DEPARTMENT *of* INFRASTRUCTURE, ENERGY *and* RESOURCES, TASMANIA

ROADWORKS SPECIFICATION

R57 - BITUMINOUS SLURRY SURFACING March 1995

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R57.1 SCOPE

This specification describes the requirements for the manufacture and placement of bituminous slurry surfacing for use on road pavements.

R57.2 MATERIALS

R57.2.1 General

The bituminous slurry shall consist of a mixture of emulsified bituminous binder (with or without polymer modifier), aggregate, mineral filler, additives and water properly proportioned to form a slurry which is spread on the road surface.

R57.2.2 Aggregate

Aggregate shall consist of crushed rock or crushed gravel but may include proportions of natural sand particles. It shall be clean, hard, angular, durable and free from clay and other aggregations of fine material, soil, organic material and any other deleterious material.

To ensure adequate physical strength and durability characteristics, the aggregate shall be derived from an approved source. The Contractor shall nominate the source/s of materials together with evidence that they meet the requirements set out in Tables R57.1 and R57.2

TABLE R57.1 AGGREGATE PROPERTIES

Property	Limit	Test Method
Degradation Factor	50 minimum	AS 1141.25
Los Angeles Value (i) Slurry seal (ii) Microsurfacing	 35 maximum 30 maximum	AS 1141.23
Ten Percent Fines Value (wet)	150 kN minimum	Q205 B
Wet/Dry Strength Variation	30% maximum	AS 1141.22
Polished Aggregate Friction Value	45 minimum	AS 1141.42
Sand Equivalent (i) Slurry seal (ii) Microsurfacing	 45 minimum 60 minimum	AS 1289.C7.1

TABLE R57.2 GRADING LIMITS FOR COMBINED AGGREGATE FILLER

Sieve Size	Percent Passing by Mass				
	Size 3	Size 4	Size 5	Size 7	Size 10
13.2 mm	100	100	100	100	100
9.5 mm	100	100	100	100	95-100
6.70 mm	100	100	100	85-100	85-90
4.75 mm	100	90-100	90-100	70-90	60-85
2.36 mm	95-100	65-90	50-70	45-70	40-60
1.18 mm	65-90	45-70	30-50	28-50	28-45
600 um	40-65	30-50	20-35	19-34	19-34
300 um	25-42	18-30	12-25	12-25	12-25
150 um	15-30	10-21	7-18	7-18	7-18
75 um	10-20	5-15	4-10	5-15	4-8

When tested in accordance with AS1141.11 & AS 1141.12 the aggregate (including filler) shall conform with the grading limits shown in Table 57.2

R57.2.3 Mineral Filler

Filler shall consist of an approved material such as Portland cement, hydrated lime or flyash with a minimum of 85% passing a 75um sieve.

The filler shall be dry, free from lumps, clay, organic material and any other deleterious material and shall comply in all respects with the requirements of AS 2357.

The quantity of filler added to the bituminous slurry during placement shall not vary by more than 1% from the filler content prescribed in the mix.

R57.2.4 Binder

Where the binder is polymer modified the supplier shall provide sufficient information for the Superintendent to be able to verify that the binder supplied is the same as that nominated in the mix design.

Bitumen used in the emulsion manufacture shall comply with the general requirements of AS 2008.

R57.2.5 Additives

The likely range of additive levels expected to be used shall be stated in the mix design. Supportive test data shall be provided that shows that the wear loss, adhesion and excess binder content of the mix design remain within the specification shown in Table R57.3 for mixes containing additive at both extremes of the design range.

R57.2.6 Water

Water shall be potable and shall be tested for compatibility with the design mix prior to use.

R57.3 MIX DESIGN

R57.3.1 General

The contractor shall design and submit for approval the bituminous slurry mix. When the nominated mix design has been approved by the Superintendent it shall become the approved mix.

The range of application rates and average depth of slurry seal or microsurfacing shall be provided as part of the mix design.

R57.3.2 Mix design Criteria

The design mix shall satisfy the properties given in Table R57.3

TABLE R57.3 MIX DESIGN CRITERIA

Property	Value		
	Test Method	Microsurfacing	Slurry Seal
Wear loss	ISSA TB 100 1 hour 1 day	 540g/m^2 maximum 800g/m^2 maximum	 800g/m^2 maximum Not applicable
Traffic Time	ISSA TB 139 30 minutes 60 minutes	 12 kg. cm minimum 20 kg. cm minimum	 12 kg.cm minimum 20 kg.cm minimum
Adhesion	ISSA TB 114 or ISSA TB 144	>=90% 11 grade points minimum (AAA,BAA)	>=90% Not applicable
Excess Binder Content >3000 AADT/lane	ISSA TB 109	Not applicable	540 g/m^2 maximum

R57.3.3 Mix Design Approval

Unless otherwise specified, the contractor shall submit the following details and samples to the Superintendent for approval at least 28 days prior to the date on which production of bituminous slurry is to commence.

(a) A statement detailing the nominal size of the design mix, the aggregate source and properties as required in clause R57.2.2, the combined aggregate/filler grading, bituminous emulsion content of the mix, the residual binder content of the emulsion and the intended proportion of each component material.

(b) a statement detailing the test results obtained by the Contractor on the submitted mix design.

(c) Samples of the component materials sufficient to manufacture at least 20 kg of mix.

TABLE R57.4 MAXIMUM PERMITTED VARIATIONS FROM APPROVED MIX DESIGN

Sieve Size	Maximum Permitted Variation of Aggregate Grading in Percent Passing (by mass)				
	Size 3	Size 4	Size 5	Size 7	Size 10
13.2 mm	Nil	Nil	Nil	Nil	Nil
9.50 mm	Nil	Nil	Nil	Nil	± 7
6.70 mm	Nil	Nil	Nil	± 7	± 7
4.75 mm	Nil	± 6	± 6	± 6	± 6
2.36 mm	± 5	± 5	± 5	± 5	± 5
1.18 mm	± 5	± 5	± 5	± 5	± 5
600 um	± 4	± 4	± 4	± 4	± 4
300 um	± 3	± 3	± 3	± 3	± 3
150 um	± 2	± 2	± 2	± 2	± 2
75 um	± 1.5	± 1.5	± 1.5	± 1.5	± 1.5

The maximum permitted variation in residual binder content shall be no more than 0.5% below or 1.0% above that stated in the approved mix design.

The contractor's approved mix design will be acceptable on all contracts within a period of two years from the date of approval subject to the following:

(a) The source and quality of the component materials in the bituminous slurry remain unchanged from the approved mix.

(b) The proportions of the component materials in the bituminous slurry remain unchanged from the approved mix design.

(c) The in-service performance of the bituminous slurry is acceptable to the Principal.

If the results of any of the above tests do not comply with the requirements of this specification, approval of the mix design may be withdrawn. The costs associated with the testing of subsequently revised mix designs shall be borne by the Contractor.

R54.7 PLANT

R57.4.1 Provision of Plant

All plant used in the performance of this work shall be provided and maintained in good working condition by the Contractor. The plant to be used shall be nominated by the Contractor and shall not be changed without reference to the Superintendent. In particular, the following requirements shall be met:

(i) Paving Unit

The Contractor shall provide evidence to the Superintendent to verify that the equipment will perform the work as specified and that all metering devices are accurately calibrated prior to commencement of work.

(ii) Ancillary Plant

Ancillary equipment necessary for the performance of the work, such as rotary road brooms, signs, lamps, barricades, hand squeegees, shovels and hand brooms shall by provided by the Contractor and shall meet all statutory requirements.

R57.4.2 Paving Unit Calibration

Each paving unit to be used in performance of the work shall be calibrated with the component materials of the approved mix design prior to the commencement of construction. Previous calibration documentation covering the same approved mix design may be accepted provided the calibration was carried out within the previous 12 month period. The documentation shall include an individual calibration for each component material at various settings which can be related to the paving unit's metering devices. No paving unit shall be allowed on the work until the calibration has been completed and/or accepted by the Superintendent.

R57.5 FIELD APPLICATION

R57.5.1 Setout

(i) General

The Contractor shall place marks at intervals not exceeding 10 m on the line to be followed by the paving unit while mixing and spreading the slurry. If the line is defined by a kerb or edge the marking will not be necessary.

Care shall be taken to ensure straight lines along kerbs and shoulders and that no runoff of bituminous slurry onto these areas will occur. Lines at intersections will be kept straight to provide a good appearance, if necessary masking shall be used to provide straight lines.

(ii) Temporary Pavement Markers

Temporary pavement markers shall be placed a maximum 40 metre intervals along existing linemarking except edgelines prior to resurfacing works. The Contractor may elect closer spacings and edgeline marking to aid setout and traffic control.

R57.5.2 Cleaning

Laying of bituminous slurry shall not commence until the pavement has been swept to ensure that the surface is free of loose material, stones, dirt, dust and foreign matter.

R57.5.3 Protection of Surface

The Contractor shall take all necessary precautions to prevent the bituminous slurry or other material used in the work from entering or adhering to gratings, hydrants, valve boxes, manhole covers, bridge or culvert decks or other road fixtures. After the bituminous slurrry has been spread the Contractor shall clean off any such material and leave such gratings, manholes and other road fixtures in a satisfactory condition.

R57.5.4 Surface Defects

If specified, surface defects shall be repaired as directed by the Superintendent, or in accordance with an approved Contract Management Plan, prior to the spreading of bituminous slurry. This may include crack filling, pothole repairs and repairs to failed pavement.

R57.5.5 Tack Coat

A tack coat is not required unless the surface to be covered is extremely oxidised and ravelled or comprises concrete or brick. If necessary, a tack coat of bitumen emulsion should be applied at a rate of 0.2 to 0.4 L/m^2. Such work shall only be carried out when specified.

R57.5.6 Water Fog Cart

The surface may be pre-wet by fogging ahead of the spreader. Water used for pre-wetting the surface shall be applied so that the entire surface is damp with no apparent flowing water ahead of the spreader box. The application rate of the fog spray shall be adjusted to suit temperature, surface texture, humidity and dryness of the surface being covered.

R57.5.7 Weather Limitations

Bituminous slurry shall not be applied if either the pavement or air temperature is below 15^oC and falling. Spreading shall not proceed during rain or when rain appears imminent.

R57.5.8 Rut-filling Correction

Where wheel ruts are 15 mm or more in depth, but not exceeding 50 mm, a rut-filling correction course shall be applied, prior to placing wearing course. Rut-filling and corrections shall be carried out using a spreader box capable of laying bituminous slurry across the varying cross-sectional depth such that it fills the rut and is stable.

R57.5.9 Spreading

(i) Process

The bituminous slurry shall be of the desired consistency when deposited in the spreading box and nothing more shall be added other than minor amounts of water for the purpose of overcoming temporary build-ups of slurry in the corners of the spreader box. The mixing time shall be sufficient to produce a complete and uniform coating of the aggregate and the resulting mixture shall be conveyed into the moving spreader box at a sufficient rate to always maintain an ample supply across the full width of the strike-off. The strike-off shall be adjusted to provide an application rate which will completely fill the surface voids and provide a nominal application rate of bituminous slurry as scheduled.

(ii) Surface Finish

Where increased surface texture is required a fabric skirt may be trailed behind the box. The surface texture shall be demonstrated on a short test run for approval by the Superintendent. If the surface texture is acceptable to the Superintendent and is approved then all subsequent work shall be finished to the same texture.

(iii) Shape

On any existing or regulated surface that varies by not more than an average of 15 mm from 3 m straight edge the finished surface or the final wearing course shall not vary by more than two thirds of the original average deviation from a 3 m straight edge.

(iv) Joints

The longitudinal joints of the wearing course shall be placed at either the edge or the centre of a traffic lane. If necessary, the edges and joints shall be lightly screeded with a hand squeegee to achieve a smooth uniform appearance and to remove excess build-up of material.

(v) Traffic Time

Bituminous slurry shall be capable of carrying slow moving traffic (< 40 km/h) within one hour of application without undue permanent damage occurring, such as rutting and ravelling. When the time before the slurry is capable of carrying traffic exceeds one hour, work shall cease if so directed by the Superintendent.

R57.6 SAMPLING & TESTING

R57.6.1 Compliance Testing

Compliance testing of the bituminous slurry shall be undertaken on a lot by lot basis. For this purpose 50 m^3 or one day's production (whichever is the lesser), or such smaller quantity which is considered as representative of consistent production of the paving unit, shall be considered as a separate lot.

R57.6.2 Compliance Criteria

(i) Frequency of Sampling

The Contractor shall obtain two 1.5 kg representative samples of the bituminous slurry from each lot at random intervals. The samples shall be taken from the discharge of the paving unit and the sample containers shall be immediately sealed.

If required, two 2L samples of bitumen emulsion shall be taken from each bulk delivery in accordance with AS 1160.

The Contractor shall supply all equipment and facilities for sampling including sample containers.

(ii) The samples of bituminous slurry obtained in accordance with Section R57.6.2.(i) shall be treated and tested as follows at a frequency which is sufficient to ensure that the bituminous slurry complies with the requirements specified in Table R57.4.

(a) Dried to constant weight in an oven at 60^oC for a minimum of 15 hours,

(b) Binder content and aggregate gradation determined by AS 2891.3.1

Each delivery of emulsion shall be tested for residual binder content or accompanied by a certification of specification compliance traceable to the relevant batch at the suppliers storage tank. If testing is required then one sample of bituminous emulsion obtained in accordance with clause R57.6.1 shall be tested as follows and the second sample retained for reference:

(a) Residue Evaporation by AS 1160 Appendix D

If the bituminous slurry is applied as a wearing course, skid resistance and texture depth tests shall be undertaken by the Contractor one month after trafficking. A minimum of four tests per lot shall be undertaken and the arithmetic mean shall be the representative value for comparison with the specified limit given in Table R57.5. For this purpose, each individual run of the paving unit shall be considered as a separate lot.

R57.6.3 Surface Finish

After trafficking for one month the pavement surface shall have average skid resistance and texture depths not less than those specified in Table R57.5.

TABLE R57.5 SURFACE FINISH REQUIREMENTS FOR WEARING COURSES

Property	Value	Test Method
Skid Resistance		
Size 3	Not applicable	Q 704
Size 4	40 minimum	
Size 5	40 minimum	
Size 7	45 minimum	
Size 10	45 minimum	
Texture Depth		
Size 3	Not applicable	WA 311.1 or Q705
Size 4	0.4 mm minimum	
Size 5	0.4 mm minimum	
Size 7	0.8 mm minimum	
Size 10	1.2 mm minimum	

R57.1 DEFECTIVE WORK AND MATERIALS

R57.7.1 Defective Work and Materials

The Contractor shall make good at this own expense any work, which in the opinion of the Superintendent, is not in accordance with this specification, whether caused by bad workmanship, defective materials supplied by the Contractor or by materials made defective by the Contractor's operations.

Non conforming bituminous slurry shall be either overlaid, removed or allowed to remain as determined by the Superintendent.

R57.8 MEASUREMENT AND PAYMENT

R57.8.1 Surface Preparation

Payment for surface preparation shall be per square metre of surface area treated. Payment shall be full compensation for set out, cleaning, protection of services, tack coat and water fog coat as detailed in the document.

R57.8.2 Bituminous Slurry Surfacing

Payment for bituminous slurry surfacing shall be per cubic metre of dry mineral aggregate (excluding filler) used in completing the works as specified. Payment shall be full compensation for mix design and approval, supply of all materials to the site, loading, mixing and spreading the bituminous slurry including finishing, joint treatment, hand work, testing, clean up and placement of temporary pavement markers.