Master Specification
Part RD-BP-C4

Application of Thin Asphalt Surfacings

September 2024

Government of South Australia
Department for Infrastructure and Transport

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Document Information

Document Information	
K Net Number:	13506233
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	30/09/2024

Document Management

 This is a controlled document and it will be updated and reissued as approved changes are made.

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RD-BP-C4 Application of Thin Asphalt Surfacings

1 General

a) This Master Specification Part sets out the requirements for the application of thin asphalt surfacing, including:

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

ii) the material requirements, as set out in section 3;

iii) the constraints to work, as set out in section 4;

iv) the requirements for the design of mix, as set out in section 5;

v) the requirements for the manufacture of mixes, as set out in section 6;

vi) the requirements for the placement of mix, as set out in section 7;

vii) the requirements for sampling and testing, as set out in section 8;

viii) the properties of finished surfacing requirements, as set out in section 9;

ix) the records of work requirements, as set out in section 10;

x) the test procedures, as set out in section 11;

xi) the Hold Point requirements, as set out in section 12; and

xii) the verification requirements and records, as set out in section 13.

b) This Master Specification Part does not apply to slurry surfacing (refer RD-BP-C6 “Slurry / Microsurfacing of Pavements”).

c) The application of thin asphalt surfacing must comply with the Reference Documents, including:

i) AGPT Part 4B: Asphalt;

ii) AS 1141.11.1 Methods for sampling and testing aggregates, Method 11.1: Particle size distribution - Sieving method;

iii) 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);

iv) 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);

v) AS 2150 Asphalt - A guide to good practice;

vi) AS/NZS 2891.3.3 Methods of sampling and testing asphalt, Method 3.3: Binder content and aggregate grading — Pressure filter method;

vii) AS/NZS 2891.8 Methods of sampling and testing asphalt, Method 8: Voids and volumetric properties of compacted asphalt mixes;

viii) Austroads Test Method AGPT-T234 Asphalt Binder Content (Ignition Oven Method); and

ix) Department Test Procedure TP346 Determination of Average Texture Depth of a Pavement Surface Using the Sand Patch Method (available from: https://dit.sa.gov.au/standards/test_procedures).

2 Documentation

2.1 Construction Documentation

In addition to the requirements of PC-CN3 “Construction Management”, the Construction Documentation must include documents, procedures, and instructions for the application and testing of thin asphalt surfacings, including:

a) provision for traffic (if not already covered in the Workzone Traffic Management Plan);

b) cleaning and preparing the existing surface;

c) tack coating;

d) method of ensuring existing cracks are sealed;

e) placing the mix;

f) level control and compaction;

g) finished thin asphalt surfacing properties;

h) sampling and testing;

i) procedure demonstrating adequate compaction of mixes when the time between batching and delivery into the paver hopper exceeds 3 hours, as required by section 4.1b);

j) asphalt mix designs, as required by section 5.1b); and

k) nominated density for the surfacing if placing at a nominal rate, as required by section 7.4.

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) the temperature measurements required by section 4.2c);

b) the test and sampling results required by section 8a);

c) the records of work required by section 10a);

d) the results of all testing undertaken in accordance with section 11b); and

e) the verification records required by section 13.

3 Materials

a) The Contractor must ensure that all aggregate complies with RD-PV-S1 “Supply of Pavement Materials”.

b) The Contractor must ensure that all binder, flux and cutter complies with RD-BP-S1 “Supply of Bituminous Material”.

4 Constraints to work

4.1 General

a) The Contractor must ensure that finished asphalt properties comply with RD-BP-D4 “Surface Characteristics of Flexible Pavements”.

b) Modified binder hot mix asphalts must not be used when the time between batching and delivery into the paver hopper exceeds 3 hours, unless the Contractor can demonstrate in the Construction Documentation that such a mix can be adequately compacted.

4.2 Temperature restrictions for hot mix

a) Hot mix asphalt must only be placed at temperatures which conform to AS 2150 Asphalt - A guide to good practice.

b) The minimum mix temperature referred to in section 4.2c) and 4.2d), as required by AS 2150 Asphalt - A guide to good practice, must be the temperature of the mix at the time that it is first placed on the surface.

c) The minimum temperature for mixes containing C320 and C600 binder is 160°C, whereas for mixes incorporating modified binders the minimum temperature must be 170°C. The range of mix temperatures must be submitted as part of the Quality Management Records.

d) Temperatures for open graded mixes, including those with modified binders must be within 140°C to 155°C as required by AS 2150 Asphalt - A guide to good practice.

e) Asphalt less than 100 mm thick must not be placed when the pavement temperature (measured in the shade) falls below 10ºC.

4.3 Wearing course restriction

a) The Contractor must ensure that the wearing course is not placed on a PMB seal until:

   i) a minimum of 24 hours' trafficking has elapsed; or

   ii) the aggregate is fully embedded into the binder.

b) The Contractor must comply with all constraints relating to traffic control as set out in PC-SM1 "Traffic and Pedestrian Management".

5 Design of mix

5.1 Cold mixes and warm mixes

a) The Contractor must design the asphalt mix in accordance with this Master Specification Part and, where appropriate, AGPT Part 4B: Asphalt.

b) As part of the Construction Documentation, the Contractor must submit details of the asphalt mix design, including mix design parameters including:

   i) aggregate grading; and

   ii) binder content (by mass of the total mix).

c) If the Contractor proposes to vary the proportions of the constituents in a nominated mix / rate or proposes to change the source of supply of any constituent, the Contractor must update the design in accordance with the requirements of PC-CN3 "Construction Management".

d) Submission of any changes to the mix design in accordance with section 5.1c) will constitute a **Hold Point**.

5.2 Hot mixes

The Contractor must design the hot mixes to meet the requirements of RD-BP-S2 "Supply of Asphalt".

6 Manufacture of mixes

a) The Contractor must ensure that the asphalt is prepared in a manufacturing plant or blending plant of proven performance. Manufacturing variations must not exceed the limits specified by the Contractor in the detailed mix design submitted pursuant to section 5.1.

b) The Contractor must ensure that hot mix asphalt is stored in accordance with AS 2150 Asphalt - A guide to good practice.

c) The Contractor must ensure that mixes are transported in a manner that does not result in the deterioration, contamination, or segregation of the mix.

7 Placement of mix

7.1 General

a) The Contractor must spread the asphalt mix so as to:

i) minimise segregation and loss of materials;

ii) produce a homogeneous product; and

iii) achieve the mix design's target relative compaction for dense graded mixes or air void content for open graded mixes.

b) Spreading methods must follow the guide for good practice as set out in AS 2150 Asphalt - A guide to good practice. The paver must be a self-propelled paving machine with automatic level control.

c) Hand placement of mix must only be used for minor correction of existing surface and in areas where placement with a paver is impracticable.

7.2 Preparation of the surface

Prior to the application of the surfacing, the Contractor must clean the existing surface by a method which ensures that the surface is clean and free of loose stones, dirt and foreign materials. The method of cleaning must ensure that damage to surfaces is prevented and that proper adhesion of the product can be achieved.

7.3 Protection of road fixtures

The Contractor must prevent primer, binder, aggregate or other material used from entering or adhering to gratings, hydrants or valve boxes, inspection pit covers, kerbs and other road fixtures.

7.4 Layer thickness

Where the surfacing is to be placed to a nominal thickness, the thickness must be determined from the spread rate using an agreed density for the surfacing nominated in the Construction Documentation.

8 Sampling and testing

a) The Contractor must conduct sampling and testing of the mix during manufacture and must submit sampling and testing reports and results as part of the Quality Management Records. The size of Work Lots must be in accordance with Table RD-BP-C4 8-1.

b) Sampling must be undertaken on a random basis. Testing must be undertaken for the properties listed in section 13.

Table RD-BP-C4 8-1 Work Lot size

Daily production quantity (t)	Maximum Work Lot size (t)
0 to 100	50
101 to 300	100
301 to 600	150
>600	200

9 Properties of finished surfacing

9.1 General

a) The Contractor must ensure that the finished surface of thin asphalt surfacings is a thin, durable surfacing layer that has sufficient bond strength, impermeability, rideability and skid resistance. The Contractor must ensure that the Works comply with the requirements specified in:

   i) section 13 as at the Date of Completion; and

   ii) section 9.2 for a period of 12 months after the date of Date of Completion.

b) Any measurement required for compliance with section 9.1 must be taken in the middle of the left hand side wheel path as best can be judged on Site.

9.2 Surface characteristics

a) The Contractor must ensure that the finished surface is free of Non-Conformances including:

   i) segregated on bony areas;

   ii) soft areas;

   iii) fatty areas;

   iv) ravelling and loss of material;

   v) surface cracking;

   vi) shoving; and

   vii) ruts.

b) The existence of any Non-Conformances must be determined by visual inspection and in accordance with the requirements of RD-BP-D4 “Surface Characteristics of Flexible Pavements” (excluding surface roughness requirements).

10 Records of work

a) The Contractor must complete daily record sheets, or an equivalent approved by the Principal, which must then be certified correct by the Contractor and submitted as part of the Quality Management Records at the completion of each day in which thin asphalt surfacing has been applied.

b) Details of all materials applied must be recorded immediately after each application and included as part of the Quality Management Records at the completion of each day in which thin asphalt surfacing has been applied.

11 Test procedures

a) 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-C4 11-1.

b) The Contractor must provide results of the testing as part of the Quality Management Records.

Table RD-BP-C4 11-1 Test procedures

Test	Test procedure
Aggregate grading	AS 1141.11 Methods for sampling and testing aggregates particle size distribution - Sieving method
Binder content: pressure filtration method	AS/NZS 2891.3.3:2013 Methods of sampling and testing asphalt Binder content and aggregate grading - Pressure filter method
Binder content: ignition oven method	Austroads Test Method AGPT-T234 Asphalt Binder Content (Ignition Oven Method)
Moisture content: oven drying method	AS 1289.2.1.1 Methods of testing soils for engineering purposes soil moisture content tests - determination of the moisture content of a soil - oven drying method (standard method)
Moisture content: microwave method	AS 1289.2.1.4 Methods of testing soils for engineering purposes soil moisture content tests - determination of the moisture content of a soil - microwave-oven drying method (subsidiary method)
Determination of average texture depth of a pavement surface using the sand patch method	Department Test Procedure TP346 Determination of Average Texture Depth of a Pavement Surface the Sand Patch Method
Calculation of voids	AS 2891.8 Methods of sampling and testing asphalt voids and volumetric properties of compacted asphalt mixes

12 Hold Points

Table RD-BP-C4 12-1 details the review period or notification period, and type (documentation or construction quality) for each Hold Point referred to in this Master Specification Part.

Table RD-BP-C4 12-1 Hold Points

Section reference	Hold Point	Documentation or construction quality	Review period or notification period
5.1d)	Submission of any changes to the mix design	Documentation	5 Business Days review

13 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-C4 13-1 have been complied with (noting that references to Work Lots in Table RD-BP-C4 13-1 have the same meaning as set out in Table RD-BP-C4 8-1).

Table RD-BP-C4 13-1 Verification requirements

Subject	Property	Frequency(1)	Acceptable limits
Supply of surfacing	Variation of actual combined aggregate grading from the nominated aggregate grading	Once per Work Lot	As specified in AS 2150 Asphalt - A guide to good practice
Supply of surfacing	Variation of actual binder content from the nominated binder content	Once per Work Lot	As specified in AS 2150 Asphalt - A guide to good practice
	Air voids	Once per Work Lot	All tests between 18% and 25% (TOGAS only)
Placement of surfacing to nominal thickness	Average layer thickness	a) Work Lot <100 t: 4 per Work Lot b) Work Lot 100 - 300 t: 6 per Work Lot c) Work Lot >300 t: 6 per Work Lot plus an additional one for each additional 100 t (or part thereof) over 300 t	±10% nominal thickness
	Minimum layer thickness	a) Work Lot <100 t: 4 per Work Lot b) Work Lot 100 to 300 t: 6 per Work Lot c) Work Lot >300 t: 6 per Work Lot plus an additional one for each additional 100 t (or part thereof) over 300 t	Nominal thickness minus 5 mm
Surface finish	Longitudinal evenness	6 random measurements per Work Lot and specific measurements at joints	Max of 5 mm deviation
	Transverse evenness	6 random measurements in the left hand side wheel paths per Work Lot	Max of 5 mm deviation, excluding designed points of crossfall change
	Surface characteristics	Once per Work Lot	Free of Defects as required by section 9.2a)

Table notes:

(1) All references to Work Lots have the meaning ascribed in Table RD-BP-C4 8-1.