Seals

20 Hold Points and Witness Points

a) Table RD-BP-D2 20-1 details the review period or notification period, and type (documentation or construction quality) for each Hold Point referred to in this Master Specification Part.

b) Table RD-BP-D2 20-2 details the review period or notification period, and type (documentation or construction quality) for each Witness Point referred to in this Master Specification Part.

Table RD-BP-D2 20-1 Hold Points

Section reference	Hold Point	Documentation or construction quality	Review period or notification period
4.1d)	Geotextile test certificate endorsed by NATA accredited laboratory	Documentation	5 Business Days notification
4.4b)	Details of bitumen emulsions	Documentation	5 Business Days notification

Section reference	Hold Point	Documentation or construction quality	Review period or notification period
9a)	All surface treatment verifications records prior to application of prime or initial seal	Documentation	24 hours notification
10a)	Prior to application of binder	Construction quality	24 hours notification

Table RD-BP-D2 20-2 Witness Points

Section reference	Witness Point	Documentation or construction quality	Review period or notification period
18.2b)	Testing	Construction quality	48 hours notification

21 Verification requirements and records

The Contractor must supply written verification as part of the Quality Management Records that the requirements listed in Table RD-BP-D2 21-1 have been complied with.

Table RD-BP-D2 21-1 Verification requirements

Subject	Property	Test Procedure	Frequency	Acceptable limits
Precoat and aggregate(1)	ALD	AS1141.20.1 or AS 1141.20.2	3 tests per Work Lot	Report value
Precoat and aggregate(1)	Grading	AS 1141.11	One test per Work Lot	Refer RD-PV-S1 “Supply of Pavement Materials”
Precoat and aggregate(1)	Flakiness	AS 1141.15	One test per Work Lot	Refer RD-PV-S1 “Supply of Pavement Materials”
Precoat and aggregate(1)	Misshapen particles	AS 1141.14	One test per Work Lot	Refer RD-PV-S1 “Supply of Pavement Materials”
Precoat and aggregate(1)	Moisture content	AS 1289.2.1.1 AS 1289.2.1.4	On request	Non-PMB: 0.8% PMB: 0.01%
Paving fabric	Mass per unit area	AS 3706.1	One per Work Lot	Refer RD-EW-S1 “Supply of Geotextiles”
Paving fabric	Wide strip tensile strength	AS 3706.2	One per Work Lot	Refer RD-EW-S1 “Supply of Geotextiles”
Paving fabric	Maximum elongation	AS 3706.2	One per Work Lot	Refer RD-EW-S1 “Supply of Geotextiles”
Paving fabric	Binder retention rate	ASTM D6140-00	One per Work Lot	Refer RD-EW-S1 “Supply of Geotextiles”
Binder and aggregate	Application rate	As recorded on daily record sheet in Appendix 3: Daily record sheet - Seal coat treatment	Per run	Refer section 17
Supply of bitumen	Refer RD-BP-S1 “Supply of Bituminous Material”			
Acceptance criteria	Texture	AGPT-T250	Refer Table RD-BP-D2 18-2	Refer Table RD-BP-D2 18-3
Acceptance criteria	Aggregate retention	AGPT-T254	Refer Table RD-BP-D2 18-2	Refer Table RD-BP-D2 18-4

Table Notes:
(1) Where aggregate is supplied by the Principal, the Principal will provide results.

22 Measurement

a) Measurement of quantities must be based on the daily record sheet in Appendix 3: Daily record sheet - Seal coat treatment.

b) For double/double seals, measurement must be determined from the area of the first coat.

c) Measurement of paving fabric must be based on the final surface area covered, with no allowance for the specified overlaps.

23 Appendix 1: Volume conversion table - bitumen emulsion

Table RD-BP-D2 23-1 Volume conversion table - bitumen emulsion

Hot litres x A = cold litres (15°C)		Cold litres x B = hot litres (T°C)						
60% Bitumen emulsion			70% Bitumen emulsion			80% Bitumen emulsion		
A	Temp (°C)	B	A	Temp (°C)	B	A	Temp (°C)	B
1.0000	15	1.0000	1.0000	15	1.0000	1.0000	15	1.0000
0.9899	16	1.0002	0.9977	20	1.0023	0.9974	20	1.0026
0.9989	18	1.0011	0.9951	25	1.0049	0.9948	25	1.0052
0.9980	20	1.0020	0.9924	30	1.0076	0.9921	30	1.0079
0.9971	22	1.0029	0.9899	35	1.0102	0.9895	35	1.0106
0.9962	24	1.0038	0.9872	40	1.0129	0.9868	40	1.0134
0.9953	26	1.0047	0.9840	46	1.0162	0.9837	46	1.0166
0.9944	28	1.0056	0.9830	48	1.0172	0.9826	48	1.0177
0.9935	30	1.0065	0.9819	50	1.0184	0.9816	50	1.0187
0.9926	32	1.0074	0.9809	52	1.0194	0.9805	52	1.0199
0.9917	34	1.0083	0.9798	54	1.0206	0.9794	54	1.0210
0.9908	36	1.0092	0.9788	56	1.0216	0.9783	56	1.0222
0.9899	38	1.0102	0.9777	58	1.0228	0.9773	58	1.0232
0.9890	40	1.0111	0.9767	60	1.0238	0.9762	60	1.0244
0.9881	42	1.0120	0.9752	62	1.0254	0.9751	62	1.0255
0.9872	44	1.0129	0.9746	64	1.0260	0.9740	64	1.0267
0.9863	46	1.0138	0.9736	66	1.0271	0.9730	66	1.0277
0.9854	48	1.0148	0.9725	68	1.0282	0.9719	68	1.0289
0.9845	50	1.0157	0.9715	70	1.0293	0.9709	70	1.0300
0.9836	52	1.0166	0.9704	72	1.0305	0.9698	72	1.0311
0.9827	54	1.0176	0.9693	74	1.0316	0.9687	74	1.0323
0.9818	56	1.0185	0.9683	76	1.0327	0.9677	76	1.0334
0.9809	58	1.0194	0.9672	78	1.0339	0.9667	78	1.0344
0.9800	60	1.0204	0.9662	81	1.0349	0.9656	81	1.0356
0.9791	62	1.0213	0.9651	82	1.0361	0.9643	82	1.0370
0.9782	64	1.0222	0.9640	84	1.0373	0.9630	84	1.0384
0.9773	66	1.0232	0.9630	86	1.0384	0.9616	86	1.0399
0.9764	68	1.0241	0.9619	88	1.0396	0.9603	88	1.0413
0.9755	70	1.0251	0.9608	90	1.0407	0.9590	90	1.0427

24 Appendix 2: Volume conversion table - hot bitumen based binders

Table RD-BP-D2 24-1 Volume conversion table - hot bitumen based binders

Multiply by "A" to reduce volume at T° to volume at 15°C Multiply by "B" to increase volume at 15°C to volume at T°					
Multiplier "A"	Temp. °C "T"	Multiplier "B"	Multiplier "A"	Temp. °C "T"	Multiplier "B"
0.9856	38	1.0146	0.9356	120	1.0668
0.9844	40	1.0158	0.9344	122	1.0702
0.9831	42	1.0172	0.9332	124	1.0716
0.9819	44	1.0184	0.9320	126	1.0730
0.9806	46	1.0198	0.9308	128	1.0743
0.9794	48	1.0210	0.9296	130	1.0757
0.9782	50	1.0223	0.9284	130	1.0771
0.9769	52	1.0236	0.9272	132	1.0785
0.9757	54	1.0249	0.9260	134	1.0799
0.9745	56	1.0262	0.9249	136	1.0812
0.9732	58	1.0275	0.9237	138	1.0826
0.9720	60	1.0288	0.9225	140	1.0840
0.9708	62	1.0301	0.9213	142	1.0854
0.9695	64	1.0315	0.9201	144	1.0868
0.9683	66	1.0327	0.9189	146	1.0883
0.9671	68	1.0340	0.9178	148	1.0896
0.9659	70	1.0353	0.9166	150	1.0910
0.9646	72	1.0367	0.9154	152	1.0924
0.9634	74	1.0380	0.9142	154	1.0939
0.9622	76	1.0393	0.9130	156	1.0953
0.9610	78	1.0406	0.9119	158	1.0966
0.9597	80	1.0420	0.9107	160	1.0981
0.9585	82	1.0433	0.9095	162	1.0995
0.9573	84	1.0446	0.9084	164	1.1009
0.9561	86	1.0459	0.9072	168	1.1023
0.9549	88	1.0472	0.9060	170	1.1038
0.9537	90	1.0486	0.9049	172	1.1051
0.9524	92	1.0500	0.9037	174	1.1066
0.9512	94	1.0513	0.9025	176	1.1080
0.9500	96	1.0526	0.9014	178	1.1094
0.9488	98	1.0540	0.9002	180	1.1109
0.9476	100	1.0553	0.8990	182	1.1123
0.9464	102	1.0566	0.8979	184	1.1137
0.9452	104	1.0580	0.8967	186	1.1152
0.9440	106	1.0593	0.8956	188	1.1166
0.9428	108	1.0607	0.8944	190	1.1181
0.9416	110	1.0620	0.8933	192	1.1195
0.9404	112	1.0634	0.8921	194	1.1209
0.9392	114	1.0647	0.8909	196	1.1224
0.9380	116	1.0661	0.8898	198	1.1239
0.9368	118	1.0675	0.8886	200	1.1523

25 Appendix 3: Daily record sheet - Seal coat treatment

										A.E. No. /	
Road Name										Date / /	
										Contractor	
Type of Work (e.g. prime, seal, reseal, etc.)										Sprayed No.	
Location of Work (on this sheet) From						-Wards (insert directions)					
To											
Reference to km Post, Junctions, chainages, etc.											
Run No.		1	2	3	4	5	6	7	8	9	0	Totals
Time												
Air Temp °C												
Surface Temp °C												
Binder Mix 100/												
Added Load (Litres)	Bitumen hot											
	Flux cold											
	Cutter cold											
	Additive											
	Total											
Dipstick Reading	Start											
	Finish											
Litres Sprayed	Hot*											
	Temp °C											
	Cold*											
	Cutter*											
	Resid Binder*											
Distance From Starting Point	Start of run											
	End of run											
Length of spray.....m												
Width of spray.....m												
Side of road												
Area sprayed m2												
Specified appl. Rate*												l/m3
Specified litres*												
Tolerance.....*												
Difference.....*												
Actual appl. Rate .....*												
Aggregate	Source and Size											
	Spec. Coverage											m2/m3
	Quantity Used											
	Act. Coverage											
	Precoat (l)											
Sample Number												

Remarks (alterations to specifications – weather, etc.) No. of Rollers used.....Swept after rolling? Yes/No

.....

.....

.....

Department Representative.....

Contractor's Representative.....