



March 2012

## WALGA SPECIFICATIONS

# Appendix 4 - Sprayed Bituminous Surfacing

**Submitted to:**

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REPORT

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**SPRAYED BITUMINOUS SURFACING SPECIFICATIONS  
REVISION REGISTER**

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### GENERAL

#### 1.0 SCOPE

1. The work under this specification consists of the supply of materials and application of the following sprayed bituminous treatments as required under the Contract:
  - a) Primes.
  - b) Primerseals (both aggregate and sand/crusher dust).
  - c) Conventional Seals and Reseals (including bitumen emulsion seals).
  - d) Polymer Modified Seals and Reseals (including SAM and SAMI seals).
  - e) Geotextile Reinforced Seals
2. Quotations are to be supplied as set out in a Schedule of Rates included in Annexure A1 and in a Lump Sum Bill of Quantities included in Annexure A2.
3. The locations and required types of sprayed bituminous surfacings including types of binder and aggregates sizes must be as shown in the Schedule of Works included at Annexure A3 and in the Drawings.
4. The sprayed bituminous treatment must be fit for purpose and as appropriate provide a surface that:
  - a) bonds to the underlying surface (whether base course, concrete or another bituminous surfacing treatment);
  - b) provides a safe durable wearing surface for traffic; and
  - c) waterproofs the pavement or bridge deck.

**Acknowledgment:** *The use of Main Roads WA specifications and guidelines and the Institute of Public Works Engineering Australia (WA Division) Local Government Guidelines for Subdivisional Development are gratefully acknowledged as the basis for these specifications.*

#### 2.0 REFERENCES

1. Australian Standards, MAIN ROADS Western Australia documents and Test Methods and ASTM test methods are referred to in abbreviated form (e.g. AS 1234, Main Roads 67-08-43 or WA 123). For convenience, the full titles are given below:

Equivalent Australian Standard test methods may be substituted for the Main Roads test methods quoted in the specifications.

##### **Australian Standards**

AS 1141	Methods for Sampling and Testing Aggregates
AS 1160	Bitumen Emulsion for Construction and Maintenance of Pavements
AS 1289	Methods of Testing Soils for Engineering Purposes
AS 1672	Limes and Limestones for Building
AS 2008	Residual Bitumen for Pavements
AS 2350	Methods of Testing Portland and Blended Cements
AS 3705	Geotextiles - Identification, Marking and General Data
AS 3706	Geotextiles - Methods of Test
AS 3972	Portland and Blended Cement
AS 2187	Parts 1 and 2 - Rules of Storage, Transport and Use of Explosives

##### **MAIN ROADS Test Methods**

WA 200.1	Sampling Procedures for Aggregates
WA 201.1	Sampling and Preparation of Granulated Rubber
WA 210.1	Particle Size Distribution of Aggregate
WA 212.1	Aggregate Moisture Content: Convection Oven Method



WA 212.2	Aggregate Moisture Content: Microwave Oven Method
WA 215.1	Average Least Dimension
WA 216.1	Flakiness Index
WA 220.1	Los Angeles Abrasion Value
WA 223.1	Crushing Test Value
WA 235.1	Bulk Density of Granulated Rubber
WA 236.1	Particle Size Distribution of Granulated Rubber
WA 237.1	Steel Content of Granulated Rubber
WA 238.1	Rubber Content of Bitumen/Rubber Blends
WA 311.1	Texture Depth
WA 312.1	Ball Embedment
WA 340.1	Sprayed Binder Application Rate: Carpet Tile Method
WA 700.1	Sampling Procedures for Bitumen and Oils
WA 756.2	Stone Coating and Water Resistance Test - Cationic Bitumen Emulsions

### ASTM Test Methods

ASTM D276	Standard Test Methods for Identification of Fibres in Textiles
ASTM D6140	Standard Test Method to Determine Asphalt Retention of Paving Fabrics Used in Asphalt Paving for Full-Width Applications

### Other Standards and Publications

#### Main Roads WA

Guide to Primersealing with Cutback Bitumen (1985)  
Engineering Road Note No 7 - Bitumen Scrap Rubber Seals  
Document No. 71-06-137 Use and Design of Geotextile Reinforced Seals  
Traffic Management for Works on Roads Code of Practice

#### AUSTROADS

Bitumen Sealing Safety Guide  
Specification for Mechanical Sprayers of Bituminous Materials  
Austroads Update of the Sprayed Seal Design Method (AP-T68/06).Austroads Technical Report AP-T37/05  
Geotextile Reinforced Seals

#### MAIN ROADS WA Specifications

Specification 100	GENERAL REQUIREMENTS
Specification 201	QUALITY SYSTEMS
Specification 202	TRAFFIC
Specification 203	OCCUPATIONAL HEALTH AND SAFETY
Specification 204	ENVIRONMENT
Specification 301	CLEARING
Specification 302	EARTHWORKS
Specification 303	PITS AND QUARRIES
Specification 304	REVEGETATION AND LANDSCAPING
Specification 501	PAVEMENTS
Specification 503	BITUMINOUS SURFACING
Specification 504	ASPHALT SURFACING
Specification 510	FULL DEPTH ASPHALT PAVEMENT
Specification 801	EXCAVATION AND BACKFILL FOR STRUCTURES

### Acts and Regulations

Environmental Protection Act 1986  
Environmental Protection Regulations 1987  
Aboriginal Heritage Act 1972





Wildlife Conservation Act 1950  
Environmental Protection (Clearing of Native Vegetation) Regs 2004  
Health Pesticide Regulations 1956  
Dangerous Goods Safety (Road and Rail Transport of Non-explosives) Regulations 2007  
Occupational Safety and Health Act 1984  
Occupational Safety and Health Regulations 1996  
Rail Safety Act  
Road Traffic Code 2000  
Main Roads Act 1930

### 3.0 DEFINITIONS

1. The terms “seal” and “reseal” have the same meaning except where the context of any particular passage indicates otherwise.
2. Strain Alleviating Membrane (SAM) and Stain Alleviating Membrane Interlayer (SAMI) are sprayed seal layers using a polymer modified binder to minimise the risk of reflection cracking.

## PRODUCTS AND MATERIALS

### 4.0 BITUMINOUS AND RELATED MATERIALS

#### 4.1 Class 170 and 320 Bitumen

##### 4.1.1 General

1. All bitumen used, whether as residual bitumen, or for manufacturing cutback bitumen, polymer modified bitumen, multigrade bitumen or bitumen emulsion shall be a straight run, slightly blown or blended product prepared by distillation from crude bituminous base oils. The bitumen shall be homogeneous. It shall not foam when heated to 205°C. The formation of a thin layer of bubbles will not be regarded as foaming.

##### 4.1.2 Properties

1. Class 170 and Class 320 bitumen shall conform to the properties shown in Table 1 at the time of manufacture and at any time until the bitumen is used.



**Table 1: Bitumen Properties**

Method Of Test	Property	Class 170		Class 320	
		Min	Max	Min	Max
AS 2341.2 or AS 2341.3 or AS 2341.4	Viscosity at 60°C, Pa.s	140	200	260	380
AS 2341.2 or AS 2341.3 or AS 2341.4	Viscosity at 135°C, Pa.s	0.25	0.45	0.45	0.65
AS 2341.12	Penetration at 25°C, (100g, 5s), pu (1 pu = 0.1 mm)	62	-	40	-
AS 2341.7	Density at 15°C, kg/m <sup>3</sup>	1000	-	1000	-
AS 2341.14	Flash Point, °C	250	-	250	-
AS 2341.8	Matter insoluble in toluene, percent	-	1.0	-	1.0
AS 2341.10	<b>Short-term effect of heat and air (Rolling Thin Film Oven Test)</b>				
AS 2341.2 or AS 2341.3 or AS 2341.4	Viscosity of residue at 60°C as percentage of original	-	300	-	300
AS 2341.11	Ductility at 15°C, mm	400	-	N/A	
AS 2341.13	Durability Value, days	9		N/A	

Note: N/A = Not Applicable

### 4.1.3 Handling and Transport

- When loading, transporting, heating, circulation, blending, transfer and sampling of bitumen and cutback bitumen, procedures as detailed in the AUSTRROADS publication "Bitumen Sealing Safety Guide" shall be followed. The supplier and carrier shall also observe the provisions and be licensed to perform delivery and heating in accordance with the *Dangerous Goods Safety (Storage And Handling Of Non-Explosives) Regulations 2007 (WA)* in respect to the transport of Dangerous Goods including Flammable Liquids.
- Residual bitumen shall be loaded into road tankers at temperatures between 170°C and 205°C or in accordance with the safe loading requirements of the facility at which the bitumen is being loaded.
- The tanker shall be equipped with facilities to enable circulation, heating and mixing of the bitumen prior to unloading. Operations involving heating and circulating of bitumen shall only be done by appropriately trained personnel.

## 4.2 Bitumen Emulsion

### 4.2.1 General

- The bitumen used for the manufacture of the bitumen emulsion shall comply with the requirements of Clause 4.1.2.

### 4.2.2 Properties

- Bitumen emulsion shall be manufactured as specified in AS 1160 and conform to the properties in AS 1160.

### 4.2.3 Handling and Transport

- Bitumen emulsion shall be loaded into road tankers at a temperature that ensures the product remains stable and in accordance with the manufacturer's instructions. Road tankers shall be lagged and shall have thermometers suitably located to give a representative temperature reading of the product in the tanker. The tanker shall be provided with facilities to enable circulation and mixing of bitumen emulsion prior to unloading.
- Operations involving heating and circulating of bitumen shall only be done by appropriately trained personnel.
- Water used to dilute bitumen emulsion shall be compatible with the emulsion. The water shall be added to the emulsion at a suitable temperature. Emulsion SHALL NOT be added to the water



## 4.3 Polymer Modified Binders

### 4.3.1 General

1. The bitumen used for the manufacture of polymer modified binders (PMB) shall comply with the requirements of Clause 4.1.2.

### 4.3.2 Properties

1. Polymer Modified Binders (PMB) for use in sprayed sealing shall conform to the properties shown in Table 2.

**Table 2: Polymer Modified Binder Properties**

Binder Property	Test Method	Binder Class			
		S10E	S20E	S25E	S35E
Consistency at 60°C (Pa.s) Minimum	AG:PT/T121 (Note)	400	2000	6000	350
Stiffness at 15°C (kPa) Maximum	AG:PT/T121	140	130	95	160
Elastic Recovery at 60°C , 100s (5) Minimum	AG:PT/T121 (Note)	N/A	N/A	85	N/A
Elastic Recovery at 15°C , 100s (5) min.	AG:PT/T121	N/A	N/A	65	N/A
Viscosity at 165°C (Pa.s) Maximum	AG:PT/T111	0.55	0.55	0.8	0.55
Flash Point (°C) Minimum	AG:PT/T112	250	250	250	250
Loss on Heating (% mass) Maximum	AG:PT/T103	0.6	0.6	0.6	0.6
Torsional Recovery at 25°C, 30s (%) Minimum	AG:PT/T122	22	50	52	16
Softening Point (°C) Minimum	AG:PT/T131	48	65	80	48
Segregation Value (%) Maximum	AG:PT/T108	8	8	8	8

Note: N/A = Not Applicable

### 4.3.3 Handling and Transport

1. When loading, transporting, heating, circulation, blending, transfer and sampling of bitumen and cutback bitumen, procedures as detailed in the AUSTRROADS publication "Bitumen Sealing Safety Guide" shall be followed. The supplier and carrier shall also observe the provisions and be licensed to perform delivery and heating in accordance with the *Dangerous Goods Safety (Storage And Handling Of Non-Explosives) Regulations 2007* (WA) in respect to the transport of Dangerous Goods including Flammable Liquids.

2. PMB shall be loaded into road tankers, isotainers or sprayers at temperatures not exceeding 195°C or the manufacturer's recommended maximum temperature, whichever is the lower. The binder shall not be heated above the manufacturer's recommended maximum temperature at any time. The binder shall be delivered at a temperature between the midpoint and maximum of the manufacturer's recommended temperature range.

3. The heating and circulating of binder shall be done only by competent, experienced and trained personnel. The circulating rate shall not be less than 450 litres per minute. Circulating shall continue for at least twenty minutes after heating ceases. The heating rate shall not exceed 20°C per hour at any stage during the heating process. Burners shall not be used unless the level of the material in the heating tank is at least 150 mm above the top of the heating tubes.



## 4.4 Cutting Oil

### 4.4.1 General

1. Oils used for reducing the viscosity of bituminous binders shall comply with the following properties:

### 4.4.2 Medium Curing Cutting Oil

1. Medium curing cutting oil shall be a petroleum product conforming to the requirements shown in Table 3. Supply of certified Aviation Turbine Fuel-Jet A1 with a statement that it had been denatured and supplied without other change as Medium Curing Cutting Oil is acceptable.

**Table 3: Properties of Medium Curing Cutting Oil**

Property	Requirements	Test Method
Distillation		ASTM D86
Initial Boiling Point	132 - 160°C	
Final Boiling Point	265°C maximum	
Temperature at 50% Recovery	220°C maximum	
Flash Point (Pensky Martin Closed)	35°C minimum	AS 2106
Viscosity at 40°C	1.0 - 1.4 mm <sup>2</sup> /s	ASTM D445
Density at 15°C	780 - 820 kg/m <sup>3</sup>	AS 2341.7
Miscibility with Equal Parts of Class 170 Bitumen	Complete No Precipitation	
Water Content	0.05% maximum	AS 2341.9
Percentage Aromatics	15% minimum (Vol)	ASTM D1319

### 4.4.3 Slow Curing Cutting Oil

1. Slow curing cutting oil shall be the recognised petroleum product distillate fuel oil conforming to the requirements shown in Table 4. Supply of certified Automotive Distillate, with a statement that it had been supplied without change as SC Cutting Oil, is acceptable.

**Table 4: Properties of Slow Curing Cutting Oil**

Property	Requirement	Test Method
Distillation		ASTM D86
Initial Boiling Point	170 - 195°C	
Final Boiling Point	360 - 400°C	
Temperature At 50% Recovery	250 - 290°C	
Flash Point (Pensky Martin Closed)	65°C minimum	AS 2106
Viscosity At 40°C	2.0 - 4.0 mm <sup>2</sup> /s	ASTM D445
Miscibility With Equal Parts Of Class 170 Bitumen	Complete No Precipitation	
Water Content	0.05% maximum	AS 2341.9

## 4.5 Precoating Fluid

### 4.5.1 General

1. Except for fine aggregates such as sands and crusher dust, all aggregate used as cover material with Class 170, Class 320, Polymer Modified binder or cut-back binder shall be precoated with a distillate or bitumen based precoating fluid meeting the requirements of this specification. The type of precoating fluid, constituents and rate of precoating shall be as detailed in Annexure C.



2. Crushed aggregate for bitumen emulsion surfacing work shall not be pre-coated with pre-coating fluid. However, the aggregate may be pre-wetted with water to assist adhesion of the binder.

**4.5.2 Distillate Precoating Fluid**

1. Unless otherwise specified the standard Precoating Fluid shall be Slow Curing Cutting Oil with 0.5% by volume of an approved adhesion agent for sprayed sealing works

**4.5.3 Bitumen Based Precoating Fluid**

1. Where specified bitumen based Precoating Fluid shall be a blend of Slow Curing Cutting Oil, Class 170 Bitumen and an approved adhesion agent for sprayed sealing works. The blend may contain between 15 and 30% by volume of bitumen and shall contain 0.5% by volume of adhesion agent. The fluid shall not contain any other materials, whether they are bituminous materials, fuels, solvents, water or oils.

**4.6 Adhesion Agent**

1. Adhesion agent shall be added to bitumen and polymer modified binders used for primes, primerseals, seals or reseals in the proportion given in the Contract specification using an adhesion agent from the list of approved adhesion agents shown Table 5.

**Table 5: Approved Adhesion Agents.**

<b>Bitumite Concentrate</b>
Redicote BE
Diamin TO-L
Fentamine BA422

Adhesion agent shall be a clear liquid product with no sediments, readily miscible with bituminous binders, easy to pour and not subject to deteriorate in storage.

**5.0 AGGREGATES**

**5.1 General**

1. Crushed aggregate, including its source rock, shall meet the requirements of this specification.

**5.2 Source Rock**

1. Source rock shall be selected from an approved quarry site such that the feed to the primary crusher is fresh, hard and durable rock, free from clay, organic matter, weathered (except as allowed below) or friable material, and is consistent in appearance. A classification system for rock material weathering is defined in Table A9 of AS 1726. The proportions of weathered rock material in the source rock shall not exceed the following limits by mass:

Slightly weathered rock	10% maximum
Distinctly weathered rock	0.1% maximum
Extremely weathered rock	0.1% maximum
Residual soil	0% maximum

2. Selection of source rock shall be such that the requirements shown in Table 6 are satisfied.

**Table 6: Source Rock Properties**

<b>Property</b>	<b>Limit</b>	<b>Method of Test</b>
Pendulum Friction Test (PAFV)	45 min	AS 1141.42



### 5.3 Crushed Aggregate for Sprayed Sealing Works

1. Source rock shall be processed to produce crushed and/or screened aggregate suitable for sprayed sealing works and shall conform to the requirements shown in Table 7. The aggregate shall be of uniform quality, clean, hard and durable and shall be free from clay, organic matter and elongated particles. The aggregate shall be of a uniform colour and appearance for the whole of the application.

**Table 7: Crushed Aggregate Properties**

Property	Requirement	Test Method
Los Angeles Abrasion Value (Note 2)		
Granite and other rock types	35% maximum	WA 220.1
Basalt	25% maximum	WA 220.1
Flakiness Index (Note 2)	35% maximum (Note 4)	WA 216.1
Average Least Dimension (Note 3)	Report	AS 1141.20.1 or WA 215.1
Water Absorption of Fine and Coarse Aggregate	2% maximum	AS 1141 6.1 AS 1141.5
Wet Strength	100kN minimum	AS 1141.22
Wet/Dry Strength Variation	35% maximum	AS 1141.22
Stripping Test Value (Note 1)	10% maximum	AS 1141.50
Degradation Factor	50 minimum	AS 1141.25.2
Secondary Mineral Content	25% maximum	AS 1141.26
Petrographic Examination	Statement of suitability for use as a sealing aggregate	

Notes:

- a) The aggregate shall be tested with 0.5% of adhesion agent in the binder using one of the approved adhesion agents listed at Clause 511.13.
- b) Not applicable for crusher dust, sand, 7 mm and 5 mm aggregate.
- c) The reported ALD shall be the mean of at least three results for each lot (maximum lot size 1000 m<sup>3</sup>) and may based on roadside stockpile samples or quarry test results.
- d) Applicable to the mean of at least three results for each lot (maximum lot size 1000 m<sup>3</sup>).

2. The particle size distribution (PSD) of the crushed aggregate shall conform to the requirements shown in Table 8. Test sieves shall comply with the requirements of AS 1152.

**Table 8: Sprayed Sealing Aggregate Particle Size Distribution Limits**

AS Sieve Size (mm)	Percentage by Mass Passing Each Sieve for Each Nominal Size of Aggregate						
	20 mm	16 mm	14 mm	10 mm	7 mm	5 mm	3 mm
26.50	100						
19.00	80 - 100	100					
16.00	0 - 20	80 - 100	100				
13.20	0 - 2	0 - 20	80 - 100	100			
9.50		0 - 2	0 - 20	80 - 100	100		
6.70			0 - 2	0 - 20	80 - 100	100	
4.75				0 - 2	0 - 25	80 - 100	100
2.36					0 - 2	0 - 30	80 - 100
1.18	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1.0	0 - 30
0.60							0 - 5

Note 1. The specification limits apply to the mean of at least three PSD results determined for each lot (maximum lot size 1000 m<sup>3</sup>).



## 5.4 Supply of Sealing Aggregate (Contractor Supplied)

1. The source of aggregate supplied by the Contractor shall be nominated with the Quotation.
2. The Contractor shall make all necessary arrangements with the nominated supplier concerning load size, rate for supply, timing of the delivery, payment and documentation.
3. Prior to the on-site delivery of crushed aggregate, the Contractor shall provide certification to the WALGA Member that the aggregate conforms to specified requirements.
4. The Contractor shall organise all cover material supplied under this Contract into clearly identifiable stockpiles either at source or on site in order that they may be tested as required by this specification.
5. The maximum size of a lot shall be no more than one day's production when applicable, or no more than approximately 1000 m<sup>3</sup>, whichever is the lesser.
6. Any contamination of aggregate after acceptance that is due in any way to the Contractor's activities shall be corrected at no cost to the WALGA Member.

## 5.5 Fine Aggregates - Crusher Dust/Sand

1. Crusher dust/sand used for primer-sealing shall be clean coarse material that should not contain more than 4% by mass of material passing the 0.075 mm sieve and should be relatively free of clay and silt. The particles should be tough, durable, sound and free of deleterious material.
2. Unless otherwise approved by the WALGA Member Representative, the material shall have the following properties:
  - i) Material shall be coarse, with a  $D_{80} > 0.60\text{mm}$  and  $C_u(\text{Coefficient of Uniformity}) > 4$ ,

Where  $D_{80}$  is the particle size in millimetres at which 80%, by mass of the sample, is smaller in size and  $C_u = \frac{D_{60}}{D_{10}}$ , where  $D_{60}$  and  $D_{10}$  are respectively equal to the particle size in millimetres at which 60% and 10%, by mass of the sample, is smaller in size.

- ii) The maximum particle size shall be 4.75 mm. Oversize material shall be removed by screening.

## 6.0 MISCELLANEOUS MATERIALS

### 6.1 Geotextile Fabric

1. The Geotextile fabric shall be non-woven needle punched fabric manufactured from polyester. The fabric shall be free of any flaws that may impact upon performance of the fabric. Geotextile fabric used for sprayed seal applications shall comply with the requirements of Table 9. The grade of Geotextile fabric to be used in the Works is specified in Annexure C.

**Table 9: Properties of Geotextile Fabric**

Test Property	Test Method	Limits	
		Light Grade Fabric	Heavy Grade Fabric
Wide strip tensile strength (kN/m)	AS 3706.2	≥ 6.0	≥ 9.0
Mass per unit area (g/m <sup>2</sup> )	AS 3706.1	130-160	170-200
Maximum Elongation (%)	AS 3706.2	40-60	40-60
UV Stabilisation - Retained Strength	AS 3706.11	At least 50% after 672 hours of exposure	At least 50% after 672 hours of exposure
Melting Point (°C)	ASTM D276	≥ 200	≥ 200
Bitumen Retention (loaded) Note 1 (L/m <sup>2</sup> )	ASTM D6140	≥ 0.9	≥ 1.1
Thickness (mm)	AS 3706.1	1.2-1.6	1.6-2.0

Note 1 - test shall be completed using Class 170 bitumen as per AS 2008



2. When stored Geotextile fabric shall be:
  - wrapped with a waterproof opaque material including the ends of rolls
  - stored in a shed away from direct sunlight and rain
  - kept off the ground and away from any source of moisture
3. Rolls of Geotextile fabric shall show the manufacturers name, type of Geotextile, batch number and date of manufacture.
4. Geotextile fabric shall be used within 2 years of the date of manufacture.
5. The Contractor shall provide test reports showing that the Geotextile fabric complies with all of the properties in Table 9. The test reports shall be NATA endorsed for all tests.

### 6.2 Protective Paper

1. A heavy-duty protective paper, such as a bitumen-laminated paper, shall be used for all start, finish and taper operations on sprayed sealing works. The paper shall be held securely in place during spraying operations, and shall be of sufficient width and strength to prevent overspray and spillage during removal. A suitable minimum standard is Sisalkraft 310 with a minimum width of 900 mm.

## DESIGN OF BITUMINOUS SURFACING

### 7.0 DESIGN GENERAL

1. Unless otherwise specified in Annexure C Table C1 the bituminous surfacing shall be designed by the WALGA Member. Where Annexure C Table C1 specifies design by the Contractor, then the Contractor shall be responsible for and shall carry out the design for the type of treatment(s) specified.

#### 7.1 Design Methods

1. The design of bituminous surfacings shall include selection of binder and design of binder and aggregate application rates unless otherwise specified. Design of binder application rates and aggregate spread rates shall be in accordance with the following:

a) Primes

The prime design, binder composition and binder application rate shall be in accordance with the requirements of the Austroads Update of the Sprayed Seal Design Method (AP-T68/06).

b) Primerseals (Sand and Metal dust)

The primerseal design, binder composition, binder application rate and aggregate application rates shall be in accordance with the requirements of the Main Roads' "Primersealing with Cutback Bitumen Design Manual" (1985).

c) Primerseals (Aggregate)

The Primerseal design, binder composition, binder application rate and aggregate application rates shall be in accordance with the requirements of the Austroads Update of the Sprayed Seal Design Method (AP-T68/06)

d) Seals and Reseals, SAM and SAMI and Geotextile Reinforced Seals (Bitumen and Polymer Modified Binders)

Design binder type, composition, binder application rates and aggregate spread rates shall be in accordance with the requirements of the Austroads Update of the Sprayed Seal Design Method (AP-T68/06) and Austroads Guide to the Selection and Use of Polymer Modified Binders and Multigrade Bitumen.





### 7.2 Design Testing

1. Testing for Average Least Dimension (ALD) shall be carried out in accordance with WA 215.1 or AS 1141.20.1. Testing for Flakiness Index shall be in accordance with WA 216.1. Sampling for testing of ALD and Flakiness Index shall be in accordance with either AS1141. 3.1 or WA 200.1. Testing for surface texture shall be in accordance with WA 311.1. Testing for ball embedment the test shall be in accordance with WA 312.1.
2. Design testing shall be carried out by the party responsible for design except that where aggregate is supplied by the Contractor it shall be the responsibility of the Contractor to carry out all aggregate testing and to supply the WALGA Member Representative with test reports detailing the ALD and Flakiness Index of each homogeneous lot of each size aggregate at least one (1) week prior to the scheduled commencement of sealing.

### 7.3 Designed by the WALGA Member

1. Where Binder Application Rate(s) and other aspects of the bituminous surfacing treatment have been provided by the WALGA Member, their representative will as necessary, order any variations to such design
2. Such amended details may include, but will not be necessarily limited to:
  - a) Aggregate precoating rate
  - b) Binder Application Rate (BAR)
  - c) Binder type and composition
  - d) Aggregate spread rate
  - e) Rolling and sweeping requirements

### 7.4 Designed by the Contractor

#### 7.4.1 General

1. Where the Contractor is responsible for the design of the bituminous surfacing treatment, the design shall be in accordance with the procedures described in Clause 7.1. The design shall be carried out by personal trained in the use of the procedures described in Clause 7.1.

#### 7.4.2 Design Traffic

1. Where the Contractor is responsible for the design of the bituminous surfacing treatment, the WALGA Member shall provide the Contractor with the design traffic for each road to be surfaced at the time of quotation and shall confirm the data at least five (5) days prior to the scheduled start of the works. The traffic data shall be supplied in terms of daily traffic volume, the percentage of commercial vehicles and the number of lanes in each road to be surfaced.

#### 7.4.3 Design

1. The Contractor shall carry out design based on the following as applicable:
  - a) The type of treatment and the nominal aggregate size specified by the WALGA Member.
  - b) Measurement of the Average Least Dimension and Flakiness Index of the aggregate proposed for use.
  - c) Measurement of the surface texture and/or ball embedment of the surface upon which the treatment is to be applied.
  - d) Traffic volume and composition data provided by the WALGA Member on request.
  - e) A visual assessment of the condition of the surface on which the treatment is to be applied and the defects present.
  - f) Climatic data relevant to the Site.



2. Prior to the application of any bituminous surfacing, the Contractor shall provide the WALGA Member with evidence of the application of appropriate design methods as outlined in Clause 7.01
3. During application of a treatment the Contractor may vary the design to allow for changes to any of the design factors, site conditions or observed performance. Details of the design variations shall be documented and submitted to the WALGA Member within 7 days of implementation of the variations.

## 8.0 PLANT AND EQUIPMENT

### 8.1 General

Except where operating out of a central depot, the Contractor shall have all of the following items of plant on site and in sound operating condition prior to the commencement of works:

- a) Mechanical sprayer
- b) Rollers
- c) Road broom
- d) Drag broom
- e) Precoater
- f) Aggregate spreading trucks/equipment
- g) Aggregate Loader.

1. The Contractor shall provide bitumen storage tanks and a geotextile applicator on site if storage of bitumen and or application of a geotextile is required as part of the works.
2. The plant and equipment shall conform to the following requirements and industry best practice standards:

### 8.2 Mechanical Sprayer

1. Binder shall be applied using a bulk bitumen sprayer of minimum capacity 5 000 litres. The sprayer shall comply with the relevant sections of "Specification for Mechanical Sprayers of Bituminous Materials" issued by AUSTRROADS. In addition to the above requirements, the sprayer dipstick shall be calibrated in 50 litre increments, and unless the sprayer is of the air pressure type, the spray bar shall be fully circulating.
2. The sprayer shall have been tested for uniformity of transverse distribution and calibrated for overall rates of application. The tests shall have been performed within the past twelve (12) months for spray rates at least 15 per cent higher than required for the Works.
3. Prior to the use of the sprayer on the Works, the Contractor shall make available to the WALGA Member the calibration certificate for the sprayer. The WALGA Member may require the sprayer to be made available at the Main Roads' Calibration Facility at Welshpool, Perth, for inspection and testing prior to or during execution of the work.
4. The WALGA Member may request prior to the commencement of Works, or at any time during the Works, that the sprayer be tested for uniformity of spray bar output, particularly transverse application, in accordance with WA 340.1. The test will be conducted for the maximum spray bar width to be used in this Contract. The requirements for the spray bar output and distribution are shown below:
  - a) The mean binder application rate of the width tested shall not exceed  $\pm 10\%$  of the binder application rate at 15°C specified for the Works;
  - b) Every tile used in the test which was fully coated shall have a binder application rate within 15% of the mean binder application rate for the width tested;
  - c) Not more than two consecutive tiles that have been fully coated shall have a binder application rate exceeding  $\pm 10\%$  of the mean binder application rate for the width tested.



5. If the sprayer does not conform to the requirements shown above it shall not be used on the Works. Subsequent tests to confirm conformity will be at the Contractor's cost. Any delays to site operations because of conducting these tests are not claimable as separate costs.

6. The Contractor shall use Copley EAN 18 (W) End Nozzles for use in spraying edges. Copley AN18 nozzles shall be fitted to the remainder of the spray bar.

### 8.3 Rollers

1. Rollers shall be rubber tyred rollers, and shall be self-propelled with minimum mass of 11 tonnes and have multi wheels each exerting a minimum load of 10kN. The wheels shall have smooth pneumatic tyres inflated to pressures of at least 700kPa. Rubber tyred rollers for the application of a seal on geotextile fabric shall have a minimum mass of 15 tonnes.

### 8.4 Road Broom

1. The units shall be a mechanically or power driven roller broom, capable of removing excess cover material and/or other loose material from the pavement surface without damage to the existing primerseal or seal surface.

2. The broom and its prime mover shall each be equipped with an amber rotating beacon visible from all directions in accordance with Main Roads Specification 203 OCCUPATIONAL SAFETY AND HEALTH.

### 8.5 Drag Broom

1. The units shall consist of fixed brushes fitted to a frame and shall be capable of distributing loose cover material laterally and longitudinally. The drag broom shall not dislodge particles embedded in the binder or damage the surface in any way. Brooms shall be angled, height adjustable and may be suspended under rubber tyred rollers.

### 8.6 Precoater

1. The precoater shall be capable of applying a uniform film of precoat agent to cover all of the surface area of the aggregate particles at a controlled and variable rate. The precoater shall have sufficient output capacity to maintain an adequate supply to the bitumen sprayer(s).

2. The precoater shall also be capable of screening dirt/foreign matter (both oversize and undersize materials) from the aggregate during its operation.

3. Prior to the use of the precoater on the Works, the Contractor shall notify the WALGA Member of such intention.

### 8.7 Aggregate Spreading Trucks/Equipment

1. Aggregate spreading equipment including truck mounted box spreaders shall be capable of spreading aggregate uniformly both transversely and longitudinally at the specified rate of application over the full length and width of each spray application.

### 8.8 Geotextile Fabric Applicator

1. The Geotextile fabric shall be spread using a purpose built machine mounted fabric spreader. An example is shown in Austroads Technical Report AP-T37/05. The fabric spreader shall keep the fabric taut during spreading such that when laid on the bond coat the width of the applied fabric is within 100mm of the ordered width of the fabric.

2. The application of bituminous surfacing shall include preparation of the surface, and the supply and application of various treatments over the widths, lengths and areas either as shown in the Drawings and/or as specified in Annexure A3.



## **PREPARATORY OPERATIONS**

### **9.0 STORAGE AND DISPOSAL FACILITIES FOR BITUMINOUS MATERIALS**

#### **9.1 Storage Sites**

1. The Contractor shall select suitable sites for bulk storage of bituminous materials and notify the WALGA Member at least five (5) days in advance of establishment or use.
2. The Contractor shall ensure that site layout and safe handling procedures conform to requirements detailed in AUSTRROADS "Bitumen Sealing Safety Guide".
3. The Contractor shall provide and maintain the necessary equipment to receive, hold, heat, circulate, handle and protect bulk bituminous materials as required by his method of working from the time of receipt to prevent misuse, damage, deterioration or loss.
4. Heating and storage tanks shall be fitted with dipsticks for volume measurement and suitable thermometers for indicating the temperature of the bitumen.
5. The Contractor shall keep on the site for independent measurement of temperature, one mercury glass maximum recording thermometer calibrated up to 260 °C, complete with a protective casing with cut out and lifting ring and one refill for the thermometer.
6. Suitable equipment shall be supplied by the Contractor to facilitate removal of liquid used to flush pumps and lines to authorised waste disposal sites.
7. Storage tanks for slow curing cutting oil and medium curing cutting oil shall be fitted with dipsticks or flow meters for volume measurement and suitable thermometers for indicating temperature.
8. The accuracy of volume and temperature measurement facilities shall be sufficient to ensure that the binder constituents (adhesion agent excepted) proportions (expressed as percentages) are those ordered  $\pm 0.5\%$ .

#### **9.2 Disposal Sites**

1. The Contractor shall dispose of bituminous products or other disposable items such as protective paper at an authorised waste disposal site.
2. Any area so used without the approval of the WALGA Member shall be made good immediately at no cost to the WALGA Member.

### **10.0 AGGREGATE DUMP SITES**

#### **10.1 General**

1. The aggregate stockpile sites shall be constructed and maintained in a tidy condition and the Contractor's operations shall not contaminate aggregate in the stockpiles in any way. Surplus aggregate shall be removed from temporary stockpiles and the aggregate stockpile sites shall be fully cleaned and rehabilitated. The Contractor shall prepare a management plan for the stockpile sites detailing how contamination from precoating work is to be managed and clean up of the site after completion of works.
2. Where aggregate is supplied in stockpile by the WALGA Member, the locations of the stockpile sites are as detailed in Annexure B. Where aggregate is supplied by the Contractor, temporary stockpile sites shall be prepared and maintained in good condition by the Contractor.
3. Prior to the stockpiling of aggregate, the Contractor shall nominate to the WALGA Member the proposed location of the stockpile sites and provide a management plan for the sites.



## 10.2 Site Preparation

1. The Contractor shall prepare aggregate stockpile sites such that they incorporate a firm, smooth, plane, well-drained surface. Stockpile areas shall be of sufficient size to allow a 4m clear margin around each stockpile.

## 10.3 Precoating

1. All aggregate except that to be used with bitumen emulsion binder shall be precoated with distillate or a bitumen based precoating fluid.

2. Aggregate precoated with a distillate precoating fluid shall be precoated at least 24 hours but not more than seven (7) days before its intended use. Aggregate precoated with a bitumen based precoating fluid shall be precoated a minimum of four (4) days but not more than twenty eight (28) days prior to its intended use.

3. The rate of application of precoating fluid shall be just sufficient to coat the entire surface area of all of the aggregate particles but shall not be less than the minimum rates of application of precoating fluid as stated in Annexure C. At the time of spreading the precoated aggregate shall not be covered with excess precoat fluid such that aggregate particles stick together or pick up on vehicle tyres or causes a delay in adhesion.

4. Care shall be taken to minimise aggregate losses and to ensure dust does not blow back onto precoated aggregate.

## 11.0 BINDER PREPARATION

### 11.1 Bitumen and Polymer Modified Binders

1. Bitumen and polymer modified binders as specified plus other specified or ordered constituents shall be mixed by circulation in the mechanical sprayer for not less than fifteen minutes immediately prior to application or such longer periods as may be necessary to ensure a uniform and homogeneous mixture.

2. Adhesion agent shall be added to the sprayer on site, dissolved in the hot binder and thoroughly mixed. The binder shall be sprayed within three (3) hours of adding the adhesion agent to the binder. Where the binder has not been sprayed within three (3) hours, further adhesion agent shall be added to the remaining binder. The amount of adhesion agent shall be as specified in Annexure C.

3. Adhesion agent shall be added at least to the minimum level specified or ordered. All other binder constituent proportions (expressed as percentages) shall be those specified or ordered + 0.5%.

4. The binder spraying temperature shall be as specified in Annexure C or by the manufacturer of the polymer modified binder.

### 11.2 Bitumen Emulsions

1. Bitumen emulsion shall be mixed by circulation in the mechanical sprayer for not less than ten minutes or such longer period as may be necessary to ensure a uniform and homogeneous mixture.

2. Where a pressurised sprayer is used circulation in the site storage or road tanker shall be permitted as a substitute for circulation in the sprayer. Such circulation shall take place immediately prior to the loading of the sprayer.



## **12.0 SURFACE PREPARATION**

### **12.1 Basecourse Surface**

1. The pavement surface to be surfaced with bituminous binder shall be swept clean of all loose sand, stones, dust and other foreign matter before surfacing. Adherent patches of foreign matter shall be removed by using hand brooming and steel scrapers or similar methods.
2. Loose material shall be swept a sufficient distance off the pavement to permit application of the bituminous binder.
3. The Contractor shall set out and mark the edge of the binder at a position to achieve the specified tolerances and to suit the method of work employed. The interval of spotting of any line is given in Annexure C. The Contractor shall provide such additional markers as are necessary to achieve the specified tolerances.
4. Application of a light water spray shall precede the application of either a prime or primerseal. The application of the light spray shall be consistent across the width of the proposed seal Works.

### **12.2 Existing Bitumen Surface**

1. Where the pavement surface to be surfaced is an existing bitumen surface, or has been surfaced or sealed with bitumen as part of previous operations, the surface shall be swept clean of all loose sand, stones, dust and other foreign matter before surfacing. Adherent patches of foreign matter shall be removed by using hand brooming and steel scrapers or similar methods.
2. Loose material shall be swept a sufficient distance off the pavement to permit spraying of the bitumen surfacing.
3. Where encountered in resealing works, the Contractor shall remove and dispose of existing raised pavement markers, both permanent and temporary, prior to resealing. The pavement markers shall only be removed at the commencement of works for the day, and shall be removed only from the section to be resealed on that day. Any area of the pavement damaged by the Contractor shall be repaired by the Contractor at no cost to the WALGA Member.

### **12.3 Cold Planed Surface**

1. Where the pavement surface to be surfaced has been produced by cold planning, the surface shall be swept clean of all loose sand, stones, dust and other foreign matter before surfacing. Adherent patches of foreign matter shall be removed by using hand brooming and steel scrapers or similar methods
2. Loose material shall be swept a sufficient distance off the pavement to permit application of the bitumen surfacing.

### **12.4 Bridge Decks**

1. Bridge deck surfaces shall be swept clean of all loose sand, stones, dust and other foreign matter before sealing. Adherent patches of foreign matter shall be removed by hand brooming, or by using steel scrapers, or similar methods.
2. The surface shall be primed with a cationic emulsion (Grade CSS/170-60 or CRS/170-60), diluted with water in the ratio of one (1) part emulsion to one (1) part water. The emulsion shall be compatible with the water used for dilution. The rate of application of the dilute bitumen emulsion primer shall be an average rate of 0.6 L/m<sup>2</sup> applied in a uniform film over the entire surface of the bridge deck. No binder, shall be applied on the prime until the emulsion has broken and has evaporated.
3. All traffic shall be kept off the bridge deck until application of the binder is complete and conforms to all requirements.



### 12.5 Protection of Roadside Furniture and Roadside Facilities

1. The Contractor shall take all necessary precautions to prevent any bituminous or other materials used on the works from entering or adhering to any road furniture or roadside facility, including masking items as a preventative measure.
2. Where necessary existing guideposts shall be removed and stored safely by the Contractor to allow bituminous surfacing operations to proceed.
3. Where not being replaced with new guideposts, the Contractor shall reinstate removed guideposts in their original locations at the completion of bituminous surfacing operations. Any guideposts damaged during their removal or reinstatement shall be replaced by the Contractor at no cost to the WALGA Member.

### 12.6 Surface Damage

1. In the event of any fuel or oil leaks or spillages onto the newly sealed surface, or any other damage to the newly sealed surface the Contractor shall reinstate the surface and or the underlying basecourse to its pre-damage condition at no cost to the WALGA Member.

### 13.0 PROVISION FOR TRAFFIC

1. The Contractor shall establish, implement and manage a Contract specific Traffic Management Plan complying with the Contract, the Main Roads' Traffic Management for Works on Roads Code of Practice, Australian Standard AS 1742.3, the Occupational Safety and Health Act 1984 and the Occupational Safety and Health Regulations 1996.
2. The Traffic Management Plan shall form part of the Contractor's OSH Plan and shall comply with the requirements of Occupational Safety and Health Act 1984 and the Occupational Safety and Health Regulations 1996.
3. The Traffic Management Plan shall also address the impact of each Traffic Management Scheme on traffic flow and movements on the road network including adjacent properties. The Contractor shall ensure that the road system, including the surrounding road network, continues to operate efficiently and any disruption to road users is minimised.
4. The Contractor shall minimise delays and inconvenience to road users during the course of the work. Traffic shall not be allowed on the new work until sufficient rolling has taken place to prevent damaging the freshly applied bituminous mat.
5. The Contractor shall supply signs, lights, plus any other necessary equipment, and erect and maintain same in good condition in accordance with the traffic management plan.
6. Signs inscribed "ROADWORKS IN PROGRESS FOR NEXT ... KM" shall be erected at each end of unswept work where the length of the work, intermittent or continuous, exceeds 1 kilometre.
7. Signs shall remain in position until after the seal is swept with no loose stones remaining on the surface. No item of plant will be permitted to operate outside the appropriate warning signs. All signs shall be free standing.
8. The Contractor shall provide at least two persons on a full time basis as traffic controllers. Warning signs shall always be erected in conjunction with the use of traffic controllers. Each traffic controller shall be equipped with a portable two-way radio, plus a spare and wear a high visibility vest.
9. Prior to implementing any proposed traffic control measures for the Works, particularly temporary speed restrictions, the Contractor shall notify the WALGA Member of such proposed measures.



## **APPLICATION**

### **14.0 APPLICATION**

1. The application of bituminous surfacing shall include the supply and application of the various treatments over the widths, lengths and areas of pavement as shown in the Drawings or as specified in the schedule in Annexure A3.

#### **14.1 Application - Bitumen and Polymer Modified Binder**

##### **14.1.1 General**

1. The surface to be sealed shall be dry and no binder shall be applied during wet or rainy conditions, or when adverse weather conditions may prevail at any time during such work or when wet or rainy conditions may prevail within 24 hours of applying a geotextile reinforced seal. No binder shall be applied whilst the pavement surface temperature is less than:

- a) 25°C for seals and reseals, or
- b) 40°C for a geotextile reinforced seal when applied during daytime hours or 25°C when applied during night works. When applied during night works the pavement temperature for the next day shall be a minimum of 40°C, or
- c) 20°C for primes or primerseals.

2. The Contractor shall provide the WALGA Member with safe and convenient access to the sprayer at all times for checking the volume before and after spraying by means of the dipstick.

3. The Contractor shall demonstrate compliance with the binder property requirements for each batch of bitumen prior to the bitumen being used on the Contract.

##### **14.1.2 Application Rate**

1. The binder application rate (BAR) for quotation purposes shall be as detailed in Annexure C. Where adjustments to the binder application rates in excess of 7.5 percent of the rates detailed in Annexure C are ordered by the WALGA Member then changes to the Contractor's rates for sealing shall be made as follows:

$$\text{URN} = \text{URT} + (\text{ARN} - \text{ART})\text{L}$$

Where:

URN = New Rate for prime, primerseal or seal (\$ per m<sup>2</sup>).

URT = Quoted rate for prime, primerseal or seal as applicable (\$ per m<sup>2</sup>).

ARN = New binder application rate (Litres per m<sup>2</sup>).

ART = Quoted binder application rate (Litres per m<sup>2</sup>).

L = Rate per litre quoted for variation in the Schedule of Rates (\$ per litre).

2. The actual BAR at 15°C shall be calculated from the quantity of binder sprayed and the actual area covered as measured on the ground.





### 14.1.3 Volume Conversion

1. Table 10 (for prime coats) and Table 11 (for primerseals, seals and reseals) give factors to be used when converting binder volumes or spray rates at temperatures other than 15°C to volumes or spray rates at 15°C or vice versa. Adjustment shall be made using the following formulae:-

- a) Volume or spray rate at 15°C equals the Volume or spray rate at T °C multiplied by the Factor for T °C.
- b) Volume or spray rate at T °C equals the Volume or spray rate at 15°C divided by the Factor for T °C.

**Table 10: Conversion Factors - Prime Coats Binder Blend of Bitumen and up to 60% MC Cutter**

Observed Temp T °C	Factor For T °C	Observed Temp T °C	Factor For T °C	Observed Temp T °C	Factor For T °C
15	1.000	80	0.9543	145	0.9105
20	0.9964	85	0.9509	150	0.9072
25	0.9929	90	0.9475	155	0.9039
30	0.9893	95	0.9441	160	0.9007
35	0.9857	100	0.9407	165	0.8974
40	0.9822	105	0.9373	170	0.8942
45	0.9787	110	0.9339	175	0.8909
50	0.9752	115	0.9305	180	0.8877
55	0.9717	120	0.9272	185	0.8845
60	0.9682	125	0.9238	190	0.8813
65	0.9647	130	0.9205	195	0.8781
70	0.9612	135	0.9171	200	0.8749
75	0.9578	140	0.9138		

NOTE: Factors for intermediate temperatures may be obtained by direct interpolation.

**Table 11: Conversion Factors - Primerseals, Seals & Re-seals**

Observed Temp T °C	Factor For T °C	Observed Temp T °C	Factor for T °C	Observed Temp T °C	Factor For T °C
15	1.000	80	0.9597	145	0.9207
20	0.9969	85	0.9567	150	0.9177
25	0.9937	90	0.9536	155	0.9148
30	0.9906	95	0.9506	160	0.9118
35	0.9875	100	0.9476	165	0.9089
40	0.9844	105	0.9446	170	0.9060
45	0.9813	110	0.9416	175	0.9031
50	0.9782	115	0.9385	180	0.9002
55	0.9751	120	0.9356	185	0.8973
60	0.9720	125	0.9326	190	0.8944
65	0.9689	130	0.9296	195	0.8915
70	0.9658	135	0.9266	200	0.8886
75	0.9628	140	0.9236		

NOTE: Factors for intermediate temperatures may be obtained by direct interpolation.



### 14.1.4 Spraying

1. The binder shall be bar circulated for at least three (3) minutes immediately prior to spraying.
2. The spraying of the binder for each run of the sprayer shall start and finish on protective paper. The sprayer shall start each run at least 10m before the protective paper and shall cross the paper at its correct spraying speed. The sprayer shall maintain its correct spraying speed over the full length of each run and shall cross the finish paper at this speed. All tapers and fillets shall be sprayed after masking with protective paper. The paper so used and any spilt bitumen shall be removed and disposed of in a suitable manner.
3. The volume of binder sprayed for each run shall be determined by dipping the tank after each run and recording the volume of binder in the tank to the nearest 50L. The sprayer must be dipped whilst parked on level ground.
4. All outside edges of the seal, parallel to the road centreline shall be sprayed with Copley EAN18 (W) edge nozzles.
5. Where the direct use of the mechanical sprayer is impracticable, the binder may be applied by using a hand lance fed from the mechanical sprayer.
6. The binder shall be sprayed onto areas as detailed in the drawings, or as otherwise specified in Annexure A3. The sprayed binder edge shall conform to the following requirements:
  - a) the sprayed edge shall not deviate from the specified edge by more than 50mm;
  - b) the rate of deviation of the sprayed edge from the specified edge lines shall not exceed one in four hundred (1: 400);
  - c) tapers to accommodate variations in specified width shall be at one in one (1:1), except at floodway exits, which shall be at one in twenty (1:20).
7. The Contractor shall take all necessary precautions to prevent binder from adhering to any existing structure. Any damage or defacement shall be made good by the Contractor at no cost to the WALGA Member immediately surfacing work on a section has been completed.

### 14.1.5 Primer Coat

1. Construction traffic shall not be allowed on newly sprayed areas until the prime has penetrated and the sprayed surface is no longer tacky
2. Where construction traffic must be allowed on areas that remain tacky and on isolated slick spots, the prime shall be dusted over with a dry sand or fine aggregate cover material and lightly rolled prior to trafficking
3. Public traffic shall not be allowed on primed areas without the approval of the WALGA Member.
4. The Contractor shall repair at no cost to the WALGA Member any damage to the prime coat caused by construction or public traffic.
5. All tacky or slick spots shall be blinded with dry sand or fine aggregate prior to the application of the next specified bituminous surface treatment.
6. The prime coat shall be cured for a period of three (3) to seven (7) days prior to the application of a subsequent bituminous surfacing treatment. Dependent upon factors such as the blend to be used, climatic conditions and the porosity of the basecourse, a reduced curing time of not less than 24 hours may be approved by the WALGA Member.



### 14.1.6 Application of Geotextile Fabric

1. A bond coat shall be applied to the prepared surface in accordance with clause 14.1. Class 170 bitumen shall be used for the bond coat without the addition of cutting oil.
2. The Geotextile fabric shall be spread on to the bond coat as soon as practical. The fabric shall be kept as low as possible to the ground during spreading. The edge of the fabric shall not deviate from the specified edge by more than 50mm. Where the fabric is creased after placement the creases shall be broomed out or cut and respread. Both sides of the crease shall be cut and then butt joined.
3. Joins of the fabric should be overlapped by 100 to 200mm with the overlapped join receiving additional binder at the rate of the bond coat for the first layer of fabric. The fabric in the join area shall not be loose. An area of loose fabric shall receive additional binder. Joins shall not occur in wheel path areas. The overlapped fabric shall be nailed down every 10m on the longitudinal join and on the transverse join five flat head nails shall be used to hold down the fabric including each corner.
4. The fabric shall be rolled with a multi tyred roller immediately after the fabric has been spread. Rolling shall cover the entire area of fabric and continue until the bond coat has been absorbed into the fabric as indicated by a darkening in colour of the fabric. Where the bond coat bleeds to the surface of the fabric rolling shall cease. Construction vehicles must not stand on the fabric and public traffic shall not be allowed on the fabric.
5. Bitumen for the seal coat shall be sprayed on to the fabric in accordance with clause 14.1. Where the fabric is wet it shall be air dried before a seal coat is applied.

## 14.2 Application - Bitumen Emulsions

### 14.2.1 General

1. The surface to be sealed shall be dry, or slightly damp if necessary to prevent development of surface tension holes in the sprayed emulsion. No binder shall be applied during wet or rainy conditions, or when adverse weather conditions may prevail at any time during such work.
2. The Contractor shall provide the WALGA Member with safe and convenient access to the sprayer at all times for checking the volume before and after spraying by means of the dipstick.
3. Prior to the binder being used on the Contract the Contractor shall demonstrate to the WALGA Member compliance with the emulsion binder property requirements for each batch of binder.

### 14.2.2 Spraying

1. Binder shall be applied only when the pavement temperature is between 10°C and 40°C.
2. The binder spraying temperature range shall be 35°C to 50°C for conventional emulsions, and shall be 50°C to 80°C for high bitumen content emulsions.
3. The emulsion binder application rates shall be as specified in Annexure C or as designed by the Contractor or WALGA Member.
4. The spraying of the binder for each run of the sprayer shall start and finish on protective paper. The sprayer shall start each run at least 10 m before the protective paper and shall cross the paper at its correct spraying speed. The paper so used and any spilt binder shall be removed and disposed of in an approved manner. All tapers and fillets shall be sprayed after masking with protective paper. All outside edges shall be sprayed with Copley EAN18 (W) edge nozzles. Where the direct use of the mechanical sprayer is impracticable, the binder may be applied using a hand lance fed from the mechanical sprayer.
5. The volume of binder sprayed for each run shall be determined by dipping the tank after each run and recording the volume of binder in the tank to the nearest 50L. The sprayer must be dipped whilst parked on level ground.



6. The binder shall be sprayed onto areas as detailed in the drawings, or as otherwise specified in Annexure C. The sprayed binder edge shall conform to the following requirements:
- the sprayed edge shall not deviate from the specified edge by more than 50 mm;
  - the rate of deviation of the sprayed edge from the specified edge lines shall not exceed one in four hundred (1: 400);
  - tapers to accommodate variations in specified width shall be at one in one (1:1), except at floodway exits, which shall be at one in twenty (1:20).
7. The Contractor shall take all necessary precautions to prevent binder from adhering to any existing structure. Any damage or defacement shall be made good immediately upon completion of sealing work at no cost to the WALGA Member.
8. In two-coat applications, the binder for the second coat shall not be applied until the binder in the first coat has completely broken and cured to form a stable primerseal leaving no water in the binder.

## 15.0 APPLICATION OF COVER MATERIAL

### 15.1 Single Coat Aggregate Primerseals and Seals

#### 15.1.1 General

- Spreading
  - The aggregate shall be dry (containing no water unless being applied as part of an emulsion seal) at the time of application and shall be uniformly spread over the sprayed area by means of a suitable type of mechanical spreader. The mechanical spreader shall be fitted with removable cut-off attachments to allow the aggregate spread width to match the required width on the pavement. The aggregate shall be applied commencing at the low edge of the pavement in successive runs parallel to that edge if the binder used is bitumen emulsion.
  - The time lag between spraying and spreading shall be kept to a minimum and all sprayed areas, with the exception of approved lapping strips, shall be covered with aggregate within ten (10) minutes of spraying the binder. The length of spray runs shall be limited to ensure compliance with this requirement. The time lag shall be varied if required to suite the properties of bitumen emulsion binder and facilitate adhesion if this type of binder is used.
  - The aggregate shall be placed to form a uniform stone mosaic of single particle thickness, in almost continuous interlocked contact, generally orientated with their least dimension vertical. In order to meet this requirement it may be necessary to apply the aggregate initially at a rate slightly less than appears optimum so that some binder is visible between the stones. Specified aggregate application rates are nominal and should be adjusted to suite the aggregate used to give the correct stone mosaic.
2. Additional Aggregate
  - Additional aggregate shall be applied to any bare or insufficiently covered areas as necessary to provide a uniform and complete cover. Where the area to be covered with additional aggregate is not of uniform width the additional aggregate shall be spread by hand.
  - Additional aggregate shall be applied before the completion of four complete coverages of rubber tyred rolling.
  - If there are surplus loose particles on any portion of the sealed area, such portion shall be swept lightly to move the loose particles but not disturb the aggregate embedded in the binder.



### 3) 3. WALGA Member Supplied Aggregate

- a) Where the Contractor excessively overspreads (applies too much aggregate), or otherwise wastes aggregate, the Contractor shall be liable for the cost of the overspread or wasted aggregate and this cost will be deducted from the money due to the Contractor.

#### 15.1.2 Rolling and Drag Brooming

1. Immediately after application of the cover material, the surface shall be rolled with rubber tyred rollers to the minimum number of complete coverages as stated in Annexure C over the whole area. For the first four complete coverages, rollers shall be operated at speeds less than 7km per hour. Drag brooming shall be carried out after every second complete coverage of rolling except on a geotextile reinforced seal, and if necessary on an emulsion seal. If an emulsion seal has not broken and cured and there is any tendency to dislodge aggregate the Contractor shall defer or eliminate drag brooming. Where drag brooming is eliminated the Contractor shall substitute light hand brooming. On geotextile seals only hand sweeping will be used to correct inconsistent spreading of aggregate.
2. The WALGA Member may order additional rolling and drag brooming and such extra work shall be paid for at Daywork rates.
3. For double coat seals, the rolling shall comply with the requirements of this section for each coat of the seal and any aggregate not incorporated in the first coat of the seal shall be removed in such a manner as to prevent removal of aggregate incorporated therein. Public traffic shall not be allowed on the first coat of a double coat seal. Any damage to the first coat shall be repaired by the Contractor at no cost to the WALGA Member prior to spraying the binder for the second coat.

#### 15.1.3 Surface Sweeping

1. Any loose cover material not incorporated in the seal after the completion of rolling shall be swept off the seal surface to beyond the outer edge of each shoulder without damage to seal, shoulder or guideposts, and shall then be dispersed such that no windrows of swept material remain.
2. Where the roadway to be sealed is kerbed the excess cover material may be swept hard against the kerb during interim sweeping operations but shall be picked up and removed during the final sweeping.
3. The initial sweeping shall take place prior to the completion of the day's work. A second sweeping shall be carried out at the commencement of the following day's work. The Contractor shall carry out subsequent sweepings as necessary for the following seven (7) days to ensure that no loose stones remain on the road surface.
4. The Contractor shall install symbolic "loose stones" signs and other temporary traffic management signs in accordance with Specification 202 TRAFFIC. The signs shall remain in place on each section of the Works for the following seven (7) days after completion of sealing. Note that an emulsion seal develops strength more slowly than a hot bitumen seal and adequate after-care may be required for up to 48 hours.

### 15.2 Application of Aggregate - Two Coat Seals

#### 15.2.1 First Coat (Larger Aggregate)

1. The first coat aggregate application shall be applied in accordance with Clause 15.01.01 to Clause 15.01.03.



### 15.2.2 Second Coat (Smaller Aggregate)

- a) The second aggregate coat shall not be applied to the first coat until completion of rolling, drag brooming, removal of excessive aggregate on the first coat. In an emulsion seal, the binder of the first coat shall have completely broken and cured to form a stable seal or primerseal leaving no water in the binder prior to application of the second coat.
- b) In an emulsion seal the first coat of aggregate may require to be sprayed with water prior to the application of the binder for the second coat.
- c) The second aggregate coat shall be spread, rolled and swept as specified for the first coat. This work shall be completed within 15 minutes of the application of the second binder coat except with an emulsion seal or primerseal.
- d) An emulsion seal or primerseal should not be swept or trafficked until the emulsion has completely broken leaving no water and the binder has had adequate curing to attain full strength, ensuring stone retention after unrestricted trafficking.

## 15.3 Sand/Crusher Dust Primerseals

### 15.3.1 General

- a) The cover material shall be dry at the time of application and shall be uniformly spread by means of a suitable type of mechanical spreader. The time lag between spraying and spreading shall be kept to a minimum and all sprayed areas, with the exception of approved lapping strips, shall be covered with material within ten (10) minutes of spraying the binder. The length of spray runs shall be limited to ensure compliance with this requirement.
- b) Sufficient loaded trucks shall be at the site to provide the full cover for the area to be sprayed at the time.

### 15.3.2 Additional Cover Material

- a) Additional cover material shall be applied to any bare or insufficiently covered areas as necessary to provide a uniform and complete cover.

### 15.3.3 Cover Material Spread Rate and Drag Brooming

- a) The cover material spread rate shall be as stated in Annexure C or as directed by the WALGA Member Representative. The actual cover material spread rate shall be calculated from the volume of cover material spread and the actual area covered as measured on the ground in accordance with the requirements detailed in Annexure C.
- b) Sufficient cover material (sand or crusher dust) must be spread and rolled into the binder to fully absorb the bituminous material applied. To achieve this result it may be necessary to slightly overspread the aggregate and broom off any excess once a stable bitumen-aggregate mat has been achieved.

### 15.3.4 Rolling

- a) Immediately after application of the cover material, the surface shall be rolled with rubber tyred rollers for the minimum number of complete coverages stated in Annexure C over the whole area. Rollers shall not be operated at speeds in excess of 7km per hour for the first four complete coverages.

### 15.3.5 Sweeping

- a) Any loose cover material not incorporated in the primerseal after the completion of rolling shall be swept off the surface to beyond the outer edge of each shoulder without damage to the primerseal or shoulder and spread evenly down the batter slope.
- b) The Contractor shall not install guideposts prior to the sweeping of loose cover material down the batter slope.
- c) The time lapse between the completion of rolling and final surface sweeping shall be determined by the WALGA Member. However, such time lapse shall not be greater than one week and may be as short as one day.



Note that fine aggregate sand/crusher dust primerseals require ongoing monitoring and maintenance, and typically the spreading of additional cover material as pavement temperatures increase to ensure the mat is stable and does not pick up on vehicle tyres.

## 16.0 MATERIAL QUALITY

1. The Contractor shall implement a quality control system to ensure material supplied under this contract complies in all respects to the specified requirements for the type of material purchased.
2. The quality control system shall include the following minimum testing requirements unless otherwise approved by the WALGA Member:

**Table 12: Minimum Testing Frequency**

Material/Property	Minimum Number of Tests
<b>Bitumen</b>	
All properties in AS 2008	1 suite of tests of all properties per production batch
<b>Bitumen Emulsion</b>	
All properties in AS 1160	suite of tests of all properties per production batch
Particle charge (AS 1160 Appendix C)	1 per delivery tanker
Residue (AS 1160 Appendix D)	1 per delivery tanker
Setting time (AS 1160 Appendix K)	1 per delivery tanker
<b>Polymer Modified Bitumen</b>	
All properties in Table 403.01	1 suite of tests of all properties per production batch
<b>Aggregate (Note)</b>	
PSD (WA 210.1)	3 tests per quarry production lot
Flakiness Index (WA 216.1)	3 tests per quarry production lot
LA Abrasion (WA 220.1)	1 test per 12 months
Water Absorption (AS 1141.5/6)	1 test per 12 months
Degradation Factor (AS 1141.25.2)	1 test per 12 months (excluding acid igneous rock)
Wet Strength and Wet/Dry Strength Variation (AS 1141.22)	1 test per 12 months
Petrographic Examination (AS 1141.22)	1 test per 12 months per material type
Secondary Mineral Content (AS 1141.26)	1 test per 12 months (excluding acid igneous rock)
Resistance to Stripping (AS 1141.50)	1 test per 12 months
ALD (AS 1141.20.1)	Minimum 3 tests per lot per aggregate size.
Flakiness Index	Minimum 3 tests per lot per aggregate size.
Particle Size Distribution	Minimum 3 tests per lot per aggregate size.

Note: A lot shall be no more than one (1) days production or 1000 m<sup>3</sup> whichever is the lesser and shall be homogeneous in terms of quality.

## 17.0 REGULATORY REQUIREMENTS

The Contractor shall conform to all statutory and regulatory requirements concerning the environment, aboriginal heritage, wildlife conservation, dangerous goods, occupational safety and health, rail safety, and road safety.



## 18.0 ANNEXURE A1

The quantities in this Schedule of Rates are the estimated quantities of the Works and are not to be taken as the actual or correct quantities. The Contractor shall be paid for the measured quantity of each section or item of work described below and executed under the contract at the rates and amounts entered applicable thereto.

Item	Description	Unit	Qty	Rate (i)	Amount	
					\$	¢
1	Class 170 bitumen	Litre at 15°C				
2	Class 320 bitumen	Litre at 15°C				
3	Class S10E PMB	Litre at 15°C				
4	Class S20E PMB	Litre at 15°C				
5	Class S35E PMB	Litre at 15°C				
6	Class S35E PMB	Litre at 15°C				
7	Bitumen emulsion - rapid setting - 60% bitumen	Litre at 15°C				
8	Bitumen emulsion - slow setting - 60% bitumen	Litre at 15°C				
9	14 mm sealing aggregate	m <sup>3</sup>				
10	10 mm sealing aggregate	m <sup>3</sup>				
11	7 mm sealing aggregate	m <sup>3</sup>				
12	5 mm sealing aggregate	m <sup>3</sup>				
13	Sand/crusher dust	m <sup>3</sup>				
14	Medium curing cutter	Litre				
15	Slow curing cutter	Litre				
16	Bitumen based precoating fluid	Litre				
17	Adhesion agent	Litre or kg				
18	Geotextile	m <sup>2</sup>				
19	Design of application rates of binder and aggregate	Design lot				
20	Sealing, inclusive of supply of all materials, all processes and operations but excluding design - 14 mm aggregate/bitumen binder	m <sup>2</sup>				
21	Sealing, inclusive of supply of all materials, all processes and operations but excluding design - 10 mm aggregate/bitumen binder	m <sup>2</sup>				
22	Sealing, inclusive of supply of all materials, all processes and operations but excluding design - 7 mm aggregate/bitumen binder	m <sup>2</sup>				







## 19.0 ANNEXURE A2

### PRICE SCHEDULE (LUMP SUM BILL OF QUANTITIES)

All items in this Bill of Quantities shall be priced and extended by the Contractor and the lump sum accepted by the WALGA Member shall equal the TOTAL AMOUNT GST INCLUSIVE. Any errors in the rates or prices entered in this Schedule shall be corrected by agreement between the Contractor and the WALGA Member. Where no agreement can be reached, any errors shall be corrected as determined by the WALGA Member so that the total amount of quotation for all items in this Schedule continues to equal the lump sum accepted by the WALGA Member.

Item	Description	Unit	Qty	Rate (i)	Amount	
					\$	¢
1	Design, supply all materials and apply specified bituminous surfacings					
2	Supply all materials and apply specified bituminous surfacings (WALGA Member to design)					
3	Supply all materials except aggregate and apply specified bituminous surfacings (WALGA Member to supply aggregate and design)					
<b>GST EXCLUSIVE TOTAL \$</b>						
<b>GST AMOUNT \$</b>						
<b>TOTAL AMOUNT OF QUOTATION \$</b>						

Note (i) Rate to include all overheads, incidentals, mobilisation and demobilisations, testing and handling of material



## 20.0 ANNEXURE A3

### SCHEDULE OF WORKS - SEAL / RESEAL

Works Item (Section Nos)	From <sup>1</sup> (SLK)	To <sup>1</sup> (SLK)	Length (km)	Width (m)	Side <sup>2</sup> (L,C,R)	Area (m <sup>2</sup> )	BAR at 15 °C (l/m <sup>2</sup> )	Cover Material (Type)	Cover Size (mm)	Comments
Road Name 1										
1										
2										
Etc. etc.										
Road Name 2										
1										
2										
Etc. etc.										
Road Name 3										
1										
2										
Etc. etc.										

NOTES:

1. SLK denotes Straight Line Kilometre distance values for "From" and "To". Alternatively, section limits may be described using chainages.
2. "L, C, R" denotes "Left", "Centre", or "Right". Leave "Side" column blank if width value in previous column is entire seal width.



## 21.0 ANNEXURE B

### COVER MATERIALS - SUPPLIED BY THE WALGA MEMBER

#### B.1 AGGREGATE DUMPSITE LOCATIONS

1. Details of aggregate supplied by the WALGA Member are shown in Table B1.

**Table B1: Dumpsite Details**

Location (SLK)	Offset (m)	Quantity Available (m <sup>3</sup> )	Size (mm)	Type



## 22.0 ANNEXURE C

### C.1 RESPONSIBILITY FOR DESIGN

**Table C1: Design Responsibility**

Seal Type	Location	Design Responsibility
Prime	All Works	
Primerseal	All Works	
Seal/Reseal	All Works	
SAM/SAMI	All Works	
Waterproof Bridge Deck Membrane	All Works	
Geotextile Seal	All Works	

### C.2 BINDER AND AGGREGATE APPLICATION RATES

1. The percentage of each binder constituent and binder application rates for Quotation purposes shall be as detailed in Table C2.

**Table C2: Binder Composition And Application Rates**

Surface Type	Binder Composition % by Volume			Binder Application Rate (BAR) @ 15°C (L/m <sup>2</sup> )
	Class 170 Bitumen	Medium Curing Cutting Oil	Slow Curing Cutting Oil	
Prime	40	60		0.6
Primerseal				As per design
Seal/Reseal - Single coat	100			As per design
Seal/Reseal - Double coat				
First Coat	100			As per design
Second Coat	100			As per design
Polymer Modified Binder Seals:	<b>PMB</b>			
High Stress Seal coat	100			As per design
Bridge Deck	100			As per design
SAM	100			As per design
SAMI	100			As per design

Rates to be modified in accordance with Clauses 7.03 or 7.04

NOTE:

- Medium curing cutting oil shall be added to the seal/reseal coat binder in accordance with Figure C1 or Table C4. To compensate for the cutter added to the binder, the binder application rates shall be increased or decreased as advised or agreed by the WALGA Member to preserve the designated residual bitumen application rate.
- The type of cover material, nominal size and spread rate for quotation purposes shall be as detailed in Table C3.



**Table C3:Aggregate Type And Spread Rate**

<b>Surface type</b>	<b>Cover Material and Size (mm)</b>	<b>Aggregate Spread Rate (m<sup>2</sup>/m<sup>3</sup>)</b>
Primerseal		
Seal/Reseal - Single coat		
Seal/Reseal - Double/ Double:		
First coat		
Second coat		
High Strength Seal		
Bridge decks		
SAM		
SAMI		

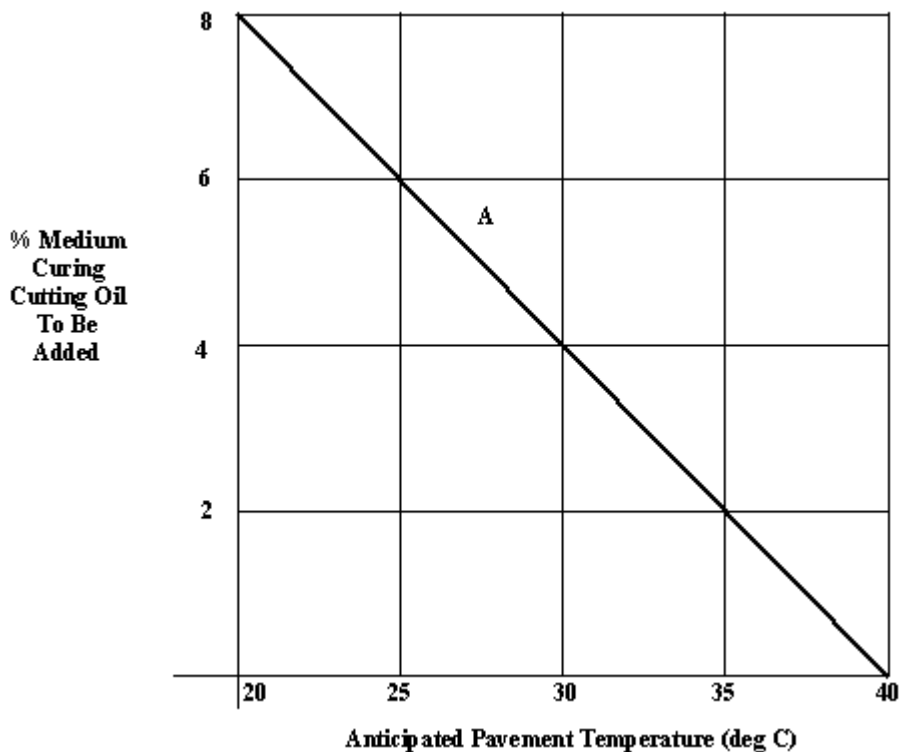
Rates to be modified in accordance with 7.03 or 7.04



**C.3 SEALS AND CUTBACK PRIMERSEALS**

**C.3.1 ADDITION OF MEDIUM CURING CUTTING OIL TO BITUMEN**

1. Medium Curing Cutting Oil shall be added to Class 170 Bitumen used for seals, reseals and aggregate primerseals depending on pavement surface temperature at the time of sealing as shown in Figure C1 Addition of Medium Curing Cutting Oil. Medium Curing Cutting Oil shall be added to the binder for fine aggregate sand/crusher dust primerseals as required by design.



*Figure C1: Addition of Medium Curing Cutting Oil*

LEGEND: Line A Class 170 bitumen (approximately 2% more cutting oil should be added if Class 320 bitumen is used.)

NOTES to Figure C1:

1. Minimum desirable pavement temperature for seals and reseals is 25 °C.
2. If the anticipated pavement temperature is likely to rise, decrease the Medium Curing Cutting Oil percentage obtained from the chart.
3. If the aggregate is clean and freshly precoated, reduce the Medium Curing Cutting Oil proportion by 1%.

**C.3.2 ADDITION OF MEDIUM CURING CUTTING OIL TO POLYMER MODIFIED BINDER**

Depending on the anticipated road temperature, medium curing cutting oil shall be added to the binder in accordance with Table C4 and accompanying notes.



**Table C4: Percentage of Cutting Oil to be Added to Polymer Modified Binder**

Pavement Temperature (°C)	Traffic (vehicle/lane/day based on AADT)	Class of Polymer Modified Binder		
		S10E and S35E	S25 E	S20E
		% by volume of total binder		
20 to 25	Less than 1000	6	8	8
	1000 or more	4	6 to 8	6 to 8
26 to 32	Less than 1000	4	6	4 to 6
	1000 or more	2	4 to 6	4
33 to 38	Less than 1000	2	4 to 5	4
	1000 or more	0 to 2	3 to 4	2
39 to 45	Less than 1000	0 to 2	Min 3	2
	1000 or more	0 to 2		
Above 45	All	0	Min 3	0 to 2

NOTES to Table C4:

1. Assessment of pavement temperature shall take into account the presence of shaded areas and expected weather conditions in the 24 hours following completion of the Works
2. Where manufacturer's instructions vary from Table C4, the manufacturer's instructions shall be followed.
3. In strain alleviating membrane interlayer or bridge deck applications where the treatment is to be covered by asphalt within a short period, it is not desirable to add cutter oil. If cutter oil is considered necessary, it shall be limited to a maximum of 2% by volume of binder.

### C.3.3 BINDER SPRAY TEMPERATURE

1. Binder Spraying Temperatures for seals and primerseals using Class 170 bitumen shall be in accordance with Table C5. Binder spraying temperatures for Class 320 bitumen may be increased by no more than 5°C from those shown in Table C5. Binder spraying temperatures for polymer modified binders as specified in Table C6 unless otherwise specified by the binder manufacturer. The manufacturer's instructions shall take precedence over Table C6.

2. Where bitumen or bitumen cutback is delivered to site at a temperature higher than the upper limit of the recommended spraying temperature range, the spraying of the product shall be delayed until such time as the temperature of the product has cooled to the recommended upper limit.

3. In certain circumstances, the WALGA Member may allow the spraying of binder at temperatures above those listed below. In such cases, the binder application rate will be adjusted as directed by the WALGA Member.

**Table C5: Bitumen Spraying Temperature**

Pavement Temperature (°C)	Binder Composition (Bitumen/MC Cutter)	Ideal Spraying Temperature Range (°C)
40 +	100/0	175-185
35	98/2	165-175
30	96/4	160-170
25	94/6	150-160
20	92/8	145-155





**Table C6: Polymer Modified Binder Spraying Temperature**

Percentage Medium Curing Cutter in Polymer Modified Binder	Spraying Temperature °C
0	180 to 190
2	175 to 185
4	170 to 180
6	165 to 175
8	160 to 170

## **C.5 BITUMEN EMULSION PRIMERSEALS**

1. Binder application rates for Bitumen Emulsion primerseals for quotation purposes shall be in accordance with Table C8.

**Table C8: Binder Application Rates (Bitumen Emulsion)**

Surface Type	Binder Application Rate (BAR) @ 15°C (L/m <sup>2</sup> )
Primerseal - 1st coat - 10mm	0.9
Primerseal - 2nd coat - 5mm	1.1

## **C.6 ROLLING**

Rolling of the seal or primerseal surface shall be to the minimum number of complete coverages shown in Table C9. A complete coverage is one pass of a roller over the entire area, ie. the total length and width of a spray run being rolled.

**Table C9: Rolling**

Type of Roller	Minimum No. of Complete Coverages
Rubber Tyred Roller	12

## **C.7 PRECOATING OF AGGREGATE**

### **C.7.1 PRECOATING FLUID**

1 Unless otherwise shown in Table C10 all aggregates shall be precoated with a distillate precoat fluid.

### **C.7.2 APPLICATION RATE**

1 The Application Rate of Precoating Fluid shall be as shown in Table C10:



**Table C10: Type of Precoat Fluid and Application Rate**

Seal Type	Type of Precoat Fluid
Primerseal	Distillate
Seal/Reseal	Distillate
Bridge Deck	Distillate
Geotextile Seal	Distillate
Polymer Modified Seal	Bitumen based

Nominal Size Aggregate (mm)	Distillate Precoat Fluid	Bitumen Based Precoat Fluid
	Minimum Application Rate (litres/m <sup>3</sup> loose)	Minimum Application Rate (litres/m <sup>3</sup> loose)
7	6	11
10	5	10
14	5	8
16	4	6

Note the rate of application of precoating fluid should be just sufficient to coat each aggregate particle uniformly without an excess of fluid.

### C.8 ADHESION AGENT

1. In cutback prime, primerseal and conventional seal binders the proportion of adhesion agent shall be 0.5% of the binder volume at 15°C, or as directed by the WALGA Member. In Polymer Modified Binders, the proportion of adhesion agent shall be 1.0% of the binder volume at 15°C, or as directed by the WALGA Member.

### C.9 GEOTEXTILE REINFORCED SEALS (GRS)

1. Fabric grade, type of binder, binder application rate, aggregate size and aggregate spread rate for GRS shall be in accordance with Table C11.

**Table C11: GRS Application Details**

	Fabric Grade	Type of Binder	BAR at 15°C (L/m <sup>2</sup> )	Aggregate Size (mm)	Aggregate Spread Rate m <sup>2</sup> /m <sup>3</sup>
<b>Single Coat Seal</b>			As per design		
Bond Coat	Light OR Heavy	C170 Bitumen	As per design		
Seal Coat		C170 Bitumen	As per design		
<b>Double Coat Seal</b>			As per design		
Bond Coat	Light OR Heavy	C170 Bitumen	As per design		
1 <sup>st</sup> Seal Coat		C170 Bitumen	As per design		
2 <sup>nd</sup> Seal Coat		C170 Bitumen	As per design		



**C.10 LINE SPOTTING**

1. Primes, primerseals, seals and reseal sections are spotted at the following intervals:

**Table C12: Line Spotting Interval**

<b>Road Feature</b>	<b>Spotting Interval (m)</b>
Straight Sections	8
Curved Sections	5



## **23.0 ANNEXURE D**

### **RECORD FORMS**

The following records are attached;

- 1D.1 Bituminous Surfacing - Contractors Daily Surfacing Record
- 1D.2 Bituminous Surfacing - Contractors Sprayer Loading Record



## WALGA SPECIFICATION 2 - SPRAYED BITUMINOUS SURFACING

### 1D.1 BITUMINOUS SURFACING - CONTRACTORS DAILY SURFACING RECORD

DATE: _____	BASE MATERIAL	PAVEMENT SURFACE	COVER AGGREGATE			BITUMEN			TOTAL QTY OF BITUMEN USED
CONTRACT NO: _____	TYPE _____	TYPE _____	TYPE _____	DUMP		TYPE 50 170 Emulsion	SOURCE **		LITRES AT 15.0°C
TIE IN POINTS FROM _____ TO _____	_____	CONDITION _____	CONDITION **	Dusty	Precoated	Damp	ADHESION AGENT _____		

Spray No.	DISTANCE		SIDE OF ROAD	SPRAYED AREA			Road Temperature	BINDER COMPONENTS				ORDERED APPLICATION RATES		Spray Temperature	BINDER QUANTITY USED				Cover Aggregate Used	ACTUAL APPLICATION RATES			% OF ORDERED APPLICATION RATES		BINDER COMPONENT QUANTITIES USED AT 15°C			
	From	To		Length	Width	Area		Component No.1	Component No.2	Component No.3	Additive Adhesion Agent	Binder at 15°C	Cover Aggregate		Dip Before Spraying	Dip After Spraying	Quantity Sprayed Hot	Quantity Sprayed at 15°C		Binder Hot	Binder at 15°C	Cover Aggregate	Binder at 15°C	Cover Aggregate	Component No. 1	Component No. 2	Component No. 3	Additive
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
<b>TOTALS</b>																												

\* Description Of Component No. 1 \_\_\_\_\_ Remarks: \_\_\_\_\_  
 Component No. 2 \_\_\_\_\_  
 Component No. 3 \_\_\_\_\_

SIGNATURE CONTRACTORS REPRESENTATIVE: \_\_\_\_\_ \*\* = Tick Appropriate Box WALGA MEMBER: \_\_\_\_\_



## WALGA SPECIFICATION 2 - SPRAYED BITUMINOUS SURFACING

### 1D.2 BITUMINOUS SURFACING - CONTRACTORS SPRAYER LOADING RECORD

DATE : \_\_\_\_\_  
 GRADE OF BITUMEN : \_\_\_\_\_ ROAD : \_\_\_\_\_ SPRAY LOAD No : \_\_\_\_\_  
 TYPE OF BLEND : \_\_\_\_\_ SPRAY RUN NUMBERS : \_\_\_\_\_ CONTRACT No : \_\_\_\_\_

A. LOADING INTO EMPTY SPRAYER					
1	Pavement Temp	_____ °C	Design Blend	___ / ___ / ___	
2	Application Rate (Hot)	_____ L/M <sup>2</sup>	Spray Temp (Hot)	___ °C	
3	Volume Required In Sprayer	_____ L @ _____ °C			
		_____ L @ 15°C			
Components To Be Added (15°C)					
	Component 1	_____ L	<b>OR</b>	_____ L @ _____ °C	
	Component 2	_____ L	<b>OR</b>	_____ L @ _____ °C	
	Component 3	_____ L	<b>OR</b>	_____ L @ _____ °C	
	Adhesion Agent	_____ L			

B. LOADING INTO SPRAYER CONTAINING PRIMER					
1	Pavement Temp	_____ °C	Design Blend	___ / ___ / ___	
2	Application Rate (Hot)	_____ L/M <sup>2</sup>	Spray Temp (Hot)	_____ °C	
3	Volume Required In Sprayer	_____ L @ _____ °C			
		_____ L @ 15°C			
Components To Be Added (15°C)					
	Component 1	_____ L	<b>OR</b>	_____ L @ _____ °C	
	Component 2	_____ L	<b>OR</b>	_____ L @ _____ °C	
	Component 3	_____ L	<b>OR</b>	_____ L @ _____ °C	
5	Primer Remaining In Sprayer	_____ L	_____ °C	_____ L @ _____ °C	
6	Actual Primer Composition	___ / ___ / ___			
7	Components Remaining in Sprayer				
	Component 1	_____ L	Component 3	_____ L	
	Component 3	_____ L			
8	Components To Be Added (15°C)				
	Component 1	_____ L	<b>OR</b>	_____ L @ _____ °C	
	Component 2	_____ L	<b>OR</b>	_____ L @ _____ °C	
	Component 3	_____ L			
	Adhesion Agents	_____ L	<b>OR</b>	_____ L @ _____ °C	

ACTUAL COMPONENTS ADDED					
A			B		
Component 1	_____ L @ _____ °C		Component 1	_____ L @ _____ °C	
Component 2	_____ L @ _____ °C		Component 1	_____ L @ _____ °C	
Component 3	_____ L @ _____ °C		Component 1	_____ L @ _____ °C	
Adhesion Agent	_____ L		Adhesion Agent	_____ L	
Actual Blend	___ / ___ / ___		Actual Blend	___ / ___ / ___	

SIGNATURES :

Contractor's Rep	
WALGA Member	

Description of Components	1 _____
	2 _____
	3 _____



## Report Signature Page

**GOLDER ASSOCIATES PTY LTD**

A handwritten signature in blue ink, appearing to read "R. Leach".

Reg Leach  
Senior Consultant Pavements and Surfacing

RDL/DMS/shp

A.B.N. 64 006 107 857

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