

## SECTION 427 - BITUMINOUS SLURRY SURFACING

### 427.01 GENERAL

This section covers the requirements for manufacture and placing sizes 3, 5, 7 and 10 mm bituminous slurry surfacing.

### 427.02 DEFINITIONS

#### Bitumen Emulsion

A system of fine droplets of bitumen with or without polymer, suspended in a mixture of water and emulsifier which begins to set up on contact with surfaces and when exposed to air.

#### Bituminous Slurry

A mixture of fine graded aggregate, bitumen emulsion and water of sufficient fluidity to be capable of being screeded over a road surface in a very thin layer without the need for heating or use of mechanical compaction equipment.

#### Micro-Surfacing

A slurry surfacing that normally contains polymer modified binder for better stability and cohesion particularly on heavily trafficked roads and for coarse aggregate mixes.

#### Mean Average Texture Depth

The mean average texture depth is the mean of 10 tests for average texture depth using the Sand Patch Test Method.

### 427.03 AGGREGATES

#### (a) General

The combined aggregate mixture shall consist of crushed rock or a mixture of crushed rock and sand.

Aggregates shall consist of clean, hard, durable, angular rock fragments of uniform quality.

Sand aggregates shall consist of clean, hard, durable grains free from lumps, clay, mica and foreign matter.

#### (b) Source Rock

Source rock shall comply with the requirements of Section 801 - Source Rock for the Production of Crushed Rock and Aggregates.

#### (c) Crushed Aggregate Products

Unless otherwise specified, properties of the aggregates used shall comply with the requirements for asphalt Type H as specified in Clause 407.03. Further to Clause 407.03, use of RAP is not permitted.

#### (d) Crusher Fines and Manufactured Sand

Crusher fines and manufactured sand shall comply with the relevant requirements specified in Table 427.031.

**Table 427.031 - Quality of Crusher Fines and Manufactured Sand**

Test Value	
Degradation Factor - Crusher Fines (min)	Plasticity Index (max)
60	3

**(e) Natural Sand**

Where natural sand is supplied as a washed sand for the registered mix, the Sand Equivalent Value of any such sand shall not be less than 45.

Where natural sand is supplied as an unwashed sand, the Plasticity Index shall not be more than 3.

**427.04 AGGREGATE GRADING**

The combined grading of the aggregates shall conform to the following grading limits for dense graded Size 3, Size 5, Size 7 and Size 10 nominal size mixes as shown in Table 427.041 and as specified in Clause 427.24.

**Table 427.041 - Grading Limits**

<b>Sieve Size (mm)</b>	<b>Size 3 (% Passing)</b>	<b>Size 5 (% Passing)</b>	<b>Size 7 (% Passing)</b>	<b>Size 10 (% Passing)</b>
13.2	100	100	100	100
9.5	100	100	100	95-100
6.7	100	100	80-100	75-95
4.75	100	90-100	70-90	60-85
2.36	90-100	60-85	45-70	40-60
1.18	65-90	40-65	28-50	28-45
0.600	40-65	25-45	19-34	19-34
0.300	25-42	15-30	12-25	12-25
0.150	15-25	10-20	7-18	7-18
0.075	10-15	5-15	5-12	4-8

**427.05 ADDED FILLER**

Added mineral filler used in the mix shall comply with Australian Standard AS 2150 – Hot mix asphalt – A guide to good practice, and the quantity added to the mix during placing shall not vary by more than 1% from the filler content for the mix design.

**427.06 BITUMINOUS MATERIAL**

Bitumen used for emulsion manufacture shall comply with the requirements of AS 2008 - Residual Bitumen for Pavements.

Polymer shall be added to the formulation of the emulsion to enhance its behaviour and field performance and meet the mix design requirements specified in Table 427.081 and the minimum softening point of the bituminous residue shall be 57°C as determined by Australian Standard Test Method AS 2341.18 (1992).

**427.07 WATER**

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

**427.08 MIX DESIGN AND TEST REQUIREMENTS**

All asphalt mixes proposed for use on VicRoads works shall be registered by VicRoads in accordance with Section 407.06.

**HP No slurry surfacing shall be supplied until the mix has been registered and the Superintendent advised of details and approves the mix for use.**

The following information is also required for each new mix design:

- (a) source of the aggregates;
- (b) grading aim for aggregates;
- (c) Assigned Polished Stone Value (PSV) of the source rock;
- (d) Degradation Factor of the crusher fines component and Sand Equivalent of the natural sand component;
- (e) bitumen content of emulsion;
- (f) softening point of emulsion residue;
- (g) slurry properties determined from tests on laboratory mixes as specified in Table 427.081.

**Table 427.081 - Slurry Surfacing Properties Test Requirements**

Property	Test	Description	Requirement
Traffic Time	Austrroads AG:PT271	Wet Cohesion @ 30 minutes (Initial set) @ 60 minutes (Trafficking)	12 kN.m (min) 20 kN.m (min)
Wear Loss	Austrroads AG:PT272	Wet Track Abrasion Loss One hour soak Six day soak	540 g/m <sup>2</sup> (max) <sup>1</sup> 800 g/m <sup>2</sup> (max) <sup>2</sup>

Notes: 1. Traffic  $\leq$  3,000 vehicles per lane per day (v/l/d)  
2. Traffic > 3,000 v/l/d

If it is proposed to use a mix which does not meet all the above requirements consideration may be given to its acceptance based on past field performance under similar conditions.

**427.09 ADDITIVES**

Additives may be used to control the setting speed of the mix depending on ambient conditions and traffic requirements. The Contractor shall specify the use of any additives when submitting the mix design.

**427.10 AMBIENT CONDITIONS FOR PLACING**

Unless otherwise specified fresh slurry surfacing shall be capable of being trafficked within one hour of being placed. Slurry surfacing shall not be placed when the pavement temperature and air temperature is 10°C and falling but may be placed when the pavement and air temperature is 5°C and rising. Slurry surfacing shall not be placed when the ambient temperature is above 40°C without prior consultation with the Superintendent nor shall it be placed during rain or when rain is imminent. If weather conditions rapidly change to prevent the slurry surfacing being trafficked within one hour, work shall not proceed without prior consultation with the Superintendent.

**427.11 SURFACE PREPARATION**

Prior to slurry surfacing commencing, the Contractor shall remove all deleterious material and sweep the surface clean. The surface may be dampened by lightly spraying with water prior to placing slurry.

**427.12 PROTECTION OF ROAD FURNITURE**

Manhole covers, entry pits and valve covers and other road furniture shall be protected by papering or other suitable means to prevent these being covered or blocked by slurry surfacing. All used paper or cover material including surplus slurry shall be removed from site.

**427.13 MIXING AND SPREADING****HP Spreading shall not commence until approval to proceed is obtained from the Superintendent.**

The metering devices used for slurry surfacing shall be re-calibrated every 12 months and shall be capable of consistently producing a uniform mix within the production tolerances for grading as shown in Table 427.131 and bitumen content as determined as part of the laboratory mix design.

If any device critical to correct proportioning of materials is overhauled or replaced the machine shall be re-calibrated prior to recommencement of work.

Adjustments to metering settings shall be made on a job by job or on a daily basis to allow for varying aggregate density, moisture content, and bitumen content of the emulsion.

**The Contractor shall produce a series of calibration charts or evidence of calibration prior to commencing work.**

The edge of the new slurry surface shall be located within 50 mm of all concrete edgings and sealed shoulders, and to within 100 mm of the specified width (or average width of carriageway if not specified) for roads with unsealed shoulders.

**Table 427.131 - Production Tolerances for Mix Grading**

Sieve Size	Tolerance on Percentage Passing (by mass)			
	Size 3	Size 5	Size 7	Size 10
13.2	Nil	Nil	Nil	Nil
9.5	Nil	Nil	Nil	±6
6.7	Nil	Nil	± 6	± 6
4.75	Nil	± 6	± 6	± 6
2.36	± 5	± 5	± 5	± 5
1.18	± 5	± 5	± 5	± 5
0.600	± 4	± 4	± 4	± 4
0.300	± 3	± 3	± 3	± 3
0.150	± 2	± 2	± 2	± 2
0.075	± 1.5	± 1.5	± 1.5	± 1.5

**427.14 FREQUENCY OF PRODUCT TESTING**

The Contractor shall test the constituents of the mix at a frequency which is sufficient to ensure that the material supplied under the contract complies with specified requirements which is not to be less than shown in Table 427.141.

**Table 427.141 - Frequency of Product Testing**

Checks Required	Minimum Frequency
Degradation Factor - Crusher Fines	One per month.
Sand Equivalent Test	One per 250 cubic metres of aggregates used or part thereof.
Unsound Rock Content	One per 200 cubic metres or part thereof sampled directly from stockpile on site or one per 200 cubic metres of production at the quarry source.
Sieve Analysis of Aggregates	One per 200 cubic metres or part thereof sampled directly from stockpile on site or one per 200 cubic metres of production at the quarry source.
Emulsion Content	One tank dipping or flow meter reading per batch or every 10 cubic metres of material placed, whichever is the lesser.
Binder Content and Full Sieve Analysis	One per 50 cubic metres or one per day from a sample of mix taken from the mixer, whichever is the lesser.
Residual Binder Content of Emulsion and Softening Point of Bituminous Residue	Certification of specification compliance for each delivery to site.

The tolerance on the residual binder content after curing shall be not more than 0.5% below or 1.0% above the mix design aim.

**427.15 RUT FILLING COURSE**

Where specified in Clause 427.24 or where wheel ruts average 25 mm or more in depth, a rut filling course shall be applied with the aid of a rut filling attachment to the mixer/spreader prior to placing the wearing course. Sections where rut filling has been carried out shall be trafficked for a minimum of 8 hours prior to placing the wearing course.

**427.16 TACK COATING**

Unless otherwise specified, concrete surfaces shall be primed with very light primer at a rate between 0.2 to 0.4 l/m<sup>2</sup> and allowed to fully cure prior to placing slurry surfacing.

**427.17 REGULATING COURSE**

Where specified in Clause 427.24 or where the existing surface varies by more than 10 mm from a 3 m straight edge, a regulating or "scratch" course shall be applied to the surface prior to placing the wearing course. The wearing course shall not be applied until the regulating course has set sufficiently to carry the mixer/spreader without damage.

For regulating or "scratch" courses, the spreader box shall be fitted with skids of not less than 1.6 m in length and where the shape of the existing surface permits, a rigid "strike off" blade may be used.

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**427.18 WEARING COURSE**

The wearing course shall be placed over the road surface at the average thickness specified in Clause 427.24. The average layer thickness shall not be less than the nominal aggregate size or greater than twice the nominal aggregate size. The layer thickness at any point shall not exceed three times the nominal aggregate size without first applying a regulating course or pre-filling isolated low areas.

**427.19 JOINTS AND JUNCTIONS**

The longitudinal joints of the wearing course shall be placed at either the edge of a traffic lane or in the centre of a traffic lane. The edge of the mat and joints shall be lightly screeded with a squeegee to achieve a smooth uniform edge and to remove isolated mis-matches in level or excess build up of surplus material at the edge of the run.

All joints shall be overlapped. The maximum overlap shall be 150 mm.

**427.20 SURFACE FINISH AND SHAPE**

The finished surface of the final wearing course shall not vary by more than 10 mm from a 3 m straight edge.

When requested by the Superintendent, the Contractor shall measure the Mean Average Texture Depth on a lot by lot basis by VicRoads Test Method for Surface Texture of Sprayed Seals as listed in Section 175. Additional payment will be made for this work.

For wearing course mixes of nominal size 7 or greater, the mean average surface texture depth determined from a lot of ten sand patch tests consisting of five tests taken at an equal spacing along each wheelpath shall be assessed as shown in Table 427.231. For the purpose of this test, a lot shall be considered as a maximum of 500 m of single traffic lane which has been trafficked for a minimum period of one month after completion.

Smaller areas not less than 100 m of single traffic lane which have a different uniform appearance such as a defective batch of material, may be treated as a separate lot.

**427.21 CLEAN-UP**

All surplus slurry shall be removed from site and any road furniture such as kerb and channels shall be cleaned of all aggregate and bitumen deposited by the Contractor.

The aggregate stockpile site and mixing area occupied by the Contractor shall be restored to a similar condition as existed before occupation.

**427.22 URGENT REPAIRS**

If serious damage to the new slurry surface occurs due to either a poor mix or inclement weather, whereby it presents a hazard to road users, the road shall be made safe within 2 hours of notification. The Contractor shall submit proposals for the rectification of damaged work to the Superintendent for review prior to commencing further work. Rectification of the damaged work shall be carried out as soon as weather conditions permit.

**427.23 ACCEPTANCE OF WORK**

Unless otherwise specified or directed work shall be assessed in accordance with Table 427.231.

**Table 427.231 - Assessment of Work**

<b>* Variation in Binder Content (% of total mass) from the Design Mix</b>	<b>* Mean Average Texture Depth (mm) or Size 7 and Size 10 Wearing Courses</b>	<b>Assessment</b>
Not more than 0.5% below or 1.0% above	Greater than or equal to 1.2 mm	Accept

For the purpose of applying the provisions contained in Table 427.231, the binder content is to be calculated from measured flow rates of aggregates and emulsion, the moisture content of the aggregates, before and after dippings from the emulsion tank, and the residual binder content of the emulsion as applicable. These provisions shall apply for every individual batch of material or for every 10 cubic metres placed, whichever is the lesser.

The requirements of Table 427.231 shall not apply to samples taken from the road for full sieve analysis and binder content unless results differ in a consistent way from the quantities measured by the mixer/spreader machine. In such cases the mixer-spreader shall be re-calibrated before further work proceeds.

- \* The assessment of work in Table 427.231 shall apply for either the Binder Content or the Mean Average Texture Depth, as applicable. Variation in binder content limits shall apply to all mixes in all layers, and the Mean Average Texture Depth is an additional requirement for Size 7 and Size 10 wearing courses.

#### **427.24 — SCHEDULE OF DETAILS**

Bituminous Slurry Surfacing Requirements (Clauses 427.03, 427.04, 427.15, 427.17 and 427.18)

**Table 427.241 — Schedule of Details**

<b>Course</b>	<b>Nominal Size</b>	<b>Average Layer Thickness (mm)</b>	<b>Minimum Polished Stone Value of 48 YES / NO</b>
Wearing	##:	##:	YES
Rut filling			##:
Regulating			##:
Other			